

MAI-2015-13

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

REPORT OF INVESTIGATION

Surface Nonmetal Mine
(Sand and Gravel)

Fatal Falling Material Accident
August 3, 2015

Pinky's Aggregates Inc.
Pinky's Aggregates Inc.
New Town, Rolette County, North Dakota
Mine ID No. 32-00909

Investigators

Leon F. Mueller
Mine Safety and Health Inspector

Edward C. Edwards
Training Specialist

LeeAnn Shinavski, PE
Civil Engineer

Originating Office
Mine Safety and Health Administration
Rocky Mountain District
P.O. Box 25367, DFC
Denver, CO 80225-0367
Richard R. Laufenberg, District Manager

TABLE OF CONTENTS

OVERVIEW.....	2
GENERAL INFORMATION	3
DESCRIPTION OF THE ACCIDENT	3
INVESTIGATION OF THE ACCIDENT	4
DISCUSSION	4
Location of the accident	4
Weather	4
Physical Factors of the Stockpile.....	5
Description of the Slope Failure.....	5
Production Cycle.....	5
Front End Loader	5
TRAINING AND EXPERIENCE	6
ROOT CAUSE ANALYSIS	6
CONCLUSION.....	6
ENFORCEMENT ACTIONS.....	7
APPENDIX A.....	8
APPENDIX B	9
APPENDIX C.....	10



OVERVIEW

William G. Makela, front-end loader operator, age 64, was killed on August 3, 2015, when he was engulfed by a slide of material from the stockpile. Makela had exited the front-end loader and was standing beside the loader prior to the slide.

The accident occurred due to management's failure to identify possible hazards and establish safe procedures associated with work or travel near stockpiles. The stockpile ground conditions created a fall of material hazard from lack of maintenance and trimming. Failure to recognize the hazard of working near the stockpile face contributed to the accident.

GENERAL INFORMATION

Pinky's Aggregates Inc., a sand and gravel surface mine, owned and operated by Pinky's Aggregates Inc., is located near New Town, Rolette County, North Dakota. The principal operating official is Dale Honsey, President. The mine normally operates one 10 hour shift a day, five to six days per week. Total employment is seven persons.

Sand and gravel is extracted by a bull dozer from a dry pit. The material is then transported by a front-end loader to the plant where it is crushed, screened, and stockpiled. Material is separated into two piles: plus one inch and minus one inch. The finished product is sold for use in construction.

The Mine Safety and Health Administration (MSHA) completed its last regular inspection of the mine on November 6, 2014.

DESCRIPTION OF THE ACCIDENT

On the day of the accident, William Makela (victim) reported to work at approximately 6:30 a.m., his normal starting time. Makela began his shift by performing a pre-shift inspection of his front-end loader. Makela was assigned to load customer trucks on the south side of the stockpile.

Makela began loading trucks at approximately 7 a.m. At about 12 p.m. Makela stopped loading trucks and took a 30-minute lunch break.

The last truck Makela loaded crossed the scale at 1:59 p.m. After loading this truck, Makela drove his front-end loader into the stockpile at about a 60 degree angle to the face of the pile, engaging the bucket into the material, parking at a slightly uphill position. He then exited the front-end loader using the ladder on the left side. Dismounting on this side of the front-end loader placed Makela between the stockpile face and the front-end loader. The stockpile sloughed.

Makela was swept under the front-end loader from behind, engulfing him in about four feet of material. Makela's head and upper body were buried, leaving only his knees, legs and feet uncovered. No one witnessed the slide of material or the accident.

At approximately 2:20 p.m., Dewayne Ice, truck driver, observed the front-end loader partially buried by the stockpile, but did not see the front-end loader operator. Ice advised John Marcavage, front-end loader operator on the north side of the pile. Marcavage attempted to make radio contact with Makela, but was unsuccessful. At approximately 2:30 p.m. Marcavage drove his front-end loader to the south side of the pile where he observed the partially buried front-end loader. Marcavage did not see Makela and proceeded to remove a loader

bucket of material from the west side of the front-end loader. It was at that time that Ice observed the uncovered legs and feet of the victim under the east side of the loader. At that time several miners arrived at the scene and began to dig the victim out by hand and shovel.

At 2:26 p.m. local emergency responders were called; they arrived at 2:39 p.m. The EMS checked for vital signs while the fire department personnel proceeded to extricate the body. Makela was pronounced dead on site at 3:14 p.m. The cause of death was attributed to suffocation.

