FAI-6856085-1

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Surface
(Copper Ore)

Fatal Powered Haulage Accident
January 28, 2022

Tri County Materials Inc (V302)
Safford, Arizona

at

Freeport-McMoRan Morenci Inc.
Freeport-McMoRan Morenci Inc.
Morenci, Greenlee County, Arizona
ID No. 02-00024

Accident Investigators

Steven Polgar
Supervisory Mine Safety and Health Inspector

Steven Arnhold
Mines Safety and Health Inspector

Peter Del Duca
Assistant District Manager

Originating Office
Mine Safety and Health Administration
Denver District
P.O. Box 25367, DFC
Denver, CO 80225-0367
Dustan Crelly, District Manager

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OVERVIEW

On January 28, 2022, at 9:09 a.m., Monroe Caston, Jr., a 56 year-old mixer driver with three years of mining experience received fatal injuries, and David Butler, a 24 year-old mixer driver in training with two years of mining experience, received serious injuries when the cement mixer truck they were in lost control, overturned on its side, and slid into a berm.

The accident occurred because the contractor that employed Caston and Butler, Tri County Materials Inc (Tri County), did not: 1) maintain braking systems in functional condition and did not remove equipment from service until defects that make continued operation hazardous were corrected, 2) conduct adequate pre-operational examinations on mobile equipment prior to operation, and 3) assure that miners wore seat belts.

GENERAL INFORMATION

Freeport-McMoRan Morenci Inc. (FMI) owns and operates the FMI mine. This mine is a surface copper operation located in Morenci, Greenlee County, Arizona. FMI mine employs 3,500 miners and operates two 12-hour shifts, seven days per week. At the mine, rock that contains copper ore is drilled and blasted in an open pit, then transported by haul truck and conveyors to an on-site processing facility, where copper and other metals are extracted and sold.

The principal management officials at the FMI mine at the time of the accident were:

Joseph Edwards	Health and Safety Director
Jun Montes	Health and Safety Manager

Tri County is located in Safford, Graham County, Arizona, and performs concrete hauling and pumping services for the FMI mine. FMI contracted Tri County to haul concrete for the Shannon Booster Project, which is a stainless-steel piping and booster pump expansion project being installed by PVB Fabrications Inc. Concrete is used for the supporting structures. Tri County has been doing work in the mining industry for at least 15 years.

The principal management officials at Tri County at the time of the accident were:

Susan Vlassis	President, Owner
Peter Vlassis	Vice President Concrete Pumping, Ready Mix, Crushing

The Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection at this mine on August 6, 2021. The 2021 nonfatal days lost (NFDL) incident rate for FMI was 2.58, compared to the national average of 1.35 for mines of this type.

DESCRIPTION OF THE ACCIDENT

On January 28, 2022, Caston and Butler arrived at the Tri County equipment yard in Safford, Arizona at 4:30 a.m. to begin their shift. Caston filled out a pre-operational examination record of the company number M14 cement mixer truck. Caston drove this cement mixer truck to the Freeport-McMoRan Morenci Inc. mine in Morenci, Arizona with Butler, his passenger, who was in training as a cement mixer truck driver.

At 6:03 a.m., Caston and Butler arrived at the mine gate and proceeded to the concrete batch plant to await their first load. At 7:21 a.m., Caston and Butler received their first load of ten cubic yards of concrete. At 8:23 a.m., Caston and Butler hauled the concrete from the batch plant to the Shannon Booster Project work site. At 8:35 a.m., the load of concrete was rejected by PVB Fabrications Inc because it was too wet. After washing out the chute of the cement mixer truck, Caston and Butler drove the loaded vehicle down the Northwest Ramp to the batch plant to discard the rejected load of cement. Caston and Butler were following an escort vehicle through the mine, which was driven by Shirean Schmidt, Mixer Driver.

According to Butler, when Caston and Butler descended the Northwest Ramp, they lost the use of the service brakes on the cement mixer truck and the speed of the truck rapidly increased. At 9:03 a.m., Caston and Butler passed their escort vehicle and a Caterpillar 793D Haul Truck driven by Brenda Owen, Haul Truck Driver, who was also descending the Northwest Ramp. Owen radioed that the cement truck had passed her and said the cement truck was traveling faster than the haul road speed limit. As the cement mixer truck continued down the Northwest Ramp, it continued to accelerate, veered out of control on a curve, overturned on its side, and slid into a berm.

