

UNITED STATES  
DEPARTMENT OF LABOR  
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Open Pit Metal Mine  
(Copper)

Hoisting  
June 15, 2018

Freeport-McMoRan Chino Mines Company  
Chino Mines Co. Mine  
Grant County, New Mexico  
ID No. 29-00708

Accident Investigators

Lee Cruise  
Mine Safety and Health Inspector

Jeremy Fuentes  
Mine Safety and Health Inspector

Mike Superfesky  
Civil Engineer  
Mine Safety and Health Technical Support

Originating Office  
Mine Safety and Health Administration  
South Central District  
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## OVERVIEW

Sam Galaz, a 57-year-old welder with 27 years of total mining experience, died on June 27, 2019, after succumbing to the injuries he suffered as a result of an accident that occurred on June 15, 2018. The victim was descending from an electric shovel using an electrohydraulic lift, when the upper arm of the lift broke resulting in a fall of approximately 15 feet.

The accident occurred because fatigue cracking or progressive fracturing in the upper arm of the aerial lift went undetected for approximately a year. Improper operation of the lift increased the potential for crack growth. As stated in the manufacturer's operating manual, not engaging the lock assembly when entering and exiting the lift or during rotation of the electric shovel can cause unnecessary repetitive loading on the lift arm.

## GENERAL INFORMATION

Freeport-McMoRan Chino Mines Company owns and operates the Chino Mines Co. Mine (Chino) open pit copper mine located in Vanadium, Grant County, New Mexico. The facility operates two twelve-hour shifts per day, seven days per week. Maintenance crews operate one ten-hour shift per day, Monday through Thursday with occasional eight-hour shifts on Fridays. The mine employs approximately 1,040 miners.

Chino drills and blasts copper ore in an open pit and transports the ore by haul truck to a primary crusher. Belt conveyors transport crushed ore to the mill for milling, concentrating, and the final product is sold on the open market.

The Mine Safety and Health Administration (MSHA) completed its last regular inspection of this operation on February 2, 2018. The non-fatal days lost (NFDL) incidence rate for the Chino Mine for Fiscal Year 2017 was 2.84 compared to the national average of 1.17 for mines of this type.

The principal officer for Freeport-McMoRan Chino Mines Company at the time of the accident was:

Chad Fretz.....President/General Manager

## DESCRIPTION OF ACCIDENT

On June 15, 2018, at 6:00 a.m., Sam Galaz, Welder, arrived at the mine site as a member of the field maintenance crew. The field maintenance crew was continuing to perform scheduled maintenance work on the electric shovel that had been ongoing for a week. They arrived at the electric shovel around 7:00 a.m. to begin work. Their tasks for the day included hoist drum and hoist rope replacement, welding, and lubrication.

The electric shovel had a lift on each side to enable the transporting of workers from the ground to the shovel platform and vice versa. At 9:20 a.m., Galaz stepped into the right side lift and used the toggle switch to activate the hydraulic system in order to swing out and lower the lift. As Galaz released the lift from the mount, the upper arm of the lift frame completely fractured and separated near the mount for the hydraulic ram, causing the lift to freefall. Thrown from the lift, Galaz fell approximately 15 feet to the ground.

At 9:22 a.m., Shane Fletcher, Field Maintenance, issued a mayday alert call over the company's radio system. Med 4, the onsite emergency response team, arrived at the scene and administered first aid. Eddie Roberts, Electric Shop 3 Supervisor, arranged for a medical helicopter transport. The medical helicopter arrived at 9:48 a.m., and transported Galaz to the University Medical Center in El Paso, Texas, where he underwent numerous surgeries. Galaz was then transferred from El Paso to Albuquerque, New Mexico before being transported to a rehabilitation center in Colorado, and then finally transferred to the Rose Medical Center in Denver, Colorado. On June 27, 2019, Galaz succumbed to the injuries.

## INVESTIGATION OF ACCIDENT

On June 15, 2018, at 9:53 a.m., Ruth Fox, Safety Administrative Assistant, contacted the Department of Labor National Contact Center (DOLNCC). DOLNCC contacted Elwood Burriss, Staff Assistant. William D. O'Dell, Assistant District Manager at the time of the accident, assigned Lee Cruise, Mine Safety and Health Inspector and Jeremy Fuentes, Mine Safety and Health Inspector, to conduct an accident investigation. Cruise and Fuentes arrived at the accident scene and issued an order under the provision of Section 103(k) of the Mine Act to ensure the safety of the miners and began the investigation. Mike Superfesky, a Civil Engineer with MSHA's Mine Waste and Geotechnical Engineering Division, visited the mine site on June 19-22, 2018, to assist in the investigation and conduct a technical evaluation of the lift.

MSHA's accident investigation team conducted a physical examination of the accident scene, interviewed miners, and reviewed documents and work procedures relevant to the accident. See Appendix A for a list of persons who participated in the investigation.

## DISCUSSION

### Location of the Accident

The accident occurred at the #43 P&H 4100 electric shovel maintenance area in Chino's East Pit.

### Weather

The weather at the time of the accident was clear, light breeze, and a high temperature of 78° F. Investigators did not consider the weather to be a factor in the accident.

### Equipment Involved in the Accident

The Electrohydraulic Aerial Lift was a Model No. SR96270112 manufactured prior to 2001 by Power Step, Inc. of Duluth, Minnesota and mounted on the electric shovel (see Appendix B). The frame of the lift consisted of a hydraulic cylinder mounted between the upper and lower arms that attach to a basket (transport platform). Based on information and data from the investigation, investigators could not determine the installation date of the lift. The lift was the primary means of access to the electric shovel and the maintenance history consisted of changing out worn parts and repairing hydraulic fluid leaks. A battery-powered electrohydraulic lift system raised the lift, with a hydraulic valve allowing for descent.

