FAI-6918980-1

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Underground
(Bituminous Coal)

Fatal Powered Haulage Accident
August 30, 2023

No. 4 Mine
Warrior Met Coal Mining, LLC
Brookwood, Tuscaloosa County, Alabama
ID No. 01-01247

Accident Investigators

Timothy Stockman
Mine Safety and Health Inspector

John Yarko
Mine Safety and Health Specialist

Originating Office
Mine Safety and Health Administration
Birmingham District
1030 London Drive, Suite 400
Birmingham, Alabama 35211
Brian Thompson, District Manager

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OVERVIEW

On August 30, 2023, at approximately 6:50 a.m., Aaron Haley, a 34-year-old belt foreman with over 13 years of mining experience, died when a longwall belt conveyor take-up unit (take-up) component, the bridle, broke and struck him.

The accident occurred because the mine operator did not maintain components of the take-up in safe operating condition.

GENERAL INFORMATION

Warrior Met Coal Mining, LLC owns and operates the No. 4 Mine, an underground bituminous coal mine located in Brookwood, Tuscaloosa County, Alabama. The No. 4 Mine employs 394 miners and operates two 12-hour shifts per day, seven days per week. The mine uses longwall mining methods to extract coal from the Blue Creek coal seam.

The principal management officials at the No. 4 Mine at the time of the accident were:

Christopher Thielen	Mine Manager
Michael Middlebrooks	Safety Manager

The Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection at this mine on June 30, 2023. The 2022 non-fatal days lost incident rate for the No. 4 Mine was 1.01, compared to the national average of 3.28 for mines of this type.

DESCRIPTION OF THE ACCIDENT

On August 30, 2023, at 6:00 a.m., Haley arrived at the mine to work on repairs to the take-up located on the C1 Longwall section (see Appendix A). The crew working with Haley on these repairs consisted of: Zumarcus Archibald, Belt Repairman; Jerren Lewis, Belt Repairman; Tucker Cochran and James Duffey, New Miners at No. 4 Mine; James Alich, Laborer for BMC Services; and Zachary Knotts, Foreman for BMC Services.

Haley, Archibald, Lewis, and Alich entered the belt conveyor entry through airlock doors and walked to the back side of the take-up between the chain link guarding panels (guards) and the coal rib. Based on interviews and evidence observed at the accident scene, investigators determined that while looking through the guards at the worksite, Haley observed an orange glow (later to be found as a damaged roller) and possibly flames near the movable carriage of the take-up. Haley, followed by Archibald, Lewis, and Alich, walked toward the glow to investigate. Arriving near the location of the take-up carriage, Haley yelled, "Shut the belt off." Alich turned and ran to the belt conveyor stop switch and shut off the belt conveyor. Hearing the belt conveyor drive slowing down, Alich began walking back toward Haley when he suddenly heard a loud noise, got knocked off his feet, and was engulfed by heavy dust.

According to interviews, at approximately 6:50 a.m., the bridle connecting the constant tension winch cable (winch cable) to the carriage broke free at the attachment points to the carriage (see Appendix B). Due to the sudden release of stored tension in the winch cable, the bridle recoiled through the guards, breaking the guards loose and striking the miners. After regaining his composure, Alich realized the guards had him pinned underneath, along with Haley, Archibald, and Lewis. Alich heard the take-up winch running and realized the bridle and winch cable were pulling the guards along the beltline.

Knotts, Cochran, and Duffey arrived outside the airlock doors, heard the loud noise, and entered the belt conveyor entry through the doors. Alich saw Knotts enter the doors and yell, "Shut the BTU off," referring to the winch. Knotts went to the control box for the winch and shut it down, stopping the winch from dragging the damaged guards. Alich and Archibald crawled out from under the guards and flipped the damaged guards off Lewis and Haley. Knotts, Cochran, and Duffey went to Lewis and Haley to check on them and saw that when the bridle broke free from the carriage, the bridle passed through the guards and struck Haley. Alich exited the belt conveyor entry, ran to the personnel carrier, and radioed for help.

