

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

REPORT OF INVESTIGATION

**Surface Nonmetal Mill
(Lime)**

**Fatal Handling Material Accident
January 25, 2008**

**Missouri Lime, LLC
Missouri Lime, LLC
Bonne Terre, St. Francois County, Missouri
Mine ID No. 23-02371**

Investigator

**Frederick B. Moore
Supervisory Mine Safety and Health Inspector**

**Originating Office
Mine Safety and Health Administration
South Central District
1100 Commerce Street, Room 462
Dallas, TX 75242-0499
Edward E. Lopez, District Manager**

OVERVIEW

On January 25, 2008, Jeffrey S. King, maintenance man, age 36, was seriously injured when he was hit on the head by a pry bar that fell from an 80-foot high elevated work platform. King was wearing a hard hat at the time of the accident and was bent over shoveling. The pry bar struck him behind the hard hat. King was hospitalized and died of his injuries later that day.

The accident occurred because management policies and work procedures failed to ensure that the work platform was maintained in a clean condition. Spillage had accumulated on the work platform making the toe boards ineffective which allowed the pry bar to be inadvertently knocked over the edge of the platform. Additionally a miner was allowed to work in an area where there was a risk of being struck by a falling object.

GENERAL INFORMATION

Missouri Lime, LLC, a surface mill, owned and operated by Missouri Lime, LLC, was located in Bonne Terre, St. Francois County, Missouri. The principal operating official was Daven Anderson, plant manager. The mill operated 2 shifts, 24 hours a day, 7 days per week. Total employment was 38 persons.

Crushed rock was trucked from a local quarry to this facility, where it was stockpiled and processed in the mill. Finished products were shipped to commercial industries.

The last regular inspection at this operation was completed under prior mine ownership on August 16, 2007.

DESCRIPTION OF ACCIDENT

On the day of the accident, Jeffrey King, reported for work at 7:00 a.m., his normal starting time. He checked in at the office and met with Ricky Henderson, maintenance supervisor, who told him there was a problem with the north lime silo bucket elevator. King then met with Clifford Jarvis, maintenance man. King told Jarvis to meet him at the elevator after he finished another task.

A short time later, Henderson and King went to the bottom of the elevator and checked it but did not find any problems. They then went to the top of the bucket elevator, removed the guards from around the drive unit, and could see that the elevator chain was off the drive sprocket.

Henderson and King left the elevator to gather tools to reposition the elevator chain back onto the sprocket. About 9:00 a.m., Jarvis joined Henderson and King at the bottom of the elevator. Henderson and King attached their tools to a rope while Jarvis pulled them up to the work platform surrounding the top of the elevator. Henderson and King then met Jarvis at the top of the elevator.

Henderson used an acetylene torch to remove two buckets on the elevator chain to provide more access to reposition the chain. The 3-man crew then attached two $\frac{3}{4}$ -ton come-a-longs to the chain in preparation for pulling it back onto the drive sprocket. The crew had two pry bars available to help them properly place the elevator chain.

The crew's initial attempts to pull and replace the elevator chain were unsuccessful and caused some material to spill from the elevator buckets. That material fell to the bottom of the bucket elevator enclosure so King went down to the bottom of the structure. He shoveled out the material from the enclosure inspection door. While King was shoveling the spillage, Henderson and Jarvis discovered that the housing was cracked between the drive unit and the sprocket.

At 10:35 a.m., Henderson used his cell phone to call King, who was working directly below and told him about the cracked housing. As Henderson ended the call, a pry bar was inadvertently knocked off the work platform. Henderson shouted a warning to King when the pry bar fell. He and Jarvis looked over the handrail and saw King slumped over. Henderson immediately requested a call for emergency medical personnel.

Josh Green, laborer, was working about 50 feet away from the north lime silo when he heard Henderson shout. Green, Curt Nicholson, kiln supervisor, and Shawn Moore, laborer, went to King and found him non-responsive.

Emergency medical personnel arrived at 10:51 a.m. and transported King to a local hospital. He was transferred to another hospital where he was pronounced dead at 2:18 p.m. by the attending physician. Death was attributed to blunt force trauma.

INVESTIGATION OF ACCIDENT

On the day of the accident, the Mine Safety and Health Administration (MSHA), was notified at 10:50 a.m. by a telephone call from Janice Marler, secretary, to MSHA's emergency hotline. Fred Gatewood, assistant district manager, was notified and an investigation was started the same 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, made 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.

DISCUSSION

Location of Accident

The accident occurred at the bottom of the north lime silo bucket elevator enclosure. The weather was cool and dry and was not considered to be a factor in the accident.