At 9:09 a.m., the first person on the scene, Meraya Milligan, Water Truck Driver, called a "Mayday" on the radio to alert mine staff that a serious accident had occurred. According to Milligan's interview, both miners were ejected from the truck. At 9:12 a.m., Vincente Moreno, Haul Truck Driver, also trained as an Emergency Medical Technician (EMT), arrived on the scene, and began administering first aid. Shortly after, another trained EMT, Daniel Leyvas, Safety Lead, arrived on the scene. The EMTs extricated Caston from the cab and moved him to a safe location to assess his injuries and began care. At 9:23 a.m., the FMI Ambulance crew, Kristen Kerrigan, Paramedic, and Ashleigh Hernandez, EMT, arrived on scene and assumed care of Caston. Then a second ambulance from Greenlee County arrived and assumed care of Butler. Caston and Butler were transported by two ground ambulances to Gila Health Resources Clinic. Butler was transported by ground, and Caston was airlifted, to the Banner University Medical Center in Tucson, Arizona where Caston was pronounced dead at 6:58 p.m.

INVESTIGATION OF THE ACCIDENT

On January 28, 2022, at 10:05 a.m., Jun Montes, Health and Safety Manager, called the Department of Labor National Contact Center (DOLNCC). The DOLNCC contacted Brad Breland, Assistant District Manager. Breland contacted Alijerado Bennett, Supervisory Mine Safety and Health Inspector, and Peter Del Duca, Assistant District Manager. Bennett sent Steven Arnhold, Mine Safety and Health Inspector, to the mine. At 6:10 p.m., Arnhold issued an order under the provisions of Section 103(k) of the Mine Act to assure the safety of the miners and preservation of evidence. Del Duca contacted Steven Polgar, Supervisory Mine Safety and Health Inspector, and assigned him as the lead accident investigator.

Polgar arrived at the mine site on January 30, 2022, at 9:00 a.m., and Del Duca arrived January 31, 2022, at 10:00 a.m., to conduct the investigation. MSHA's accident investigation team conducted an examination of the accident scene, interviewed miners and management, examined conditions, and reviewed work procedures relevant to the accident. See Appendix A for a list of persons who participated in the investigation.

The accident was investigated concurrently with the assistance of the Arizona State Mine Inspector's Office, and with maintenance and testing assistance provided by Empire Southwest, LLC (Caterpillar), which provides regular maintenance at this mine.

DISCUSSION

Location of the Accident

The accident occurred at the bottom of the Northwest Ramp (see Appendix B) prior to the intersection with the Light Vehicle Access Ramp. The portion of the Northwest Ramp that the cement mixer truck travelled had an average grade exceeding 10 percent, with peaks greater than 12 percent. A survey map is included in Appendix B for reference with stated grades along the ramp. After overturning and sliding on its side, the cement truck left marks in the unpaved Northwest Ramp roadway that investigators measured to be 252 feet long.

Equipment Involved

The truck involved in the accident was a Mack CV513 cab and chassis equipped with a cement mixer drum in a typical 10-wheel plus a tag axle (third axle) configuration, identified as company truck M14. Investigators determined that the third axle was not lowered while the truck was in use and therefore was not able to provide additional braking assistance.

Investigators noted the following defects in the braking system:

1. Three of the four brakes were out of adjustment beyond retirement criteria with the fourth being within 3/16 inches from required retirement criteria.
2. The rear drive axle had mismatching brake chambers with a standard Type 30 brake chamber paired with a Type 30 long stroke brake chamber. This configuration results in unequal brake force, timing, and less effective braking.
3. The brake shoe on the driver side was not correctly positioned.
4. One of the brake actuators had an air leak between the park and service brake chambers.
5. Five of six braking components were worn beyond retirement criteria.

These defects made operation of the truck hazardous. Tri County management was notified of the defective brakes on a pre-operational inspection record dated January 20, 2022 but did not take the truck out of service.

Seat Belts

Investigators determined that neither miner was wearing a seat belt at the time of the accident. Investigators examined and tested both seat belts and determined that they functioned as designed.

Weather

The weather on the day of the accident was a high of 57 degrees Fahrenheit with clear skies. Investigators determined that weather did not contribute to the accident.

Road Conditions

Investigators determined, based on investigation photographs and witness statements, the road was damp at the time of the accident. Investigators determined that the damp road did not contribute to the accident.

Training and Experience

Oscar Montano, Mine Safety and Health Training Specialist, examined Tri County's training plan, Caston's training records, and Butler's training records.

Caston had over three years of mining experience as a cement mixer driver for Tri County. Caston received eight hours of annual refresher training on January 21, 2022. Caston also received task training and hazard training. All training was completed in accordance with MSHA Part 48 training regulations.

