

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

**REPORT OF INVESTIGATION
Underground Nonmetal Mine
(Limestone)**

**Fatal Fall of Rib Accident
April 11, 2014**

**Mississippi Lime Company
Mississippi Lime Company-Ste. Genevieve
Ste. Genevieve, Ste. Genevieve County, Missouri
Mine ID No. 23-00542**

Investigators

**William D. O'Dell
Mine Safety and Health Specialist**

**Lawrence D. Sherrill
Mine Safety and Health Inspector**

**Michael Superfesky, P.E.
Civil Engineer**

**James Angel
Mechanical Engineer**

**James G. Vadnal
Mining Engineer**

**David Weaver
Assistant District Manager**

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



OVERVIEW

On April 11, 2014, Christopher R. Rawson, Utility/Boom Operator, age 29, and John E. Hahl, Utility/Boom Operator, age 53, were killed when a section of rock fell from a rib and struck an outrigger on a boom truck. The miners were working in the 120 bench top area using scaling bars to manually scale a pillar while standing in a man basket on a Hi-Ranger boom mounted to the back of an International truck. The miners were approximately 38 feet above the mine floor. Approximately 25 tons of material fell with about 2½ to 5 tons of the material striking the outrigger.

The accident occurred due to management's failure to ensure that persons perform the task of scaling the roof and ribs from a safe location. The boom truck was positioned where it could be struck by falling material.

GENERAL INFORMATION

Mississippi Lime Company-Ste. Genevieve, an underground mine and lime plant operation owned and operated by Mississippi Lime Company, is located near Ste. Genevieve, Missouri. The principal operating official is William H. Ayers, President & COO. The mine operates three 8-hour shifts per day, seven days per week. Total employment is 559 persons.

Limestone is drilled and blasted underground in a room and pillar mining method. The initial excavations into unmined areas of the deposit are referred to by the mine operator as the heading (excavation). A 55 feet wide by 30 to 35 feet high area is drilled 16 feet long. Next, the area is shot and a mechanical scaler is used to scale loose material and trim the heading to the proper dimensions. The roof and ribs are then manually scaled and the material is loaded out of the heading to complete the cycle. The second excavation is typically the "roof shot" where a 55 feet wide by 30 feet high area of roof is shot, manually scaled, and loaded out of the heading. The last excavation is the bench shot where the bottom of the heading and crosscut is drilled and shot. The final heading dimensions are 55 feet wide, with crosscuts 50 feet wide. Both the headings and crosscuts are 90 to 95 feet high and are supported by 45 feet wide pillars in a staggered pattern.

At the accident site, both the heading and roof had been shot and mucked, resulting in 55 feet wide headings, 50 feet wide crosscuts, and a 55 feet high back supported by 45 feet by 45 feet square pillars in a staggered pattern.

The material is delivered to an underground crusher. Crushed limestone is conveyed out into the production facility on the surface. Bulk and bagged finished products are sold for use in a variety of markets including chemical manufacturing, construction, industrial, metal and steel, as well as food products.

The Mine Safety and Health Administration (MSHA) completed the last regular inspection at this mine on March 13, 2014.

DESCRIPTION OF THE ACCIDENT

On the day of the accident, April 11, 2014, Christopher Rawson and John Hahl (victims) started work at 6:30 a.m. At the underground mine office, Arthur Roth, Mine Utility Foreman, assigned them the task of scaling a pillar in the 120 bench top area.

Rawson and Hahl drove the boom truck to the 120 bench in the Peerless section of the mine. They entered the 120 bench area off the 113 haulage road and drove to the pillar marked 120 LP PS #1.

At the 120 Bench area, Rawson and Hahl worked from a man basket on the Hi-Ranger boom mounted to the back of the International truck to scale the pillar. The miners were assigned the single pillar to scale during their shift.

A. Roth, began making his rounds by checking water levels and ventilation fans. At 8:00 a.m., he passed by the 120 bench top area and observed the scalers working.

