FAI-7026231-1

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Underground
(Coal)

Fatal Powered Haulage Accident
March 22, 2023

Longview Mine
Century Mining LLC
Volga, Barbour County, West Virginia
ID No. 46-09447

Accident Investigators

Nicholas Blevins
Mining Engineer

Bryan Yates
Mine Safety and Health Specialist

Originating Office
Mine Safety and Health Administration
Morgantown District
604 Cheat Road
Morgantown, WV 26508
Carlos Mosley, District Manager

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OVERVIEW

On March 22, 2023, at approximately 8:50 a.m., Cecil Barker, a 62 year-old surveyor with over 17 years of mining experience, died when a battery powered personnel carrier on which he was riding overturned.

The accident occurred because the mine operator did not: 1) maintain the Company No. 2 Stryker personnel carrier in safe operating condition, 2) conduct adequate pre-operational examinations, and 3) ensure the number of miners traveling on each personnel carrier did not exceed the available number of seats when transporting miners.

GENERAL INFORMATION

Century Mining LLC, a subsidiary of American Metals and Coal International Inc., owns and operates the Longview Mine in Volga, Barbour County, West Virginia. The underground coal mine employs 208 miners and operates two twelve-hour shifts, seven days per week. The mine operates three mechanized mining units using continuous mining (CM) machines to extract coal. Belt conveyors transport the coal to the surface.

The principal management officials at the Longview Mine at the time of the accident were:

Keith Hainer	President
Ryan Toler	General Manager
Mark Kimler	Superintendent
Daniel Curry	Safety Manager

The Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection at this mine on March 21, 2023. The 2022 non-fatal days lost incident rate for the Longview Mine was 1.82, compared to the national average of 3.22 for mines of this type.

DESCRIPTION OF THE ACCIDENT

On March 22, 2023, at 6:30 a.m., Barker began his shift. Barker and William Allen Jr., Surveyor, reviewed production reports from previous shifts and planned to set survey spads on the Tailgate section based on the reports. They also planned to survey for a belt drive location in Northeast Mains. Barker and Allen entered the mine and proceeded to the mouth of the Tailgate section. They obtained the Company No. 2 four-person Electric Mine Utility Vehicle (EMU) and Allen drove them to the working section. After setting the spads, Barker and Allen loaded their equipment onto the Company No. 2 two-person personnel carrier (Stryker) to go to Northeast Mains. Allen stated he conducted a visual exam of the Stryker and found no issues.

At approximately 8:40 a.m., Barker and Allen started travelling outby and Allen drove the Stryker in the No. 2 entry toward the Northeast Mains with Barker sitting in the passenger's seat. They picked up Adam Elkins, Engineer, who was walking inby to assist Barker and Allen for the day. Barker sat on top of the Stryker with his feet down behind the seats and Elkins sat in the passenger seat.

According to interviews, Allen continued to drive the Stryker outby and started up a grade. See Appendix A for a map of the accident scene. At approximately 15½-block, Elkins accidentally depressed the emergency stop button (E-stop) located between the seats on the center console (see Appendix B). The E-stop shut the power off to the Stryker, which came to a stop and began drifting backwards downhill. Elkins pulled the E-stop button back out, restoring power to the Stryker. The lights came back on, but the tram control, including the regenerative braking did not work. Allen applied the foot brake and the hand activated parking brake but neither functioned. The Stryker began to pick up speed and Allen attempted to keep it in the center of the entry as it rolled backwards so the Stryker would not contact the entry ribs and overturn. The Stryker travelled approximately 210 feet and entered the 17-block intersection and veered toward the passenger side rib.

At approximately 8:50 a.m., the rear passenger side of the Stryker impacted the rib inby the 17-block intersection. The passenger side rear tire travelled up the rib, causing the Stryker to overturn. Barker and Allen ended up underneath the Stryker and Elkins was thrown clear. Allen crawled out from under the Stryker and yelled for Barker and Elkins but only got a response from Elkins. Allen ran around the Stryker and found Barker pinned under the passenger side.

Allen checked Barker's pulse, could not detect one, and started cardiopulmonary resuscitation (CPR).

