CAI-2004-15

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

Underground

Fatal Roof Fall Accident
August 2, 2004

at

Mine No.25
Reedy Coal Company Inc.
Pinetop, Knott, Kentucky
ID No. 15-18740

Accident Investigators

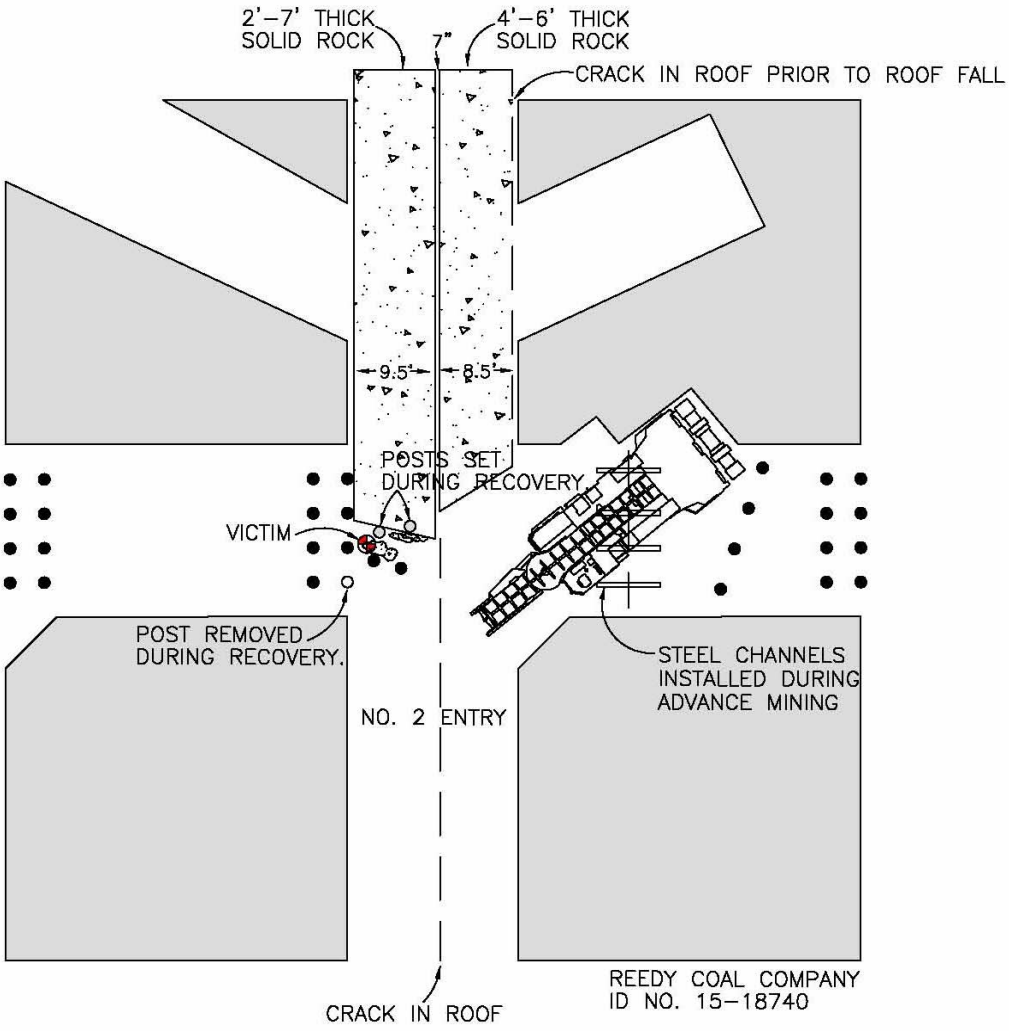
Charles L. Barton
Mine Safety and Health Inspector

Roger Dingess
Roof Control Specialist

Originating Office
Mine Safety and Health Administration
District 7
3837 South Highway 25E
Barbourville, Ky., 40906
Joseph W. Pavlovich, District Manager

TABLE OF CONTENTS

ACCIDENT SITE



OVERVIEW

At 3:50 p.m. on Monday August 2, 2004, Jimmy W. Anderson, a 38-year old roof bolter operator with 14 years of mining experience was fatally injured, at Reedy Coal Company, Mine No. 25. Anderson and the section crew had just finished setting timbers for retreat mining and were observing the roof during the final push out, when a fall of roof occurred in the No. 2 entry resulting in fatal injuries. Anderson was located in the intersection of the No. 2 entry, at crosscut No. 20, inby the turn posts. The fall ranged from 0-60 inches in thickness, 18 feet wide, and started at the center of the No. 2 entry intersection and extended inby for an undetermined distance.

