FAI-6923436-1

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Surface
(Crushed, Broken Limestone)

Fatal Machinery Accident
October 1, 2022

R J Valente Grafton Quarry
R J Valente Gravel
Grafton, Rensselaer County, New York
ID No. 30-03434

Accident Investigators

Daniel Pullen
Mine Safety and Health Inspector

Michael Powers
Mine Safety and Health Inspector

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

TABLE OF CONTENTS

OVERVIEW

On October 1, 2022, at 8:13 a.m., Darren Miller, a 35 year-old mechanic with over 47 weeks of mining experience, died when he was struck by the overhaul hook ball on a crane. The crane was being used to install an engine and transmission in a haul truck when the overhaul hook ball detached and fell.

The accident occurred because the mine operator did not: 1) ensure that the mechanic stayed clear of suspended loads while replacing the engine in the haul truck, and 2) remove the crane from service to prevent operation in an unsafe manner.

GENERAL INFORMATION

R J Valente Gravel owns and operates the R J Valente Grafton Quarry, a surface limestone mine located in Grafton, Rensselaer County, New York. R J Valente Grafton Quarry employs 12 miners and operates one ten-hour shift per day, five days per week, and a half shift on Saturdays. The mine loads, hauls, and processes limestone from the quarry, and loads customer trucks with the final product.

The principal management officials at R J Valente Grafton Quarry at the time of the accident were:

Anthony Valente	Manager
Bryan Ostrander	Operations Manager

The Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection at this mine on July 7, 2022. The 2021 non-fatal days lost incident rate for R J Valente Grafton Quarry was 9.28, compared to the national average of 1.26 for mines of this type.

DESCRIPTION OF THE ACCIDENT

On October 1, 2022, at 7:00 a.m., Anthony Valente (Valente) and Darren Miller arrived at the mine site and began preparations to install the engine and transmission into the haul truck. At 7:09 a.m., Valente started the crane while Miller connected the crane's rigging to the engine. At 7:26 a.m., Valente activated the Load Moment Indicator (LMI) system override to bypass the safety system. The LMI system monitors various sensors, interprets the crane's changing configuration during a lift, and provides the crane operator with a continuous reading of the safe operating capacity.

Miller initially guided Valente's movement of the crane using hand signals from the ground. Valente lifted the engine from a trailer and moved it to the front of the truck. Guided by Miller's signals, Valente raised the engine and moved it slowly into place. When the engine was above the truck's engine compartment, Miller climbed up onto the truck frame behind the engine compartment. Valente raised the engine again to align it with the engine mounts. Valente stated that on at least two occasions, he increased the slack on the auxiliary line to avoid pulling the ball into the sheave. At one point, Miller yelled, "we're almost there."

Miller gave Valente the hand signal to move the crane's boom. When Valente made this adjustment, the overhaul hook ball was pulled up into the sheave, which severed the hoist rope. The overhaul hook ball fell and struck Miller. At 7:55 a.m., Valente called to Miller and received no response. Valente turned off the crane, exited the crane, observed Miller's condition, and ran to Ostrander to inform him of the accident.

At 8:03 a.m., Ostrander called 911. Grafton Fire Company, Inc and New York State Police were dispatched and arrived within minutes. Eric Cullum, Medical Legal Death Investigator for Rensselaer County, pronounced Miller dead at 8:13 a.m.

INVESTIGATION OF THE ACCIDENT

At 8:11 a.m., Ostrander called the Department of Labor National Contact Center (DOLNCC) to report the accident. The DOLNCC contacted Thomas Rasmussen, Staff Assistant. Rasmussen contacted, Brian Righi, Supervisory Mine Safety and Health Inspector, who called Ostrander and issued an order under the provisions of Section 103(j) of the Mine Act to ensure the safety of the miners and preservation of evidence. Righi sent Matthew Mattison, Mine Safety and Health

Inspector, to the mine. At 10:10 a.m., Mattison arrived at the mine and modified the 103(j) order to a 103(k) order. Andrew Bower, Supervisory Mine Safety and Health Inspector, sent Daniel Pullen and Michael Powers, Mine Safety and Health Inspectors, to the mine and assigned them to lead the investigation.

At 2:15 p.m., Pullen and Powers arrived at the mine to conduct the investigation. MSHA's accident investigation team conducted an examination of the accident scene, interviewed miners and mine management, and reviewed conditions 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 on Level 3 of the quarry (see Appendix B).

Weather

The weather at the time of the accident was 50 degrees Fahrenheit with mostly sunny skies and a light breeze. Investigators determined that weather did not contribute to the accident.

Equipment Involved

The haul truck involved in the accident was a Caterpillar 773B haul truck. Investigators found the crane's overhaul hook ball sitting on the frame of the haul truck. Based on interviews, investigators determined that Miller was standing on the haul truck's frame where the overhaul hook ball was found at the time of the accident. Investigators also determined that the haul truck did not have any defects that contributed to the accident.