INVESTIGATION OF THE ACCIDENT

Dena Bloms, Office Clerk, notified MSHA by telephone call at 2:56 p.m. on August 3, 2015, to the Department of Labor's National Contact Center (DOLNCC). The DOLNCC notified Peter Del Duca, Staff Assistant and an investigation was started that day.

An order was issued under the provision of Section 103 (j) of the Mine Act to ensure the safety of miners. This order was subsequently modified to a Section 103 (k) order when the first Authorized Representative arrived at the mine.

MSHA's accident investigation team traveled to the mine site, made physical inspection of the accident scene, interviewed miners and reviewed conditions and work procedures relevant to the accident. MSHA conducted the investigation with the assistance of mine management and miners.

DISCUSSION

Location of the accident

The accident occurred on the south side of the one inch minus stockpile. The stockpile consisted of two stacks of material which had merged into one pile about 35 feet in height. Continued load out created a working face with a near vertical angle.

Weather

On the day of the accident it was clear and the temperature was 83 °F with calm winds. Since May 2015, periods of rain and sunshine created a temporary increase in strength of the material in the pile. The temporary increase in strength, termed "apparent cohesion," results from negative pore water pressures within the sand and gravel material matrix. Changes in moisture, either from wetting or drying, affect the apparent cohesion and therefore the strength of the material.

Stockpile Construction

One-inch and smaller size sand and gravel was transported to the stockpile using a radial stacker conveyor. The material was deposited to an average height of 35 feet with sides sloped to the material's natural angle of repose. The stockpile covered a surface area of 0.5 acres. The perimeter was measured to be 617 feet (183 feet, 209 feet, 52 feet, and 173 feet on the south, west, north, and east sides, respectively). The side slopes ranged from 32-36 degrees in areas that exhibited the natural angle of repose and 42-52 degrees in areas that exhibited over-steepened slopes. The slopes were able to maintain their over-steepened condition due to moisture in the sand and gravel.

Large cracks on the surface of the stockpile, areas of material separation and previous sloughing of material were evident on all sides of the stockpile.

Description of the Slope Failure

The accident occurred on the south face of the stockpile which was measured to be 39 feet high. The slope failure extended the full height of the pile and was 90 feet wide at the bottom, displacing an estimated 400 cubic yards of material. The slope failure occurred directly adjacent to the loader, and the fallen material partially covered the front and left side of the loader resulting in six feet of material at the front of the loader and four feet at the side of the loader where the victim was located. An estimated 15 cubic yards of fallen material adjacent to the victim had been removed during the rescue efforts.

Production Cycle

In the area specific to the accident, Makela was assigned to continuously load out customer trucks from the south side of the stockpile. The mine operator instructed Makela to extract material from the pile along the entire face, in an effort to allow the stockpile to "slough". This practice was thought to reduce the exposure to the front-end loader operator, by controlling the natural fall of the working face. Despite this effort, the stockpile could not fall to the angle of repose due to the moisture in the pile and the internal structure.

Front End Loader

The front-end loader involved was a John Deere 724 J. This was a rubber-tired model with a gross weight of 40,700 pounds. The attached bucket had a rated capacity of 4.75 cubic yards. The ground clearance was 1.5 feet, the height to the top of the cab was 11.2 feet, and the height to the bucket hinge pin was 13.6 feet. The loader had a maximum reach of 18 feet. The loader was found to be in good working order. No defects were found that would contribute to the accident.

At the time of the accident, the front end loader was located at the toe of the stockpile and oriented at a 60 degree angle to the working face. The bucket was in the lowered position and engaged into the pile. The transmission was in park and the left side cab door was open.

TRAINING AND EXPERIENCE

William Makela had 10 years previous equipment operation experience before working for Pinky's Aggregates Inc. Records indicate that on May 26, 2015, Makela received newly hired experienced miner training, task training for the John Deere 724 J loader and site specific training. Makela had been an employee of Pinky's aggregates Inc. since May 26, 2015.

ROOT CAUSE ANALYSIS

A root cause analysis was conducted and the following causal factors were identified.

Root Cause: Management failed to correct the hazardous stockpile ground conditions. The stockpile was constructed 39 feet high, and the slope was greater than the angle of repose despite not having equipment able to safely trim the pile to the angle of repose. The stockpile ground conditions created a fall of material hazard from a lack of trimming or maintenance.

Corrective action: The stockpile was trimmed to the angle of repose. Management retrained miners in identifying and controlling areas of the stockpile where hazardous slips can occur. Additionally, a Standard Operating Procedure was adopted that load out is only allowed when equipment is on site that is able to trim the 35 foot high stockpile to the angle of repose.

