MAI-2016-11

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION
Metal and Nonmetal Mine Safety and Health

REPORT OF INVESTIGATION

Surface Facility
Cement

Fatal Machinery Accident
August 9, 2016

Huelsman & Sweeney Construction Co., Inc.
Contractor I.D. No. C1Y

at

Kosmos Cement Co.
Louisville, Jefferson County, Kentucky
Mine I.D. No. 15-04469

Investigators

James (Mike) Hollis
Supervisory Mine Safety and Health Inspector

Dave (Major) Smith
Mine Safety and Health Inspector

Mike Snyder
Mining Engineer – Technical Support

Originating Office

Mine Safety and Health Administration
Southeastern District
1030 London Drive, Suite 400
Birmingham, AL 35211
Samuel K. Pierce, District Manager

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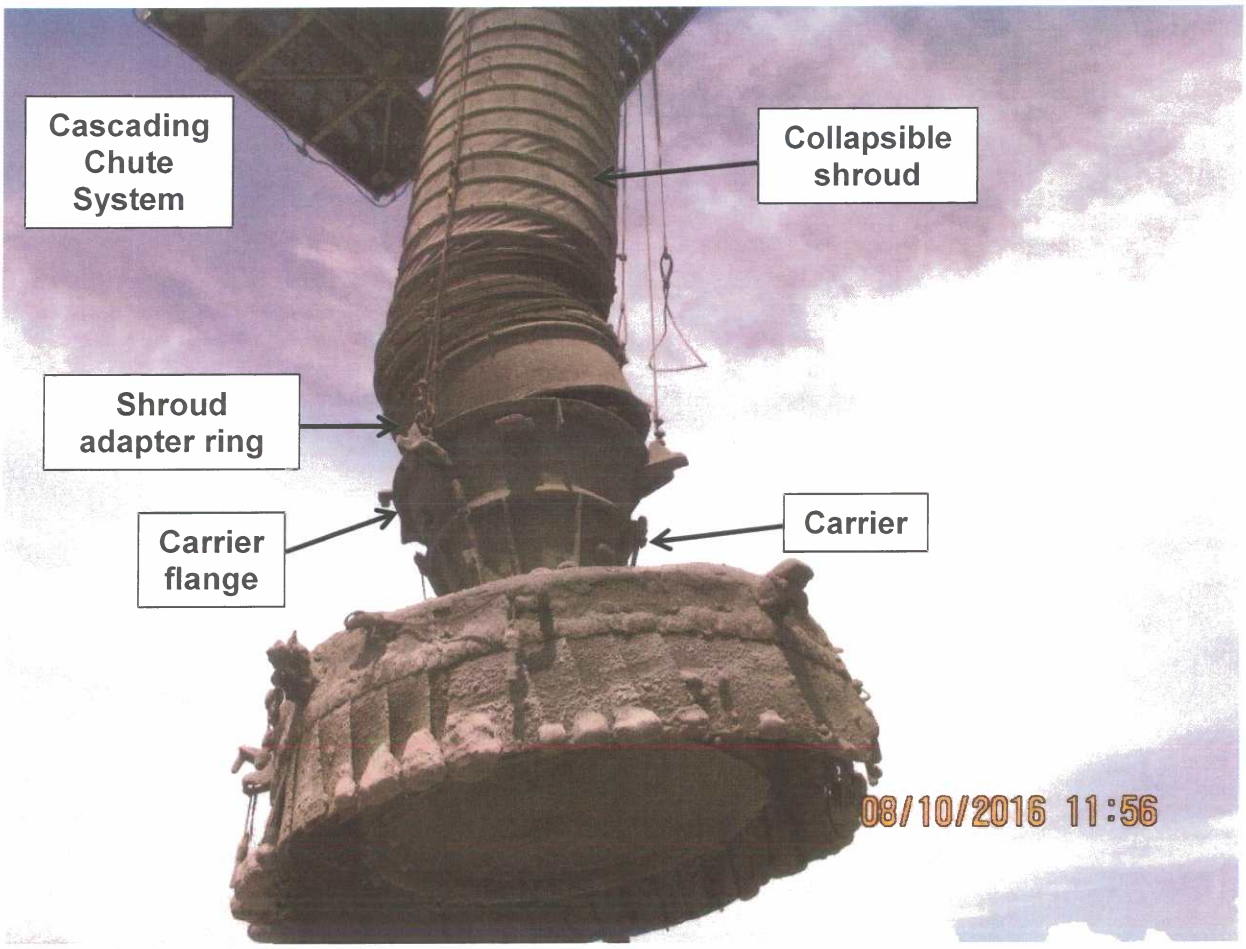

OVERVIEW

On August 9, 2016, Richard J. Snyder (age 33), was fatally injured while changing sheave wheels at a cascading barge loadout chute. The victim was positioned between slackened wire ropes and the chute when the chute dropped. This caused a loss of slack in the wire ropes, which pinned the victim against the chute.

