FAI-7021955-1

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

# REPORT OF INVESTIGATION

Surface
(Hydraulic Cement)

Fatal Engulfment Accident
November 5, 2022

Knoxville Cement Plant
CEMEX Construction Materials Atlantic, LLC
Knoxville, Knox County, Tennessee
ID No. 40-00840

Accident Investigator

Ronald Caudill
Mine Safety and Health Specialist

Originating Office
Mine Safety and Health Administration
Barbourville District
3837 S U.S. HWY 25E
Barbourville, Kentucky 40906
Samuel Creasy, District Manager

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## OVERVIEW

On November 5, 2022, at 4:10 a.m., Thomas Mitchell, a 21 year-old production utility miner with 13 months of experience, died when he was engulfed in a coal stockpile.

The accident occurred because the mine operator did not: 1) conduct an adequate workplace examination in the coal shed before miners began work, and 2) prevent miners from positioning themselves over drawholes without platforms or safety lines.

## GENERAL INFORMATION

CEMEX Construction Materials Atlantic, LLC owns and operates the Knoxville Cement Plant mine. The Knoxville Cement Plant is a surface limestone mine and cement processing facility located in Knoxville, Knox County, Tennessee. The mine employs 134 miners and operates three eight-hour shifts, seven days per week. The mine drills and blasts limestone in an open pit quarry, and haul trucks transport the blasted material to a primary crusher. Belt conveyors transport the crushed rock to a secondary crusher and to the cement facility for final processing. The mine's plant uses a coal-fired kiln to process cement. Coal is brought to the plant by contract coal trucks and is dumped in the coal shed. Miners use a front-end loader to dump coal onto the grizzly, located in the floor of the coal shed. The grizzly is a metal grate designed to slow the flow of coal and prevent large chunks of coal or foreign objects from entering the hopper below. Coal is fed from the hopper onto a belt conveyor and transported to coal silos.

The principal management officials at the Knoxville Cement Plant mine at the time of the accident were:

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| Steven Switzer | Plant Manager |
| Sarah Wagler | Production Manager |
| Jonathan Marlow | Health & Safety Manager |
| Tristan Wright | Production Supervisor |

The Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection at this mine on September 20, 2022. The 2021 non-fatal days lost incident rate for the Knoxville Cement Plant mine was 2.94, compared to the national average of 1.70 for mines of this type.

## DESCRIPTION OF THE ACCIDENT

On November 4, 2022, at 10:30 p.m., Mitchell; Wright; Brandon Kirkland, Hunter Watson, Timothy Wynn, Production Utility Miners; and Brandon Tackett, Night Shift Control Room Attendant, began their shift in the production break room. Production utility miners rotate between jobs each week. On this shift, Mitchell operated a front-end loader. His assigned duties were to load rock into a hopper at the rock reclaim area and dump coal onto the grizzly in the coal shed.

On November 5, 2022, at 1:00 a.m., Mitchell, Kirkland, Watson, Wynn, and Tackett, took their first break in the break room of the plant. At 1:38 a.m., the cyclones at the crusher/dryer area of the plant stopped functioning. Mitchell, Watson, and Kirkland traveled to the area and repaired the cyclones, finishing at 1:54 a.m. Mitchell got back on the front-end loader and began to load coal onto the grizzly in the coal shed. At 2:31 a.m., coal silo #1 was full, which activated the high-level alarm and automatically stopped the belt conveyor. At 3:05 a.m., Tackett restarted the belt conveyor to replenish coal silo #1.

At 3:20 a.m., Mitchell traveled to the rock reclaim area to begin loading rock. According to interviews, Mitchell told Tackett that he planned to run rock for approximately 45 minutes and asked Tackett to let him know when that time was up. Tackett later notified Mitchell that 45 minutes had passed. Mitchell told Tackett to start the belt conveyor because he was going to the coal shed to put a load of coal on the grizzly and then take the front-end loader to the garage to refuel.