There was one lift located on each side of the electric shovel. The lift utilized a hydraulic system for lowering the lift to the ground. Two spring-loaded pull-down vertical ladders provided secondary access and were located on the rear corners of the electric shovel. The field maintenance crew had used the right side lift, involved in the accident, multiple times during the week leading up to the accident. Based on interviews, Galaz was welding inside the electric shovel housing and needed to return to ground level to retrieve a piece of metal that was being prepared for installation.

Exponent, Inc., a multi-disciplinary science and engineering consulting firm hired by Chino, conducted a metallurgical analysis of the upper lift arm at the fracture surface. Exponent, Inc. used Metals Engineering and Testing Laboratory to perform the testing at their offices in

Phoenix, Arizona and in coordination with Superfesky. The metallurgical examination identified fatigue cracking.

MSHA concluded that the primary cause of the accident was undetected fatigue cracking or progressive fracture in the upper arm of the lift due to normal operation. Generally, initial cracking is difficult to detect visually. The lift failure occurred when the cracks were substantial enough to compromise the load capacity of the upper arm. Improper operation of the lift increased the potential for crack growth. Specifically, not engaging the lock assembly when entering and exiting the lift or during rotation of the electric shovel caused unnecessary repetitive loading on the lift arm.

#### Training and Experience

Sam Galaz had 27 years of total mining experience, all at this mine. Investigators determined that the mine operator did not provide adequate task training for using the lift on the electric shovel, and did not provide training for operating the lift in a safe manner.

### **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 mine operator implemented the corresponding corrective action to prevent recurrence.

Root Cause: The lab test results indicated that fatigue cracks existed for approximately a year. Improper operation of the lift increased the potential for crack growth. Specifically, not engaging the lock assembly in place when entering and exiting the lift or during rotation of the electric shovel caused unnecessary repetitive loading on the lift arm.

Corrective Action: The mine operator replaced the lift with Airstair articulated steps for equipment access.

Root Cause: The mine operator did not provide adequate task training for the lift on the electric shovel. The mine operator did not provide training in the safe work procedures for operating the lift.

Corrective Action: The mine operator replaced the lift with Airstair articulated steps for equipment access and trained all miners in its proper and safe use.

## CONCLUSION

Sam Galaz, a 57-year-old welder died on June 27, 2019, after succumbing to the injuries he suffered as a result of an accident that occurred on June 15, 2018. The victim was descending from an electric shovel using an electrohydraulic lift, when the upper arm of the lift broke resulting in a fall of approximately 15 feet.

The accident occurred because fatigue cracking or progressive fracturing in the upper arm of the aerial lift went undetected for approximately a year. Improper operation of the lift increased the potential for crack growth. As stated in the manufacturer's operating manual, not engaging the lock assembly when entering and exiting the lift or during rotation of the electric shovel can cause unnecessary repetitive loading on the lift arm.

*Approved:* \_\_\_\_\_ *Date:* \_\_\_\_\_

William D. O'Dell  
South Central District Manager

## ENFORCEMENT ACTIONS

Order No. 9359961 – Issued on June 15, 2018, under the provisions of 103(k) of the Federal Mine Safety and Health Act of 1977:

An accident occurred at this mine site on June 15, 2018 at 9:22 a.m... This order is being issued under the Federal Mine Safety and Health Act of 1977 section 103(k) to prevent destruction of any evidence, behind the red flagging, in the area around and including the electric shovel, that would be used in assisting the cause of the accident and also prohibits all activities in this area except to rescue miners.

Citation No. 9408697 – Issued on April 03, 2019, under the provisions of Section 104(a) of the Mine Act for violation of 30 CFR Part 48.27:

The mine operator did not provide complete task training for the lift on the electric shovel. An accident occurred at this mine site on June 15, 2018 at 9:22 a.m., when the structure of the right lift on the electric shovel failed when a miner was using the lift to return to ground level and causing the miner to fall about 15 feet to the ground and to be severely injured. The mine operator must provide, to any miner assigned to the task, training of the assigned task, including safe work procedures of the task to be performed.



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

**Chino Mines Co.**

Shane Fletcher\* .....Field Maintenance  
Robert Villanueva\* ..... Diagnostic Mechanic  
Mark Borner\* .....Field Maintenance  
Jason Lozano .....Field Maintenance  
Richard Marquez\* .....Maintenance Supervisor  
Harold Lewis ..... Shovel Diagnostic Mechanic  
Frankie Morales .....Field Maintenance  
Arliss Jones .....Safety Representative  
Frank Castillo .....Safety Representative  
Barney Thompson .....Field Maintenance  
Tony Otero .....Safety Representative  
Irvin Shores ..... Haul Truck Driver/ Emergency Response Team Member  
Ruth Fox .....Safety Administrative Assistant  
John Swagzdis ..... Safety Manager  
Avenildo Vigil ..... Shovel Diagnostic Mechanic  
Pete Ortiz\* ..... Diagnostic Mechanic  
Ivan Jimenez ..... Emergency Response Team Member

**Freeport McMoRan Chino Mines Company**

Anna Laija ..... Corporate Health & Safety Director  
Mitch Kruger ..... Corporate Safety

**Exponent, Inc.**

Caleb Roepke .....Managing Engineer

**Mine Safety and Health Administration**

Lee Cruise .....Mine Safety and Health Inspector  
Jeremy Fuentes .....Mine Safety and Health Inspector  
Mike Superfesky ..... Civil Engineer - Mine Waste and Geotechnical Engineering Division

**Appendix B**  
#43 P&H 4100 Electric Shovel