The accident occurred because the operator and contractor failed to ensure the chute was blocked against hazardous motion and the means used to raise the chute were beyond the manufacturer's design capacity.

GENERAL INFORMATION

The Kosmos Cement Company (Kosmos) is a processing facility located in Louisville, Jefferson County, Kentucky. The Plant Manager is Ricardo Queroga-Morales and the Safety and Health Manager is Robert Munoz. The facility operates seven days per week with three eight-hour shifts per day and employs 141 people.

Material is processed into cement and loaded into trucks, railroad cars or barges for shipment to customers. Kosmos contracted with Huelsman & Sweeney Construction Co., Inc. (Huelsman & Sweeney), to perform various maintenance tasks at the facility.

The Mine Safety and Health Administration (MSHA) completed the last regular inspection at this operation on July 15, 2016.

DESCRIPTION OF ACCIDENT

Richard J. Snyder, a Leadman for Huelsman & Sweeney contractor, reported to work on August 9, 2016, at his normal starting time of 6:00 a.m. At approximately 6:15 a.m., Wayne Amburgy, Shipping Supervisor for Kosmos, informed Snyder that the cable sheaves needed to be replaced at the 1627 barge load-out. At approximately 7:00 a.m., Amburgy assigned two Kosmos employees, Tyler Osborne and Jose Madera, and a contractor for Huelsman & Sweeney, Kevin White, to assist Snyder in replacing the cable sheaves.

Snyder informed Osborne they needed manually operated chain hoists (come-a-longs) and rigging but he did not have that equipment with him. Snyder told Osborne to get three 3-ton come-a-longs and a 5/8-inch choker to support the weight of the chute system. Osborne could only find three 2-ton come-a-longs. White, Osborne, and Madera attached the three 2-ton come-a-longs using the 5/8-inch choker. Osborne went to the top to assist Snyder in lifting the chute system. After this attempt failed, the four-person crew discussed the matter and determined that the 2-ton come-a-longs were not adequate for lifting the chute system. Snyder indicated he had some 5-ton come-a-longs in his shop in Indiana. Snyder left the facility at approximately 12:24 p.m. to get the come-a-longs and returned at approximately 3:00 p.m. with one 6-ton and two 5-ton come-a-longs. White, Osborne, and Madera attached these come-a-longs to the same locations that the 2-ton come-a-longs had been attached. Osborne went back to the top to assist Snyder in lifting the chute system.

When Snyder observed that sufficient slack in the wire ropes had been achieved, he positioned himself between the chute and the slackened wire ropes to replace the sheave wheels. When Snyder began replacing the second sheave wheel, the bolted connections to the adaptor ring failed causing the chute to drop and the wire ropes to lose slack. Two of the three wire ropes pinned the victim against the chute.

The operator called 911 at approximately 6:38 p.m. and emergency services arrived on site at approximately 6:51 p.m. The victim's body was recovered at approximately 11:35 p.m. The cause of death was attributed to multiple injuries.

INVESTIGATION OF ACCIDENT

Robert Munoz notified MSHA of the accident at 7:03 p.m. EST on August 9, 2016, by telephone call to the Department of Labor's National Contact Center (DOLNCC). The DOLNCC contacted Michael Evans, Safety Specialist, Southeast District. An order pursuant to Section 103(k) of the Federal Mine Safety & Health Act of 1977, as amended, was issued upon arrival of an Authorized Representative of the Secretary of Labor.

MSHA's accident investigation team conducted a physical inspection of the accident scene, interviewed employees, reviewed training documentation, and examined work procedures relevant to the accident. MSHA Technical Support participated in the investigation to determine whether equipment-related factors contributed to the accident. The investigation was conducted with the assistance of mine management, labor representatives, contractor employees, contractor management, and local police.

DISCUSSION

Training and Work Experience

The victim was an experienced rigger who had performed this task several times. He had over four years of experience at mines with three years performing work at this site. A representative of MSHA's Educational Field and Small Mine Services conducted an in-depth review of the victim's training records. MSHA determined that there were no contributory training deficiencies.

Chute Information

The Cleveland Cascade Chute, Model CCC-Mark III-85, was manufactured by PEBCO located in Paducah, Kentucky. The chute is connected to a movable trolley system and was designed for loading 1,000 tons per hour of cement into barges. The material enters the head of the chute assembly from a conveyor at the top of the structure.

