FAI-6847530-1

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

# REPORT OF INVESTIGATION

Surface
(Granite)

Fatal Powered Haulage Accident
October 14, 2020

Columbia Quarry
Vulcan Construction Materials, LLC
Columbia, Richland County, South Carolina
Mine ID No. 38-00013

Accident Investigators

Darren A. Conn
Supervisory Mine Safety and Health Inspector

Shawn J. Rees
Mine Safety and Health Inspector

Originating Office
Mine Safety and Health Administration
Birmingham District
1030 London Dr. Suite 400
Birmingham, Alabama 35211
Mary Jo Bishop, District Manager

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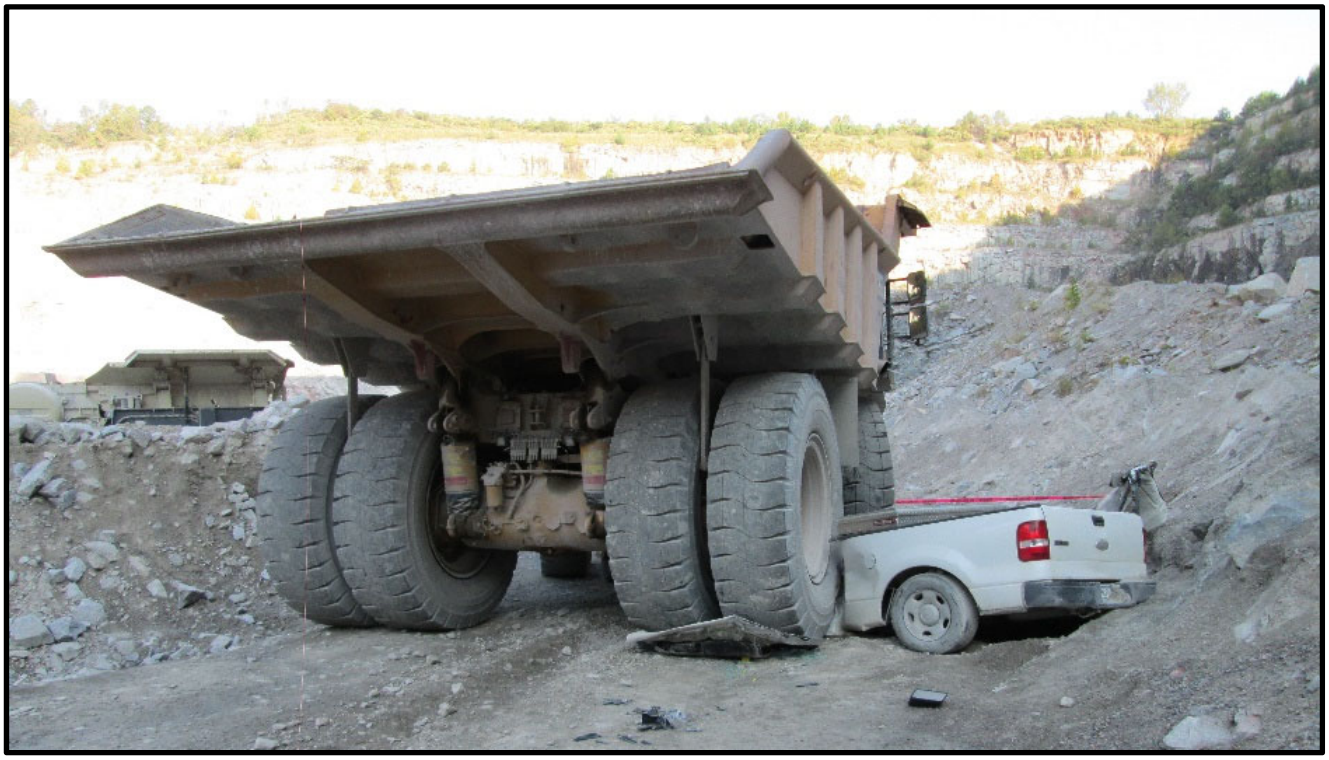

## OVERVIEW

On October 14, 2020, at approximately 12:40 p.m., Esau Belton, a 61-year-old Leadman with 25 years of mining experience, died when a haul truck ran over his pickup truck.