Elkins and Allen notified John Maier, Dispatcher, about the accident and that they needed an ambulance and help to free Barker from underneath the Stryker. Brandal Carr, CM Maintenance Supervisor; Jacob Godfrey, Management Trainee; Gordon McGee, Outby Electrician; Jason Tenney, CM Supervisor; and James Sublett, Outby Foreman/Emergency Medical Technician (EMT), arrived at the accident scene to help while Allen continued CPR. The men lifted the Stryker and pulled Barker from underneath and Sublett took over CPR for Allen.

Robert Mulvihill, Roof Bolter/EMT; and Gregory Hoffman, Roof Bolter, retrieved the Automated External Defibrillator (AED) and the EMT kit from the Tailgate section and traveled to the accident scene. Mulvihill placed the AED pads on Barker. The AED did not advise giving a shock at that time. He also used an oral airway and bag valve mask to supply oxygen to Barker while continuing chest compressions.

Miners secured Barker to a backboard and placed him on the emergency EMU for transport to the main line track. Tenney, Mulvihill, Sublett, and Harry Foster II, Communications/Outby Electrician, rode on the EMU with Barker. The AED advised giving Barker a shock twice on the way out which were administered. The miners transferred Barker to a diesel rail-mounted personnel carrier at the mainline track and transported him to the portal bottom where they rode the elevator to the surface. At 9:20 a.m., Barker was transferred to Barbour County Emergency Medical Services and driven to Broaddus Hospital where Robert Sutherland, D.O., pronounced Barker dead at 9:50 a.m.

INVESTIGATION OF THE ACCIDENT

On March 22, 2023, at 9:04 a.m., Daniel Curry, Safety Manager, called the Department of Labor National Contact Center (DOLNCC) to report the accident. The DOLNCC contacted Michael Stark, Staff Assistant. Stark sent Nicholas Blevins, Mining Engineer, and Bryan Yates, Mine Safety and Health Specialist, to the mine to conduct the accident investigation. Stark also notified Kevin Honeycutt, Supervisory Mine Safety and Health Inspector, of the accident.

At 10:00 a.m., Honeycutt and Zackery Bray, Mine Safety and Health Trainee, arrived at the mine. Honeycutt issued an order under the provisions of Section 103(k) of the Mine Act to ensure the safety of the miners and preservation of evidence. Blevins and Stark arrived at the mine at 11:15 a.m., and Yates arrived shortly after.

James Baker, Assistant District Manager, and Benjamin Hall, Supervisory Mine Safety and Health Specialist, arrived at the mine on March 23, 2023, to assist with the investigation.

MSHA's accident investigation team, in conjunction with the West Virginia Office of Miners' Health Safety and Training (WVOMHST), conducted an examination of the accident scene, interviewed miners and mine management, and reviewed conditions and work practices relevant to the accident. See Appendix C for a list of persons who participated in the investigation.

DISCUSSION

Location of the Accident

The accident occurred at 17-block in the No. 2 entry of the Tailgate section (see Appendix A). The section has varying grades along its entire length, but the overall grade from the working face of the section to the Northeast Mains is uphill. Based on interviews, investigators determined that the Stryker lost power and began drifting backwards at 15½-block. The distance from this location to the impact point at 17-block is approximately 210 feet with an average grade of approximately 9.5%. Allegheny Surveys, Inc, a surveying contractor, surveyed the accident scene.

Equipment Involved

The Stryker personnel carrier involved in the accident was manufactured by Grace Equipment Company, Inc., and was delivered to the mine in December 2022. The Stryker had a seating capacity of two persons and was being used to transport miners to and from the Tailgate section from the Northeast Mains track. Three miners were riding on the Stryker at the time of the accident. The mine operator has a Comprehensive Mine Safety Program that states, "No employee shall ride in the scoop bucket, or on top of the scoop, or any equipment that does not provide adequate seating." Barker was not in a designated seat and was sitting on top of the personnel carrier directly behind the seats. The mine operator did not ensure the number of miners traveling on each personnel carrier did not exceed the available number of seats when transporting miners, which contributed to the severity of the accident.

Investigators examined the Stryker at the accident scene and observed the Stryker to have loose front-end tie rod connections resulting in 1 and 9/16 inches of play in the driver's side wheel and 3/16 of an inch of play in the passenger's side wheel. Investigators could not determine if this was a result of the accident, nor could they determine if this existed when the last weekly examination was conducted. Investigators could not determine if this contributed to the accident.