The system is designed to be raised or lowered to accommodate changing water levels. Raising and lowering the discharge end is accomplished with three wire ropes attached at approximately 120 degree intervals around the carrier, which is the cone shaped structure above the discharge. The hoist ropes were specified as 5/8-inch diameter 6x37 IWRC EIPS wire ropes with a breaking strength of 41,200 pounds each. The cascade chute can be lowered approximately 85 feet from the steel structure supporting the trolley system when fully extended.

Shroud Adapter Ring

Based on conversations with PEBCO personnel, the Mark III PEBCO Cascade Chute did not incorporate the shroud adapter ring into the original design of the system. Once the chute had been installed at the site, issues developed that allowed the wire rope terminations to abrade against the collapsible shroud. The adapter ring was manufactured and shipped to the site with a drawing specifying eight 9/16-inch diameter holes equally spaced to be drilled through the carrier flange and adapter ring to accommodate eight 1/2-inch diameter bolts. There were no lifting lugs incorporated into the PEBCO design of the spacer ring.

The operator welded three lifting lugs to the spacer ring after it arrived on-site. These lugs were the attachment points for lifting the chute with the two 5-ton and one 6-ton come-a-longs. According to design drawings and interviews with manufacturer representatives, these lugs were not part of the original design and should never have been considered part of a means to lift the weight of the chute.

Carrier Flange and Adapter Ring Examination

The connection between the adapter ring and the carrier flange was examined during the investigation. Three 1/2-inch grade 8 bolts and nuts spaced approximately 120 degrees apart were found on the carrier flange. Three matching holes were identified in the adapter ring. The 1/2-inch bolted connections joining the adapter ring to the carrier flange were insufficient to support the loads imposed on them while the sheaves were being changed. The adapter ring was not manufactured by PEBCO or originally designed to provide a lifting point for the lower portion of the chute indicating that the machinery, equipment, and tools used to raise the chute were being used beyond the design capacity intended by the manufacturer. Additionally, the chute was not otherwise blocked against hazardous motion.

Other Factors and Considerations

The wire ropes connected to the carrier flange were reeved incorrectly. Two of the ropes crossed over each other as they left the triple set of sheave wheels and traveled over the sheave wheels that feed the hoist drum. This can cause unnecessary abrasion to the ropes, and the exaggerated fleet angle from sheave to sheave can cause unnecessary wear to the sheaves.

During the investigation, it was discovered there had been several failures of the cascade chute. In December 2014, a structural failure caused substantial damage to the top of the structure. Sheave wheels operating in a misaligned condition would tend to wear the sheave wheels at a faster rate.

ROOT CAUSE ANALYSIS

A root cause analysis was conducted and the following root causes were identified:

- *Root Cause:* The operator and contractor failed to ensure miners were following proper procedures to block equipment against hazardous motion.

  Corrective Action: The operator and contractor implemented a plan to ensure proper procedures are utilized to block equipment against hazardous motion and operator and contractor employees have been trained in this plan.

- *Root Cause*: The means used to raise the chute were beyond the manufacturer's design capacity.

  Corrective Action: The operator and contractor provided training to operator and contractor employees regarding the proper steps and means, according to manufacturer's design, for raising and lowering the chute system.

CONCLUSION

Richard J. Snyder was fatally injured while changing sheave wheels at a cascading barge loadout chute when the lifting rigging failed causing the chute to drop and the wire ropes pinned him against the chute. The operator and contractor failed to ensure the chute was blocked against hazardous motion and the means used to raise the chute were beyond the manufacturer's design capacity.

ENFORCEMENT ACTIONS

Issued to Kosmos Cement Co. (Mine Operator)

Order No. 8822587-- issued August 9, 2016, pursuant to Section 103(k) of the Federal Mine Safety & Health Act of 1977:

A fatal accident occurred at this operation on 08/09/2016 at approximately 1840 when Richard J. Snyder, Contractor, leadman, was pinned to the loading spout by a wire rope. While conducting repairs on the spout (discharge of 1627 belt) located at the river load-out, the ring separated near the bottom of the spout putting tension on the wire ropes. This order is being issued under Section 103(k) of the Federal Mine Safety and Health Act of 1977, to ensure the safety of all personnel at this operation. It prohibits all activity other than that of recovery operations at the affected area. This 103(k) order was issued verbally to Robert Munoz, Health & Safety Manager, at 2100 hours and has now been reduced to writing.

Citation No. 8910404 -- issued pursuant to Section 104(a) of the Federal Mine Safety & Health Act of 1977 for a violation of 30 CFR § 56.14105:

Failure to block machinery or equipment against hazardous motion contributed to a fatal accident at this mine at approximately 18:40 hours on August 9, 2016. A contract miner

was pinned between the loading cascade and two of the three lifting cables while in process of replacing two cable sheaves on the 1627 barge loading cascade. Three bolts holding the weight of the carrier pulled through their holes at the metal ring attached to the top of the carrier. This caused the carrier to fall, pinning the victim between the cascade chute and the two lifting cables, because the carrier was not blocked against hazardous motion.