North Lime Silo

The north lime silo was a concrete structure used to store finished materials. The silo was 80 feet high and 24 feet in diameter. Finished material was transferred to the silo on a belt conveyor. The belt conveyor discharged the material into a vertical bucket elevator located on the outside wall of the east side of the silo. The elevator then dumped the material into the silo.

Bucket Elevator

The bucket elevator was located in an 80-foot high enclosure consisting of eight 2-foot by 6-foot by 10-foot high sections. The bottom of the elevator was 13 feet above the base of the silo and the top was 12 feet above the top of the silo. Work platforms were located at both the top and bottom of the elevator.

The elevator consisted of 10-inch by 12-inch buckets mounted on every other link of a drive chain comprised of 2-inch by 10-inch steel links. The drive chain looped around 33-inch sprockets at the top and bottom of the bucket elevator. A 5 horsepower drive motor was located at the top of the bucket elevator. The motor powered the bucket elevator indirectly by way of a speed reducer and chain.

Work Platforms

The work platform at the top of the elevator was situated around three sides of the structure in a U-shape and was accessed by a vertical ladder from the top of the silo. The platform was constructed of expanded metal sections with a diamond-shaped pattern and was provided with standard handrails, mid-rails, and toe boards along the outer edge. The platform measured 34 inches by 19 feet on the side

where the crew was working. Material spillage from the elevator had accumulated on that section of the platform and made the toe boards ineffective.

The work platform at the bottom of the bucket elevator measured 33 inches by 19 feet and provided access to an inspection door near the bottom of the bucket elevator enclosure. The platform was provided with handrails and toe boards and was usually accessed by descending a vertical ladder from the No. 2 conveyor then walking the north side of the silo. However on the day of the accident, King accessed the bottom platform by walking from the ground across accumulated material spillage then up to the platform.

Pry Bar

The pry bar that struck the victim was 38 inches long and weighed 10 pounds 4 ounces. It was $\frac{7}{8}$ inches round on the upper end which increased to $1\frac{1}{16}$ inches square about a third of the way down. The final five inches were tapered on one side to form a beveled edge.

Training and Experience

Jeffrey King (victim) had 1 year and 42 weeks of mining experience, including 12 weeks at this operation. Ricky Henderson had 9 months and 1 week of mining experience, all at this operation. Michael Jarvis had 1 week and 3 days of mining experience, all at this operation. All three persons had received training in accordance with 30 CFR, Part 46.

ROOT CAUSE ANALYSIS

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

Causal Factor: A risk analysis was not performed to identify all possible hazards and ensure that controls were in place to protect persons performing work at the silo bucket elevator. The top work platform was not cleaned up before maintenance tasks were begun. The victim was allowed to work underneath a work platform where other persons were performing maintenance tasks using hand tools.

Corrective Action: Management should establish policies, procedures, and controls to ensure tasks are safely completed. A risk assessment should be performed before performing work. Any potential hazard associated with the task should be identified and appropriate measures taken to ensure the safety of all persons. Persons performing the task should be trained regarding safe work procedures.

CONCLUSION

The accident occurred because management policies and work procedures failed to ensure that the work platform was maintained in a clean condition. Material spillage had accumulated on the work platform making the toe boards ineffective which allowed the pry bar to be inadvertently knocked over the edge of the platform. A miner was allowed to work in an area where there was a risk of being struck by a falling object.

ENFORCEMENT ACTIONS

ORDER No. 7870014 was issued on January 25, 2008, under the provisions of Section 103(k) of the Mine Act.

A fatal accident occurred at this operation on January 25, 2008, when a miner was shoveling at the bottom of a bucket elevator and was struck by a falling pry bar. This order is to ensure the safety of all personnel at this operation. It prohibits all activity at the bucket elevator until MSHA has determined that it is safe to resume normal operations in the area. The mine operator shall obtain prior approval from an authorized representative for all actions to recover and/or restoring operations in this area.

This order was terminated on January 26, 2008, after conditions that contributed to the accident had been corrected.

CITATION No. 6240121 was issued on February 15, 2008, under the provisions of Section 104(d)(1) of the Mine Act for a violation of 56.20003(b):

A fatal accident occurred at this operation on January 25, 2008, when a 38-inch pry bar struck the victim on the head. The 80-foot high work platform from which the pry bar fell was not maintained in a clean condition. Material spillage had accumulated on the platform making the toe boards ineffective and allowing the pry bar to be accidentally knocked over the edge. The supervisor engaged in aggravated conduct constituting more than ordinary negligence in that he and two miners were working from the platform without first removing the spilled material. This violation is an unwarrantable failure to comply with a mandatory standard.

