

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

REPORT OF INVESTIGATION

**Surface Nonmetal Mill
(Limestone)**

**Fatal Falling Material Accident
January 17, 2009**

**Specialty Rock Products Incorporated
Specialty Rock Products Inc.
Princeton, Caldwell County, Kentucky
Mine I.D. No. 15-17075**

Investigators

**Doniece L. Schlick
Mine Safety and Health Specialist**

**Roger W. Rowe
Mine Safety and Health Inspector**

**Jorge L. Rivera
Mine Safety and Health Inspector**

**James B. Pfeifer, P.E.
Civil Engineer**

**Joe Fritz
Mine Safety and Health Specialist**

**Originating Office
Mine Safety and Health Administration
Southeastern District
135 Gemini Circle, Suite 212 Birmingham, Alabama 35209
Wyatt S. Andrews, Acting District Manager**



OVERVIEW

Juan Nieves-Banuelos, leadman/mill operator, age 48, was fatally injured on January 17, 2009, when he was engulfed in a crushed limestone mill feed hopper (hopper). Nieves-Banuelos had placed material into the hopper with a front-end loader and entered the top of the hopper to dislodge bridged material that would not feed onto the belt conveyor below.

The accident occurred because management failed to establish safe work procedures that prevented persons from being exposed to the hazard of falling material. Management was aware that the hopper frequently experienced blockages of material. They had not trained miners how to remove such blockages or provided a safe means to clear the blockages.

Miners were not familiar with the hazards at the mine. Persons performing the tasks were not provided with required new miner training.

GENERAL INFORMATION

Specialty Rock Products Incorporated, a limestone milling operation, owned and operated by Specialty Rock Products Inc., was located approximately three miles south of Princeton, Caldwell County, Kentucky. The principal operating official was Willie Barry Howton, president. The mine normally operated two 12-hour shifts per day, 6 days per week. Total employment was nine persons.

Crushed limestone was delivered by contractor trucks and dumped in a covered storage shed. The hopper was located at the end of the covered storage shed and was charged by a front-end loader. The mill feed belt conveyor carried the material to a bowl mill, where it was crushed. The material was then carried by belt conveyor to the bagging, super sacks, and bulk storage bin. Finished products were sold as rock dust to the coal mining industry.

The last regular inspection was completed on December 16, 2008.

DESCRIPTION OF THE ACCIDENT

On the day of the accident, Juan Nieves-Banuelos (victim) reported to work at 6:00 a.m., his normal starting time. He met with James McIntosh, lead man/mill operator, and discussed the freezing conditions and the frequent blockages that were causing problems in the hopper. During his shift, Nieves-Banuelos used the front-end loader to load the hopper and also worked in the mill room.

At 3:00 p.m., Nieves-Banuelos told Julian Preciado and Juan Melendez, mill workers, that he was going to load material into the hopper. He told them to turn the belt conveyor off when the flow of material stopped. About 3:30 p.m., Melendez noticed that no material was coming into the mill bagging area so he shut down the bagging belt conveyors and traveled to the bottom of the hopper to check it. The hopper belt conveyor was running but no material was coming out of the hopper.

Melendez and Preciado used rebar rods to push through holes in the sides of the hopper in an attempt to unclog the blockage when they determined that Nieves-Banuelos was trapped in the hopper. They went to the top of the hopper where the material was dumped and found the front-end loader running with the operator's compartment door open. The hopper was full of material and they could not see Nieves-Banuelos. Preciado ran to the second floor of the mill and told Arquimides Tapia, second shift mill operator, that Nieves-Banuelos was trapped in the hopper.

Melendez, Preciado, and Tapia could not locate the victim and ran to the Rodgers Group Princeton Quarry, an adjacent mine, to get help where they met Larry Boyd and Randy Wynn, Princeton Quarry miners. They were yelling in Spanish and Boyd and Wynn understood that someone needed help. Boyd used his cell phone to call Gary Mitchell, production foreman, Princeton Quarry, and told him there was a problem at the Specialty Rock mill. Mitchell and Chris Huett, production supervisor, Princeton Quarry, went to the accident site. Mitchell called for emergency medical services.

Mitchell could not communicate with the miners due to the language barrier; however, they gestured to the hopper. Mitchell went around to the bottom of the hopper and found that the victim was in the hopper. Mitchell tried to find an opening in the bottom of the hopper but there were no access doors.

Emergency medical personnel arrived and used torches to cut holes in the side of the hopper to recover Nieves-Banuelos. A pick was found next to the victim. At 5:30 p.m., Dewayne Trafford, chief deputy coroner Caldwell County pronounced the victim dead at the scene. The cause of death was asphyxiation.

