

UNITED STATES  
DEPARTMENT OF LABOR  
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Surface  
(Crushed & Broken Traprock)

Fatal Machinery Accident  
July 17, 2023

Holcim – NER, Inc.  
Swampscott Quarry  
Swampscott, Essex County, Massachusetts  
ID No. 19-00020

Accident Investigators

Jason Dibble  
Mine Safety and Health Inspector

Gary Merwine  
Mine Safety and Health Inspector

Terence Taylor  
Senior Civil Engineer

Originating Office  
Mine Safety and Health Administration  
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Peter Montali, District Manager

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## OVERVIEW

On July 17, 2023, at approximately 1:06 p.m., Christopher G. Perry, a 37-year-old miner with one year and six months of mining experience, died when he was helping to replace an arm guard on a gyrotory crusher. A steel lifting lug that had been welded onto the crusher's narrow arm guard detached and struck Perry while the narrow arm guard was being lifted by a crane.

The accident occurred because the mine operator did not ensure the miner was clear of a suspended load.

## GENERAL INFORMATION

Holcim – NER, Inc. owns and operates the Swampscott Quarry in Swampscott, Essex County, Massachusetts. This surface mine employs 32 miners and operates two eight-hour shifts, six days per week. The mine extracts traprock by drilling and blasting. The blasted material is transported to the onsite mill for processing. The finished product is sold to the construction industry.

The principal officer for Holcim – NER, Inc. at the time of the accident was:

Laura McCoy

Quarry Manager

The Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection at this mine on February 14, 2023. The 2022 nonfatal days lost (NFDL) incident rate for Swampscott Quarry was zero, compared to the national average of 1.27 for mines of this type.

## DESCRIPTION OF THE ACCIDENT

On July 17, 2023, Matthew Carrier, Second Shift Foreman, and John Kontarasis, First Shift Foreman, were performing repair work on the gyratory crusher which involved the removal and replacement of the arm guards. Carrier welded one 4-inch by 4-inch by ½-inch steel lifting lug on each of the arm guards so they could be lifted with a crane. Miners were going to lift the arm guards to clean and prepare the area before replacing the arm guards. An irregular-shaped hole of approximately 1.75-inch diameter was burned through the center of the lifting lugs so the rigging could be attached (see Appendix A).

At approximately 11:00 a.m., Christopher Perry arrived at the mine to assist with repairing the crusher. He entered the gyratory crushing chamber using a ladder to reach a temporary work platform that had been placed on top of the eccentric bushing, and assisted Kontarasis with lifting and cleaning under arm guard No. 3 (see Appendix B). Arm guard No. 3 is referred to as the “narrow arm guard” in the manufacturer’s literature. During the repair work, Kyle Hemenway, Laborer, gave radio signals to Tyler Handorff, Crane Operator, employed by Hallamore Corporation. Hemenway was located on an elevated platform around the crusher bin, approximately 25 feet above where Perry and Kontarasis were working in the crusher.

While the arm guard was lifted by the crane, Kontarasis kneeled to clean dirt and debris from under the arm guard. At this time, the welded connection of the lifting lug attached to the top of the narrow arm guard failed and the lug flew upward and struck Perry.

Michael Morency, Laborer, who had been handing tools to Perry and Kontarasis, called 911 on his cell phone at 1:08 p.m. Hector Casillas, Project Manager, employed by Turnkey Processing Solutions, heard yelling from the primary crusher area. Casillas immediately notified Laura McCoy, Quarry Manager, and secured the scene until Northeast Tech Rescue services arrived to remove Perry from the accident area. Madeline Moore, Chief Medical Examiner, pronounced Perry deceased at the medical examiner’s office.

## INVESTIGATION OF THE ACCIDENT

On July 17, 2023, at 1:19 p.m., John Erickson Jr., Regional Safety and Health Manager, called the Department of Labor National Contact Center (DOLNCC) to report a fatal accident. The DOLNCC contacted Kevin Abel, Assistant District Manager, and informed him of the accident. Abel sent Adrian Scallion, Mine Safety and Health Inspector, to the mine. At 3:20 p.m., Scallion arrived at the mine, began work to secure the area, and issued an order under the provisions of 103(k) of the Mine Act to ensure the safety of miners and preservation of evidence. Abel assigned Jason Dibble and Gary Merwine, Mine Safety and Health Inspectors, to investigate the accident. Dibble and Merwine arrived at the mine the next morning at 8:00 a.m. and began the investigation. Terence Taylor, Senior Civil Engineer, from Technical Support was also assigned to assist the district with the investigation. For a list of persons involved in the investigation, see Appendix C.