Gary Roth, Driller, started work around 7:00 a.m. He drove a drill down to the 120 bench top area and set up the drill one pillar off the 113 haul road. Rick Stuppy, Drill-Blast-Scale (DBS) Supervisor, and David Russell, Crew Leader, made rounds earlier in the shift, marked headings, and checked equipment. They both drove to the scalers' location. As Stuppy and Russell approached the boom truck, they observed lights on the ground and the turntable on its side. They found the two victims lying near the basket of the boom. Stuppy instructed Russell to check on the two miners as he went for help. Russell checked the victims for vital signs and found them both nonresponsive.

At 8:59 a.m., Ste. Genevieve County ambulance dispatched two units to the mine. The victims were brought out of the mine at 11:21 a.m. and pronounced dead. The cause of death for both victims was attributed to blunt force trauma.

INVESTIGATION OF THE ACCIDENT

MSHA was notified of the accident at 9:00 a.m. on April 11, 2014, by a telephone call from Rick Donovan, Safety and Health Manager, to MSHA's National Call Center. The National Call Center notified Elwood Burriss, Staff Assistant, and an investigation was started that same day. To ensure the safety of all persons, 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, 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 miners' representatives.

DISCUSSION

Location of the Accident

The accident occurred at the 120 bench top area at the 5th pillar on the right side of the 120 Right heading off the Main Haul Road 113. The heading numbering system on the right side of the Main Haul Road progresses sequentially from 111 heading through 120, then skips ahead to 126. The 120 Right heading was initially developed with a heading excavation and a roof shot in the mid 1990's and measured 55 feet high by 55 feet wide. Mining activity in this area was minimal until recently when the bottom bench was mined.

Geology

Mississippi Lime underground mine in Ste. Genevieve, Missouri, extracts high calcium limestone from the Mississippian Geologic Age, Meramecian Series, Salem Formation. The operator stated that the original portal was started in 1939 and that mining extends over sixteen hundred acres. Mining heights, room widths, and pillar sizes have all varied over the decades. Scaling has been the primary method for roof and rib control. Roof bolting is not used for ground support.

55' Hi-Ranger International Boom Truck

The boom truck involved in the accident is a Hi-Ranger Mobile Aerial Tower manufactured by Mobile Aerial Towers, Inc. in March, 1969. It is a vehicle-mounted elevating and rotating aerial device (aerial lift) with an articulating lattice boom used to position personnel. The Hi-Ranger is a series 7, model 7-55, that was overhauled and tested by Fransyl Equipment Co., Inc. in October, 2002. A plate on the tower specifies that the platform (also referred to as a bucket or basket) has a capacity of 750 lbs. and a platform height of 55 feet. The Hi-Ranger is mounted on a 2003 International truck body, model 4300 DT466, SBA (set-back axle), with a wheel base of approximately 40 feet.

The mine operator provided an Operation and Maintenance manual, dated September 1976, for this machine. The manual specifies a different serial number than the equipment in use at the mine. The manual specified that in the stowed position, the Hi-Ranger (without the truck) had a length of 32 feet 10 inches, a width of 8 feet, a minimum overhead operating clearance of 33 feet 9 inches, a comfortable working height of 60 feet, a maximum horizontal reach of 33 feet 6 inches, a rated platform capacity of 900 lbs., an outrigger spread (outside-to-outside) of 15 feet 6 inches, and a weight of 9,750 lbs.

The Hi-Ranger was severely damaged in the accident, including the top plate of the turntable which was separated from the turntable bearing. The 14 bolts securing the top plate to the bearing were also broken during the accident. The top plate of the turntable came to rest in a vertical position to the left of the turntable. The hydraulic lines and air line running through the center of the turntable were intact and had prevented the top section of the turntable from falling off the truck. The left outrigger sustained considerable damage. The 2½-inch diameter cylinder rod was bent and broken. The

cylinder's 1½-inch diameter upper mounting pin was broken. A protective cover over the cylinder was bent, as was the outrigger's lower support frame. The chord sections connecting the upper boom to the platform were bent when the platform landed on its left side.