INVESTIGATION OF THE ACCIDENT

The Mine Safety and Health Administration (MSHA) was notified of the accident at 4:35 p.m., on January 17, 2009, by a telephone call from Misty Horning, the mill owner's daughter, to the National Call Center. Doniece Schlick, mine safety and health specialist, was notified and an order was issued under provisions of 103(k) of the Mine Act to ensure the safety of the miners. An investigation was started the same day. A Part 50 citation was issued for untimely reporting.

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 and employees, the Caldwell County Coroner's Office, Emergency Medical Services, Emergency Management Agency, Fire and Rescue, and employees from the Rogers Group Princeton Quarry.

DISCUSSION

Location of the Accident

The accident occurred at the mill feed storage bin structure located at the western end of the material storage shed approximately 75 feet east of the grinding mill. The hopper was located at the western end of a ramp inside the mill feed storage shed. The ramp was relatively smooth and dry and was constructed of crushed limestone. The ramp was 15 feet wide and 80 feet long, with a maximum grade (uphill towards the hopper structure) of 13 percent. Crushed limestone was stockpiled on both sides of the ramp going to the top of the hopper under the material storage shed.

Weather

No precipitation fell on either the day of the accident or the prior day. The average air temperatures on the day of the accident and the prior day were 31 degrees Fahrenheit and 11 degrees Fahrenheit, respectively. The freezing temperatures could have been a contributing factor to the accident.

Bridged arches in the crushed limestone material were more likely to form when the cross-sectional area of the flow region was reduced. The cold temperatures could have caused additional crushed limestone to freeze against the sidewalls of the funnel-shaped flow area, reducing the cross-sectional area of flow.

Materials and Equipment

The mill feed bin discharged crushed limestone onto the mill feed belt conveyor via a hopper. The 24-inch wide mill feed belt conveyor transported the material 75 feet to a Raymond bowl mill where it was ground to the consistency of a fine powder, minus 200 mesh. Reportedly, the mill produced approximately 15 tons of product per hour.

The storage shed, covered by a roof, was open on the northern, eastern, and western sides. The southern side of the storage shed was covered with steel sheeting. The crushed limestone was typically delivered to the storage shed by truck and was dumped on either side of a ramp in the middle of the storage shed leading to the storage bin. A rubber-tired front-end loader with a bucket capacity of approximately 2.5 cubic yards was used to load the material into the mill feed storage bin.

The bottom of the ramp was located at the eastern side of the storage shed. At the western side of the storage shed, the ramp was 2 to 3 feet higher in elevation than the top edge of the storage bin. The ramp extended into the storage bin and the front edge of the bin was covered. The typical work practice was to completely fill the bin to create a mound at the top of it. This was done to minimize the time spent loading material.

The rectangular-shaped mill feed storage bin measured 19 feet long (north-south), 8 feet wide (east-west), and 7.5 feet deep. The north, south, and west sides of the storage bin extended 9 feet higher than the east side (load side). The top of the wedge-shaped hopper was approximately 11.5 feet long, 8 feet wide, and 5 feet deep. The crushed limestone discharged directly onto the mill feed belt conveyor through a 6-inch high by 9-inch wide opening on the western side of the hopper chute.

Two holes, approximately 1.25 inches wide by 2 inches high had been cut into the lower western side of the hopper directly over the belt conveyor. Steel reinforcing bars of various lengths (approximately 2 to 6 feet long) were typically shoved up through the holes to break the bridged material that would form in the dumped limestone material above the discharge chute. Persons interviewed stated that they had to remove obstructions (choked and/or bridged material) at least once or twice each shift, but sometimes as often as every 10 minutes.

Based on visual observations, the investigators estimated the size of the crushed limestone particles ranged from fine sand to approximately 1 inch. The majority of the mixture consisted of fine- to medium-sized sand. Clumps of frozen material were observed in the area where the crushed limestone was stockpiled and within the mill feed storage bin. These frozen clumps were generally less than 8 inches in diameter and were relatively easy to break apart.

The crushed limestone, comprising the frozen clumps, appeared to be representative of the non-

frozen material and no segregation had occurred. The presence of frozen clumps and the color (medium gray) indicated the crushed limestone was not completely dry but contained at least a few percentage points (by weight) of moisture. Dry crushed limestone of this type is typically light gray to white in color.

