

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

Underground Coal Mine

Fatal Slip/Fall of Person Accident
May 15, 2012

Frontier-Kemper Constructors Inc. (A01)
Evansville, IN
at
Gibson South
Gibson County Coal, LLC
Owensville, Gibson County, Indiana
I.D. No. 12-02388

Accident Investigator

Dean Cripps,
Electrical Engineer

Originating Office
Mine Safety and Health Administration
District 8
2300 Willow Street
Vincennes, Indiana
Robert A. Simms,
District Manager

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Photograph showing the concrete bucket, hopper, and 8" flexible hose

OVERVIEW

On Tuesday, May 15, 2012, at approximately 10:45 p.m., James Palmer, a laborer for Frontier-Kemper Constructors, was injured when he was knocked to the floor of the work platform suspended in the shaft. The fall resulted in a broken bone in his left leg. Palmer and two other employees were handling an eight-inch diameter hose attached to the bottom of a hopper that was suspended beneath a six-cubic yard concrete bucket in the shaft. The hose was being used to direct concrete from the bucket into the forms lining the shaft wall. The hose was overloaded as concrete came out of the hopper too fast, which caused the hose to surge. This sudden movement of the hose knocked the victim and his coworkers off their feet. The victim was removed from the shaft and taken to a local

hospital where he was treated and released. On May 24, 2012, the victim died at his home in Marion, Illinois, from complications from his injury.

The accident occurred when the concrete hose surged, causing Palmer to fall onto the work deck. The lack of effective procedures to prevent the hose from surging contributed to the accident. Palmer's death was charged to the mining industry because his death resulted from a work related injury.

GENERAL INFORMATION

The Gibson South Mine is located near Owensville in Gibson County, Indiana. The mine operator is Gibson County Coal, LLC, a subsidiary of Alliance Resource Partners LP. The mine is under construction and was in non-producing status. Principal officers for the mine at the time of the accident were Dan Durham, General Manager, and Jerry Wheeler, General Manager of Construction.

Frontier-Kemper Constructors, Inc., located in Evansville, Indiana, was contracted by Gibson County Coal to construct a 30-foot diameter dual-compartment, concrete lined ventilation shaft and a dual-compartment, over/under slope. The shaft was being developed to approximately 577 feet deep and the slope to 2200 feet in length.

The principal officers for Frontier-Kemper on this project were: Rob Brown, Mining Division Manager; Jason Hayes, Project Manager; and Bob Smith, Safety Coordinator.

A regular safety and health inspection (E01) by the Mine Safety and Health Administration (MSHA) was ongoing at the time of the accident. The previous regular safety and health inspection was completed on March 28, 2012.

DESCRIPTION OF THE ACCIDENT

On May 15, 2012, James Palmer (victim) reported to work at the shaft construction site for his 7:00 p.m. to 7:00 a.m. shift. Palmer and four other employees: Chris Robinson, Lead Miner; T.J. McGuire, Miner; Michael Schultz, Miner II; and Kurt Thomas, Laborer, were lowered down the shaft to the work deck. They continued with a concrete pour that had begun on the previous shift. Concrete was being poured behind forms encircling the excavated shaft to create the shaft lining.

Concrete was delivered to the work deck in a 6-cubic yard bucket. Attached to the bottom of the concrete bucket was a hopper that funneled the wet concrete into an 8-inch flexible hose. This hose extended approximately 20 feet below the hopper. The end of the hose was inserted behind the forms to deliver the concrete to the required locations. The work of inserting the hose behind the forms and moving it to various locations around the shaft was performed manually by employees on the work deck. Normally, three employees were required to handle the flexible hose as concrete was being delivered through it.

At the time of the accident, Palmer, Schultz, and Thomas were holding the hose as concrete was being poured through it. After relocating the hose to a different side of the shaft, the employees instructed Robinson to begin releasing concrete from the concrete bucket. An excessive amount of concrete was released into the hose that the three employees were holding. This caused the hose to surge, knocking Palmer and Schultz down. Palmer received a fracture to a bone in his left leg when he fell onto the work deck.

Palmer was hoisted out of the shaft to the surface. Doug Dye, Assistant Superintendent, drove Palmer to Gibson General Hospital in Princeton, Indiana. Palmer was diagnosed with a left ankle fracture, treated, and released. Dye drove Palmer back to the mine, arriving prior to the scheduled 7:00 a.m. shift change. Palmer drove himself from the mine to his hotel in Princeton. The next morning, May 17th, Palmer drove approximately two hours to his residence in Marion, Illinois. Palmer did not return to work, spending the next several days recuperating at home. On May 24, 2012, Palmer died unexpectedly at his home. Subsequent to his death, an autopsy was conducted on the victim. According to the autopsy, the cause of death was attributed to bilateral pulmonary thromboembolism, due to deep vein thrombosis of the left calf, due to clinical fracture of the left fibula bone.