The crane involved in the accident was a 2016 Grove RT765E-2 rubber-tired crane with a rated lifting capacity of 65 tons. The crane had two hoists, one main and one auxiliary. The main hoist had a load block lifting system that used pulleys to increase capacity for lifting heavier loads. The auxiliary hoist had an overhaul hook ball lifting system and was typically used for lighter loads when speed is more critical than weight capacity.

According to interviews, the crane was brought to the mine in April 2020 as a rental unit. While returning the crane to the rental company on April 21, 2020, the crane was damaged when it rolled over during the transportation process. The mine operator purchased and repaired the damaged crane. After the repairs were made, the crane was not certified or inspected by the manufacturer or a manufacturer's representative for use after the rollover incident. Manitowoc Crane Care sent a letter to R J Valente Gravel on January 21, 2021, stating that the damage to the crane meant it was not fit for service and that they would work with the crane's owner to ensure that the crane could be properly repaired and inspected afterward. Based on interviews, investigators learned that the crane was used at the mine soon after the mine operator made repairs. Additionally, the auxiliary wire rope hoist line on the crane was damaged in May 2022 and was defective at the time of the accident. During the four previous regular inspections conducted by MSHA, from February 2021 through July 2022, the crane was documented as "tagged out of service" and the crane received only a visual inspection.

Two-Blocking

Two-blocking is an unsafe condition where the crane's suspended load or loading attachments contact the sheaves at the end of the crane's boom (Appendix C). This can occur by raising the hoist past its upper limits or by telescoping the crane boom without releasing enough hoist line to compensate for the additional boom length. Two-blocking can cause damage to the hoist line and sheaves because the hydraulic power of the crane can exceed the material strength of these components. Failure of the hoist line causes the suspended load to fall.

The crane had an anti-two-blocking system consisting of two limit switches, a junction box, a signal cable, a cable reel, and a control system. The signals from the two limit switches combine in the junction box and relay through the signal cable into the cable reel that is on the side of the boom. The cable reel sends the limit switch signals to the control system in the operator's cab. The LMI system is part of the control system.

On October 3, 2022, Mark Kvitkovich and Jennifer Okpala, Mechanical Engineers with MSHA Technical Support (TS), and Roland Laxton, Technician for Stephenson Equipment, Inc., arrived at the mine to evaluate the crane and found multiple safety defects. On November 9, 2022, Darrick Marris, Vice President for Stephenson Equipment, Inc., and Eric Fidler, Director, Product Safety for Manitowoc Company, Inc., arrived at the mine site to assist TS investigators in their evaluation of the crane. Investigators obtained the saved electronic data stored in the control system of the crane (see Appendix D).

As part of the anti-two-blocking system, each hoist on the crane has a limit switch with a ten-pound weight attached to the hoist line above the suspended load. When the weight contacts the limit switch, the control system recognizes a two-blocking fault and stops the hydraulic hoist motor. This is designed to prevent the load from being raised any further. MSHA TS investigators did not find visual evidence of damage to the main hoist limit switch assembly but found damage to the auxiliary hoist limit switch assembly. Additionally, the weight was laying on the deck of the crane with damaged mounting hardware. This damage would not have allowed reattachment of this weight to the limit switch to function properly. Furthermore, the sheave on the end of the auxiliary hoist boom had paint transfer marks from the overhaul hook ball assembly, indicating that two-blocking had occurred. According to interviews, Valente frequently pulled the overhaul hook ball into the sheave on the end of the auxiliary hoist boom while operating the crane.

Another component of the anti-two-blocking system was the slip ring conductor. The cable reel used the slip ring conductor to maintain the electrical connection between the limit switches on the end of the boom and the control system in the operator's cab. MSHA TS investigators found the slip ring conductor dislodged, damaged, and laying inside the cable reel housing. The condition of the slip ring conductor caused the crane's control system to signal a two-blocking fault that limited the operation of the crane.

MSHA TS investigators determined that the only way to operate the crane was to bypass the anti-two-blocking system by activating the LMI system override function. The LMI system override switch was in the operator's compartment and activated by a key. The mine operator

kept the key in the crane. The crane was operated in an override mode because the control module was continuously giving an error which caused a flashing light alarm and an audible alarm to prevent operation of the crane. The crane operator had to turn and hold the key switch in the "On" position to activate the override function and turn off the alarm. The spring return key switch returned to the "Off" position when the crane operator released the key. The use of this override function by the crane operator allowed the crane to operate in an unsafe manner, which contributed to the accident. According to interviews, the anti-two-blocking system had not functioned during 2022 and the crane was always operated in the override mode. According to the data recorded by the crane, the LMI system override function was used 32 times between August 20, 2022, and October 1, 2022.

Training and Experience

Miller had over 47 weeks of mining experience, all as a mechanic with R J Valente Gravel, with regular travel between R J Valente Gravel mines. Scott Chiccarello and Kathleen Hammerlin, Mine Safety and Health Training Specialists, reviewed the mine operator's training plan, including Miller's and Valente's training records. Miller received Newly Hired Experienced Miner Training in accordance with MSHA Part 46 training regulations. Miller had previous experience in performing this task as a mechanic, however task training records were not available.