At approximately 4:05 a.m., Mitchell drove the front-end loader from the rock reclaim area to the coal shed. According to interviews, Watson heard Mitchell ask Tackett on the mine radio if he was getting any coal on the belt. Tackett answered, “no,” and Mitchell said, “okay.”

Based on interviews and information gathered during the investigation of this accident, the investigator determined that at 4:10 a.m., Mitchell parked and exited the front-end loader and walked on the coal stockpile over the grizzly. The investigator determined that Michell’s weight caused the bridged coal above the grizzly to collapse and engulf him. There were no eyewitnesses to the accident.

Tackett called Mitchell on his personal cellphone after the 4:00 a.m. break but the call went straight to voicemail. At 5:17 a.m., Tackett told Watson to look for Mitchell. Watson went to the coal shed, where he found Mitchell's front-end loader unoccupied with the engine running, the operator's cab door open, and the bucket slightly raised over the coal stockpile. Watson backed Mitchell's front-end loader five feet and parked it with the bucket on the ground.

At 5:26 a.m., Tackett started the belt conveyor, expecting the pre-start alarm would get Mitchell's attention. Watson and Kirkland met at the coal shed and continued to search for Mitchell but could not find him.

At 6:30 a.m., the day shift production crew started their shift. Wright told everyone on the night shift to clock out. Wright informed Christopher Ballinger, Day Shift Production Supervisor, that Mitchell was missing and updated Ballinger on the search efforts. Ballinger arranged for miners on his crew and other department personnel to continue the search.

After an extensive search of all mine areas, Ballinger instructed Christopher Commander, Day Shift Production Utility Miner, to use a front-end loader to remove coal over the grizzly. At 7:20 a.m., Commander removed a third bucket of coal and discovered Mitchell. Ballinger called Ivan Wheaton, Day Shift Control Room Attendant, on the radio and told him to call 911. At 7:22 a.m., Wheaton called 911.

Personnel from the Knoxville Police Department; the Knoxville Fire Department (KFD); American Medical Response (AMR); and Chris Hawley, Medico-Legal Death Investigator with the Knox County Regional Forensics Center (KCRFC), arrived at the mine. Hawley pronounced Mitchell dead at 8:15 a.m.

## INVESTIGATION OF THE ACCIDENT

On November 5, 2022, at 7:31 a.m., Marlow called the Department of Labor National Contact Center (DOLNCC). The DOLNCC contacted Brian Napier, Supervisory Mine Safety and Health Inspector. Napier contacted Craig Plumley, Assistant District Manager, who contacted Samuel Creasy, District Manager, and Ryan O'Boyle, Supervisory Mine Safety and Health Inspector. O'Boyle sent David Smith, Mine Safety and Health Inspector, to the mine. At 9:10 a.m., Smith 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. Plumley assigned Ronald Caudill, Mine Safety and Health Specialist, as the accident investigator.

Caudill arrived at the mine on November 5, 2022. Caudill, along with members of International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers, and Helpers, 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 at the coal shed (see Appendix B). The grizzly is in the center of the south side of the coal shed (see Appendix C).

### Weather

The weather at the time of the accident was 57 degrees Fahrenheit with clear skies. The investigator determined that weather did not contribute to the accident.

### Equipment Involved

Mitchell was operating a Caterpillar 980K front-end loader, company No. 22. The investigator found no defects on the front-end loader that contributed to this accident.

### Coal Stockpile

At the time of the accident, coal was stockpiled approximately14 feet high along both sides of the narrow travelway and above the grizzly with no separation to the back of the coal shed. The over-steepened and connected stockpiles were vulnerable to sloughing and the grizzly location could not be determined.