Butler had over two years of mining experience, all with Tri County. Butler was being trained as a cement mixer driver. Butler had received eight hours of annual refresher training on February

19, 2021. Butler also received task training and hazard training. All training was completed in accordance with MSHA Part 48 training regulations.

Pre-Operational Examination

Investigators reviewed the pre-operational examination records for the M14 cement mixer truck. Investigators found that previous defects affecting safety, including brakes, were noted in the records, but no corrective actions were taken. Investigators found that Caston had reported that the brakes were out of adjustment on January 20, 2022. Nevertheless, the truck had been operated during that shift and subsequent shifts.

Investigators found that the air horn had been identified as not working on January 20, 2022, and on January 24, 2022, but had not been identified on every shift during which the truck had been operated since the condition was first noted.

Investigators discovered the mismatching brake canisters, improperly positioned brake shoe, worn S-cam bushings, and air leak between the park and service brake on the drive axle were obvious, but were not noted in the pre-operational examination records.

Investigators determined that the pre-operational examination of the M14 cement mixer truck was inadequate on the day of the accident and on three of the four days prior to the accident. Investigators determined that equipment was not removed from service when defects made operation hazardous.

ROOT CAUSE ANALYSIS

The accident investigation team conducted an analysis to identify the underlying causes of the accident. The team identified the following root causes, and the contractor implemented the corresponding corrective actions to prevent a recurrence.

1. Root Cause: The contractor did not maintain braking systems in functional condition and did not remove equipment from service until defects that make continued operation hazardous were corrected.

   Corrective Action: The contractor took all trucks out of service and inspected the braking systems on all trucks before putting them back in service. The contractor developed written criteria for removing defective equipment from service, specifically addressing defective brakes. The contractor developed a written Standard Operating Procedure (SOP) regarding inspecting brakes (before each vehicle use). All miners were trained on the criteria to recognize and remove defective equipment from service and on the SOP.

2. Root Cause: The contractor did not conduct adequate pre-operational examinations on mobile equipment prior to operation.

   Corrective Action: The contractor developed a written SOP regarding pre-operational examinations of mobile equipment. The SOP addresses who is responsible for performing the examinations, how to document the examination and correct the defects, where the completed documentation is turned in, and how records of corrections are kept. The contractor trained all miners on the SOP.

3. Root Cause: The contractor did not assure that miners wore seat belts.

   Corrective Action: The contractor developed a written SOP regarding seat belt use while all vehicles are in motion and trained all miners in the SOP.

CONCLUSION

On January 28, 2022, at 9:09 a.m., Monroe Caston, Jr., a 56 year-old mixer driver with three years of mining experience received fatal injuries, and David Butler, a 24 year-old mixer driver in training with two years of mining experience, received serious injuries when the cement mixer truck they were in lost control, overturned on its side, and slid into a berm.

The accident occurred because the contractor that employed Caston and Butler, Tri County Materials Inc (Tri County), did not: 1) maintain braking systems in functional condition and did not remove equipment from service until defects that make continued operation hazardous were corrected, 2) conduct adequate pre-operational examinations on mobile equipment prior to operation, and 3) assure that miners wore seat belts.

Approved By:

_____ _____

Dustan Crelly Date
District Manager

ENFORCEMENT ACTIONS

1. A 103(k) order was issued to Freeport-McMoRan Morenci Inc.

   An accident occurred at this operation on January 28, 2022, at 9:09 a.m. This order is being issued under the authority of the Federal Mine Safety and Health Act of 1977, under Section 103(k) to insure the safety of all persons at the mine, and requires the operator to obtain the approval of an authorized representative of MSHA of any plan to recover any person in the mine or to recover the mine or affected area. This order prohibits any activity in the affected area. The operator is reminded of the obligation to preserve all evidence that would aid in investigating the cause or causes of the accident in accordance with 30 CFR 50.12.

2. A 104(d)(1) citation was issued to Tri County Materials Inc for a violation 30 CFR 56.14101(a)(3).

   A fatal accident occurred at this operation on January 28, 2022, when a miner driving a Mack CV513 mixer was unable to control his speed while descending the Northwest Ramp. The truck subsequently overturned, coming to rest against a berm after sliding 252 feet on its side. The brakes on three of the wheels were found to be out of adjustment beyond retirement criteria while a fourth brake was almost out of compliance. The rear axle had mismatching brake canisters, including a standard chamber and a long stroke type 30 chamber. Mismatching brake canisters resulted in unequal brake force and timing. Additionally, five out of six S-Cams on the brake assemblies were worn beyond retirement criteria, which resulted in diminished braking capacity and one of the brake shoes starting to work its way out of the drum. This functional loss of half the braking system led to a rapid increase in speed, which terminated in a crash that resulted in fatal injuries to the driver and serious injuries to the passenger. The mine operator engaged in conduct constituting more than ordinary negligence in that the brake deficiencies were reported to the mine operator on January 20, 2022, and no effort was made to correct the hazardous condition. This violation is an unwarrantable failure to comply with a mandatory standard.