Investigators examined the Stryker at the accident scene and found the main power switch in the "on" position, the tram switch in the "forward" position, and the light switch in the "front" position. Additionally, the E-stop button was depressed, and the parking brake was not engaged. James Paynter, Mine Maintenance Chief, stated during the investigation that the E-stop was depressed, and the batteries were unplugged after the accident to prevent the batteries from catching on fire.

Stryker Electrical System

The Stryker was equipped with an electrical propulsion system that includes a lead-acid battery pack, a 3-phase induction motor, and a motor controller. The motor controller initiates a regenerative braking system that recharges the batteries as a miner releases the accelerator pedal. The regenerative braking system also slows the Stryker down as the motor charges the batteries.

When the E-stop button is depressed, it deenergizes the motor controller. The motor controller is incapable of providing regenerative braking when it has no power. The service or parking brake systems would be the only means to slow or stop the Stryker. The Stryker was designed so that

it must come to a complete stop before the controller can fully reset after the E-stop is pulled back out. This design was incorporated to prevent damage to the drive axle.

The Stryker rolling backwards down the grade prevented the regenerative braking system from resetting after the E-stop button was pulled back out. Curtis Instruments Inc., the motor controller manufacturer, conducted testing and data extraction of the controller and did not detect any faults or abnormalities throughout the testing process. MSHA Technical Support observed this testing, reviewed the data, and did not find any electrical deficiencies that could have resulted in a failure of the regenerative braking system or a loss of system propulsion.

Stryker Braking System

The Stryker had a wet brake system consisting of a wet brake assembly (brake pack) on each side of the rear axle. The brake packs contain the discs that slow or stop the personnel carrier. The wet brake system is designed to activate by either of two methods: hydraulically by a service brake foot pedal or mechanically by a parking brake hand lever. Both methods activate the same set of brake packs on the rear axle. MSHA Technical Support and WVOMHST personnel examined and tested the components of the braking system. The rear axle brake components were observed to be in operable condition and the brake discs were observed to have minimal wear. Based on interviews with miners, the regenerative braking system was used almost exclusively to slow or stop the Stryker.

The service brake is activated through a foot brake master cylinder that pushes hydraulic oil to the brake packs. The investigators applied the service brake foot pedal and manually rotated the rear wheel. The application of the service brake foot pedal did not create any hydraulic pressure and did not prevent the rear wheels from rotating. Additionally, when the service brake foot pedal was released, there was no pressure that returned it to the fully released position as designed. Maintenance records obtained during the investigation show the foot brake master cylinder was replaced on January 17, 2023. The master cylinder that was replaced on the Stryker was not the designed master cylinder for the wet brake system. The wet brake system was designed to work with a foot brake master cylinder compatible with mineral based hydraulic oil. The replacement master cylinder is designed to operate with DOT 3/4 brake fluid according to the reservoir cap (see Appendix D).

MSHA Technical Support's lab analysis determined that mineral based hydraulic oil was inside of the recently installed master cylinder reservoir at the time of the accident. The piston spring cup inside the brake master cylinder was found to be damaged when inspecting the internal components (see Appendix E). An analysis conducted by the RJ Lee Group, an independent laboratory contracted by Technical Support, determined the piston spring cup to be made of Ethylene-Propylene (EP), which is not compatible with mineral based hydraulic oil. The mineral based hydraulic oil inside the brake master cylinder caused the piston spring cup to swell and eventually fail over time. This failure of the piston spring cup would not allow the brake master cylinder to build pressure to engage the service brake. Investigators determined this condition contributed to the accident but were unable to determine how long the condition existed.

The investigators moved the parking brake lever into the applied position and attempted to manually rotate the wheels at the accident scene. The parking brake provided no resistance to

the rear drive axle due to slack in the parking brake cable. Investigators determined that it was out of adjustment and contributed to the accident.

Examinations

Kevin Spitznogle, Electrician, conducted the last required weekly electrical examination on the Stryker on March 20, 2023. No hazards were reported.

MSHA regulations do not require pre-operational examinations on this type of equipment. The mine provides a checklist located on the equipment for miners to use when conducting pre-operational examinations on Stryker personnel carriers; however, they do not record the examinations. The checklist includes a requirement to inspect both the service and parking brakes. According to interviews, a pre-operational examination was not conducted on the Stryker before operating it prior to the accident. Investigators determined this contributed to the accident.