### Grizzly

The light on the ceiling of the coal shed that marks the grizzly's location was not working at the time of the accident. There were no other signs indicating the location of the grizzly. The coal did not feed uniformly through the grizzly and into the hopper because it was fine and damp, making it susceptible to binding and bridging. Bridging occurs when a surface layer of coal remains intact as coal below the surface layer falls through the grizzly, thereby creating a hidden cavity below the surface layer of coal (see Appendix E). During the investigation, the investigator conducted four simulations of loading coal over the grizzly with the front-end loader. As coal entered the hopper, the coal bridged over the grizzly each time, creating a void. The investigator determined that a void was created after the belt conveyor was restarted at 3:05 p.m.

### Belt Conveyor Data

The investigator obtained a printout of data from the Programmable Logic Controller (PLC), which shows the amperage (flow of electric current) of the crusher (see Appendix F). An increase in crusher amperage correlates to a loaded belt conveyor. The PLC data was used to: 1) corroborate interview statements, 2) determine the time when the coal bridged over the grizzly, and 3) determine the time that the accident occurred. The data indicates the coal belt was running and loaded with material at 3:20 a.m., which coincides with the conversation between Mitchell and Tackett. The amperage dropped at 4:00 a.m., indicating that the conveyor belt was not loaded, and coal had bridged over the grizzly. This time aligns with when Mitchell was heard asking Tackett if he was getting coal on the belt. At 4:10 a.m., the amperage increased. The investigator determined Mitchell walked over the bridged coal stockpile at this time, causing the bridge to collapse and engulf him.

Examinations

At the time of the accident, the mine operator had not conducted a workplace examination since October 2, 2022. Coal was stockpiled approximately 14 feet high along both sides of the narrow travelway and above the grizzly with no separation to the back of the coal shed. The over-steepened and connected stockpiles were vulnerable to sloughing and the grizzly location could not be determined. The light above the grizzly was not functioning, and there were no other signs indicating the location of the grizzly. An adequate workplace examination would have identified these hazards.

Training and Experience

Mitchell had one year, one month, and one day of mining experience, all at this mine. Mitchell received annual refresher training on January 13, 2022. The investigator reviewed the training records and found that Mitchell received all training in accordance with MSHA Part 46 training regulations, which included being task trained on operating the front-end loader.

## ROOT CAUSE ANALYSIS

The accident investigator conducted an analysis to identify the underlying causes of the accident. The accident investigator 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 conduct a workplace examination in the coal shed before miners began work.

   Corrective Action: The mine operator developed and implemented a new written procedure requiring a supervisor to conduct a minimum of two workplace examinations of the coal shed each shift. The mine operator trained all supervisors on this procedure. The mine operator installed a light that illuminates when the underground belt and feeder are running. The mine operator repaired the light over the grizzly and installed a reflective ball that is used to mark the location of the grizzly. As an additional precaution, the mine operator installed cameras to monitor the coal shed.

2. Root Cause: The mine operator did not have procedures to prevent miners from positioning themselves over drawholes without platforms or safety lines.

   Corrective Action: The mine operator developed and implemented new written coal shed procedures for working in the coal shed. These procedures address loading coal on the grizzly and what to do if a miner must exit the front-end loader, which includes communication procedures. The procedures prohibit accessing the grizzly on foot, require piles to be maintained less than six feet high, and require a center travelway that will be kept clear of coal at a specified distance. Pedestrians are not allowed in the coal shed unless additional precautions are taken, as listed in the safety rules. Miners in the coal shed must always have two-way communication on their person.

## CONCLUSION

On November 5, 2022, at 4:10 a.m., Thomas Mitchell, a 21 year-old production utility miner with 13 months of experience, died when he was engulfed in a coal stockpile.

The accident occurred because the mine operator did not: 1) conduct a workplace examination in the coal shed before miners began work, and 2) prevent miners from positioning themselves over drawholes without platforms or safety lines.

Approved by:

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Samuel Creasy Date
District Manager

ENFORCEMENT ACTIONS

1. A 103(k) order was issued to CEMEX Construction Materials Atlantic, LLC.

   A fatal accident occurred on November 5, 2022, at 4:10 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 CEMEX Construction Materials Atlantic, LLC for a violation of 30 CFR 56.18002.

