

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

REPORT OF INVESTIGATION

Underground Metal Mine
(Gold)

Fatal Fall of Back Accident
October 25, 2018

Lee Smith Mine
Small Mine Development LLC
Elko, Elko County, Nevada
Mine ID No. 26-02397

Investigators

Stephen P. Rogers
Mine Safety and Health Specialist

Patrick Barney
Mine Safety and Health Inspector

Benjamin Gibson
Mine Safety and Health Inspector

Originating Office
Mine Safety and Health Administration
Western District
991 Nut Tree Road
Vacaville, CA 95687

Kevin G. Hirsch, Acting District Manager

OVERVIEW



Jason M. Holman, a 42-year-old Powderman with eight years of experience, was fatally injured on October 25, 2018, when Cemented Rock Fill (CRF) used to backfill previously mined areas fell from the back/roof and buried him while he was loading blast holes. Mr. Holman's body was recovered from the fallen material on October 26, 2018.

The accident occurred because mine management policies, procedures and controls were inadequate to ensure the establishment and maintenance of safe ground conditions where persons work or travel.

GENERAL INFORMATION

Small Mine Development LLC operates Lee Smith mine, a multi-level underground gold mine, located in Elko, Nevada. Paul Joggerst, Project Manager, is the principal operating official. The mine operates seven days a week with four crews rotating 12-hour shifts, and employs 83 miners.

Gold ore is drilled, blasted and transported by Load-Haul-Dump (LHD) loaders and trucks to the surface where it is shipped to and processed at the Jerritt Canyon Mill. The finished products are sold to commercial industries.

At the time of the accident, the Mine Safety and Health Administration (MSHA) was in the process of conducting a regular inspection, which started on October 22, 2018.

DESCRIPTION OF THE ACCIDENT

On October 25, 2018, the victim, Jason M. Holman arrived at the Lee Smith Mine at 6:00 a.m., his normal starting time. Holman and Robert Pierce, Batch Plant Operator, were assigned the tasks of loading blastholes, installing air and water utility lines, and installing ground support.

At 4:15 p.m., Holman drove the ET-05 powder truck to the Zone 8-6755 drift and backed the truck in. Pierce arrived at the location in a tractor, and both miners began loading blastholes.

Holman and Pierce had nearly completed loading the blastholes when Pierce received a radio call about a broken air line in need of repair at a different location in the mine. Holman continued loading blastholes while Pierce went to the cab of the powder truck to get tools to repair the air line. At 4:50 p.m., the CRF back/roof collapsed, where Holman and Pierce had been loading blastholes. Pierce was thrown out of the cab of the truck by the force of the back/roof fall striking the vehicle.

Pierce moved toward the back of the powder truck looking for Holman, but had to retreat because more CRF was falling from the back/roof. Pierce called Todd Caruso, Acting Supervisor, on the radio at 4:55 p.m. to inform him of the fall and that Holman was missing.

Caruso, and Chad Chambless, Miner, arrived at the scene about 5:05 p.m. They saw a large amount of CRF covering the rear of the powder truck. There was no sign of Holman and they presumed he was buried under the fall.

INVESTIGATION OF THE ACCIDENT

Clark Mansanares, Safety Superintendent for Lee Smith mine, called the Department of Labor National Contact Center (DOLNCC) at 5:11 p.m. on October 25, 2018, and notified MSHA of the accident. DOLNCC notified Robert Wood, Field Office Supervisor in the Western District. MSHA dispatched Gary Hebel, Supervisory Mine Safety and Health Inspector, to the accident scene. MSHA also contacted the mine management and issued an order under the provisions of

Section 103(j) of the Mine Act to ensure the safety of miners. When an inspector arrived on site, the 103(j) order was modified to a 103(k) order.

Mine management submitted a plan to MSHA to recover Holman from the accident scene. Mine management and mine rescue team members recovered Holman and transferred him to the Elko County Sheriff's Coroner at 4:45 a.m., on October 26, 2018.

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. See Appendix A for persons participating in the investigation.