Workplace Examinations

The established practice for conducting workplace examinations at this mine required each miner entering their work area to perform a workplace examination. The record of each examination was submitted to their supervisor at the end of their shift. Hazards noted were separated from the record maintained for MSHA and were typically disposed of as soon as the condition was corrected. Documentation of workplace examinations for the 120 Bench top area was not provided for the preceding week prior to the accident although multiple crews had entered the area during that period. Additionally, persons interviewed during the investigation indicated that management had been in the area prior to the accident marking the "120 LP PS #1" pillar with spray paint for the scaling crew. Barricades or warning signs had not been provided in the area around that pillar despite observations made for loose ground. A non-contributory citation was issued for failure to provide barricades or warning signs.

TRAINING AND EXPERIENCE

Christopher Rawson had 7 years of mining experience, all at this mine. Rawson had been working in his current position since December, 2013. John Hahl had 8 years of mining experience, all at this mine. Hahl had been working in his current position since November, 2010. A representative of MSHA's Educational Field Services staff conducted a review of the mine operator's training records including the training records for Rawson and Hahl. All of their required MSHA Training, including Annual Refresher Training and Task Training, were found to be up-to-date and in compliance with MSHA requirements.

ROOT CAUSE ANALYSIS

The investigators conducted a root cause analysis and the following root cause was identified:

Root Cause: Management did not ensure that persons scaled the roof and ribs from a location that would not expose them to falling material.

Corrective Actions: The mine operator developed a new procedure for the setup of the scaling rig utilizing a berm and set distance of operation. Miners conducting scaling tasks were trained in the new procedures.

CONCLUSION

The accident occurred due to management's failure to ensure that persons perform the task of scaling the roof and ribs from a safe location. The boom truck was positioned where it could be struck by falling material.

ENFORCEMENT ACTIONS

Issued to Mississippi Lime Company

Order No. 8766856 - Issued on April 11, 2014, 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:

An accident occurred at this operation on April 11, 2014 at approximately 0845 hours. As rescue and recovery work is necessary, this order is being issued, under Section 103(j) of the Federal Mine Safety and Health Act of 1977, to assure the safety of all persons at this operation. This order is also being issued to prevent the destruction of any evidence which would assist in investigating the cause of causes of the accident. It prohibits all activity at the 120 Bench top area until MSHA has determined that it is safe to resume normal mining operations in this area. This order applies to all persons engaged in the rescue and recovery operation and other persons on-site. This order was initially issued orally to the mine operator at 0925 hours and has now been reduced to writing.

The order was subsequently modified to Section 103(k) after an Authorized Representative arrived at the mine. This order was terminated on August 18, 2014, after conditions that contributed to the accident no longer existed.

Citation No. 8765048 – Issued under provisions of Section 104(a) of the Mine Act for a violation of 30 CFR 57.3201:

A double fatality occurred at this underground operation on April 11, 2014 when a fall of material from the pillar struck a Hi-Ranger boom truck, causing the truck and attached manbasket to overturn. Two miners were performing scaling operations from the basket when the truck overturned. The pillar was located in the 120 bench top area and was about 54 feet in height. A large piece of rock fell from the pillar striking an outrigger on the boom truck. The boom and man-basket broke loose at the turn table and fell to the mine floor, fatally injuring both miners. The scaling rig was in a location that exposed persons to injury from falling material and no other protection from falling material was provided.

Approved: _____

Michael A. Davis
District Manager

Date: _____

APPENDIX A

PERSONS PARTICIPATING IN THE INVESTIGATION

Mississippi Lime Company

Rick Donovan	Safety and Health Manager
Jeffrey P. Gurley	Safety and Health Supervisor
Jazz Coffman	Safety and Health Office Assistant
Jimmy Gann	Training Coordinator
Allen Schilli	Crew Leader: Equipment Mechanic
John Mlaker	Consultant UTEP – Director of Engineering
Jonathan Henry	Consultant Midwest Crane Repair

Quarry Workers' Local 829

Ricky J. Kline	Business Manager
Jim Mueller	Miners' Representative

Steelman, Gaunt & Horsefield

Ryan Seelke	Attorney for Mississippi Lime
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Mine Safety and Health Administration