The accident occurred as a result of hazardous roof conditions on the working section not being corrected. An elongated crack, parallel with the right rib, extended into the No. 2 entry intersection. A hillseam was present in the right crosscut running parallel with the No. 2 entry. The parallel joints, combined with the extraction of coal, allowed the roof fall to initiate inby the pillar line and to propagate outby to the No. 2 entry intersection at crosscut 20. The contributing factors were: Failure to follow the approved roof control plan; the victims position was prohibited by the provisions of the approved roof control plan. The day shift mine foreman failed to alert the oncoming shift of the hazardous condition by not recording hazardous conditions found.

GENERAL INFORMATION

Reedy Coal Company Inc., Mine No. 25 is located in Pinetop, Knott County, Kentucky. The mine normally operates two ten-hour production shifts per day (Monday through Thursday) with a weekend crew that works three 14-hour production shifts on Friday, Saturday and Sunday. Maintenance is performed on the third shift, Monday through Friday.
Total employment is 64 persons.

The principal officers for the mine at the time of the accident were:

Willis Ring.....President

Coal is extracted from the mine using a Joy continuous miner, transported to the feeder by a battery powered ramcar and placed onto a conveyor belt for transport to the surface. The coal is loaded into Caterpillar trucks and transported to the top of the mountain and dumped. The coal is next transported by truck to a preparation plant to be sized and cleaned. The finished product is then trucked or railed to the customer.

Prior to the accident, the Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection (AAA) on June 30, 2004. The mine was opened in April 2004 and had reported no injuries prior to this accident.

DESCRIPTION OF ACCIDENT

On the day of the accident, Jimmy W. Anderson, (victim) reported for work at approximately 3:15 p.m. He departed the surface on a battery operated locomotive mantrip at approximately 3:30 p.m. and traveled to the end of the track. He then continued to the working section traveling in a battery powered ramcar. While Anderson was traveling to the section, the day shift crew continued pillar extraction on the 001 section. The day shift foreman, Anthony Esteveze, was summoned to the No. 2 entry, by the continuous mining machine operator, for the purpose of examining a crack that ran parallel with the entry next to the right rib. The foreman observed the fracture line and checked three test holes in the immediate area. He then instructed the machine operator to back out and to resume mining from the end of the pillar block.

The second shift crew arrived on the section at approximately 3:45 p.m. Anderson proceeded to the No. 2 entry where the continuous mining machine was located. Linville Meade, electrician, and Rick Fouts, foreman, assisted Anderson in installing timbers in the No. 2 entry prior to mining the final push-out. Machine operator, Danny Baker, checked the continuous mining machine and then trammed it into position for the final push-out. Meade proceeded to the No. 3 entry to observe the mine roof. Within a few moments, Meade was summoned to do some repair work. At this time Fouts left Anderson and traveled to the No. 3 entry to replace Meade and continued to observe the mine roof. Baker loaded three cars of coal with the continuous mining machine, when, without warning, the mine roof fell. In interviews Baker stated that he looked for Anderson but could not see him. Baker proceeded around the tail of the machine and saw Anderson covered by rock and called immediately for Fouts.

Fouts immediately traveled to Anderson's location and summoned help to remove the rock. Anderson was removed to a safe location outby the fall, CPR was initiated, and Anderson was transported to the surface. Emergency Medical Personnel, on the surface, were unable to detect vital signs. Anderson was pronounced dead at the scene by the Knott County Coroner, Jeff Blair,at 6:05 p.m. August 2, 2004.