Approved: _____ Date: _____

Edward E. Lopez
District Manager

APPENDIX A

PERSONS PARTICIPATING IN THE INVESTIGATION


Missouri Lime, LLC

Daven A. Anderson	plant manager
Edward L. King	production manager

Mine Safety and Health Administration

Frederick B. Moore	supervisory mine safety and health inspector
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APPENDIX B

Accident Investigation Data - Victim Information										U.S. Department of Labor		
Event Number: 1 0 5 1 9 3 7										Mine Safety and Health Administration		
Victim Information: 1												
1. Name of Injured/III Employee: <i>Jeffrey S. King</i>			2. Sex: <i>M</i>	3. Victim's Age: <i>36</i>		4. Last Four Digits of SSN:			5. Degree of Injury: <i>01 Fatal</i>			
6. Date(MM/DD/YY) and Time(24 Hr.) Of Death: <i>a. Date: 01/25/2008 b. Time: 14:18</i>						7. Date and Time Started: <i>a. Date: 01/25/2008 b. Time: 7:00</i>						
8. Regular Job Title: <i>104 maintenance man</i>				9. Work Activity when Injured: <i>030 shoveling material spillage</i>				10. Was this work activity part of regular job? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				
11. Experience a. This			b. Regular			c. This			d. Total			
Years	Weeks	Days	Years	Weeks	Days	Years	Weeks	Days	Years	Weeks	Days	
Work Activity: <i>0</i>	<i>12</i>	<i>0</i>	Job Title:	<i>0</i>	<i>12</i>	<i>0</i>	Mine: <i>0</i>	<i>12</i>	<i>0</i>	Mining: <i>1</i>	<i>42</i>	<i>1</i>
12. What Directly Inflicted Injury or Illness? <i>048 pry bar</i>						13. Nature of Injury or Illness: <i>140 struck on head</i>						
14. Training Deficiencies: Hazard: _____ New/Newly-Employed Experienced Miner: _____ Annual: _____ Task: _____												
15. Company of Employment: (If different from production operator) <i>Operator</i>						Independent Contractor ID: (if applicable)						
16. On-site Emergency Medical Treatment: Not Applicable: _____ First-Aid: _____ CPR: _____ EMT: <input checked="" type="checkbox"/> Medical Professional: _____ None: _____												
17. Part 50 Document Control Number: (form 7000-1)						18. Union Affiliation of Victim: <i>9999 None (No Union Affiliation)</i>						
Victim Information:												
1. Name of Injured/III Employee:			2. Sex:	3. Victim's Age:		4. Last Four Digits of SSN:			5. Degree of Injury:			
6. Date(MM/DD/YY) and Time(24 Hr.) Of Death:						7. Date and Time Started:						
8. Regular Job Title:				9. Work Activity when Injured:				10. Was this work activity part of regular job? Yes <input type="checkbox"/> No <input type="checkbox"/>				
11. Experience: a. This			b. Regular			c. This			d. Total			
Years	Weeks	Days	Years	Weeks	Days	Years	Week	Days	Years	Weeks	Days	
Work Activity:			Job Title:			Mine:			Mining:			
12. What Directly Inflicted Injury or Illness?						13. Nature of Injury or Illness:						
14. Training Deficiencies: Hazard: _____ New/Newly-Employed Experienced Miner: _____ Annual: _____ Task: _____												
15. Company of Employment: (If different from production operator)						Independent Contractor ID: (if applicable)						
16. On-site Emergency Medical Treatment: Not Applicable: _____ First-Aid: _____ CPR: _____ EMT: _____ Medical Professional: _____ None: _____												
17. Part 50 Document Control Number: (form 7000-1)						18. Union Affiliation of Victim:						
Victim Information:												
1. Name of Injured/III Employee:			2. Sex:	3. Victim's Age:		4. Last Four Digits of SSN:			5. Degree of Injury:			
6. Date(MM/DD/YY) and Time(24 Hr.) Of Death:						7. Date and Time Started:						
8. Regular Job Title:				9. Work Activity when Injured:				10. Was this work activity part of regular job? Yes <input type="checkbox"/> No <input type="checkbox"/>				
11. Experience: a. This			b. Regular			c. This			d. Total			
Years	Weeks	Days	Years	Weeks	Days	Years	Week	Days	Years	Weeks	Days	
Work Activity:			Job Title:			Mine:			Mining:			
12. What Directly Inflicted Injury or Illness?						13. Nature of Injury or Illness:						
14. Training Deficiencies: Hazard: _____ New/Newly-Employed Experienced Miner: _____ Annual: _____ Task: _____												
15. Company of Employment: (If different from production operator)						Independent Contractor ID: (if applicable)						
16. On-site Emergency Medical Treatment: Not Applicable: _____ First-Aid: _____ CPR: _____ EMT: _____ Medical Professional: _____ None: _____												
17. Part 50 Document Control Number: (form 7000-1)						18. Union Affiliation of Victim:						