## DISCUSSION

### Weather

It was 88 degrees with clear skies at the time of the accident. Investigators determined weather was not a factor in the accident.

### Location of the Accident

The accident occurred at the Gyratory Crusher (see Appendix D).

### Equipment Involved

The crusher involved in the accident was a Metso 42-65 Superior MK-II Gyratory Crusher. The crusher was manufactured on February 28, 2005, and is utilized as the primary crusher at the mine.

A gyratory crusher is a machine that processes raw materials by crushing them into smaller pieces of various sizes to enable easier separation of different minerals from each other. Material is crushed between the moving surface and stationary surface of the cone, or between the moving surface and the inner wall of the shell.

The arm guard liners protect two support arms and a pinion shaft arm from rock abrasion and wear during crushing operations. The narrow arm guard liner being lifted at the time of the accident weighed approximately 320 pounds. The clearance between the edge of the work platform and the surface of the concave wear plates lining the crushing chamber above the arm guard was 14.5 inches. Because of the narrow clearance, miners decided to lift the arm guards up and clean under them, rather than completely remove them during cleaning. Hemenway, Kontarasis, and Morency all stated that narrow arm guard No. 3 was lifted and was unrestrained as Kontarasis cleaned beneath it with a compressed air wand and pry bar.

A 2008 Grove GMK-5220 crane was used to lift out crusher components and to lift the narrow arm guard at the time of the accident. The crane was able to lift 84,000 pounds in its configuration at the time of the accident. Boom movements and cabling up or down were controlled by moving two lever-arm joy sticks. During MSHA's investigation of the accident scene, a trained and qualified crane operator demonstrated that all the crane controls functioned as intended by the manufacturer. During interviews, the crane operator told investigators he reached to plug in his lunchbox into a 12-volt receptacle outlet prior to the accident. The investigation determined the joystick for the boom up control is next to the 12-volt plug receptacle. The crane was equipped with a load moment indicator (LMI) that provided the operator with a readout of the load magnitude.

To lift the arm guards, the miners used a 12-foot-long endless loop synthetic sling as a vertical hitch that hung from the crane hook at the base of the crane's lifting block. According to the manufacturer, the ultimate breaking load for the 12-foot-long sling is more than 66,000 pounds and could be as high as 79,200 pounds. The miners used a one-inch-diameter screw pin shackle to connect the bottom of the sling to the lifting lug. The shackle had an 8.5-ton capacity and the ultimate capacity was 51 tons or 102,000 pounds. Investigators determined that both the sling and shackle were adequate for lifting the narrow arm guard.

### Sling Manufacturer Simulation Tests

When the welds on the lifting lug broke, the lug, shackle, and sling traveled at least 16 feet vertically before coming to rest on the top side of the lifting block of the crane. Investigators contacted the sling manufacturer to conduct a series of quick release simulation tests to determine the force needed for the sling and rigging to travel a similar distance. The manufacturer first determined that the sling would travel less than an inch if the force was equal to the weight of the narrow arm guard liner at the time of the release. They then determined that 12,480 pounds of force was needed for the sling and rigging to travel the full 12-foot height of their test apparatus.

### Lifting Lug Welded Connection

To attach the lug to narrow arm guard No. 3, Carrier used a stainless-steel welding rod to make a single-pass weld on each side and across the front of the 4-inch-wide lug. There was no weld along the back 0.5-inch-thick edge because the position of the concave lining plates made it inaccessible. Based on interviews and observation of the weld, investigators determined Carrier used a stainless-steel welding electrode to ensure proper adhesion of the lug to the narrow arm guard.

Industrial Testing Laboratory Services (ITLS) examined the fracture surfaces of the welded connection between the lifting lug and narrow arm guard. ITLS determined that the weld filler was a good match for the narrow arm guard metal. ITLS concluded that the weld size far exceeded what was needed to suspend the 320-pound arm guard.

Based on these measured fracture areas and the strength of the weld metal and base metal, MSHA investigators determined that the welded connection was of sufficient strength to lift the narrow arm guard. Depending on the angle of inclination between the lifting sling and the longitudinal axis of the weld, the connection strength was calculated to vary between 26,000 pounds (longitudinal) and 59,700 pounds (perpendicular).