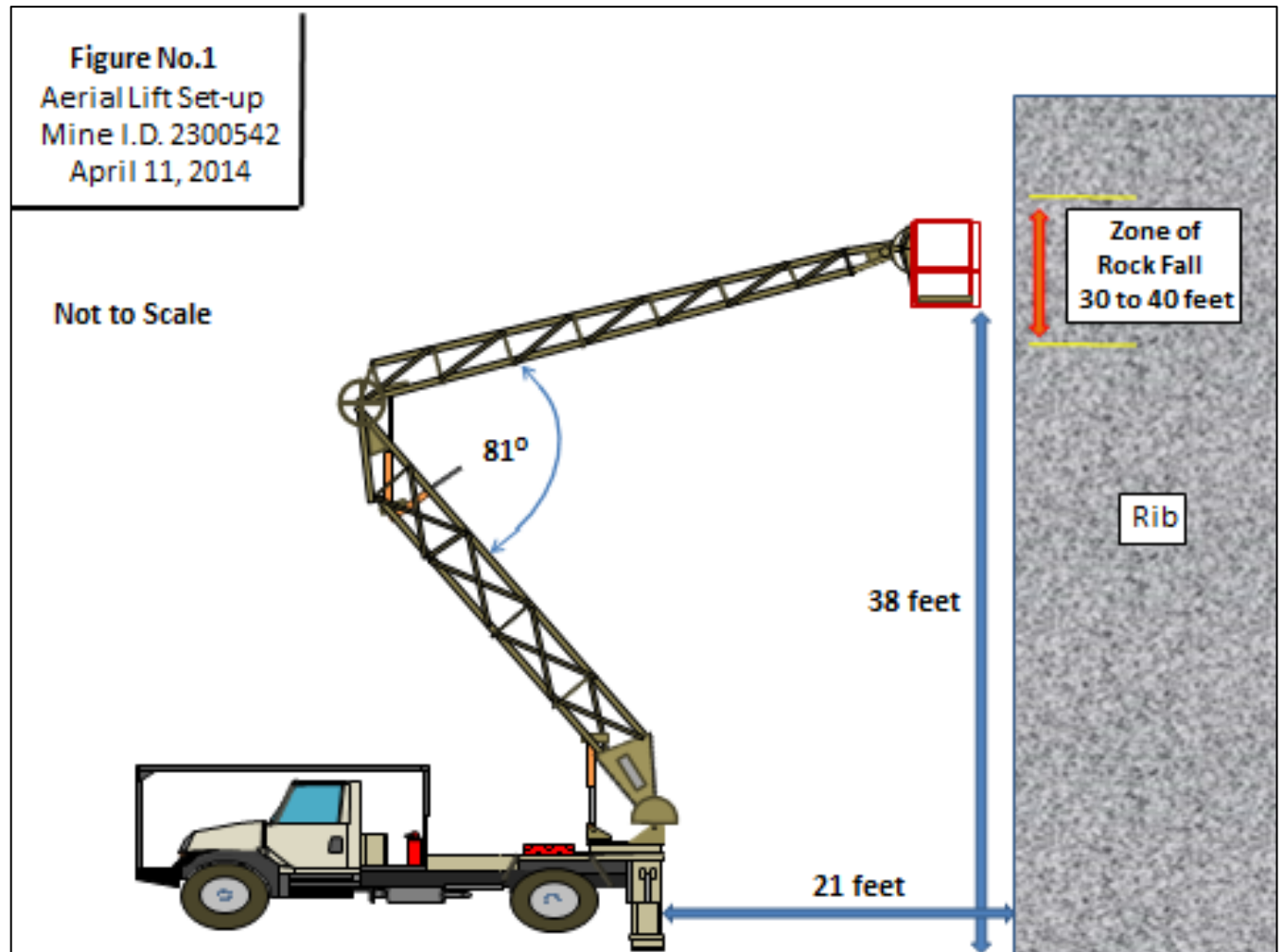
William D. O'Dell	Mine Safety and Health Specialist
Lawrence Sherrill	Mine Safety and Health Inspector
David Weaver	Assistant District Manager
Michael C. Superfesky P.E.	Civil Engineer
James Angel	Mechanical Engineer
James G. Vadnal	Mining Engineer