   A fatal accident occurred at this mine on November 5, 2022, when a coal stockpile engulfed a production utility miner. The mine operator did not conduct a workplace examination in the coal shed before miners began work in the area for conditions that may adversely affect safety or health. The last record of a workplace examination in this area was on October 2, 2022. The investigator observed the following conditions that were present at the time of the accident:

   1. Coal was stockpiled approximately 14 feet high along both sides of the narrow travelway and above the grizzly with no separation to the back of the coal shed. The over-steepened and connected stockpiles were vulnerable to sloughing and the grizzly location could not be determined, exposing miners to engulfment hazards.

   2. The light above the grizzly was not functioning, and there were no other signs indicating the location of the grizzly.

   An adequate workplace examination would have found these hazards and allowed them to be corrected before miners began work in the coal shed.

   The mine operator engaged in aggravated conduct constituting more than ordinary negligence by allowing miners to work in the coal shed without conducting a workplace examination, where conditions that affected safety or health existed. Additionally, miners turn in workplace examination records to the mine operator during their shift for the mine operator's review. The mine operator should have recognized that no workplace examination had been conducted of the coal shed since October 2, 2022, even though miners are assigned to work there each shift. This violation is an unwarrantable failure to comply with a mandatory standard.

3. A 104(a) citation was issued to CEMEX Construction Materials Atlantic, LLC for a violation of 30 CFR 56.9312.

   A fatal accident occurred at this mine on November 5, 2022, when a coal stockpile engulfed a production utility miner. The mine operator did not provide the miner with platforms or

safety lines to use before positioning himself over the grizzly. The size of the over-steepened and connected stockpiles made them vulnerable to sloughing and prevented miners from being able to distinguish between the coal over the grizzly and stockpiled coal. The light on the ceiling of the coal shed that marks the grizzly's location was not working at the time of the accident. There were no other signs indicating the location of the grizzly. The coal was being drawn through the grizzly into an underground hopper, but it became bridged over the grizzly.

While assigned to load coal onto the grizzly using a front-end loader, the production utility miner exited the front-end loader and positioned himself on the coal stockpile over the grizzly. At the time of the accident, the coal over the grizzly was approximately 14 feet high and connected to the coal stockpiles on each side of the coal shed. The coal did not feed uniformly through the grizzly and into the hopper because it was fine and damp, making it susceptible to binding. As coal gravity-fed through the grizzly and into the underground hopper, the coal stockpile became bridged over the grizzly. Bridging occurs when a surface layer of coal remains intact as coal below the surface layer falls through the grizzly, thereby creating a hidden cavity below the surface layer of coal.

APPENDIX A – Persons Participating in the Investigation

CEMEX Construction Materials Atlantic, LLC

| | |
|---|---|
| Ryan Langton | Director of Health & Safety |
| Steven Switzer | Plant Manager |
| Sarah Wagler | Production Manager |
| Jonathan Marlow | Health & Safety Manager |
| Tristan Wright | Production Supervisor |
| Christopher Ballinger | Day Shift Production Supervisor |
| Justin Hance | Yard Supervisor |
| Brent Johnstad | Maintenance Supervisor |
| Tony Burnett | Laboratory Technician |
| Brandon Kirkland | Production Utility Miner |
| Hunter Watson | Production Utility Miner |
| Timothy Wynn | Production Utility Miner |
| Christopher Commander | Day Shift Production Utility Miner |
| Ivan Wheaton | Day Shift Control Room Attendant |
| Brandon Tackett | Night Shift Control Room Attendant |
| Daniel Sexton | Maintenance Miner |

International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers, and Helpers

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|---|---|
| Thomas Guerra | Union President/Miners' Representative |
| Stacey Smith | Miners' Representative/Safety Representative |
| Jeffery Daughtery | Miners' Representative |