Root Cause: Management failed to ensure that all persons could recognize the fall of material hazards associated with working near the stockpile and traveling between the stockpile and equipment. Makela did not recognize the hazard imposed by the stockpile and exited the front-end loader between the loader and the stockpile, hindering escape.

Corrective action: Miners were trained to evaluate the potential hazards of falling material and the dangers of work or travel between stockpiles and equipment.

CONCLUSION

The accident occurred because standards and controls were not established to control falling or sliding material on the stockpile where persons work or travel. The stockpile was about 35 feet in height and was constructed of mostly minus material with varying amounts of moisture. Miners failed to recognize the potential hazard and traveled or worked in the fall zone. Further, the front-end loaders on site were not capable of effectively controlling the hazards due to their limited 18 feet of reach.

ENFORCEMENT ACTIONS

Issued to Pinky's Aggregates Inc.

Order No. 8824197 – Issued August 3, 2015, under the provisions of section 103(j) of the Mine Act. An Authorized Representative modified this order to section 103(k) of the Mine Act upon arrival at the mine site:

An accident occurred at this operation on [08/03/2015] at approximately 2:45 PM. As rescue and recovery work is necessary, this order is being issued, under Section 103(j) of the Federal Mine Safety and Health Act of 1977, to assure the safety of all persons at this operation. This order is also being issued to prevent the destruction of any evidence which would assist in investigating the cause or causes of the accident. It prohibits all activity at the entire mine site until MSHA has determined that it is safe to resume normal mining operations in this area. This order applies to all persons engaged in the rescue and recovery operation and any other persons on-site. This order was initially issued orally to the mine operator at 03:15 PM and has now been reduced to writing.

Citation No. 8833554 – Issued under the provisions of section 104(a) of the Mine Act for a violation of 30 CFR 56.9314

A fatal accident occurred on August 3, 2015 when a front end loader operator was engulfed by a large slide of material on the south side of the stockpile. The failure occurred due to the lack of trimming of the working face of the stockpile, creating a hazard to persons. The loader operator was exposed to the slide hazard as he was standing outside the loader at the bottom of the access ladder.

Citation No. 8833555 – Issued under the provisions of section 104(a) of the Mine Act for a violation of 30 CFR 56.3430

A fatal accident occurred on August 3, 2015 when a front end loader operator was struck by a large slide of material on the south side of the stockpile. The loader was stopped at the stockpile and not positioned to allow an escape route, safe from the fall of material hazard. The miner was exposed to this condition as he was traveling outside the loader, between the loader and the untrimmed stockpile.

Approved By: _____

Richard Laufenberg

Date: _____

11-16-2015

Richard Laufenberg,
District Manager

APPENDIX A
Persons Participating in the Investigation

Pinky's Aggregates Inc

Dale Honsey

President

Mine Safety and Health Administration

Leon C. Mueller

Mine Safety and Health Inspector

Edward C. Edwards

Training Specialist

LeeAnn Shinavski, PE

Civil Engineer

APPENDIX B Victim Information

Accident Investigation Data - Victim Information

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



Event Number:

6	6	9	6	9	4	0
---	---	---	---	---	---	---

Victim Information: 1															
1. Name of Injured/ill Employee: <i>William G. Makeja</i>				2. Sex <i>M</i>		3. Victim's Age <i>64</i>		4. Degree of Injury: <i>01 Fatal</i>							
5. Date(MM/DD/YY) and Time(24 Hr.) Of Death: <i>a. Date: 08/03/2015 b. Time: 15:14</i>							6. Date and Time Started: <i>a. Date: 08/03/2015 b. Time: 6:30</i>								
7. Regular Job Title: <i>182 Loader Operator</i>				8. Work Activity when Injured: <i>053 Operating Loader</i>				9. Was this work activity part of regular job? <table style="width: 100%;"><tr><td style="text-align: center;">Yes</td><td style="text-align: center;">No</td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr></table>					Yes	No	<input checked="" type="checkbox"/>
Yes	No	<input checked="" type="checkbox"/>													
10. Experience			a. This			b. Regular			c. This			d. Total			
Years	Weeks	Days	Years	Weeks	Days	Years	Weeks	Days	Years	Weeks	Days	Years	Weeks	Days	
<i>10</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>10</i>	<i>1</i>	<i>0</i>	<i>10</i>	<i>1</i>	<i>10</i>	<i>0</i>	<i>0</i>	<i>10</i>	<i>0</i>	<i>0</i>	
11. What Directly Inflicted Injury or Illness? <i>091 Stockpile Failure</i>							12. Nature of Injury or Illness: <i>110 Buried Alive</i>								
13. Training Deficiencies:															
Hazard:			New/Newly-Employed Experienced Miner:				Annual:			Task:					
14. Company of Employment: (If different from production operator) <i>Operator</i>								Independent Contractor ID: (if applicable)							
15. On-site Emergency Medical Treatment:															
Not Applicable:		First-Aid:		CPR:		EMT:		Medical Professional:		None:					
		<input checked="" type="checkbox"/>		<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>								