According to interviews, Brandon Riley, Utility, operated the Stryker on the shift prior to the accident and identified a deficiency in the brakes in that the foot brake pedal had to be pushed real hard and it would not spring back all the way when you let off. He verbally reported to Heather Vincent, CM Maintenance Supervisor, that the brakes were not working properly. Riley parked the Stryker near the mainline track and drove the Company No. 2 EMU back to the Tailgate section.

Vincent later took the EMU to where the Stryker was parked and drove the Stryker back to the Tailgate section. She told investigators there were no issues with the brakes and that she rarely used the foot brake due to the regenerative brakes. The Stryker was never taken out of service after Riley told Vincent the brakes were not working properly.

Allen also told investigators there was a deficiency in the brakes at the time of the accident. Allen described the same problem with the brakes that Riley told to investigators. Because of the interview statements, and the examination, testing, and findings by MSHA Technical Support, investigators determined that the mine operator did not maintain the Stryker in safe operating condition or remove it from service immediately. Investigators determined that this contributed to the accident.

No violations were observed in the No. 2 entry that would have contributed to the accident. Investigators determined that the examinations of the No. 2 entry did not contribute to the accident.

Training and Experience

Barker had more than 17 years of mining experience, including over ten months at the Longview Mine. Tonya Kelley, Mine Safety and Health Training Specialist, conducted a review of the training records. Barker received annual refresher training on March 10, 2023. Barker, Allen, and Elkins had no record of task training for operating the Stryker. However, investigators determined Allen had knowledge and experience operating the Stryker and this did not contribute to the accident.

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 maintain the Company No. 2 Stryker personnel carrier in safe operating condition.

   Corrective Action: The mine operator examined all personnel carriers to ensure they were maintained properly, particularly the braking systems. The mine operator also conducted task training with all miners on the pre-operational examinations of all personnel carriers in the mine. This training included procedures for removing equipment from service when identifying safety defects. The mine operator also installed a second independent front brake system and brass tags that identify the type of oil required for each master cylinder on all rubber-tired personnel carriers in the mine and trained miners on the proper oil required for each master cylinder.

2. Root Cause: The mine operator did not conduct adequate pre-operational examinations.

   Corrective Action: The mine operator conducted task training with all miners on the pre-operational examinations of all personnel carriers in the mine. This training included procedures for removing equipment from service when identifying safety defects.

3. Root Cause: The mine operator did not ensure the number of miners traveling on each personnel carrier did not exceed the available number of seats when transporting miners.

   Corrective Action: The mine operator updated the written procedure requiring that all passengers on personnel carriers do not exceed the number of designated seats available. The mine operator trained all miners on the new procedures.

CONCLUSION

On March 22, 2023, at approximately 8:50 a.m., Cecil Barker, a 62 year-old surveyor with over 17 years of mining experience, died when a battery powered personnel carrier on which he was riding, overturned.

The accident occurred because the mine operator did not: 1) maintain the Company No. 2 Stryker personnel carrier in safe operating condition, 2) conduct adequate pre-operational examinations, and 3) ensure the number of miners traveling on each personnel carrier did not exceed the available number of seats when transporting miners.

Approved By:

_____ _____

Carlos Mosley Date
District Manager

ENFORCEMENT ACTIONS

1. A 103(k) order was issued to Century Mining LLC.

   A fatal accident occurred on March 22, 2023, at 8:50 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) order was issued to Century Mining LLC for a violation of 30 CFR 75.1725(a).

   A fatal accident occurred at this operation on March 22, 2023, when a surveyor was riding on a rubber-tired personnel carrier that crashed and overturned, resulting in crushing injuries to the miner. The mine operator did not maintain the Company No. 2 Stryker two-person personnel carrier, Serial Number SAC5015, in safe operating condition in that the following unsafe conditions were observed by investigators and were determined to contribute to the cause of the accident:

   1. The brake master cylinder recently installed on the personnel carrier was filled with mineral based hydraulic oil. The installed master cylinder is only compatible with DOT 3/4 brake fluid. The mineral based hydraulic oil deteriorated the internal components of the master cylinder rendering it defective and preventing the foot brake from activating the wet brake system.