The accident occurred because mine management did not ensure miners adhered to traffic policies, procedures, and controls. Mine management did not address traffic pattern changes created by a screening plant and stock pile at the edge of the haul road.

## GENERAL INFORMATION

Vulcan Construction Materials, LLC owns and operates the Columbia Quarry, in Columbia, Richland County, South Carolina. Columbia Quarry operates one ten-hour shift, four days per week.

Miners drill and blast to extract granite from an open pit quarry. Equipment operators load material into large off-road haul trucks. The haul trucks deliver the mined rock to a primary crusher where the rock is initially sized. A belt conveyor transports the granite to a secondary plant for sizing and screening. Columbia Quarry sells the granite to various consumers after processing.

The principal officers for Vulcan Construction Materials, LLC (Vulcan) at the time of the accident were:

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| David Clement | Senior Vice President |
| Suzanne Wood | Senior Vice President |
| Tom Baker | Chief Operating Officer |

The Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection at this mine on July 1, 2020. The 2019 non-fatal, days lost (NFDL) incident rate for Columbia Quarry was zero, compared to the national average of 1.47 for mines of this type.

## DESCRIPTION OF THE ACCIDENT

On October 14, 2020, at 5:00 a.m., Belton arrived at the Columbia Quarry. Belton reviewed paperwork and conducted a daily safety meeting at 6:00 a.m. with the pit crew where he spoke to miners about three points of contact while climbing and being aware of surroundings. After the safety meeting, Belton proceeded to the pit where he inspected haul roads for hazards and checked pit pumps.

At 8:21 a.m., Belton had a conversation with Jeffrey Huntley, Plant Manager. At approximately 10:00 a.m., Belton parked his pickup truck on the north end of the bench road close to the loading area. Belton got into the fuel truck and started going about his daily job duties servicing and fueling equipment.

At approximately 11:30 a.m., Jeremy Cline, Equipment Operator, contacted Belton, via two-way radio on channel one, to let him know the bottom of the lip shroud had broken off the bucket of the front-end loader. Belton instructed Cline to take the front-end loader to the main shop area and wash the mud out of the bucket. Shortly after, Belton arrived in the fuel truck and assessed the damage while helping Cline remove the teeth on the loader bucket. The replacement parts were located in an area behind the shipping container, so Belton told Cline he was taking the fuel truck back to the bench road loading area to retrieve his pickup truck. Belton asked Cline if he wanted to ride with him to retrieve the pickup truck and travel to the shipping container. Cline decided to stay and remove the remainder of the shrouds from the loader bucket.

According to Ronnie Lawhorn, Haul Truck Driver, Belton traveled in the fuel truck past the primary crusher hopper at approximately 12:30 p.m. and blew the horn, signaling he was in the area, but did not say anything on the two-way radio. Lawhorn waited to dump while Belton continued to the bench road loading area. Belton arrived at the bench road loading area and parked the fuel truck. While driving towards to the primary crusher, Neal Gunther, Haul Truck Driver, passed Belton on the bench road at the loading area.

At approximately 12:40 p.m., Belton was traveling in his pickup truck preparing to exit the bench road, while Lawhorn was in his haul truck traveling down the main haul road preparing to enter the bench road. Miners in the pit and primary crusher area, with access to channel one on a two-way radio, stated that neither Belton nor Lawhorn announced himself as exiting or entering the bench road. Lawhorn made an unusually sharp right-hand turn onto the bench road. Within approximately thirty feet, Lawhorn felt the front right tire of the haul truck raise and thought he had hit a large rock in the road. Fearing he had cut the tire, Lawhorn exited the haul truck's cab to assess the damage. Lawhorn noticed he had struck a pickup truck, and the pickup truck had lodged under the haul truck. Then, Lawhorn noticed Belton was inside the pickup truck.