DISCUSSION

Location of the Accident

The accident occurred in Zone 8-6755. The drift is driven underneath CRF and is approximately 18 feet wide and 21 feet high. The operator had installed CRF in the previously mined, overlying level (6770) approximately 2-1/2 months prior to the accident. The back/roof fall occurred directly above where Holman was loading blastholes. *(See Appendix B, Figure 1 & Figure 2)*

Subsequent to the accident, the mine operator performed a cavity monitor survey. The survey showed the fall cavity to be 7 feet in height. The base of the fall cavity was 19 feet wide, extending rib to rib. The profile of the cavity was smooth and "hump backed." No bolt holes or fractures were visible in the cavity.

Mining Method

The mine uses underhand cut-and-fill throughout 80% of the mine. In underhand cut-and-fill drifts, the operator drives cuts beneath previously installed CRF, so the back/roof of the underlying level consists of CRF installed in the overlying level. Cuts are normally 15 feet wide but can be as narrow as 12 feet, or as wide as 20 feet.

Ground Control

The primary method of ground control is CRF in the underhand drifts. Seven-foot-long split set friction stabilizers may be installed for support in areas where the back is comprised entirely of CRF for controlling the outer skin.

Ground control in development drifts driven in country rock (the intact, native rock that hosts the orebody) consists of 7-foot-long split set friction stabilizers installed on 4-foot centers, with 3-inch welded wire mesh panels.

The operator supports the transition between CRF and country rock with split sets and welded wire mesh panels. The back/roof in the 6770 level (above the accident site) was a transition between CRF and country rock. The mine operator installed split sets and welded wire mesh panels in the transition.

Batch Plant Process

The batch plant process combines a mixture of water and cement to create a slurry for use in creating CRF. There are computer calibrated load cells to measure the water and percentage of cement used, compared to the amount of aggregates, to derive an expected overall strength of the CRF.

Cemented Rock Fill

CRF is made of aggregate and batch plant slurry. A front end loader operator visually selects rock from the available stockpile, adds the appropriate volume of slurry to the aggregate, and mixes the materials in the sump using the bucket of the front end loader.

Ideally, CRF remains on the surface for 30 minutes between mixing and delivery. The investigators found the operator had stockpiled the CRF on the surface for up to 2 hours before loading it into trucks for delivery underground. CRF should always be laid in position soon after mixing to avoid setting and stiffening.

Once the CRF is delivered underground, a bulldozer w/jammer attachment pushes the CRF into the open drift. If the jammer operator observed CRF deficiencies, they were supposed to be reported to the surface so adjustment could be made to the CRF mixture. Investigators found inconsistencies in how inferior CRF was handled when reported. In some cases when the CRF was too wet, the jammer operator mixed in dryer CRF. Other operators would either set the inferior CRF aside or continue to place the inferior CRF into the drift. The design target for the CRF was 600 psi unconfined compressive strength, with 70% of ultimate strength required after 7 days, and 28 days representing the full cure time. The operator did not conduct follow-up testing by collecting core samples from backfill for comparison with cylinder samples, so MSHA did not have any direct measurement and does not actually know what the strength of the failed backfill was.

Investigators found a lack of quality control in the selection of aggregate, mixing, delivery, and placement of CRF.

Training and Experience

Jason M. Holman had over eight years of mining experience. A representative of MSHA's Educational Field and Small Mine Services (EFSMS) staff conducted a review of the operator's training plan and records. EFSMS determined Holman had been trained in accordance with 30 CFR Part 48.

ROOT CAUSE ANALYSIS

The accident investigation team conducted a root cause analysis to identify the underlying cause of the accident. The team identified the following root cause and the corresponding corrective action implemented to prevent a recurrence.

Root Cause:

Mine management policies, procedures and controls were inadequate to ensure the establishment and maintenance of safe ground conditions where persons work or travel.