Mine Safety and Health Administration

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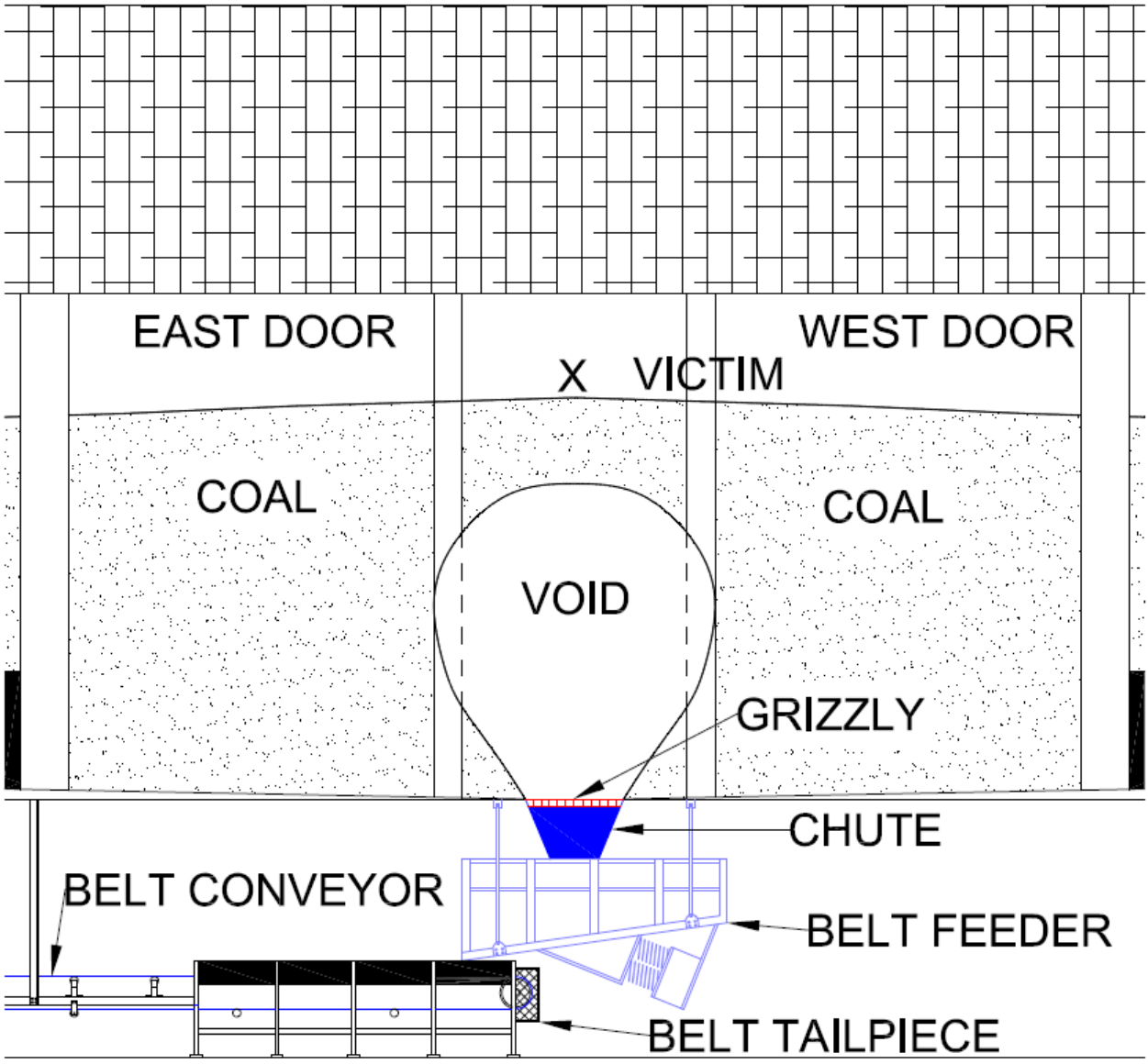
|---|---|
| Samuel Creasy | District Manager |
| Craig Plumley | Assistant District Manager |
| Ryan O'Boyle | Supervisory Mine Safety and Health Inspector |
| Timothy Carter | Mine Safety and Health Specialist |
| Ronald Caudill | Mine Safety and Health Specialist |
| Martin Holbrook | Mine Safety and Health Specialist |
| David Smith | Mine Safety and Health Inspector |
| Michael Pruitt | Mine Safety and Health Training Specialist |