INVESTIGATION OF THE ACCIDENT

On May 30, 2012, MSHA District 8 Assistant District Manager, Sylvester DiLorenzo, had a conversation with George Zugel, Corporate Safety Director for Frontier Kemper, about a matter unrelated to this accident. During the conversation, Zugel mentioned that James Palmer had died at his home. After learning of the death, DiLorenzo contacted, Adron Wilson, Supervisory Special Investigator for District 8, and instructed him to check on details relating to Palmer's death. Wilson contacted the Williamson County Coroner's Office in Marion, Illinois and inquired about the circumstances of Palmer's death. The

coroner's office provided a copy of the preliminary autopsy report to MSHA on June 1, 2012. The report listed the cause of death as "bilateral pulmonary thromboembolism, due to deep vein thrombosis, left calf, due to clinical fracture of left fibula bone."

On June 4, 2012, MSHA began an accident investigation because of Palmer's death. Dean Cripps, Accident Investigator from the Benton, Illinois field office, traveled to the mine on June 5, 2012. Cripps issued a 103(k) order and all construction work in the shaft was halted until the investigation was conducted. A physical examination of the shaft construction site was conducted on June 5, 2012. Interviews with seven employees were conducted on June 6, 2012, at the mine site. Also on June 6th, Cripps and Wilson interviewed Robin Palmer, wife of the victim, at her parents' home in Marion, Illinois.

The on-site portion of the investigation was completed on June 14, 2012. Lists of persons who participated in the investigation are shown in Appendices A and B of this report.

DISCUSSION

Location of the Accident

The accident occurred in a 30-foot diameter shaft that was under construction. The concrete-lined shaft had been excavated from the surface to a depth of approximately 150 feet by drilling, shooting, and mucking. When the accident occurred, the victim and four other employees were working from the top deck of a work platform suspended in the shaft.

Shaft Sinking Plan

Coal mine operators are required by 30 CFR, § 77.1900 to submit a plan to the Coal Mine Safety and Health District Manager for the construction of a slope or shaft. The original slope and shaft sinking plan was approved by the district manager on November 10, 2011. Upon approval, this plan sets the standards to be followed by the mine operator or a contractor in the slope and shaft sinking operation.

Concrete Pour

On the day of the accident, a concrete pour was being made to form the shaft lining. The day shift began the concrete pour, and the evening shift completed the task.

Concrete is delivered into the shaft in a six-cubic yard concrete bucket. The bucket is filled with concrete at the top of the shaft. The bucket is attached to the hoist rope and is lowered down the shaft by the main construction hoist. The concrete is dispensed through an opening in the bottom of the concrete bucket. A clamshell type gate is installed over the opening at the bottom of the bucket and controls the flow of concrete from the bucket. This clamshell gate can be opened and closed manually by a handle on the side of the bucket. It can also be operated remotely by use of a pneumatic valve and cylinder attached to the clamshell gate.

Attached to the bottom of the concrete bucket is a hopper with a flexible hose attached to it. The hopper gathers the concrete as it is released from the concrete bucket and funnels it down to the hose. The concrete flows by gravity through the hose. The hose is approximately 20-feet long. This flexible hose allows the concrete to be distributed to different areas around the shaft wall.

At the time of the accident, the clamshell gate on the concrete bucket was being operated remotely. A small chain was attached to the pneumatic valve and hung down from the concrete bucket to the work deck. An employee standing on the work deck operated the valve by pulling the chain. This in turn, caused the clamshell gate to open and close. Interviews with several employees indicated that this was not the preferred method of operating the gate. The flow of concrete from the bucket into the hopper was difficult to control because the person operating the valve could not see how much concrete was being released into the hopper. In addition, the pneumatic cylinder did not always completely close the clamshell gate. This often allowed an excessive amount of concrete to be released from the bucket into the hopper. The uneven flow of concrete through the flexible hose caused it to surge, which made controlling the hose difficult.

Operating the clamshell gate manually was the preferred method mentioned by the persons interviewed. This method requires a person to stand on a platform attached to the concrete bucket and operate the handle attached through linkage to the gate. This person can see the concrete as it is being released from the bucket into the hopper and have much greater control of the concrete into the flexible hose.

MSHA Presence on the day of the Accident

MSHA Coal Mine Inspector (CMI), Steve Wilson, from the Vincennes, Indiana field office arrived at the mine at 2:15 a.m. on May 16th, 2012, as part of the ongoing regular inspection. He was not aware of the accident involving Palmer that had occurred in the shaft some three and one half hours before his arrival. During the course of his inspection, CMI Wilson was informed of the accident. By that time, Palmer had been released from the hospital and was back at the mine. CMI Wilson traveled to Frontier Kemper's office and spoke with Palmer. Palmer told CMI Wilson that the hose being used to pour the concrete shifted, causing him to lose his balance and fall backward, breaking a bone in his ankle. CMI Wilson then traveled to the shaft construction site. He was lowered down the shaft to the work deck. No tripping hazards were observed on the work deck by CMI Wilson.

Training and Experience

MSHA reviewed the victim's new miner training and task training records, which were current and up-to-date. Palmer had received separate task training for: 1. Work as a Laborer, 2. Work in Construction, and 3. Operation of a Man Lift.