Corrective Action:

Mine management has revised policies, procedures, and controls for producing the CRF and provided training on the policies, procedures, and controls to the employees. Mine management is conducting follow-up testing of the backfill and load cells have been calibrated at the batch plant. The company's new operating plan contains changes in how the CRF is mixed, changes in the frequency and number of compression tests of cylinder samples, improvements in tracking cylinder test results and placement of those results on mine maps. The new plan also includes training on handling and placement of CRF, and includes steps to ensure that good aggregate material is being used.

CONCLUSION

Jason M. Holman died when the CRF fell from the back/roof and buried him while he loaded blastholes. The accident occurred because mine management policies, procedures and controls were inadequate to ensure the establishment and maintenance of safe ground conditions where persons work or travel.

ENFORCEMENT ACTIONS

Order No. 9379161 was issued on October 25, 2018, pursuant to Section 103(j) of the Federal Mine Safety & Health Act of 1977, originally issued verbally and reduced to writing upon arrival of an inspector and subsequently modified to an order pursuant to Section 103(k):

An accident occurred at this operation on 10/25/2018 at approximately 4:55 p.m. 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 that would assist in investigating the cause or causes of the accident. It prohibits all activity at Lee Smith Mine except to the extent necessary to rescue an individual or prevent or eliminate an imminent danger until MSHA has determined 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 any other persons on-site. This order was initially issued orally to the mine operator at 5:36 p.m. and has been reduced to writing.

Citation No. 9439013 was issued to Small Mine Development LLC, under the provisions of Section 104(a) of the Mine Act of a violation of the 30 CFR 57.3360.

A fatal roof fall occurred at this operation on October 25, 2018, when cemented rock fill (CRF) fell from above and buried the victim. The victim was in the process of loading explosives into drill holes at the Zone 8-6755-3 underhand drift as part of his normal work activities, when the roof fall occurred. At this mine, CRF is considered the primary method of ground support in underhand cut-and-fill stopes, and is intended to be an engineered product. Management engaged in aggravated conduct constituting more than ordinary negligence in that they failed to implement an adequate quality control process to ensure the engineered product was properly produced; allowed the practice of stock piling batches of CRF on the surface which were exposed to the elements for up to two hours, before loading onto haul trucks for placement underground; and failed to ensure proper placement of the backfill.

Approved: _____

Kevin G. Hirsch
Acting District Manager

Date: _____

Appendix A
Persons Participating in the Investigation
(Persons interviewed are indicated by a * next to their name)

Small Mine Development LLC

Keith Jones	General Manager
Paul Joggerst*	Project Manager
Alan Tyler Hickman*	Superintendent
Mathew Brawley*	Assistant Superintendent
John Featherston*	Sr. Engineer
Marie Sandoval	Safety Manager
Clark Mansanares	Safety Superintendent
Todd Caruso*	Acting Supervisor
Chad Chambless*	Miner
Robert Pierce*	Batch Plant Operator
Tracy Crum*	Jumbo Operator
Aaron Bond*	Batch Plant Operator/Jammer/Truck Driver
Jason Merkley*	Batch Plant Operator
Eric Manzanares*	Batch Plant Operator/Powderman
Logan Iverson	Batch Plant Operator/Truck Driver
Tyson Canty*	Jammer/Truck Driver
Nick Geer*	Batch Plant Operator/Jammer/Truck Driver
James Edwards*	Batch Plant Operator/LHD/Truck Driver
Charlie Thacker*	Jammer/Truck Driver
Troy Jones*	Batch Plant Operator/Jammer

Jerritt Canyon Gold

Daniel Eklund	Surface Supervisor
Kellie Munger	Safety Director

Langston and Associates

Radford B. Langston P.E	Consultant
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Mine Safety and Health Administration

Kevin Hirsch	Acting District Manager
Gary Hebel	Supervisory Mine Safety and Health Inspector
Stephen Rogers	Mine Safety and Health Specialist
Patrick Barney	Mine Safety and Health Inspector
Benjamin Gibson	Mine Safety and Health Inspector
Sandin Phillipson PH D	Supervisory Geologist
Emily Muto	Geologist
Mike Tromble	Supervisory Training Specialist