Valente has been with the mine for 24 years and five months and has been employed in his current position for approximately five years. Valente's primary responsibilities at the mine were management of day-to-day operations. Investigators learned Valente did not receive task training on the 2016 Grove RT765E-2 crane and falsified his task training certificate. However, Valente's actions demonstrate that he knew how to perform certain functions in the override mode.

Examinations

There were no records of pre-operational inspections for the crane. The crane was listed as out of service during each of the prior four MSHA inspections. The mine operator continued to operate the crane despite having knowledge that there were defects that affected safety.

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 mine operator implemented the corresponding corrective actions to prevent a recurrence.

1. Root Cause: The mine operator did not ensure that the mechanic stayed clear of suspended loads while replacing the engine in the haul truck.

   Corrective Action: The mine operator developed and implemented a new written procedure for working near suspended loads. All miners were trained in this new procedure.

2. Root Cause: The mine operator did not remove the crane from service to prevent operation in an unsafe manner.

Corrective Action: The crane involved in the accident was permanently removed from service. The mine operator developed and implemented a new written procedure for out of service criteria of mobile equipment. All miners were trained in this new procedure.

CONCLUSION

On October 1, 2022, at 8:13 a.m., Darren Miller, a 35 year-old mechanic with over 47 weeks of mining experience, died when he was struck by the overhaul hook ball on a crane. The crane was being used to install an engine and transmission in a haul truck when the overhaul hook ball detached and fell.

The accident occurred because the mine operator did not: 1) ensure that the mechanic stayed clear of suspended loads while replacing the engine in the haul truck, and 2) remove the crane from service to prevent operation in an unsafe manner.

Approved By:

_____ _____

Peter Montali Date
District Manager

ENFORCEMENT ACTIONS

1. A 103(k) order was issued to R J Valente Gravel.

   A fatal accident occurred on October 1, 2022, at 8:13 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 R J Valente Gravel for a violation of 30 CFR 56.16009.

   On October 1, 2022, a fatal accident occurred at this mine when a mechanic was struck by the overhaul hook ball that detached and fell from a 2016 Grove RT765E-2 crane, Serial No. 235630. The mine operator did not ensure that the mechanic stayed clear of suspended loads while replacing the engine in the haul truck. The miner was working directly with the mine's manager, Anthony Valente. The mine operator engaged in aggravated conduct constituting more than ordinary negligence by allowing the mechanic to work under a suspended load under direct supervision of the mine's manager. This violation is an unwarrantable failure to comply with a mandatory standard.

3. A 104(d)(1) order was issued to R J Valente Gravel for a violation of 30 CFR 56.14100(c).

   On October 1, 2022, a fatal accident occurred at this mine when a mechanic was struck by the overhaul hook ball that detached and fell from a 2016 Grove RT765E-2 crane, Serial No. 235630. The mine operator did not prevent operation of the crane with multiple safety defects that made continued operation hazardous, including a non-functioning anti-two block system and a damaged auxiliary wire rope. The damaged and non-functioning safety features created defects which required that the crane be taken out of service. Anthony Valente knew that the machine had safety defects. The manufacturer of the crane sent a letter concerning damages and certification of the crane. The crane's alarms were functioning to indicate failure of system. The mine operator engaged in aggravated conduct constituting more than ordinary negligence by knowingly operating the crane while intentionally overriding key safety functions. This violation is an unwarrantable failure to comply with a mandatory standard.

APPENDIX A – Persons Participating in the Investigation

R J Valente Gravel

Anthony Valente	Manager
Bryan Ostrander	Operations Manager
Stephen A. Valente	Sales Manager
Stephen J. Valente	Front End Loader Operator
Jason DuPont	Front End Loader Operator
Mark DiFusco	Water Truck Driver
Eric Gapp	Plant Operator
Michael Jeske	Plant Operator
Joseph Canaam	Plant Laborer
Sean Fredericks	Plant Laborer

Stephenson Equipment, Inc.

Darrick Marris	Vice President
Roland Laxton	Technician

Manitowoc Company, Inc.

Eric Fidler	Director, Product Safety

Mine Safety and Health Administration

Matthew Mattison	Mine Safety and Health Inspector
Michael Powers	Mine Safety and Health Inspector
Daniel Pullen	Mine Safety and Health Inspector
Scott Chiccarello	Mine Safety and Health Training Specialist
Kathleen Hammerlin	Mine Safety and Health Training Specialist
Mark Kvitkovich	Mechanical Engineer, Technical Support
Jennifer Okpala	Mechanical Engineer, Technical Support

APPENDIX B – Aerial View

APPENDIX C – Photo of Accident Scene

APPENDIX D – Significant Data Recorded on Date of Accident

Significant Events	Date	Time (EDT)	Definition/Meaning
Switched On	10/1/2022	07:09:39	Machine Ignition Turned On
LMI Error: A1	10/1/2022	07:09:42	Anti-Two-Blocking Safety System Activated by LMI System
LMI: Bypass On	10/1/2022	07:26:41	LMI System Override Activated by Machine Operator
Switched Off	10/1/2022	07:55:53	Machine Ignition Turned Off