

UNITED STATES
DEPARTMENT OF THE INTERIOR
MINING ENFORCEMENT AND SAFETY ADMINISTRATION

REPORT OF MULTIPLE FATAL COAL-MINE ROOF-FALL ACCIDENT
NO. 105 MINE
BETHLEHEM MINES CORPORATION
CENTURY, BARBOUR COUNTY, WEST VIRGINIA

November 26, 1975

by

John M. Dower
Mining Engineer

and

Richard J. Vasicek
Federal Coal Mine Inspector

Originating Office
Mining Enforcement and Safety Administration
Morgantown, West Virginia 26505
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Coal Mine Health and Safety District 3

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INTRODUCTION

This report is based on an investigation made pursuant to the Federal Coal Mine Health and Safety Act of 1969 (83 Stat. 742).

A roof-fall accident occurred about 10:15 a.m., Wednesday, November 26, 1975, in the intersection of the No. 3 entry, 1 Right off East Mains section. Gary M. Brown, continuous-mining-machine-operator helper, who was operating the continuous miner; Denley M. Tenney, mason, who was the continuous-miner-operator helper; and Edgar L. Zickefoose, inside utilityman, were apparently killed instantly. Brown, age 27, had 7 years 1 month total mining experience, 2 years 1 month at this mine, and is survived by his widow and two dependent children. Tenney, age 46, had 7 years 6 months total mining experience, 2 years 6 months at this mine, and is survived by his widow and three dependent children. Zickefoose, age 23, had 1 year 3 months total mining experience, 8 months at this mine, and is survived by his widow and one dependent child.

A representative of the Mining Enforcement and Safety Administration, who was performing an inspection on another working section of the mine, was notified of the accident at approximately 10:30 a.m. the same day, by a company official, and an investigation was started immediately.

Information for this report was obtained from statements made by company officials and employees, and from an investigation at the scene of the accident.

GENERAL INFORMATION

The 105 Mine is located about 1,000 feet west of Century, Barbour County, West Virginia, off U. S. Route 119. The mine is opened by six drifts into the Redstone coalbed which ranges from 48 to 60 inches in thickness locally. A total of 67 persons was employed, 65 of whom worked underground. About 1,300 tons of coal is mined daily on two production shifts.

The 1 Right section had been developed approximately 400 feet to the right of the East Mains entries using a block-mining system. Six entries with connecting 90-degree crosscuts were driven on 80-foot centers with widths of 17 to 18 feet. The mining cycle constituted the developing of the entries to 100-foot maximum depths starting with the No. 1 entry on the left and proceeding sequentially to the No. 6 entry on the right, returning to the No. 3 entry and developing crosscuts at the 80-foot centers to the No. 6 entry, and finally returning to the No. 3 entry and developing the crosscuts left to the No. 1 entry.

The face of the No. 3 entry at Spad Station 512 is approximately 380 feet from a strip mine highwall. A highwall located to the right of the section is approximately 200 feet from the No. 6 entry. The overburden in the accident area is about 200 feet in thickness.

Under normal conditions, the 1 Right section produces coal only on the 12 p.m. to 8 a.m. shift each working day.

The mining machine on the working section was a Lee Norse CM38-1K continuous-mining machine, Serial No. 3521, Approval No. 2F-1517-1. The machine was redesigned by the operator and a remote-control unit with a control cable 40 feet in length was installed to allow the operator to remain under permanently supported roof while mining coal.

The Fletcher bolter-conveyor machine (Serial No. 74068, Type BC-15.0-10, Approval Nos. 2G-2855A and 2B-197-4) used in conjunction with the remote control continuous-mining machine utilized two integral roof drills and an integral temporary roof support unit to install permanent roof supports during the mining cycle. The rubber-tired machine is equipped with three remotely operated hydraulic roof jacks and metal crossbeams which provide temporary support during bolting operations. Roof bolts are installed on pattern by two pivoting, extendible drill heads on each side which are equipped with separate canopies, controls, and integral dust-collecting systems. The roof-bolt installations were required to be maintained to within 40 feet of the advancing face. The continuous miner normally discharged coal into the bolter conveyor which in turn loaded the coal into shuttle cars. At the time of the accident the bolter conveyor was not in use and the continuous miner was loading directly into a shuttle car.