INVESTIGATION OF THE ACCIDENT

Tony Sturgill, Mine Safety and Health Inspector, of District 7 Hindman field office, were notified at approximately 3:59 p.m. on the day of the accident through a telephone call from Johnny Couch, second shift outside person, for Reedy Coal Company. An investigation was started the same day. An order was issued pursuant to Section 103(k) of the Mine Act to ensure the safety of miners and to secure the accident scene.

An accident investigation team was assembled and included members from District 7, and Office of Technical Support. The team immediately traveled to the mine, conducted a physical examination of the accident scene, interviewed persons, and reviewed training records, daily exam records, conditions, and procedures relative to the accident. MSHA conducted the investigation with the assistance of mine management and the Kentucky Office of Mine Safety and Licensing. None of the person's interviewed desired that their statements be kept confidential.

DISCUSSION

1. The accident occurred at approximately 3:50 p.m., while making the final push-out in the No. 2 entry, mining the No. 37 cut, in the right pillar block. The accident occurred at the beginning of the second shift, on the 001 working section, during retreat mining.

2. Anderson had 14 years total mining experience, 8 years and 32 weeks with Reedy Coal Company and 14 weeks at this mine. Anderson's job title was roof bolter operator/timberman.

3. All required 30 CFR Part 48 training had been completed. The victim was given annual refresher training on October 10, 2003, and Experienced Miner, Hazard, and Task Training for Roof Bolter Operator on April 21, 2004 for the new mine.

4. Anderson signed a weekly safety meeting attendance sheet on July 19 & 26, 2004, addressing among others, the topics of Pillaring and Timbering.

5. Anderson was found on the intersection side of a double row of breaker posts installed along the left rib line of No. 2 entry, in crosscut 20, inby the continuous mining machine.

6. In interviews, continuous mining operators stated that the corner of the outby pillar is typically clipped during retreat/pillar mining and supplemental support was not installed.

7. The following discrepancies between the approved plan dated April 7, 2004 and actual practices employed in the mine were identified:

   A. Plan Requirement: "While coal is being cut, mined or loaded: while operating the continuous mining machine with remote control, the continuous miner operators, and other section personnel, will position themselves in a safe location outby the continuous miner, and; no personnel will advance inby the second installed row of permanent roof support outby the face." (Page 15 Number 1(a) of approved roof control plan dated April 7, 2004).
   Practice: The victim was found inby the turn posts and inby the continuous mining machine.

8. A Joy continuous miner extracts the Hazard No. 4 seam, which averages 40 to 48 inches in height. At the time of the accident, the mine, in operation since April of 2004, was

in the process of retreat mining the first developed panel (1st Left North Mains). Two additional planned panels are expected to deplete limited reserves within 6 months.

The accident occurred in the No. 2 entry at crosscut 20 intersection, near the left rib line. The victim was positioned on the intersection side of a double row of breaker posts installed along the left rib line of No. 2 entry in crosscut 20.

9. Roof failure nearly spanned No. 2 entry, from rib to rib. The outby edge of the roof fall ended approximately halfway through the crosscut 20 intersection. The fall appeared to extend inby an estimated 50 to 70 feet, with eleven rows of bolts visible along the right rib line, protruding approximately 2 feet from the fallen material. Several bolts on the left side protruded 2 to 3 feet.

10. The fall material that struck the victim was originally located on the outby edge of the main failure zone. At the time of the investigation, it was lying on the floor in two sections, one overlapping the other, reportedly placed there by workers recovering the victim. The slab on top was roughly 2 feet by 4 feet by up to 8 inches thick. The underlying slab was 2 feet by 3-4 feet and up to ten inches thick where visible, with feathered edges. Each slab was estimated to weigh between 400 and 700 lbs.

11. The main failure occurred as two elongated blocks, separated by a steeply dipping discontinuity near the center of the entry. In crosscut 20, the fall was 4 ½ feet thick near the center, tapering to a few inches near the right rib and roughly 3 feet near the left rib. Fall material thickness may have been greater further inby. Except for small slabs on the periphery of the fall, the main blocks, where visible, remained mostly intact after impact with the floor.