During the investigation, the bin was nearly full of material except for the funnel-shaped hollow section above the hopper. The diameter at the top of the funnel-shaped hole in the crushed limestone was approximately 7.5 feet. The diameter of the funnel was 3 to 4 feet at a height of approximately 7 to 9 feet above the discharge opening. During the rescue/recovery operations, fire hoses were used to spray water into the top of the funnel to remove crushed limestone that surrounded the victim. The diameter of the funnel-shaped hole was probably increased due to the rescue efforts.

Training and Experience

Juan Nieves-Banuelos, victim, had 15 weeks of mining experience all at this mine. At the time of the accident, he had not received training in accordance with 30 CFR, Part 46.

ROOT CAUSE ANALYSIS

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

Root Cause: Management failed to establish procedures to unclog bridged material in the hopper. Management was aware of the problems with the material bridging but did not have procedures in place to protect persons working at the hopper.

Corrective Action: Management established policies, procedures, and controls to unclog the bridged hopper and to prevent persons from entering the hopper. The top of the hopper was modified and a grizzly was added to prevent anyone from entering the hopper. All persons working at the hopper were trained regarding the procedures.

Root Cause: Management did not ensure that all miners were given new miner training or task training in the hazards at the mine.

Corrective Action: Management provided the required 24 hours of new miner training to all miners and new task training when miners are assigned a new task.

CONCLUSION

The accident occurred because management failed to establish safe work procedures that prevented persons from being exposed to the hazard of falling material. Management was aware that the hopper frequently experienced blockages of material. They had not trained miners how to remove such blockages or provided a safe means to clear the blockages.

Miners were not familiar with the hazards at the mine. Persons performing the tasks were not provided with required new miner training.

ENFORCEMENT ACTIONS

Order No. 6508084 was issued on January 17, 2009, under the provisions of Section 103(k) of the Mine Act:

A fatal accident occurred at the Specialty Rock Products operation on January 17, 2009, when an employee fell into the material hopper and was engulfed by the material. This order is issued to assure the safety of all persons at this operation. It prohibits all activity at the material dump hopper and the number one discharge belt area until MSHA has determined that it 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 January 26, 2009. The hopper was modified and a grizzly was added to prevent anyone from entering the hopper.

Citation No. 7771504 was issued on March 13, 2009, under the provisions of Section 104(d)(1) of the Mine Act for a violation of 30 CFR 56.16002(c):

A fatal accident occurred at this operation on January 17, 2009, when a miner was engulfed by blocked material in a hopper. The victim entered the hopper to remove the blockage when the material came loose and covered him. The victim entered the hopper without the use of a ladder, platform, or staging. The discharge belt conveyor located underneath the hopper was not locked out and continued to operate. The victim entered the hopper without wearing a safety belt or harness equipped with a lifeline suitably fastened. A second person, similarly equipped, was not present. Management personnel engaged in aggravated conduct constituting more than ordinary negligence in that they were aware that the hopper frequently experienced blockages of material and neither trained miners how to remove such blockages nor provided safe means of clearing such blockages as required by this standard.

This citation was terminated on March 13, 2009, after the operator modified the top of the mill feed hopper to keep persons from entering. All persons were trained in the proper procedures.

Order No. 7771504 was issued on March 13, 2009, under the provisions of Section 104(d)(1) of the Mine Act for a violation of 30 CFR 46.5(a):

A fatal accident occurred at this operation on January 17, 2009, when a miner was engulfed by

blocked material in a hopper. The victim entered the hopper to remove the blockage when the material came loose and covered him. Management engaged in aggravated conduct constituting more than ordinary negligence in that the victim had not received 24 hours of new miner training.

This citation was terminated on March 13, 2009, after all employees were withdrawn and provided with the required Part 46 training.

Approved: Date:
Wyatt S. Andrews
Acting District Manager

APPENDICES

- A. Persons Participating in the Investigation
- B. Victim Data Sheet

APPENDIX A

Persons Participating in the Investigation

Specialty Rock Products Incorporated

Willie Barry Howton	president
Michael W. Horning	foreman
James McIntosh	lead man second shift
Juan Melendez	mill worker/bagger
Julian Preciado	mill worker/bagger
Arquimides Tapia	mill worker/bagger

Rogers Group Princeton Quarry

Chris Huett	production supervisor
Gary Mitchell	production foreman
Randy Wynn	maintenance/truck driver
Larry Boyd	maintenance/plant operator

Caldwell County Coroner's Office

Dewayne Trafford	chief deputy coroner
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Mine Safety and Health Administration

Doniece L. Schlick	mine safety and health specialist
Roger W. Rowe	mine safety and health inspector
Jorge L. Rivera	mine safety and health inspector
James B. Pfeifer, P.E.	civil engineer
Joe Fritz	mine safety and health specialist