APPENDIX C

Accident Scene Schematic and Photos

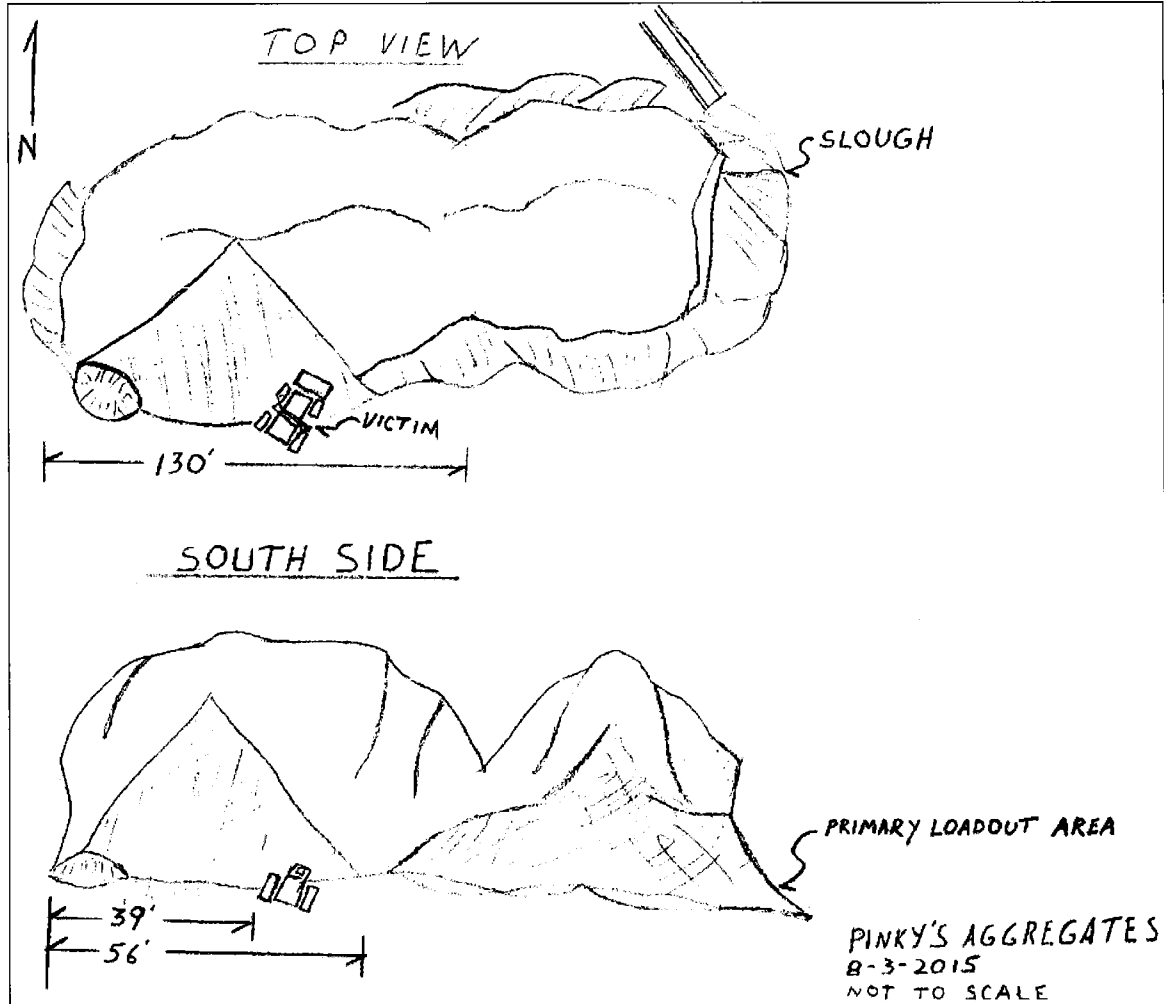


Figure 1 - Schematic of the Stockpile and Victim's Location



Figure 2 - Stockpile and Slide



Figure 3 - Right Side of Front End Loader