APPENDIX B – Aerial View of the Accident Location

APPENDIX C – Grizzly in the Floor of the Coal Shed

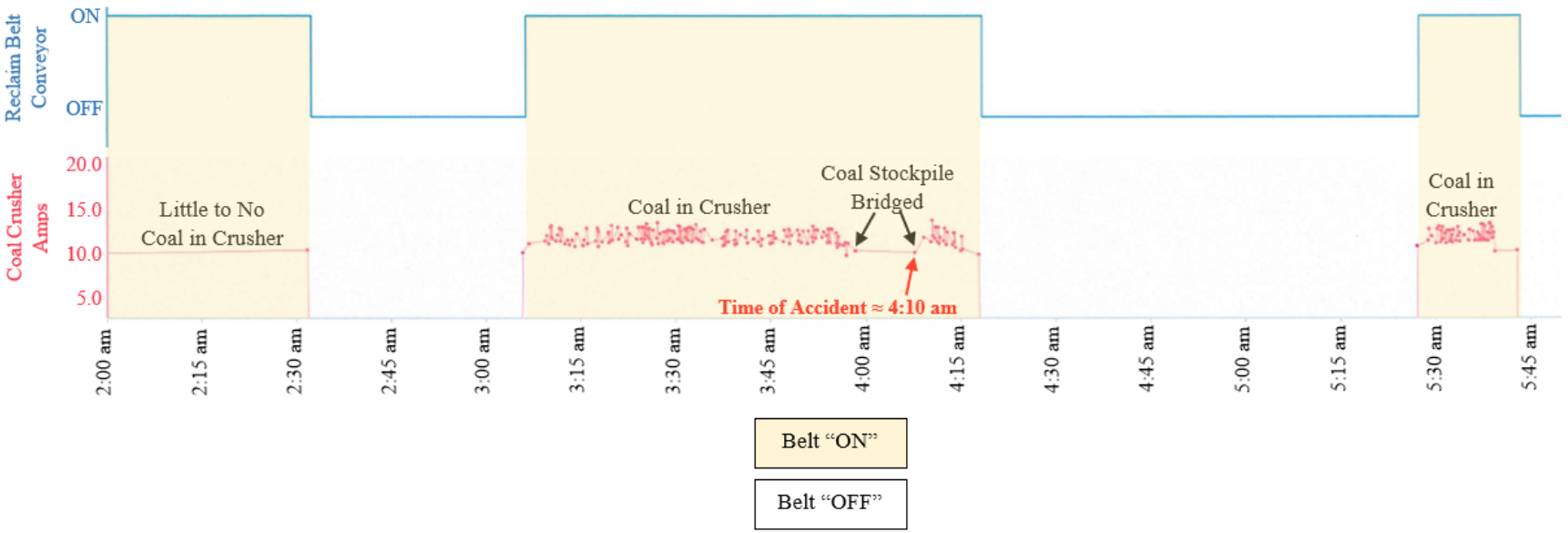
APPENDIX D – Caterpillar 980K Front-End Loader

APPENDIX E – Profile View of Bridging




NOT TO SCALE

# APPENDIX F – Belt Conveyor Data




Top Line (Blue) represents the conveyor belt being placed in the "ON" or "OFF" position in the control room.

Bottom Line (Red) represents the amperage reading from the crusher motor. When "ON" the amperage runs around 10 Amps with little to no material in the crusher. When the crusher receives material, the amperage readings will increase because of the additional stress placed on the motor.