Lawhorn immediately radioed for help. Cory Johnson, Haul Truck Driver, was simultaneously coming off the bench road after his haul truck had been loaded. Johnson saw the accident and radioed Huntley to get to the scene as quickly as possible. Gunther was preparing to dump at the primary crusher and heard the distress call on the radio. Gunther looked down the hill, saw the accident, and, at 12:42 p.m., called Huntley on his cell phone. Johnson exited his haul truck and ran to the scene to assist.

Huntley arrived at the scene and immediately activated the emergency response plan. Gunther called 911 at 12:45 p.m., while Huntley checked for vital signs and determined Belton did not have a pulse.

The Columbia-Richland Fire Department and Emergency Medical Service (EMS) arrived at the mine at 12:55 p.m. Upon arrival at the accident scene, EMS personnel determined that Belton was deceased. Amber Hynes, Richland County Deputy Coroner, traveled to the accident scene and pronounced Belton dead at 12:49 p.m. The South Carolina Highway Patrol arrived on scene at 1:44 p.m. to conduct an independent investigation.

## INVESTIGATION OF THE ACCIDENT

On October 14, 2020, at 1:02 p.m., Charles T. Chidsey, Vulcan's Director of Safety for the Southeast Region, called the Department of Labor National Contact Center (DOLNCC) to report a possible fatal accident. The DOLNCC contacted Brian Thompson, Assistant District Manager, who contacted Jeffery Phillips, Supervisory Mine Safety and Health Inspector, who contacted the mine and issued a 103(j) order orally. Phillips then traveled to the mine site with Benjamin D. Adams, Mine Safety and Health Inspector, who modified the 103(j) order to a 103(k) order upon arrival.

On October 15, 2020, at 8:46 a.m., Darren A. Conn, Supervisory Mine Safety and Health Inspector, and Shawn J. Rees, Mine Safety and Health Inspector, arrived at the mine to conduct the accident investigation. MSHA's accident investigation team conducted a physical inspection of the accident scene, haul truck, and pickup truck; interviewed employees; reviewed training documentation; and examined work procedures relevant to the accident. MSHA conducted the investigation in cooperation with mine management and mine employees. See Appendix A for a list of persons who participated in the investigation.

## DISCUSSION

### Location of the Accident

The accident occurred on the bench road, which is a single lane road off the pit's main haulage road (see Appendices B & C). The main haulage road measured approximately fifty-one feet in width and had a grade of fourteen percent. To access the bench road safely from the main haulage road, the entrance to the bench road was widened to approximately eighty feet. On January 19, 2019, the mine operator installed a screening plant at the edge of the bench road, visible on the right hand side of the haul road (see Appendix B). There was also a stockpile to supply the screening plant. The installation of the screening plant and the stockpile narrowed the bench road at the turning area down to twenty-eight feet.

The haul truck contacted the pickup truck approximately thirty feet from where the haul truck turned off the main haulage road onto the bench road. Based on observations of the accident scene, investigators believe the haul truck pushed or dragged the pickup truck approximately twelve feet (there was the presence of a shallow rut consistent with the pickup truck's tires). The haul truck and the pickup truck came to rest on the bench road at a two percent downhill grade. The bench road was dry, hard packed, and properly maintained.

Most mine roads at Columbia Quarry have a right-hand traffic pattern with the exception of pit roads and bench roads. The main pit roads have a left-hand traffic pattern. Bench roads are single-lane where empty haul trucks yield to loaded haul trucks. An empty haul truck, such as the haul truck

driven by Lawson at the time of the accident, traveling to be loaded would be in a left-hand traffic pattern on the main pit road, then make a right hand turn onto a single lane bench road.

Weather Conditions

The weather at the time of the accident was clear with calm winds and a temperature of 74 degrees Fahrenheit. Investigators determined that weather was likely not a factor in the accident.

Traffic Policies, Procedures, and Controls

The mine had verbal policies regarding traffic policies, procedures, and controls. The policies included radio communication, speed limits, right of way, and traffic patterns. Accident investigators determined miners, including equipment operators in the pit area, were properly trained on the aforementioned policies, but did not follow all policies. Investigators could not find any evidence that an audit of the policies was ever conducted.