At approximately 6:55 a.m., Ronald Holmes, Outby Foreman, heard Alich's call for help over the radio. At approximately 7:05 a.m., Holmes met Alich at the belt conveyor entry and entered with Alich to assess the situation. Benjamin Richardson, Outby Foreman, also arrived at the accident scene. Realizing Haley had suffered serious injuries, Holmes and Richardson placed Haley on a personnel carrier and transported Haley to the hoist for emergency evacuation.

At 7:20 a.m., Haley and Richardson arrived on the surface where Northstar Ambulance personnel and AirEvac Helicopter personnel took over treatment. En route to the hospital, emergency medical responders realized that Haley's condition had worsened. Nathan Hadley, Medical Control Physician, ordered resuscitation efforts to be discontinued at 8:12 a.m.

INVESTIGATION OF THE ACCIDENT

On August 30, 2023, at 7:24 a.m., Richard Marlowe, Vice President of Safety, called the Department of Labor National Contact Center (DOLNCC) to report the accident. The DOLNCC contacted Rory Smith, Staff Assistant, and informed him of the accident. Smith contacted Sammy Elswick, Supervisory Mine Safety and Health Inspector, who sent Timothy Stockman, Mine Safety and Health Inspector, to the mine. At 9:22 a.m., Stockman arrived at the mine and 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.

Brian Thompson, District Manager; David Allen, Assistant District Manager; Thomas Chatham, Supervisory Mine Safety and Health Inspector; and John Yarko, Mine Safety and Health Specialist, arrived at the mine a short time later. Thompson assigned Stockman as the lead investigator. MSHA's accident investigation team, along with the State of Alabama Department of Natural Resources, Office of Mines and Minerals, and members of the United Mine Workers of America, conducted an examination of the accident scene, interviewed miners and management, and reviewed conditions and work procedures 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 underground at the C1 Longwall belt conveyor #3 entry, belt take-up/storage unit (see Appendix D).

Equipment

The equipment involved in the accident is as follows:

1) Belt Drive – Syntron Material Handling design with four 480 Volt, 300 HP Motors. The C1 longwall belt conveyor take-up storage unit consists of a belt take-up – Syntron Material Handling design with a winch cable tensioned movable carriage and constant tension winch. The constant tension winch was manufactured by Continental Global Material Handling – Model Number CTW-RA-10-60-47-70-285. 100 HP. (Winch setting @ 65% of 52,000 lbs. Maximum = 33,800 lbs.)

2) Belt Winder – Irwin Mine and Tunneling Supplies, Model – BW50722DTBSKPUW
Tension / Pull Capacity @ 3,000 PSI (Hydraulic Pressure):
80,000 lbs. @ 10" Belt roll diameter
16,000 lbs. @ 50" Belt roll diameter
8,000 lbs. @ 100" Belt roll diameter

Events Before the Accident

Investigators determined that events occurred before the accident resulting in damage to belt take-up system components contributed to the occurrence of the fatal accident.

Approximately four weeks before the accident, the pin in the bridle at the winch cable connection on the take-up unit slipped out of the bottom eye at the connection point. This caused the winch cable to pull out of the bridle, bending the top eye at the connection point and the bridle upward due to the force exerted by the winch, and causing the winch cable to backlash on the winch cable drum. The mine operator untangled and inspected the winch cable and heated the top of the bridle with a torch to hammer it back down parallel to the bottom, aligning the holes for a pin. Instead of the mine operator repairing the top eye at the connection point to reinstall a pin from the manufacturer, the mine operator installed a different pin, approximately twice the length of the original pin provided by the manufacturer. The longer pin protruded several inches below the bottom of the bridle.

Approximately two weeks prior to the accident, the winch cable broke. The mine operator installed a new winch cable and again used the longer pin at the winch cable connection on the bridle.