3. A 104(d)(1) order was issued to Tri County Materials Inc for a violation of 30 CFR 56.14100(a).

   A fatal accident occurred at this operation on January 28, 2022, when a miner driving a Mack CV513 mixer was unable to control his speed while descending the Northwest Ramp. After a rapid increase in speed, the truck overturned and came to rest against a berm after sliding 252 feet on its side. This caused fatal injuries to the driver and serious injuries to the passenger. The inconsistent inspection and reporting of the brake defects was evidenced by defects being reported on a pre-operational inspection dated January 20, 2022, but not on subsequent inspections despite the truck being driven on January 24, 25, 26 and 28, 2022, with no corrective measures taken. The air horn was identified as not working on January 20 and 25, 2022, but not on January 24 or 28, 2022, again with no corrective action between inspections. There was no pre-operation inspection record for January 26, 2022. The mismatching brake canisters were not identified on any of the pre-operational inspections. The vice president reviews the pre-operational inspection records and directs corrective

actions. The mine operator engaged in conduct constituting more than ordinary negligence in that no effort was made to ensure that consistent, adequate pre-operational inspections were being conducted to correct hazardous conditions. This violation is an unwarrantable failure to comply with a mandatory standard.

4. A 104(a) citation was issued to Tri County Materials Inc for a violation of 30 CFR 56.14131(a).

   A fatal accident occurred at this operation on January 28, 2022, when a miner driving a Mack CV513 mixer was unable to control his speed while descending the Northwest Ramp. The truck subsequently overturned, coming to rest against a berm after sliding 252 feet on its side. The crash resulted in fatal injuries to the driver and serious injuries to the passenger. Neither miner was wearing a seatbelt at the time of the crash. The passenger was fully ejected from the truck and the driver was partially ejected with his feet pinned under the pedals and his upper body outside the cab, on the ground.

5. A 104(d)(1) order was issued to Tri County Materials Inc for a violation 30 CFR 56.14100(c).

   A fatal accident occurred at this operation on January 28, 2022, when a miner driving a Mack CV513 mixer was unable to control his speed while descending the Northwest Ramp. The truck subsequently overturned, coming to rest against a berm after sliding 252 feet on its side. Excessive speed terminated in a crash that resulted in fatal injuries to the driver and serious injuries to the passenger. The brakes were reported to be out of adjustment on a pre-operational inspection dated January 20, 2022. The mismatching brake canisters were not identified on any pre-operational inspections but had been in that condition for an extended period of time. The truck was not removed from service at any point after the brake defects were reported. The mine operator engaged in conduct constituting more than ordinary negligence in that the no effort was made to remove defective equipment from service. This violation is an unwarrantable failure to comply with a mandatory standard.

6. A 104(a) citation was issued to Tri County Materials Inc for a violation 30 CFR 56.9101.

   A fatal accident occurred at this operation on January 28, 2022, when a miner driving a Mack CV513 mixer did not control his speed while descending the Northwest Ramp. While descending, the miner shifted the truck out of gear and was unable to shift back into any gear. This caused the speed of the truck to rapidly increase, which ultimately resulted in the truck overturning, and coming to rest against a berm after sliding 252 feet on its side. This resulted in fatal injuries to the driver and serious injuries to the passenger.

APPENDIX A – Persons Participating in the Investigation

Freeport-McMoRan Morenci Inc.

Jun Montes	Health and Safety Manager
Anna Laija	Director, Occupational Health and Safety
Rachel Adams	Root Cause Analysis Specialist
Daniel Leyvas	Safety Lead
Ashleigh Hernandez	Emergency Medical Technician
Boyce Butler	Equipment Operator
Jerry Alvillar	Safety Lead
Kristen Kerrigan	Paramedic
Meraya Milligan	Water Truck Driver
Vincente Moreno	Haul Truck Driver
Brenda Owen	Haul Truck Driver

Empire Southwest, LLC (Caterpillar)

Brant Mattice	Service Lead
Eric Aguilar	Commercial Motor Vehicle Technician
Don Seeley	Commercial Motor Vehicle Technician

Tri County Materials Inc

Susan Vlassis	President, Owner
Peter Vlassis	Vice President Concrete Pumping, Ready Mix, Crushing
David Butler	Mixer Driver in Training