CONCEPTUALIZED VIEW OF THE ACCIDENT SCENE



APPENDIX C

CONCEPTUALIZED VIEW OF THE TRUCK SETUP



Accident Investigation Data - Victim Information

Event Number: 6 6 0 9 9 0 0

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



Victim Information: 1											
1. Name of Injured/Ill Employee: Chris R. Rawson				2. Sex: M		3. Victim's Age: 29		4. Degree of Injury: 01 Fatal			
5. Date(MM/DD/YY) and Time(24 Hr.) Of Death: a. Date: 04/11/2014 b. Time: 8:45								6. Date and Time Started: a. Date: 04/11/2014 b. Time: 6:30			
7. Regular Job Title: 077 High Boom Scaler						8. Work Activity when Injured: 006 Hand scaling pillar				9. Was this work activity part of regular job? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
10. Experience: a. This Work Activity:			Years	Weeks	Days	b. Regular Job Title:			Years	Weeks	Days
			0	12	0				0	12	0
c. This Mine:			Years	Weeks	Days	d. Total Mining:			Years	Weeks	Days
			7	45	3				7	45	3
11. What Directly Inflicted Injury or Illness? 117 Falling from elevated heights						12. Nature of Injury or Illness: 370 Blunt force trauma					
13. Training Deficiencies: Hazard: <input type="checkbox"/> New/Newly-Employed Experienced Miner: <input type="checkbox"/> Annual: <input type="checkbox"/> Task: <input type="checkbox"/>											
14. Company of Employment: (If different from production operator) Operator Independent Contractor ID: (if applicable)											
15. On-site Emergency Medical Treatment: Not Applicable: <input type="checkbox"/> First-Aid: <input type="checkbox"/> CPR: <input type="checkbox"/> EMT: <input type="checkbox"/> Medical Professional: <input type="checkbox"/> None: <input checked="" type="checkbox"/>											
16. Part 50 Document Control Number: (form 7000-1)						17. Union Affiliation of Victim: 2480 Laborers Int. Union					
Victim Information: 2											
1. Name of Injured/Ill Employee: John E. Hahn				2. Sex: M		3. Victim's Age: 53		4. Degree of Injury: 01 Fatal			
5. Date(MM/DD/YY) and Time(24 Hr.) Of Death: a. Date: 04/11/2014 b. Time: 8:45								6. Date and Time Started: a. Date: 04/11/2014 b. Time: 6:30			
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10. Experience: a. This Work Activity:			Years	Weeks	Days	b. Regular Job Title:			Years	Weeks	Days
			3	19	0				3	19	0
c. This Mine:			Years	Weeks	Days	d. Total Mining:			Years	Weeks	Days
			8	18	6				8	18	6
11. What Directly Inflicted Injury or Illness? 117 Falling from elevated heights						12. Nature of Injury or Illness: 370 Blunt force trauma					
13. Training Deficiencies: Hazard: <input type="checkbox"/> New/Newly-Employed Experienced Miner: <input type="checkbox"/> Annual: <input type="checkbox"/> Task: <input type="checkbox"/>											
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5. Date(MM/DD/YY) and Time(24 Hr.) Of Death:								6. Date and Time Started:			
7. Regular Job Title:						8. Work Activity when Injured:				9. Was this work activity part of regular job? Yes <input type="checkbox"/> No <input type="checkbox"/>	
10. Experience: a. This Work Activity:			Years	Weeks	Days	b. Regular Job Title:			Years	Weeks	Days
c. This Mine:			Years	Weeks	Days	d. Total Mining:			Years	Weeks	Days
11. What Directly Inflicted Injury or Illness?						12. Nature of Injury or Illness:					
13. Training Deficiencies: Hazard: <input type="checkbox"/> New/Newly-Employed Experienced Miner: <input type="checkbox"/> Annual: <input type="checkbox"/> Task: <input type="checkbox"/>											
14. Company of Employment: (If different from production operator) Independent Contractor ID: (if applicable)											
15. On-site Emergency Medical Treatment: Not Applicable: <input type="checkbox"/> First-Aid: <input type="checkbox"/> CPR: <input type="checkbox"/> EMT: <input type="checkbox"/> Medical Professional: <input type="checkbox"/> None: <input type="checkbox"/>											
16. Part 50 Document Control Number: (form 7000-1)						17. Union Affiliation of Victim:					