   2. The manually activated parking brake was out of adjustment and did not operate when activated.

   The following unsafe condition was observed by investigators. However, investigators could not determine if this contributed to the accident:

   1. The front-end tie rod connections were loose resulting in 1 and 9/16 inches of play in the driver's side wheel and 3/16 of an inch of play in the passenger's side wheel.

   The mine operator engaged in aggravated conduct constituting more than ordinary negligence because the deficiency in the brakes was reported to a CM Maintenance Supervisor, but no effort was made to correct the deficiency or take the Stryker out of service. This violation is an unwarrantable failure to comply with a mandatory standard.

3. A 314(b) safeguard was issued to Century Mining LLC for a violation of 30 CFR 75.1403.

   A fatal accident occurred at this operation on March 22, 2023, when a surveyor was riding on a rubber-tired personnel carrier that crashed and overturned, resulting in crushing injuries to the miner. The mine has several locations of steep inclines. The accident occurred when the personnel carrier was traveling up an incline with an average grade of 9.5%. The carrier lost power and rolled back down the incline, picked up speed and crashed because of undetected defects in the service brakes and parking brakes.

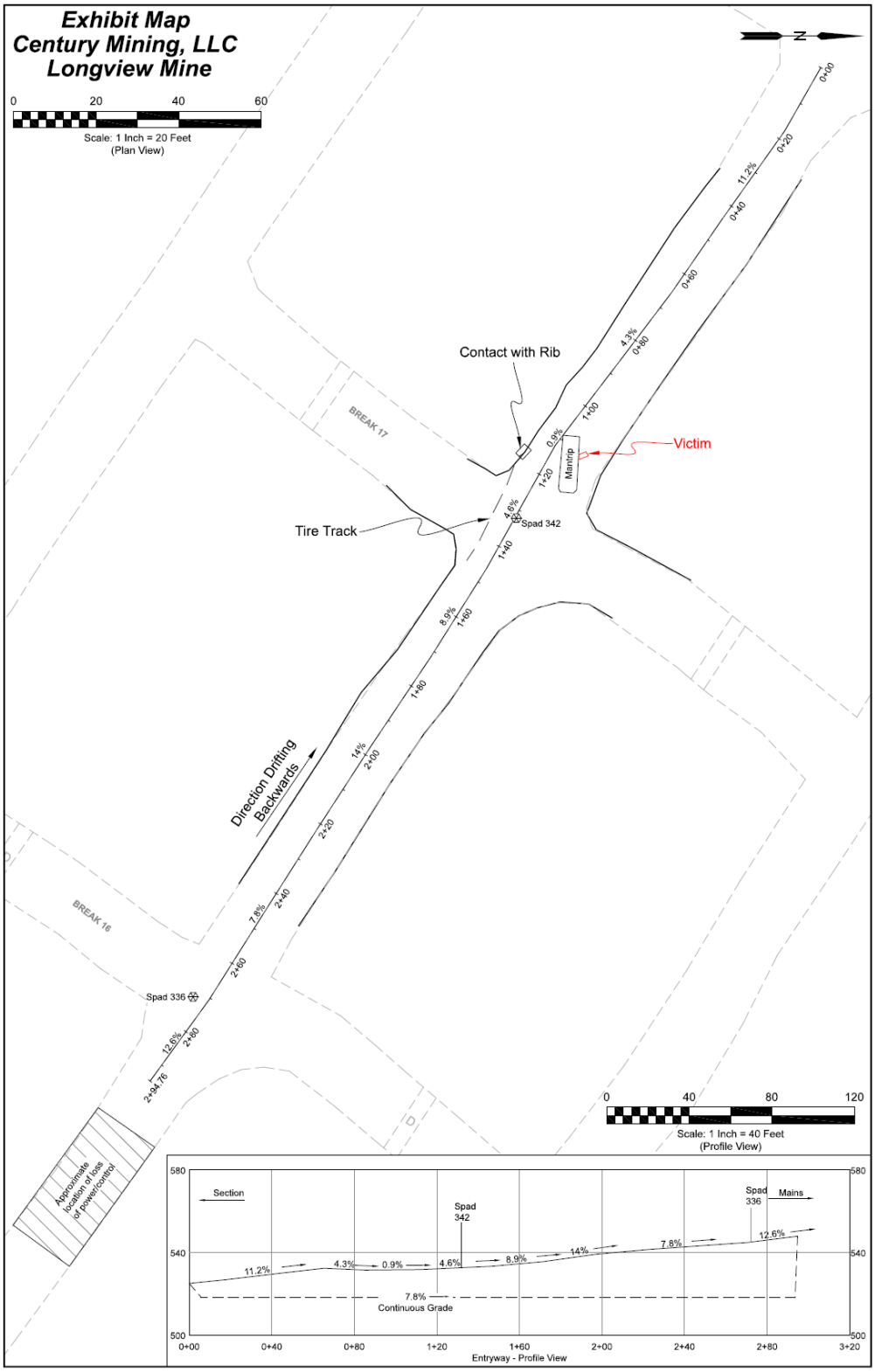
   The investigation revealed that inadequate pre-operational examinations were made on the Stryker personnel carrier prior to operation. Additionally, the mine operator did not have procedures in place to identify safety defects on self-propelled mobile equipment prior to operation and to correct or remove the equipment from service when safety defects are identified. The investigation also revealed that three miners were riding on the two-person personnel carrier when the accident occurred. The victim was sitting on top of the personnel carrier behind the two designated seats.