The roof-control plan which was approved by the Mining Enforcement and Safety Administration required that three rows of roof bolts be installed in the entries and crosscuts during advance mining on a maximum of 5-foot centers crosswise and lengthwise. The roof-control plan stated that all provisions are minimum requirements for roof supports and where conditions indicated, the plan shall be supplemented with either longer and/or additional roof bolts, posts, or crossbars. The plan also required that if changes are made in the mining system, the plan shall be revised accordingly. The roof-control plan also stipulated that a test hole was to be drilled in each place each production shift to assure that bolts were anchored a minimum of 12 inches from partings of coal, mud seams, or other irregularities; and that workmen shall not advance in by permanent roof supports, except to install temporary supports.

The roof-control plan further stated that torque checks were to be made on at least 1 out of every 10 roof bolts from the face to the outby side of the last open crosscut each 24 hours during coal-producing days. The results shall be recorded showing how many checks were made, how many roof bolts were below 90-foot pounds when installed against the roof or 60 foot-pounds if installed against wood, and how many roof bolts were above 225 foot-pounds. If more than one-half of the tested roof bolts fall outside the listed range, the plan required that corrective action be taken and a report filed with the superintendent. Corrective action shall be supplementary support such as posts or cribs. A copy of the approved roof-control plan was posted at the mine.

The roof in the entries and crosscuts of the 1 Right section panel was shale rock which was interspersed with roof cracks, clay veins, and slips of variable widths and undetermined thicknesses. The roof was supported with four rows of 4-foot roof bolts an average of 45-inch centers along the entries and crosscuts. Five-foot roof bolts had been installed at intermittent locations where a roof crack and clay veins were observed.

The roof in the immediate area of the accident consisted of laminations of shale and hardened mud seams which had interspersed roof cracks and a clay vein of variable widths and undetermined thicknesses. The accident investigation revealed that no 5-foot roof bolts had been installed in the area where the accident occurred. Preshift and on-shift examinations for methane and other hazards were made daily.

The 1 Right section is an experimental section and a regular crew had been trained to operate the remote-control Lee Norse continuous-miner and the Fletcher bolter-conveyor machine.

The company's training and retraining program had been approved by the Mining Enforcement and Safety Administration and it included all the requirements of the Federal Coal Mine Health and Safety Act of 1969. The program is administered by the Bethlehem Mines Corporation, Marion-Barbour Division instructors and safety department.

Brown, victim, had attended the company's training classes on coal-mine ventilation, first-aid refresher, roof and rib control, detection of methane and oxygen deficiency using MSA spotter and flame safety lamp, principles of mine rescue, and the use of the self-rescuer.

Tenney, victim, had received training in roof and rib control, the safe use and handling of explosives, detection of methane gas and oxygen deficiencies using the spotter and flame safety lamp, first-aid refresher methods, principles of mine rescue, and the use of the self-rescuer.

Zickefoose, victim, participated in a 40-hour orientation program given by the Bethlehem Division instructors which included 20 hours underground training where practical application was stressed. In addition, Zickefoose received training in roof and rib control, the proper use and care of the methane spotter and flame safety lamp, the detection of methane and oxygen deficiency, and the use of the self-rescuer.

Dale K. Bartlett, acting section foreman, was the victim's immediate supervisor. He is certified by the State of West Virginia as a mine foreman; however, he was a member of the United Mine Workers of America and classified as a continuous-mining-machine-operator helper. He has 23 years mining experience and about 6 weeks as an acting section foreman. Bartlett received training in roof and rib control, the safe use of handling explosives, the detection of methane and oxygen deficiencies, principles of mine rescue, and the use of the self-rescuer.