Truck drivers were instructed verbally to make a wide right turn from the main haulage road to the bench road, and follow the berm to the narrower portion of bench road near the screening plant. Three truck drivers did this, but Lawhorn did not. Instead of making a wide turn, he made a sharp turn and drove directly to the narrower portion of the bench road. Also, investigators determined that although normally followed, the established radio communication policy was not followed pertaining to entering/exiting pit roads and/or bench roads at the time of the accident

Equipment Involved

A 2012 Caterpillar 777G 100 Ton Off-Highway Haul Truck was involved in the accident. MSHA found no defects affecting the safe operation of the haul truck.

The haul truck was equipped with two cameras: (1) front view, center mounted above the engine compartment and (2) rear view center mounted. The camera images are displayed on a four-inch by six-inch screen monitor inside the operator's compartment. With the transmission of the haul truck placed in park, the image displayed on the screen monitor is front facing. With the transmission placed in drive, the image displayed on the screen monitor is front facing, and with the transmission placed in reverse the image displayed on the screen monitor is rear facing. Both the front and rear facing cameras functioned properly when tested.

Investigators checked the camera visibility on the right side front frame plate (bumper) of the haul truck. The operator had visibility on the front camera eight feet eight inches from the right front wheel and over four feet from the right front frame (bumper) of the haul truck. The haul truck's camera system was not equipped to record data. Investigators determined that Lawhorn probably could not see the truck Belton was driving on the monitor for the front facing camera because the sharp right turn placed the pickup truck too close to the vehicle to register on the camera.

Blanchard Caterpillar downloaded the Engine Control module and Vital Information Management System and did not find any faults from the day of the accident.

Investigators noticed damage on the right side of the haul truck was limited to paint scuffs, scratches, and a damaged hydraulic hose.

The victim was operating a 2007 Ford F-150 company pickup truck. The pickup truck was sufficiently damaged so that MSHA could not conduct a functionality test of the pickup truck's controls, engine, brakes, lights, horn, steering and transmission.

Examinations

Mine management conducted a workplace examination on the main haulage road the morning of the accident with no hazardous conditions reported or recorded. Mine management conducted a workplace examination on the bench road the morning of the accident with no hazardous conditions reported or recorded. Mine management conducted a pre-operational examination on the haul truck the morning of the accident with no defects affecting safety reported or recorded.

Training and Experience

Esau Belton worked at the Columbia Quarry for seventeen years. He had been a Leadman since March 2018. Belton's duties included assisting the pit supervisor in overseeing all pit operations, servicing equipment, and training miners on new tasks, including traffic patterns and rules. MSHA determined he completed all required task training pursuant to Part 46, including traffic policies, procedures, and controls pertaining to radio communication in May 2016. Ronnie Lawhorn completed the same training in January 2018.

## ROOT CAUSE ANALYSIS

The accident investigation team conducted an analysis to identify the underlying causes 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 accident occurred because mine management did not ensure its established policies, controls, and procedures governing traffic control were followed.

Corrective Action: Mine management installed new equipment, developed new written policies and procedures governing traffic control, and trained all miners. Additionally, mine management relocated the screening plant and widened the bench road in that area from 28 feet to 78 feet. The new equipment and revised policies and procedures include the following:

1. Whip flags equipped with strobe lights on all vehicles traveling to the pit area. Vehicles are prohibited from entering the pit area unless they are equipped with a whip flag and strobe light.
2. Every vehicle traveling to the pit area (crossing under the C-2 belt conveyor) must have a radio set to the proper channel with instructions on how to use the radio pertaining to communication procedures.
3. Standardized communication procedures when entering the pit area. Truck to truck communication requiring three-part communication. The three-part communication policy consists of communication where equipment operators will have to announce entering/exiting pit roads, have it acknowledged by an oncoming equipment operator, and then repeat the receipt of acknowledgement.
4. Install signs at the C-2 belt conveyor posting the requirements for new radio procedures before proceeding, as well as posting three-part communication requirements for personnel in the pit.
5. Place convex mirrors at all active bench entrances.
6. Replace approximately 100 feet of earthen berm with large boulders. This will help an equipment operator to see pit road traffic between the boulders when entering/exiting pit roads.
7. Train miners on the need to maintain established traffic patterns, blind spot distances of haul trucks, and haul truck and pit traffic safe practices.