Appendix B

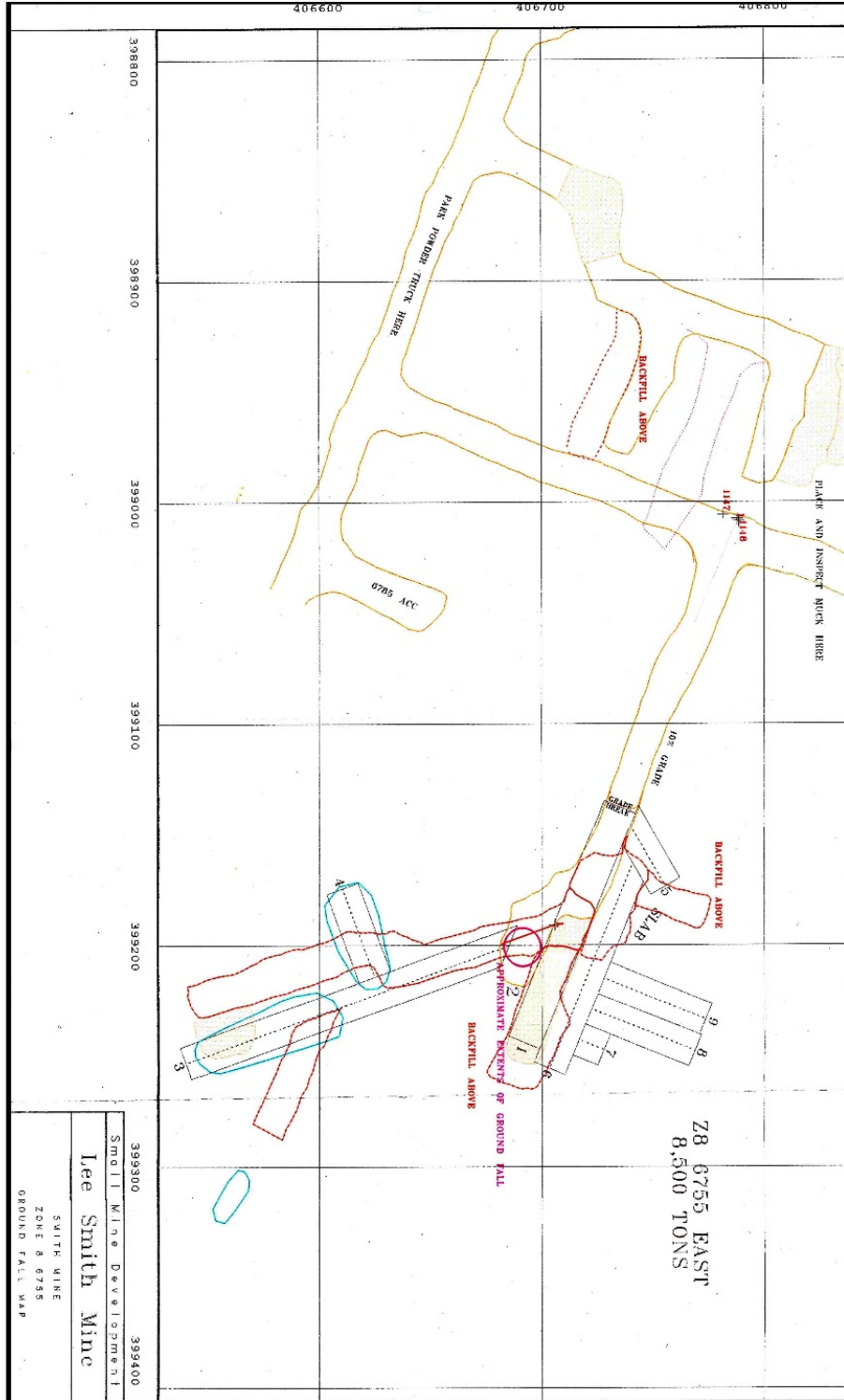


Figure 1
Level view showing the location of the accident.