The management structure for this mine consisted of a superintendent, mine foreman, assistant mine foreman, and a section foreman for each crew.

The last Federal inspection was completed October 29, 1975.

The investigation was conducted by Mining Enforcement and Safety Administration personnel. The following persons furnished information and/or were present during the investigation:

Bethlehem Division and Company Officials and Employees

H. R. Raschke	Assistant Manager, Bethlehem Mines Corporation
T. E. Kobrick	Manager, Safety and Workmen's Compensation Division, Bethlehem Steel Corporation
E. T. Millward	Assistant Chief Mine Inspector, Safety and Workmen's Compensation Division, Bethlehem Steel Corporation
Dave A. Sparks	Division Superintendent
R. H. Jeran	General Superintendent
James Gray	Superintendent - No. 105 Mine
William P. Boni	General Assistant Mine Foreman
M. Jacques	Assistant Mine Inspector
B. H. Payne	Outside Foreman
John A. Nicholson	Division Safety Inspector

L. Lantz	Mine Inspector
J. Pigza	Chief Maintenance Division
L. Sirk	General Assistant Mine Foreman
L. M. Rauer	Superintendent, No. 108 Mine
V. Zara	Assistant Mine Inspector
G. A. Wingfield	Assistant Foreman
Arthur Allgouer	Engineer, Bethlehem Division Office
Rusty Pearl	Engineer, Bethlehem Division Office
Garry Coberly	Engineer, Bethlehem Division Office
Ronald F. Zaro	Assistant Foreman
Dale K. Bartlett	Acting Section Foreman
T. T. McGee	Mine Clerk
Henry Moran	Member Safety Committee, UMWA, No. 105 Mine
John Selan	Member Safety Committee, UMWA, Chairman
Carl L. Hinzman	Assistant Foreman, Midnight Shift
Charles W. Tinney	Roof-bolt-machine operator
Billy T. Shreve	Roof-bolt-machine operator
Matthew Cain	Roof-bolt-machine operator
Sherwood Herron	Roof-bolt-machine operator
Walter F. Lach	Beltman

United Mine Workers of America

Lawrence A. Floyd, Jr.	President, District 31 UMWA
Donald Poland	Safety Coordinator, UMWA District 31

West Virginia Department of Mines

Walter Miller	Assistant Inspector-at-Large
Lester E. Wolfe	District State Mine Inspector
Carl Kinty	District State Mine Inspector

Mining Enforcement and Safety Administration

Joseph Marshalek	Assistant District Manager
Clifford Ellis	Coal Mine Safety Specialist, Arlington, Va.
Gene Fuller	Coal Mine Safety Specialist, Arlington, Va.
Robert Crumrine	Supervisory Coal Mine Technical Specialist (Roof-Control)
Coperry Keith	Coal Mine Inspection Supervisor
Arthur Cross	Coal Mine Inspector
Robert L. Wilmoth	Coal Mine Inspector
Glenn R. Springer	Technical Support Roof Control, Pittsburgh, Pa.
John M. Dower	Mining Engineer
Richard J. Vasicek	Coal Mine Inspector

DESCRIPTION OF ACCIDENT

On the day of the accident, the 8 a.m. to 4 p.m. crew was informed that their regular section in East Mains would not produce coal because of maintenance problems and they were to be transferred to the 1 Right off East Mains section. Before the crew left the surface management assigned the men the following duties to be performed: Gary M. Brown, continuous-miner-operator helper, to operate the continuous miner; Denley M. Tenney, mason, to work as the continuous-miner-operator helper; Edgar L. Zickefoose, inside utilityman; Walter E. Lach, beltman, to operate the shuttle car; and Dale K. Bartlett, continuous-miner-operator helper, to perform duties as acting section foreman.