12. The discontinuity bisecting the main fall extended outby to the crosscut 19 intersection, angling slightly toward the right rib. It was dilated to a maximum of $^{1}/_{8}$ inch at crosscut 20 and became tight further outby. Roughly parallel curvilinear discontinuities were mapped in adjacent entries and were found to be persistent over several crosscuts.

13. In No. 3 entry, a discontinuity extended from the crosscut 20 intersection, curving to the left pillar line, terminating in crosscut 19 at the pillar between No. 2 and No. 3 entries. This discontinuity was heavily stained with iron oxides and had been strapped in several locations on development. The intermittent strapping indicates that the condition was recognized by mine personnel and understood to require additional roof support. Mine personnel indicated that these types of discontinuities were encountered throughout the panel. The general orientation of the discontinuities mapped underground matched those observed in surface outcrops in the vicinity of the mine portal.

14. Exposure of discontinuities on development, some with oxide staining (indicating the presence of water), and orientations consistent with surface joints suggest that the discontinuity bisecting the fall existed prior to retreat mining and was part of a northwest oriented joint set.

15. Entry width measurements taken in No. 2 entry between crosscuts 19 and 20 were 20 feet 11 inches near the pillar notch and 20 feet 6 inches near the center of the pillar. Outby crosscut 19; No. 2 entry was 19 feet, 8 inches wide. Widths in adjacent entries were 19 feet 9 inches and 19 feet 4 inches.

16. The roof was supported with grade 60, 5/8 diameter, 48-inch long fully grouted, headed rebar bolts installed on 4 foot by 4 foot centers.

17. The four turn posts required by the roof control plan to be installed diagonally across the intersection were not visible at the time of the investigation. Based on the observed position of these turn posts in nearby entries, the fall would have taken out the two turn posts furthest inby, but should not have reached the two outby posts. However, what appeared to be a post was visible under the leading edge of the fall blocks.

18. The original configuration of posts in the No. 2 entry at crosscut 20 intersection was unclear as several additional posts were set during recovery of the victim, and at least one of the breaker posts in crosscut 20 (left side) was moved to facilitate recovery efforts.

19. The immediate roof adjacent to the accident location consisted of a hard, gray, sandy micaceous shale with prominent black laminate surfaces. The fall material, observed remotely, appeared to be similar to outby observations. A localized area of immediate roof in entry one, exposed between the coal seam and the mined roof, consisted of dark gray mudstone.

20. Test samples of both rock types were subjected to immersion in fresh water for 48 hours. The integrity of the samples was unaffected.

21. Groundwater inflow into the mine is generally limited to small seeps, although development of crosscuts 15 through 20 in No. 1 entry was halted due to the presence of water.

22. Rib sloughing to a depth of a few inches occurred in No. 2 entry between crosscuts 19 and 20. Reportedly, the sloughing occurred in the interval between the time of roof failure and the investigation on the afternoon of August 3rd.

23. A double row of breaker posts had been installed in No. 2 entry on the outby side of the crosscut 20 intersection (subsequent to the fall in No. 2 entry). A few posts on the left side appeared to be taking weight, as evidenced by the crushing of the post wedges.

ROOT CAUSE ANALYSIS

An analysis was conducted to identify the most basic causes of the accident that were correctable through reasonable management controls. During the analysis, causal factors were identified that, if eliminated, would have either prevented the accident or mitigated its consequences.

Listed below are causal factors identified during the analysis and their corresponding corrective actions implemented to prevent a recurrence of the accident:

1. *Causal Factor:* The victim was in an unsafe location in the No. 2 entry intersection inby the continuous mining machine.

   Corrective Action: Mining practices and procedures should be reviewed to ensure that during retreat mining no one is allowed inby the continuous mining machine. The mine operator should reinstruct all affected personnel in the approved roof control plan and ensure compliance with its provisions.

2. *Causal Factor:* A review of examinations for hazardous roof conditions conducted during the day shift, prior to the accident, on the 001 mechanized mining unit (MMU) indicated that observed hazardous conditions were not recorded in the approved record book. In interviews the foreman acknowledged observing the crack radiating down the right rib but failed to record this condition. Identification of these conditions during the examination should have been recorded in the approved record book in order to alert the oncoming shift foreman to hazardous conditions. The record could have prompted corrective actions by mine management.