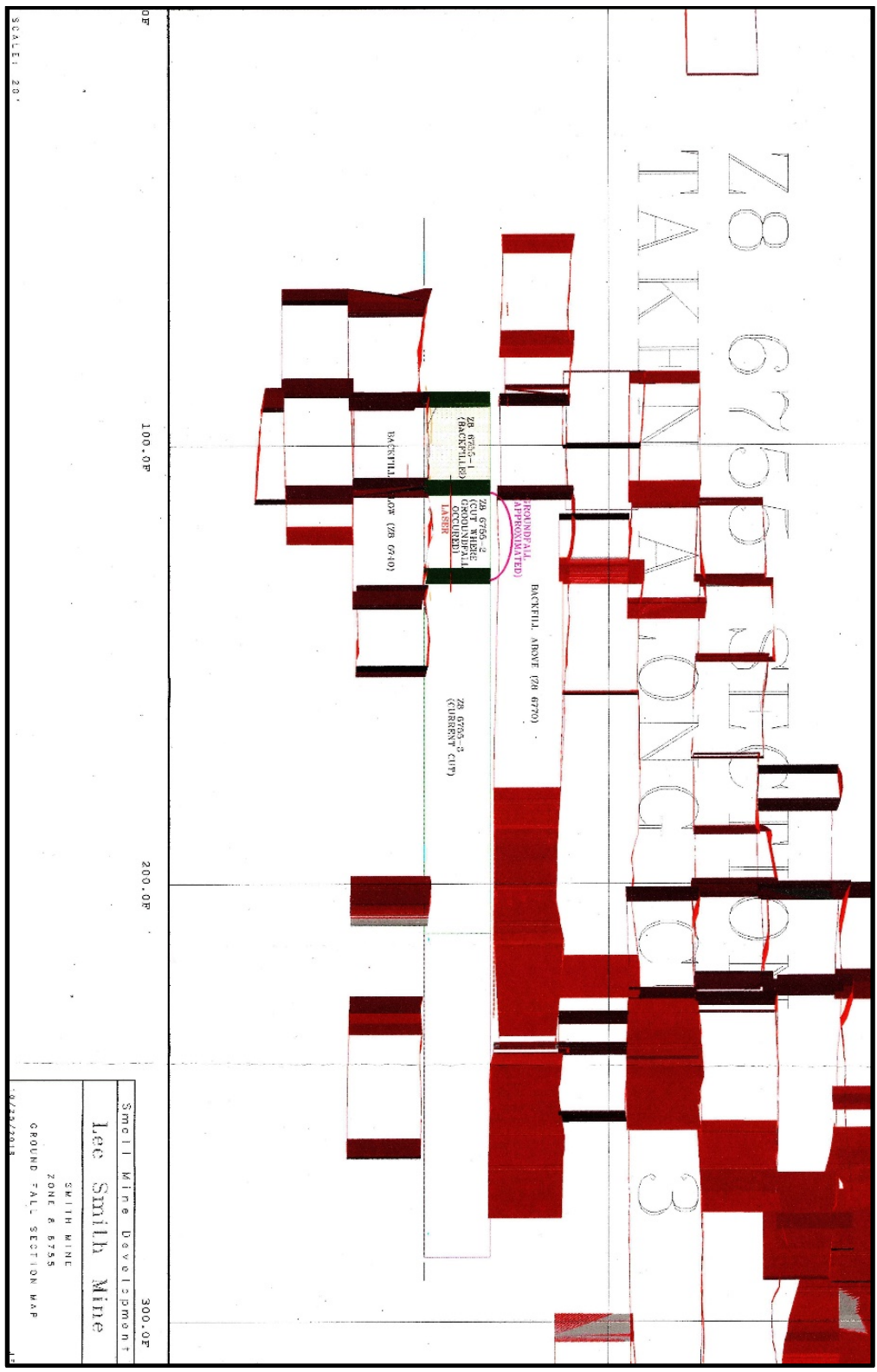


Figure 2
 Longitudinal section view showing an approximation of the roof fall cavity.