   This is a notice to provide safeguard requiring the following policies and procedures be implemented on all rubber-tired personnel carriers in the mine:

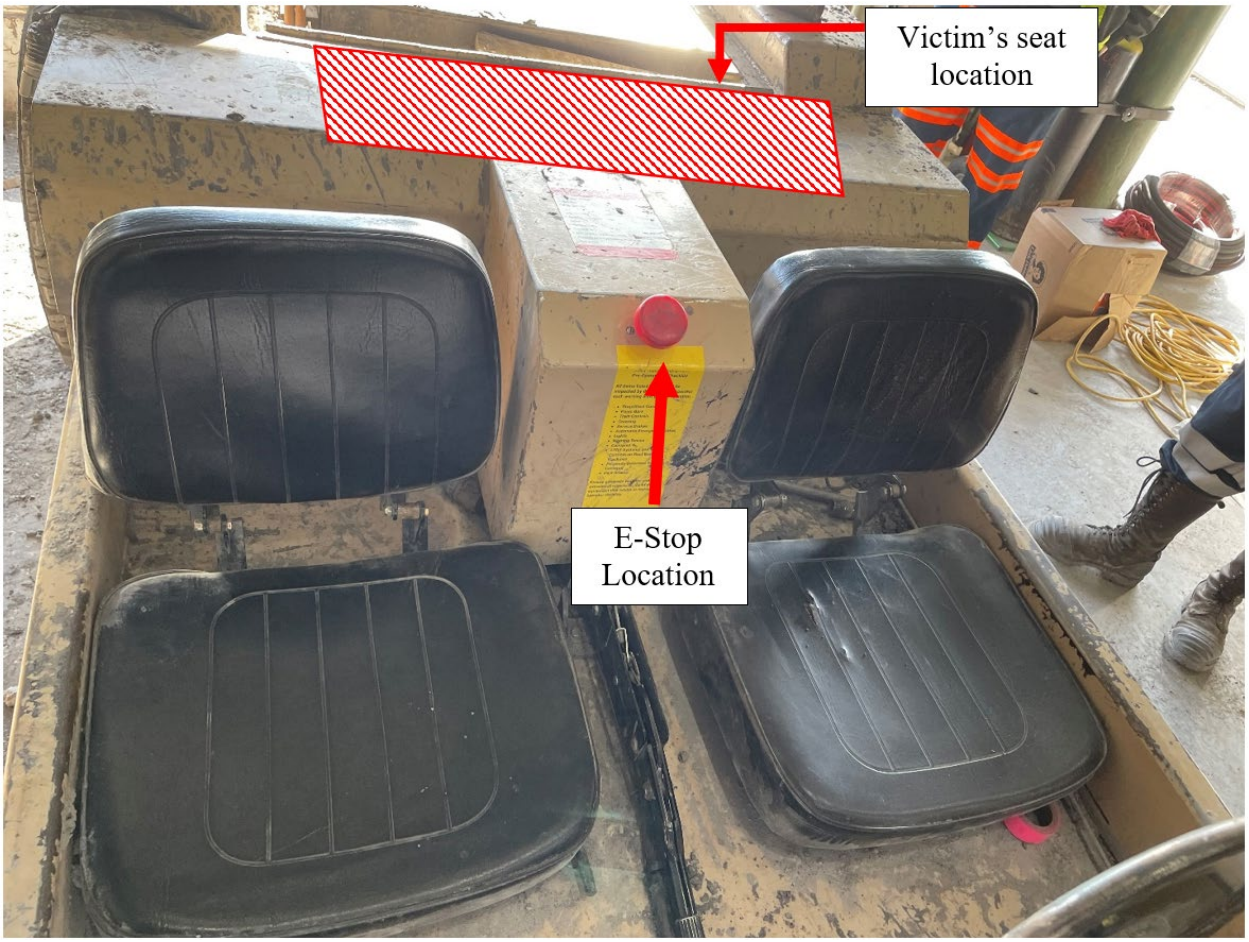
   1. A pre-operational examination will be conducted by a qualified person to ensure that no safety defects are present before operating a personnel carrier. This examination will be recorded in a pre-operational examination book provided on the equipment. The results of the pre-operational examinations shall be maintained on the surface for one year. The examination records shall be made available to MSHA upon request. All safety defects will be repaired prior to placing the equipment in service, or the equipment will be removed from service until repairs can be completed.