   Corrective Action: The certified persons making the examinations should properly identify, make the appropriate corrections, and record all hazardous conditions. Mine management should develop and follow procedures to identify and correct any and all hazardous conditions and to notify all persons affected by the condition.

CONCLUSION

The accident occurred as a result of hazardous roof conditions on the working section not being corrected. An elongated crack, parallel with the right rib, extended into the No. 2 entry intersection. A hillseam was present in the right crosscut running parallel with the No. 2 entry. The parallel joints, combined with the extraction of coal, allowed the roof fall to initiate inby the pillar line and to propagate outby to the No. 2 entry intersection at crosscut 20. The contributing factors were: Failure to follow the approved roof control plan; the victims position was prohibited by the provisions of the approved roof control plan. The day shift mine foreman failed to alert the oncoming shift of the hazardous condition by not recording hazardous conditions found.

.

Approved By:

ORIGINAL SIGNED BY 9-23-04
Joseph W. Pavlovich Date
District Manager

ENFORCEMENT ACTIONS

Order No. 7547237 was issued on August 2, 2004, under the provisions of section 103(k) of the Mine Act.

A fatal accident occurred at this operation on August 2, 2004, when the miner was fatally injured by a pillar fall on the 001 active section. This order is issued to assure the safety of all persons at this operation. It prohibits all activity in the underground areas of the mine until MSHA has determined that it is safe to resume normal mining operations at this mine. The mine operator shall obtain prior approval from an authorized representative for all actions to recover and/or restore operations to the affected area.

Citation No. 7501539 104(a), S&S, Moderate negligence was issued to Reedy Coal Company for a violation of 75.220(a)(1).

An investigation of the fatal roof fall accident that occurred on August 2, 2004, determined that the approved Roof Control Plan, dated April 7, 2004, was not being complied with in the No. 2 entry on the 001 Mechanized Mining Unit (MMU). The victim was found inby the continuous mining machine while the continuous mining machine was mining. The approved plan required that all personnel be located in a safe location outby the continuous mining machine when the continuous mining machine is mining.

Citation No. 7501540 104(a), S&S, Moderate negligence was issued to Reedy Coal Company for a violation of 75.360(f).

An investigation of the fatal fall of roof accident that occurred on August 2, 2004, determined that the day shift foreman who conducted the pre-shift examination failed to properly record the results of his examination of the 001 Mechanized Mining Unit (MMU). The foreman stated that hazardous conditions were found and that a decision was made to back out the continuous mining machine and approach the pillar block from another position. The pre-shift record book did not contain any entries identifying the hazardous conditions.

Appendix A

Persons Participating in the Investigation

Reedy Coal Company, Inc.

Name	Title
Willis Ring	President
Rosevelt Sandlin	Manager
Jerry Bentely	Superintendent
Rick Fouts	Foreman

Kentucky Office of Mine Safety and Licensing

Name	Title
Tracey Stumbo	Chief Accident Investigator
Johnny Green	Deputy Chief Accident Investigator
Bob Banks	Mine Inspector
Bobby Ashworth	Mine Inspector

Mine Safety and Health Administration

Name	Title
Neil Morholt	Attorney, Office of Solicitor
William B. Johnson	Supervisory Mine Safety and Health Inspector
Charles L. Barton	Mine Safety and Health Inspector/Accident Investigator
Roger Dingess	Mine Safety and Health Specialist/Roof Control
Paul Tyrna	Geologist, Technical Support
Bill Gray	Geologist, Technical Support

Appendix B
List of Persons Interviewed

Name	Title
Dwight David Kincer	Continuous Mining Machine Operator (day shift)
Kenneth Ray Adams	Continuous Mining Machine Operator (day shift)
Erwin Lucas	Roof Bolter Operator/Timberman (day shift)
Phillip Johnson	Mine Emergency Technician (day shift)
Robert Anthony Esteveze	Section Foreman (day shift)
Linville Meade	Electrician/Repairman (second shift)
Daniel William Baker	Continuous Mining Machine Operator (second shift)
Rick Darrell Fouts	Section Foreman (second shift)
Jerry Bentley	Mine Superintendent