Citation No. 8910406 -- issued pursuant to Section 104(d)(1) of the Federal Mine Safety & Health Act of 1977 for a violation of 30 CFR § 56.14205:

Failure to insure that machinery, equipment or tools were not being used beyond the manufacturer's design capacity contributed to a fatal accident that occurred at this mine at approximately 18:40 hours on August 9, 2016. The three bolt holes drilled in the carrier flange and steel spacer failed to support the combined weight of the carrier and the accumulation of material that had built up. The original design of the ring and carrier required eight 9/16-inch holes to be drilled with proper bolts installed. Only three holes had been drilled in the carrier and the ring. In addition, after being delivered to the mine site, three lifting lugs were welded to the steel ring approximately 18 inches around the flange. These lugs were not part of the original manufacturer's design. Two five-ton come-a-longs and one six-ton come-a-long were attached to the three lugs to lift the carrier when the system failed, causing the fatal accident. Management engaged in aggravated conduct constituting more than ordinary negligence by altering and using equipment beyond the manufacturer's design capacity. This violation is an unwarrantable failure to comply with a mandatory standard.

Issued to Huelsman & Sweeney Construction Co., Inc. (Contractor)

Citation No. 8910405 -- issued pursuant to Section 104(d)(1) of the Federal Mine Safety & Health Act of 1977 for a violation of 30 CFR § 56.14105:

Failure to block machinery or equipment against hazardous motion contributed to a fatal accident at this mine on at approximately 18:40 hours on August 9, 2016. A contract miner was pinned between the loading cascade and two of the three lifting cables, while in process of replacing two cable sheaves on the 1627 barge loading cascade. Three bolts holding the weight of the carrier pulled through their holes at the metal ring attached to the top of the carrier. This caused the carrier to fall, pinning the victim between the cascade chute and the two lifting cables, because the carrier was not blocked against hazardous motion. Management engaged in aggravated conduct constituting more than ordinary negligence by failing to insure that a means to effectively protect persons from hazardous motion of the carrier was in place. This violation is an unwarrantable failure to comply with a mandatory standard.

Approved: _____ Date: 2/3/17
Samuel K. Pierce
Southeast District Manager

APPENDIX A – Persons Participating in the Investigation

Kosmos Cement Co.

Robert Munoz	Health & Safety Manager
Gary Poole	Safety Technician
Mike Cimino	Attorney

Huelsman & Sweeney Construction Co., Inc.

Mark Bishop	Owner
Ronnie Sweeney	Owner

Mine Safety and Health Administration

James (Mike) Hollis	Supervisory Mine Safety and Health Inspector
Sonya Conway	Mine Safety and Health Inspector
Dave (Major) Smith	Mine Safety and Health Inspector
Mike Snyder	Mining Engineer, Technical Support
Mike Pruitt	Mine Safety and Health Specialist

APPENDIX B – Victim Information

Accident Investigation Data - Victim Information

Event Number: 6 7 1 8 6 3 0

U.S. Department of Labor
Mine Safety and Health Administration

Victim Information: 1

1. Name of Injured/Ill Employee	2. Sex	3. Victim's Age	4. Degree of Injury
Richard J. Snyder	*M*	*33*	*01 Fatal*

5. Date(MM/DD/YY) and Time(24 Hr.) Of Death
a. Date: 08/09/2016 *b. Time: 18:40*

6. Date and Time Started
a. Date: 08/09/2016 *b. Time: 6:00*

7. Regular Job Title
104 Ironworker making repairs

8. Work Activity when Injured
039 Replacing cascade chute sheaves

9. Was this work activity part of regular job?
Yes: X No:

10. Experience	Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days
a. This Work Activity	*4*	*14*	*0*	b. Regular Job Title	*4*	*14*	*0*	c. This Mine	*3*	*1*	*0*	d. Total Mining	*4*	*14*	*0*

11. What Directly Inflicted Injury or Illness?
065 Chain hoist lifting system failure

12. Nature of Injury or Illness
390 Multiple injuries

13. Training Deficiencies
Hazard: New/Newly-Employed Experienced Miner: Annual: Task:

14. Company of Employment (If different from production operator)
Huelsman & Sweeney Construction Co. Inc
Independent Contractor ID: (if applicable) *CTY*

15. On-site Emergency Medical Treatment
Not Applicable: First-Aid: CPR: EMT: Medical Professional: None: X

16. Part 50 Document Control Number (form 7000-1) *220162230014*
17. Union Affiliation of Victim *2534* *Int. Assn. Iron Workers*