On August 28, 2023, Samuel Harris, Belt Foreman, was working with a belt crew and operating the belt winder to remove excess belting from the conveyor belt. This is required as the longwall retreats from the mine, which results in less overall belt length being needed as mining continues. The take-up winch tension was released to allow for the belt winder to begin winding the excess belting. When the tension was released, the bridle dropped down, contacting cross braces in the take-up track frame. The longer pin previously installed in the bridle, hooked one of the cross braces. As Harris began winding the belt, the track frame cross brace that was hooked by the bridle pin, was ripped out of the track frame. This caused severe damage to the track frame on both sides of the system and weakened the bridle at the connection points to the moveable carriage. Harris knew the longer pin installed at the bridle connection caused the damage to the track frame. However, management did not check for additional damage caused by this event, and they allowed the continued use of the longer pin. Investigators determined this contributed to the accident.

Even though Harris saw the damage to the track frame, he determined that the movable carriage was beyond the damaged section of the track frame and would not prevent the conveyor belt from being operated. Harris continued to wind the belt out of the take-up. Then he reconnected the belt and restarted the belt conveyor. Harris knew it would be a few days before enough belt would be accumulated in the take-up from the retreat mining process to reach the damaged area of the take-up.

On the shift before the accident, a crew of workers removed damaged rails and cross braces, then slid new rails in place, but did not attach them. The crew reinstalled the guarding and started the belt conveyor back up. When Haley's crew de-energized the loaded belt conveyor immediately before the accident, the additional stress on the bridle connection points caused the bridle to break free and strike Haley.

Investigators determined the damage created by the longer pin contacting the track frame weakened the bridle attachment connections and contributed to the accident. MSHA Technical Support took representative sections of the bridle for laboratory testing and evaluation, and the findings were consistent with those of the MSHA investigators. Specifically, laboratory testing found:

1) The link bars in the bridle met the minimum strength requirements for ASTM A36 steel.

2) Differences in pinhole size and the extent of the steel yielding caused the winch cable tensile load to unevenly transfer to the bridle and resulted in an imbalanced loading of the link bars. These differences were the result of the incident where the tow bar caught on a track cross-member prior to the accident.

3) The unequal load distribution caused the track-side link bar to receive more of the belt tension load, which caused the track-side link bar to fracture first and release from the mobile carrier.

4) The damage to the walk-side link bar was consistent with lateral loading and tensile overload, which would have occurred after the failure of the track-side link bar.

5) The walk-side link bar was unable to carry the full belt tension load of 33,800 pounds following the fracture of the track-side link bar; therefore, the walk-side link bar was fractured, failed, and released from the mobile carrier.

Training and Experience

Haley had over 13 years of mining experience, including three years of experience at this mine as a belt foreman. Investigators reviewed training documentation and determined Haley received all training in accordance with MSHA Part 48 training regulations.

Examinations

Investigators determined that preshift and on-shift examinations were conducted in the belt conveyor entry during the shift before the accident. Miners worked at the same work site on the previous shift, therefore the belt conveyor would not have been in operation when these examinations were conducted. There was no report of hazardous conditions in the work area recorded in the record book. Due to the location of the damaged rollers in the belt conveyor take-up, investigators determined it was unlikely that damaged rollers would have been observed by an examiner because the belt was not running to produce audible or visual indications of hazards. The components of the take-up system and the belt conveyor would conceal the area of the damaged rollers when the take-up winch was released.

Also, the mine operator originally installed the longer pin to repair the system. Under normal operations, an examiner would have seen the pin elevated above the take-up rails and would not have recognized this as a hazard. Investigators determined that examinations did not contribute to the accident.

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 maintain components of the take-up in safe operating condition.