Ames Construction

Shirean Schmidt	Mixer Driver

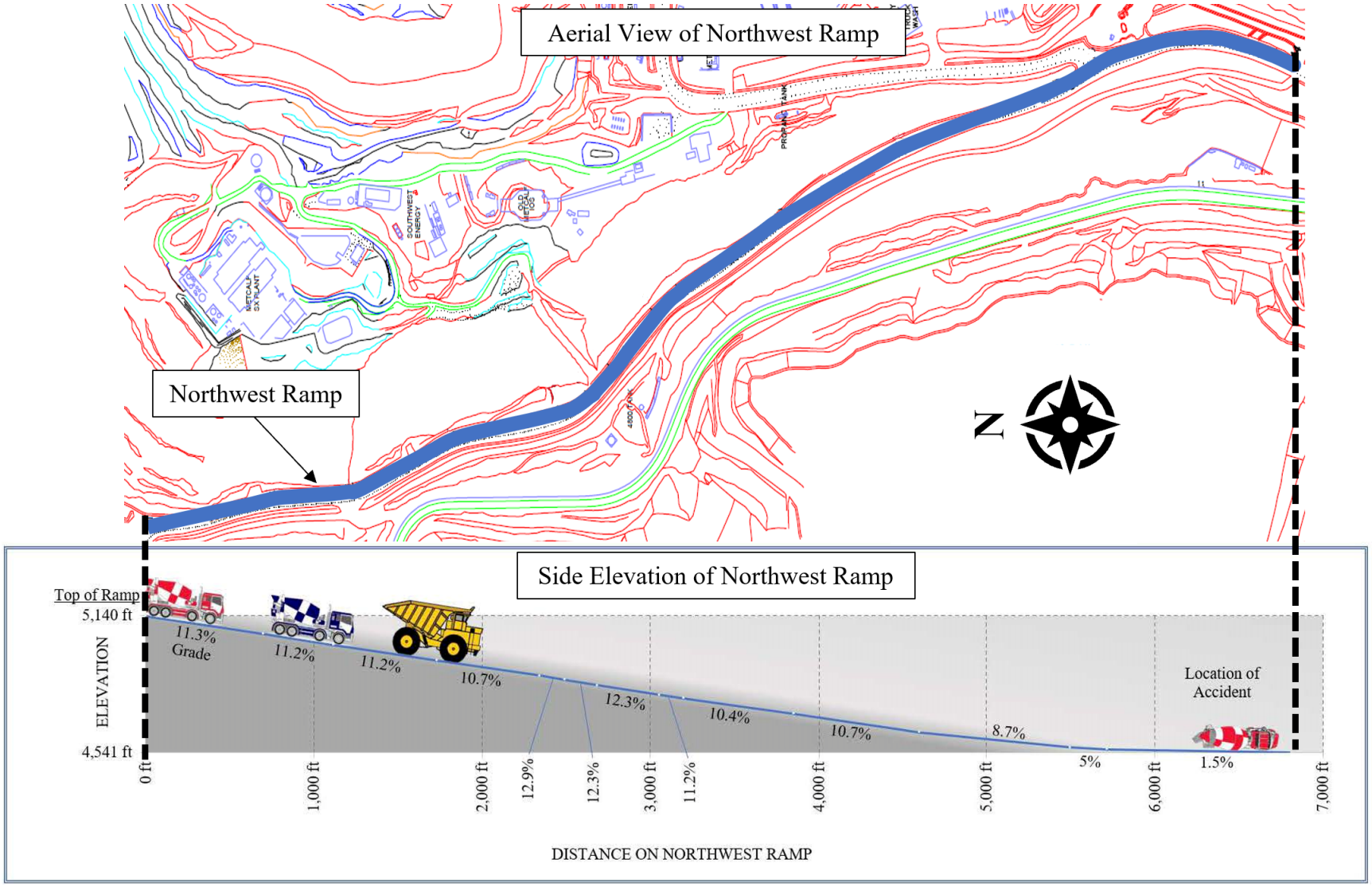
Arizona State Mine Inspector's Office

John Stanford	Senior Deputy Mine Inspector
Karen Johnson	Deputy Mine Inspector

Mine Safety and Health Administration

Brad Breland	Assistant District Manager
Peter Del Duca	Assistant District Manager
Alijerado Bennett	Supervisory Mine Safety and Health Inspector
Steven Polgar	Supervisory Mine Safety and Health Inspector
Steven Arnhold	Mine Safety and Health Inspector
Oscar Montano	Mine Safety and Health Training Specialist

APPENDIX B – Survey Map of Northwest Ramp



Images and distance between vehicles on the Northwest Ramp are for illustrative purposes only.