The victim had worked for Frontier Kemper at several shaft and slope construction projects since being hired in August of 2011. The day of his injury was the first time the victim had been involved in a concrete pour at this specific construction shaft.

A non-contributory citation was issued for violation of 30 CFR § 48.3(c)(8)(i). The contractor failed to submit a complete list of task assignments as part of the approved training plan. The training plan was updated, as required by § 48.3(e) to include the list of task assignments. The training plan was also revised to require the contractor to provide training on the requirements of the approved shaft and slope sinking plan and all plan addendums prior to any employee beginning work or continuing work at the construction site.

ROOT CAUSE ANALYSIS

An analysis was conducted to identify the underlying cause of the accident that was correctable through reasonable management controls. Listed below is a root cause identified during the analysis and the corresponding corrective action implemented to prevent a recurrence.

Root Cause: The contractor's policies and procedures in place at this construction project did not ensure that the concrete pouring process was performed in a manner to minimize exposure of employees to hazards from the surging concrete hose.

Corrective Action: The contractor submitted an addendum to MSHA for their approved shaft sinking plan, which was approved by the District Manager. The addendum details the method to be used in future concrete pours, which would minimize employee exposure by changing the employee's location during concrete pours and by reducing the possibility of the concrete hose surging. The contractor's employees were trained in the plan's revised method for positioning of the employees and for the pouring of concrete.

CONCLUSION

The accident occurred during a concrete pour, when the concrete hose surged with excessive concrete while Palmer was holding the hose, causing him to fall onto the work deck. The contractor's lack of effective procedures to prevent the concrete hose from surging contributed to the accident. The victim's death was charged to the mining industry because his death was attributed to a work-related injury.

Approved by:



Robert A. Simms
District Manager



Date

ENFORCEMENT ACTIONS

1. A Section 103(k) Order, No. 8431891, was issued to prevent the destruction of any evidence which would assist in investigating the cause of the accident and to ensure the safety of miners until the investigation could be completed.

Appendix A

Persons Participating in the Investigation

Mine Safety and Health Administration

Dean Cripps	Electrical Engineer, Accident Investigator
Adron Wilson	Supervisory Special Investigator
Steve Wilson	Coal Mine Safety and Health Inspector

Frontier Kemper Constructors

Bob Smith	Safety Coordinator
Bill Oiler	Senior Field Safety Coordinator
Rob Brown	Mining Division Manager
Jason Haynes	Project Manager

Gibson County Coal

Gary Timmons	Safety Department
Jerry Wheeler	General Manager of Construction

Appendix B

Persons Interviewed

Frontier Kemper Constructors

T. J. McGuire	Miner
Michael Schultz	Miner II
Kurt Thomas	Laborer
Chris Robinson	Lead Miner
Kermit Browning	Mechanic
Aaron Dehaven	Top Lander
Doug Dye	Assistant Superintendent

Appendix C

Victim Information

Accident Investigation Data - Victim Information

U.S. Department of Labor



Event Number: 4 2 5 2 1 0 6

Mine Safety and Health Administration

Victim Information: 1																
1. Name of Injured/Ill Employee: <i>James A. Palmer</i>				2. Sex <i>M</i>		3. Victim's Age <i>43</i>		4. Degree of Injury: <i>01 Fatal</i>								
5. Date(MM/DD/YY) and Time(24 Hr.) Of Death: <i>a. Date: 05/24/2012 b. Time: 19:15</i>								6. Date and Time Started: <i>a. Date: 05/15/2012 b. Time: 19:00</i>								
7. Regular Job Title: <i>116 Laborer</i>				8. Work Activity when Injured: <i>008 Cement Work</i>				9. Was this work activity part of regular job? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>								
10. Experience		Years	Weeks	Days	b. Regular		Years	Weeks	Days	c. This		Years	Weeks	Days	d. Total	
a. This					Job Title:					Mine:					Mining:	
Work Activity:		<i>0</i>	<i>39</i>	<i>0</i>			<i>0</i>	<i>39</i>	<i>0</i>	<i>0</i>		<i>0</i>	<i>22</i>	<i>0</i>	<i>0</i>	
11. What Directly Inflicted Injury or Illness? <i>016 Scaffold/Staging/Platform/catwalk/gantry</i>								12. Nature of Injury or Illness: <i>220 Fracture</i>								
13. Training Deficiencies:																
Hazard:		New/Newly-Employed Experienced Miner:				Annual:				Task:						
14. Company of Employment: (if different from production operator) <i>Frontier-Kemper Constructors</i>										Independent Contractor ID: (if applicable) <i>A01</i>						
15. On-site Emergency Medical Treatment:																
Not Applicable:		First-Aid:		CPR:		EMT:		Medical Professional:		None: <input checked="" type="checkbox"/>						
16. Part 50 Document Control Number: (form 7000-1)								17. Union Affiliation of Victim: <i>9999 None (No Union Affiliation)</i>								