### Failure of Lifting Lug Connection

Based on interviews and testing, investigators determined the narrow arm guard was suspended, but then became caught on the underside of the concave lining plates, or wedged against the crusher, eccentric bushing, and support arm. The force applied by the crane to the rigging was much greater than the weight of the arm guard and rigging. Investigators determined that the crane boom or load line controls were engaged. This caused the arm guard to move and become hung up, allowing the load magnitude to rapidly increase beyond the strength of the weld. Investigators determined that this caused the accident.

### Communications

Hemenway and Handorff used handheld radios to communicate. Kontarasis was communicating from down within the crusher with Hemenway on the landing, who then radioed to Handorff to engage the desired crane function. Testing of the radios showed the radios were in good working order at the time of the accident. During interviews, investigators determined that there was an approximate three-second delay between voicing the desired command and the crane operator engaging the function. Investigators determined that communication with the crane operator was not a factor in the accident.

### Examinations

The investigators determined that a workplace examination was not conducted in the specific area where the work was taking place. Investigators determined that the lack of an examination was not a factor in the accident. A preoperational examination of the crane was conducted. Investigators determined this examination was not a factor in the accident.

### Training and Experience

Christopher G. Perry had one year and six months of mining experience, including two working periods at the mine from October 21, 2013, to March 3, 2014, and May 17, 2022, to July 17, 2023. Perry received Annual retraining on March 21, 2023.

Tyler Handorff worked out of the International Union of Operating Engineers Local 4 union hall as a qualified hoisting engineer in Massachusetts. His current national crane operator certification was issued on April 30, 2020, and expires on April 30, 2025. The mine operator trained Hallamore to operate the Grove 5220 crane on January 25, 2019. Handorff received site specific hazard training on July 17, 2023.

## ROOT CAUSE ANALYSIS

The accident investigation team conducted an 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 a recurrence.

Root Cause: The mine operator did not ensure the miner was clear of the suspended load.

Corrective Action: The mine operator developed and implemented a new written procedure for working around suspended loads and trained all miners in the new procedure and on the dangers of working near suspended loads.

## CONCLUSION

On July 17, 2023, at approximately 1:06 p.m., Christopher G. Perry, a 37-year-old miner with one year and six months of mining experience, died when he was helping to replace an arm guard on a gyratory crusher. A steel lifting lug that had been welded onto the crusher's narrow arm guard detached and struck Perry while the narrow arm guard was being lifted by a crane.

The accident occurred because the mine operator did not ensure the miner was clear of a suspended load.

Approved By:

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Peter Montali  
District Manager

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Date

## ENFORCEMENT ACTIONS

1. A 103(k) Order No. 9715810 was issued to Holcim – NER, Inc. on July 17, 2023:

A fatal accident occurred on July 17, 2023, at approximately 1:06 p.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 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(a) Citation to Holcim – NER, Inc. for a violation of 30 CFR 56.16009.

On July 17, 2023, a fatal accident occurred at this mine when a miner was struck by a lifting lug while performing repairs on the gyratory crusher. The mine operator did not ensure the miner stayed clear of a suspended load. The miner was standing inside the gyratory crusher, near the hoisted materials, when the lifting lug connection failed and the lug struck the miner, causing fatal injuries.



APPENDIX A – Lifting Lug Welded to Narrow Arm Guard No. 3



APPENDIX B – Narrow Arm Guard No. 3



APPENDIX C – Persons Participating in the Investigation

Holcim – NER, Inc. Swampscott Quarry

Tanya Taylor	Aggregates General Manager
Scott Jacoby	Vice President Health, Safety & Risk
Jacques Million	Aggregates Maintenance Manager
Laura McCoy	Quarry Manager
John Kontarasis	First Shift Foreman
Matthew Carrier	Second Shift Foreman
Robert Butland	Laborer
Omar Estevez-Giaimo	Laborer
Kyle Hemenway	Laborer
Michael Morency	Laborer
Matthew Quadros	Laborer
John Mello	Truck Driver (Miners' Representative)
Hilery O'Shaughnessy	Mechanic (Miners' Representative)

Hallamore Corp. (MSHA Contractor ID #P785)

Tyler Handorff	Crane Operator
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Turnkey Processing Solutions (MSHA Contractor ID #R722)

Hector Casillas	Project Manager
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Mine Safety and Health Administration

Jason Dibble	Mine Safety and Health Inspector
Gary Merwine	Mine Safety and Health Inspector
Adrian Scallion	Mine Safety and Health Inspector
Terence Taylor	Senior Civil Engineer, Technical Support
Scott Chiccarello	Mine Safety and Health Training Specialist



APPENDIX D – Aerial View of the Accident Scene