The crew entered the mine about 8 a.m. and arrived on the section about 8:25 a.m. After examining the section, Bartlett instructed Zickefoose, victim, to obtain supplies. Mining operations were started in the crosscut between Nos. 5 and 6 entries and completed about 9:30 a.m. The continuous miner was then trammed to and parked in the No. 3 entry outby Spad Station No. 512 (see sketch). Meanwhile, Sherwood Herron and Matthew R. Cain, roof-bolt machine operators, who reportedly arrived in the section about 9 a.m., trammed and parked the Fletcher bolter-conveyor machine in the crosscut between Nos. 5 and 6 entries in preparation to perform bolting operations.

Prior to starting mining operations in the No. 3 entry intersection, Bartlett, reportedly, examined the roof visually and by the sound-and-vibration method and established a sight line to assure proper mining of the crosscut to the left. The intersection area had previously been bolted; Bartlett then left the immediate area to conduct an examination of the other working places.

After the foreman left the place, Brown, victim, operating the remote-control continuous miner loaded 11 shuttle cars from the first run of the crosscut left off the No. 3 entry advancing the face about 16 feet without incident.

Bartlett returned to the No. 3 entry intersection about this time and was notified by Tenney that the water pressure on the continuous-miner was low. Bartlett left the area about 10:10 a.m. to examine the water pump which was located about 180 feet outby Spad Station No. 512 in the belt conveyor entry.

When Lach returned with his shuttle car, Brown had repositioned the machine and started mining the corner for the second miner run. At this time Lach observed three men in the intersection. When the corner was penetrated about 20 inches, the roof collapsed without warning crushing Brown, Zickefoose, and Tenney to the mine floor. The area of the roof fall was about 24 feet 6 inches long, 22 feet 10 inches wide, 4 feet 7 inches thick (see sketch).

Lach immediately notified Bartlett of the occurrence and recovery work was started immediately. Lifting jacks were used to free the victims. When no signs of life could be detected, the victims were placed on broken backboards and transported to the surface, then by ambulance to the Broadus Hospital, Philippi, Barbour County, West Virginia, where they were pronounced dead on arrival.

The investigation revealed the following:

1. A slip and clay vein joined together in the corner where the continuous-miner cutting head was located.
2. The roof in the No. 3 entry and crosscut between Nos. 3 and 4 entries inby Spad Station No. 492 was supported with 4-foot long roof bolts installed on 3- to 5-foot centers lengthwise and crosswise.
3. During the investigation, the roof bolts tested in the No. 3 entry inby Spad Station No. 492 were within the torque range. However, more than 10 per centum of 68 roof bolts tested in the last open crosscut between Nos. 3 and 4 entries only torqued at 55-foot pounds or less.
4. During the accident investigation, it could not be established that test holes to determine anchorage strata and separations were being drilled in the roof as required by the approved roof-control plan.
5. Gary M. Brown, victim, had worked the 12 p.m. to 8 a.m. shift on November 26, 1975, in the East Mains section and decided to double back and work the following 8 a.m. to 4 p.m. shift in the 1 Right section which was his regular section.
6. It could not be determined when the No. 3 entry inby Engineer's Station No. 492 was mined and bolted; however, the preshift, on-shift, and daily report book indicated that the crosscut right at Engineer's Station No. 512 between Nos. 3 and 4 entries was mined on November 20, 1975, and roof bolts were installed in the last 40 feet of the crosscut on November 21, 1975. Twenty-six roof bolts were shown on the on-shift and daily report book as tested, with one roof bolt listed as above the torque range required and five roof bolts below the required torque range.
7. The records in the preshift, on-shift, and daily report book for the shift in the 1 Right off East Mains section, prior to the accident, showed that the Nos. 1, 2, 3, and 6 entries, had been dangered off. However, during the accident investigation in the 1 Right section, it was determined that danger signs were posted to signify areas of unsupported roof from the last row of installed roof bolts to the faces which included distances of 7 to 10 feet. Slips were present in the unsupported areas of the Nos. 1, 2, and 6 entries.

8. Sixteen 4-foot roof bolts were recovered from the roof fall area which indicated a full pattern of roof bolts was installed prior to the roof fall.