Corrective Action: The mine operator: 1) installed a new bridle on the moveable carriage. The new bridle is provided with gussets, which prevent the bridle from dropping down and contacting the track frame of the take-up when there is slack in the winch cable, 2) installed a two-inch diameter plasma rope to the moveable carriage and bridle to prevent the bridle from breaking free if the connections break again, and 3) developed and implemented a written policy prohibiting any miner from being in the belt conveyor entry between the belt drive and take-up winch when the belt conveyor is intentionally started or stopped, to reduce exposure.

CONCLUSION

On August 30, 2023, at approximately 6:50 a.m., Aaron Haley, a 34-year-old belt foreman with over 13 years of mining experience, died when a longwall belt conveyor take-up unit (take-up) component, the bridle, broke and struck him.

The accident occurred because the mine operator did not maintain components of the take-up in safe operating condition.

Approved By:

_____ _____

Brian Thompson Date
District Manager

ENFORCEMENT ACTIONS

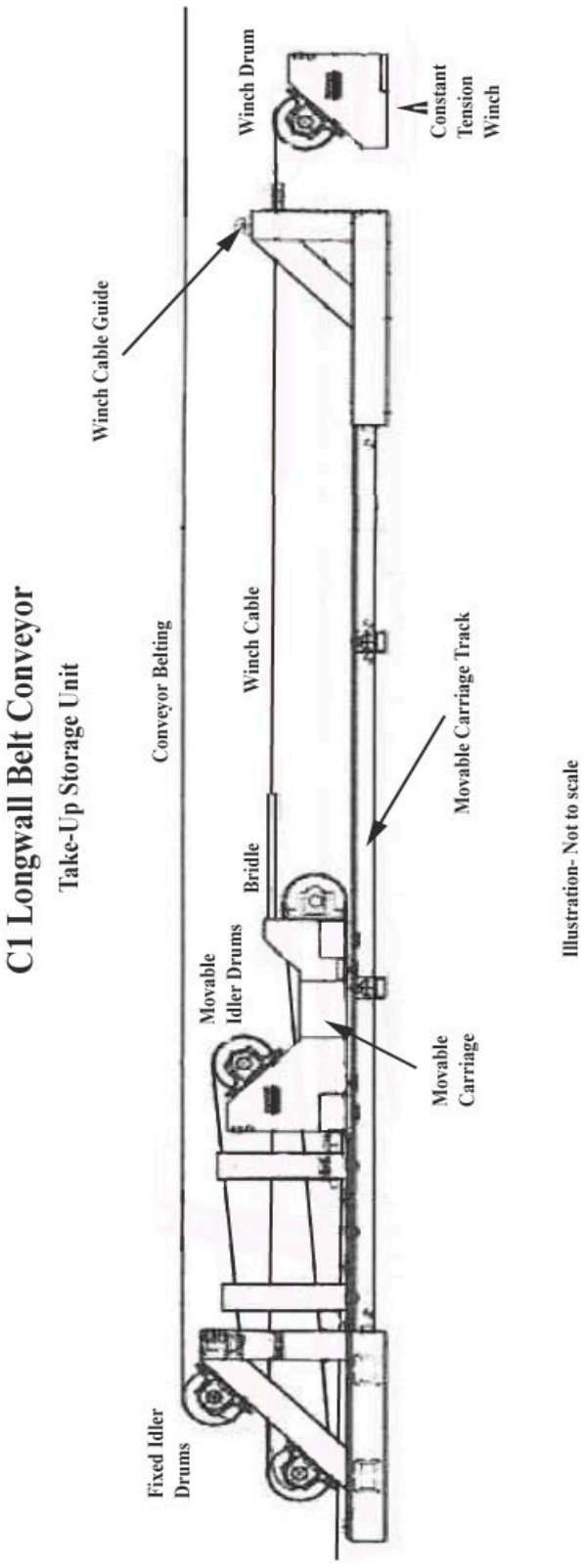
1. A 103(k) order was issued to Warrior Met Coal Mining, LLC.