   2. The number of miners traveling on each personnel carrier shall not exceed the available number of seats when transporting miners.

APPENDIX A – Map of the Accident Scene



APPENDIX B – Stryker Seating Arrangement



APPENDIX C – Persons Participating in the Investigation

Century Mining LLC

Ryan Toler	General Manager
Mark Kimler	Mine Superintendent
Bradley Phillips	Mine Foreman
Daniel Curry	Safety Manager
James Paynter	Mine Maintenance Chief
Randy Boggs	Shift Safety Specialist
Adam Elkins	Engineer
Jacob Godfrey	Management Trainee
Heather Vincent	CM Maintenance Supervisor
William Stepp	Shift Maintenance Foreman
Daniel Lanham	Shift Mine Foreman
Jason Tenney	CM Supervisor
James Sublett	Outby Foreman/ EMT
Orren Bennett II	B-Crew Maintenance Shift Foreman
Terry Taylor	Crew Leader
Brandal Carr	CM Maintenance Supervisor
Brandon Riley	Utility
Robert Mulvihill	Roof Bolter/EMT
Gregory Hoffman	Roof Bolter
William Allen Jr.	Surveyor
Harry Foster II	Communications/Outby Electrician
John Maier	Dispatcher
Frederick Cade	Utility
Cody Streets	Outby Utility
Gordon McGee	Outby Electrician
Kevin Spitznogle	Electrician

Grace Equipment Company, Inc.

Randy Workman	President

Steptoe and Johnson LLP

Shawn Morgan	Attorney
Monte Williams	Attorney

Exponent

Christopher Andrecovich	Senior Associate

West Virginia Office of Miners' Health, Safety, and Training

McKennis Browning	Deputy Director
Edward Peddicord	Inspector at Large
John Meadows	Assistant Inspector at Large
James Bowman	District Inspector
Tadd Rankin	District Inspector

John Sparks	District Inspector
Michael Matlick	District Inspector

Mine Safety and Health Administration

James Baker	Assistant District Manager
Michael Stark	Staff Assistant
Benjamin Hall	Supervisory Mine Safety and Health Specialist
Kevin Honeycutt	Supervisory Mine Safety and Health Inspector
Nicholas Blevins	Mining Engineer
Bryan Yates	Mine Safety and Health Specialist
Rodney Fultz	Mine Safety and Health Specialist
Louis Bernatowicz	Mine Safety and Health Specialist
Philip Long	Mine Safety and Health Specialist
Tonya Kelley	Mine Safety and Health Training Specialist
Zachery Bray	Mine Safety and Health Inspector Trainee
Gary Rethage	Supervisory General Engineer, Technical Support
Zachary Allen	Mechanical Engineer, Technical Support
Lon Santis	Physical Scientist, Technical Support
Jordan Rose	Electrical Engineer, Technical Support

APPENDIX D – Brake Master Cylinders

Figure 1: Brake Master Cylinder on Stryker at the time of the accident

Figure 2: Brake Master Cylinder designed for Stryker service brake system

APPENDIX E – Stryker Brake Master Cylinder Disassembled