## CONCLUSION

On October 14, 2020, at approximately 12:40 p.m., Esau Belton, a 61-year-old Leadman with 25 years of mining experience, died when a haul truck ran over his pickup truck.

The accident occurred because mine management did not ensure miners adhered to traffic policies, procedures, and controls. Further, a screening plant and associated stock pile at the edge of the haul road was an aggravating factor that may have contributed to the accident.

Approved By:

_____ _____

Mary Jo Bishop Date
District Manager

ENFORCEMENT ACTIONS

1. Order No. 9497761- Issued October 14, 2020, at 12:58 p.m., to Columbia Quarry under provisions of Section 103(j) of The Mine Act.

   An accident occurred at this operation on 10-14-2020 at approximately 12:50 resulting in a haul truck colliding with a pickup truck along the haul road on the portable crusher level. One miner is trapped inside the pickup truck at this time. MSHA issued this order, under Section 103(J) of the Federal Mine Safety and Health Act of 1977, to prevent the destruction of any evidence, which would assist in investigating the cause or causes of the accident. It prohibits all activity at the immediate areas surrounding the Cat 777G haul truck and the Ford F150 until the extraction of the trapped miner and MSHA has determined that it is safe to resume normal mining operations in this area. The inspector issued the order orally to the mine operator at 12:58 p.m. and reduced it to writing.

2. Order No.9497761-1 - Issued October 14, 2020 at 3:00 p.m. to Columbia Quarry under provisions of Section 103(k) of The Mine Act.

   MSHA modified the initial order to reflect that MSHA is now proceeding under the authority of Section 103(k) of the Federal Mine Safety and Health Act of 1977. This Section 103(k) Order is intended to protect the safety of all persons on-site, including those involved in rescue and recovery operations or investigation of the accident. The mine operator shall obtain prior approval from an Authorized Representative of the Secretary for all actions to recover and/or restore operations in the affected area. Additionally, the mine operator is reminded of its existing obligations to prevent the destruction of evidence that would aid in investigating the cause or causes of the accident.

3. A 104(a) citation was issued to Vulcan Construction Materials, LLC for a violation of 30 CFR § 56.9100(a).

   A fatal accident occurred in the pit area of the mine on October 14, 2020, at approximately 12:40 p.m., when a Leadman in a Ford F-150 company pickup truck, exiting the 330 bench road, was run over by a Caterpillar 777G haul truck, entering the 330 bench road. Neither the driver of the haul truck, nor the driver of the pickup truck, announced himself as entering or exiting the bench road. Established policies, procedures, and controls governing traffic were not being followed.

Appendix A
Persons Participating in the Investigation

Vulcan Columbia Quarry

| | |
|---|---|
| Jeffrey Huntley | Plant Manager |
| Charles T. Chidsey | Regional Safety Director |
| Christine Behnke | Safety & Health Representative |
| Bill Doran | Attorney (Outside Counsel) |
| Cory Johnson | Haul Truck Driver |
| Jeremy Cline | Equipment Operator |
| Forrest Farmer | Plant Operator |
| Neal Gunther | Haul Truck Driver |
| Ronnie Lawhorn | Haul Truck Driver |

South Carolina Highway Patrol

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|---|---|
| J. Vaughan | Trooper |

Mine Safety and Health Administration

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|---|---|
| Darren A. Conn | Supervisory Mine Safety and Health Inspector |
| Shawn J. Rees | Mine Safety and Health Inspector |
| Scott K. Johnson | Educational Field and Small Mine Services Supervisor |

APPENDIX B
Photograph of Accident Scene

APPENDIX C
Aerial Photograph - Pit