   A fatal accident occurred on August 30, 2023, at approximately 6:50 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.

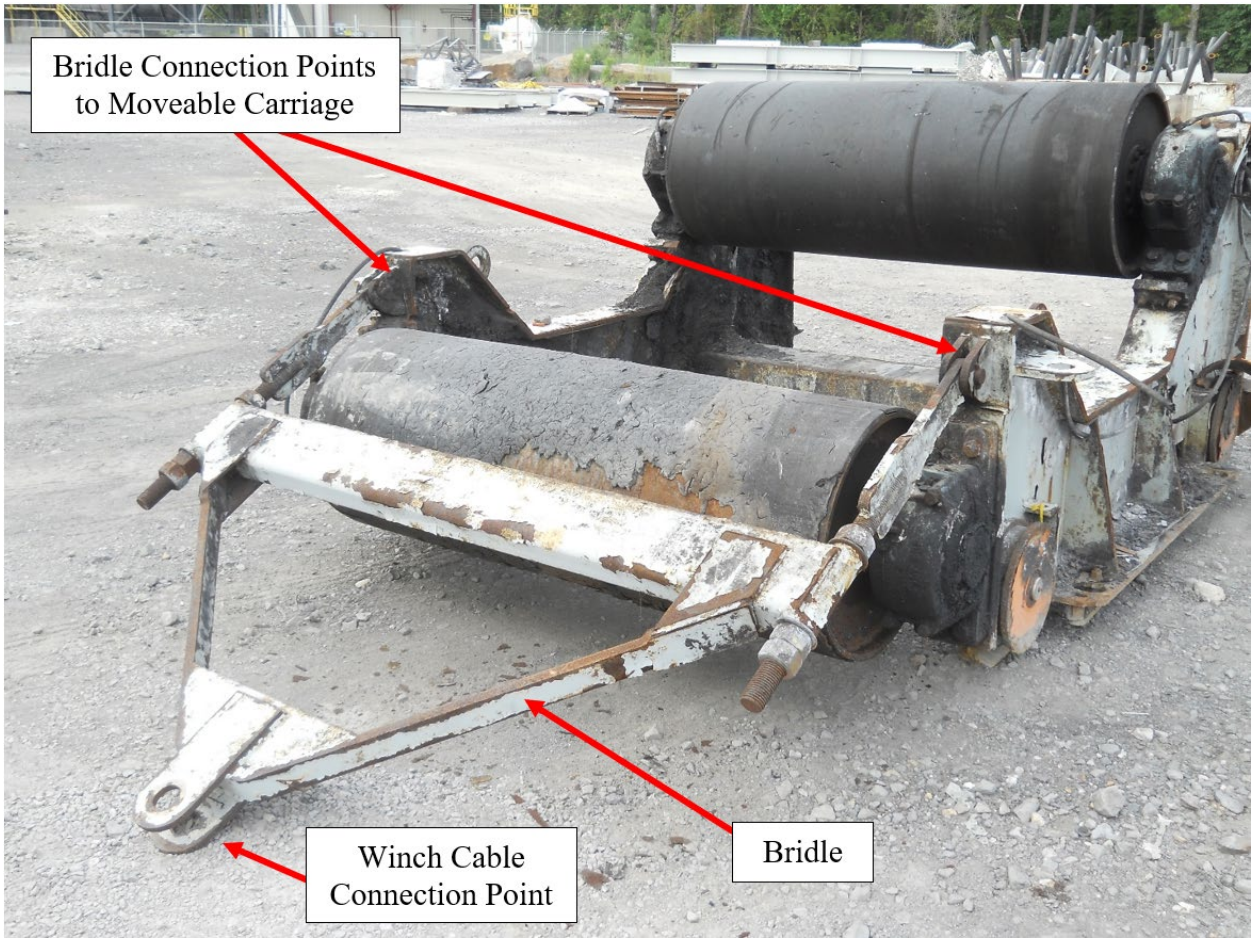
2. A 104(d)(2) order was issued to Warrior Met Coal Mining, LLC for a violation of 30 CFR 75.1725(a).