CAUSE OF ACCIDENT

Failure of management and workmen to properly evaluate the roof conditions in the No. 3 entry intersection where a clay vein and slip were known to exist, failure of management to provide additional roof supports, and to alter the mining system so that the corner rib was not mined exposing additional area where the clay vein and slip joined was the cause of the accident.

FINDING OF FACTS

1. Additional roof supports were not provided where a roof crack and clay vein were known to exist, prior to the roof fall accident, in the No. 3 entry intersection at Spad Station No. 512. A Violation of Section 75.200.
2. The approved roof-control plan was not being complied with, in that, roof bolt spacings exceed the maximum allowable distance to face, 5 feet, at various locations on the section. A Violation of Section 75.200.
3. During the investigation it was determined that test holes, one foot deeper than the roof bolts being installed, were not being drilled in each working place. A Violation of Section 75.200.
4. The preshift and on-shift examinations indicated that a violation or a hazardous condition existed in face areas of the Nos. 1, 2, 3, and 6 entries which was not corrected. Roof cracks and slips were located in the unsupported area. A Violation of Section 75.304.

REQUIREMENTS

1. Management and workmen shall comply with all provisions of the approved roof-control plan in that additional roof supports shall be installed when adverse roof conditions are encountered and test holes, one foot deeper than the roof bolts installed, shall be drilled.
2. The approved roof-control plan shall be reviewed and revised to incorporate provisions for a better, more positive roof support in areas having slips and clay veins. The revised plan shall be submitted to the District Manager for approval.

NOTICES AND ORDERS

Section 103(f)

A roof fall occurred above the roof bolt's anchorage in the intersection of the crosscut left off No. 3 entry inby Engineer's Station No. 492 which resulted in three men being under the fall.

Action Taken

The 103(f) Order No. 1RLW was issued at 2 p.m., November 26, 1975, permitting only necessary personnel to enter the area to recover the victims and conduct an investigation of the accident. The Order was terminated November 28, 1975.

Section 103(f)

The 103(f) Order was issued to complete the multiple fatal roof-fall accident investigation. All activities shall be restricted to recovery of the continuous-mining machine and roof bolts in the accident area. The roof bolts shall be recovered, stored, and checked by the Mining Enforcement and Safety Administration personnel before the accident investigation is complete.

Action Taken

The 103(f) Order No. 1RLW was issued at 2:30 p.m., December 8, 1975, permitting only the personnel required to support the roof in the accident area and to recover the continuous miner and roof bolts. The Order was terminated December 16, 1975.

Section 104(a)

Order No. 2RLW was issued on November 28, 1975, for Violation of Section 75.200.

Action Taken

Order No. 2RLW was issued on November 28, 1975, requiring that all men except those referred to in Section 104(d) of the Act be withdrawn from the 1 Right off East Mains section. The Order was terminated December 8, 1975.

Notice of Violation - Section 75.200.

Notice of Violation No. 1RJV dated December 5, 1975, was issued on Form 104(b) requiring that this violation be abated by 8 a.m., December 10, 1975. The violation was abated within the specified time as extended.

Notice of Violation - Section 75.200.

Notice of Violation No. 2RJV dated December 5, 1975, was issued on Form 104(b) requiring that this violation be abated by 8 a.m., December 10, 1975. The violation was abated within the specified time as extended.

Notice of Violation - Section 75.200.

Notice of Violation No. 3RJV dated December 5, 1975, was issued on Form 104(b) requiring that this violation be abated by 8 a.m., December 10, 1975. The violation was abated within the specified time as extended.

Notice of Violation - Section 75.304.

Notice of Violation No. 4RJV dated December 5, 1975, was issued on Form 104(b) requiring that this violation be abated by 8 a.m., December 10, 1975. The violation was abated within the specified time as extended.

Respectfully submitted,

/s/ John M. Dower

John M. Dower
Mining Engineer

/s/ Richard J. Vasicek

Richard J. Vasicek
Federal Coal Mine Inspector