   On August 30, 2023, a fatal accident occurred at this mine when a bridle used for connecting the winch cable to the moveable carriage of the C1 Longwall belt conveyor take-up broke free, recoiled through the guarding, and struck a belt foreman. The mine operator had installed a pin to connect the winch to the bridle that was approximately twice the length of the standard pin provided by the manufacturer. The pin's length caused it to hook onto a cross brace, severely damaging the rails on both sides of the take-up frame and producing stresses on the bridle above the design strength. The stress weakened the bridle at the pin connection points. When the mine operator de-energized the loaded C1 Longwall belt conveyor immediately before the accident, additional stress on the bridle connection points caused the bridle to break free and strike the belt foreman. The mine operator engaged in aggravated conduct constituting more than ordinary negligence because mine management was aware of the damage caused by the longer pin but did not correct the hazard. This violation is an unwarrantable failure to comply with a mandatory standard.

APPENDIX A – Belt Take-Up Illustration



APPENDIX B – Similar Movable Carriage with Bridle



APPENDIX C – Persons Participating in the Investigation

Warrior Met Coal Mining, LLC No. 4 Mine.

Richard Marlowe	Vice President of Safety
Jeffrey Ball	Vice President of Maintenance
Drew Schlueter	Director of Safety Awareness
Christopher Thielen	Mine Manager
Richard Rose	Deputy Mine Manager
Joshua Cannon	Maintenance Manager
Mark Milligan	Longwall Manager
Michael Middlebrooks	Safety Manager
Nathaniel Booker	Project Manager
Gary Meggs	Belt Manager
Bobby Johnson	Maintenance Coordinator
Joseph Price	Belt Coordinator
Jason Lee	General Mine Foreman
Stephen Miller	Shift Foreman
William Sada	Shift Foreman
Ronald Holmes	Outby Foreman
Benjamin Richardson	Outby Foreman
Samuel Harris	Belt Foreman
Jason Beasley	Safety Supervisor
Sylvester Cambell	Safety Supervisor
Zumarcus Archibald	Belt Repairman
Jerren Lewis	Belt Repairman
Dylan Moore	Belt Repairman
Michael Speights	Belt Repairman
Joseph Szafranski	Belt Repairman
Logan Turner	Belt Repairman
Darvis Smith	Inside Laborer
Tyler Weaver	Surveyor
Tucker Cochran	New Miner
James Duffey	New Miner

BMC Services

Zachary Knotts	Foreman
James Alich	Laborer
Joseph Harris	Laborer
David Little	Laborer

United Mine Workers of America

Lawrence Spencer	District 20 International Vice President
John Earnest	International Representative, Region II
Ollie Williams	International Representative, Region II
William Burns	Miners' Representative
David Cooper	Miners' Representative

State of Alabama Department of Natural Resources, Office of Mines and Minerals

John Connellan	Mine Inspection Supervisor
Thomas Ray	Mine Inspector
Jerry Wells	Mine Inspector
James West	Mine Inspector

Mine Safety and Health Administration

Brian Thompson	District Manager
David Allen	Assistant District Manager
Thomas Chatham	Supervisory Mine Safety and Health Inspector
Scott Johnson	Supervisory Mine Safety and Health Training Specialist
Dederrick Morgan	Mine Safety and Health Inspector
Timothy Stockman	Mine Safety and Health Inspector
John Yarko	Mine Safety and Health Specialist
Michael Superfesky	Civil Engineer, Technical Support
Russell Stackpole	Mechanical Engineer, Technical Support
Matthew Pezze	Mechanical Engineer, Technical Support
Ryan Stephan	Senior Mechanical Engineer, Technical Support

APPENDIX D – Location of Accident Scene