

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

REPORT OF INVESTIGATION

Surface Nonmetal Mine
(Limestone CB)

Fatal Sliding Material Accident

March 11, 2005

Grassy Stone LLC
Grassy Stone LLC
Grayson, Carter County, Kentucky
Mine ID No. 15-17312

Investigators

Larry R. Nichols
Supervisory Mine Safety and Health Inspector

Roger W. Rowe
Mine Safety and Health Inspector

John W. Fredland, P.E.
Civil Engineer

Carol L. Tasillo, P.E.
Civil Engineer

Deborah B. Combs
Mine Safety and Health Specialist

Originating Office
Mine Safety and Health Administration
Southeast District
135 Gemini Circle, Suite 212; Birmingham, AL 35209
Michael A. Davis, District Manager



**Victim
entered here**

Figure 1 General Overview of Storage bins

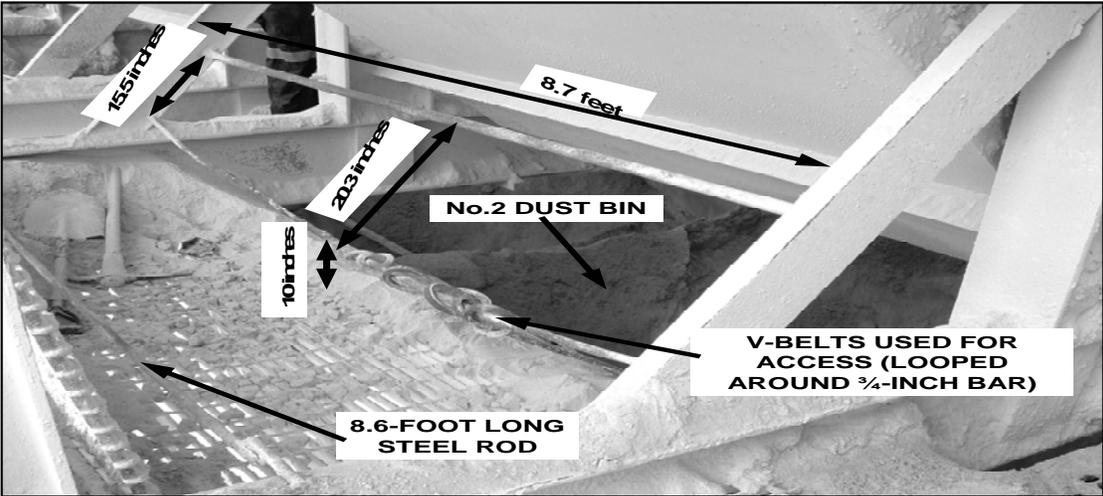


Figure 2 No. 2 Dust Bin Access

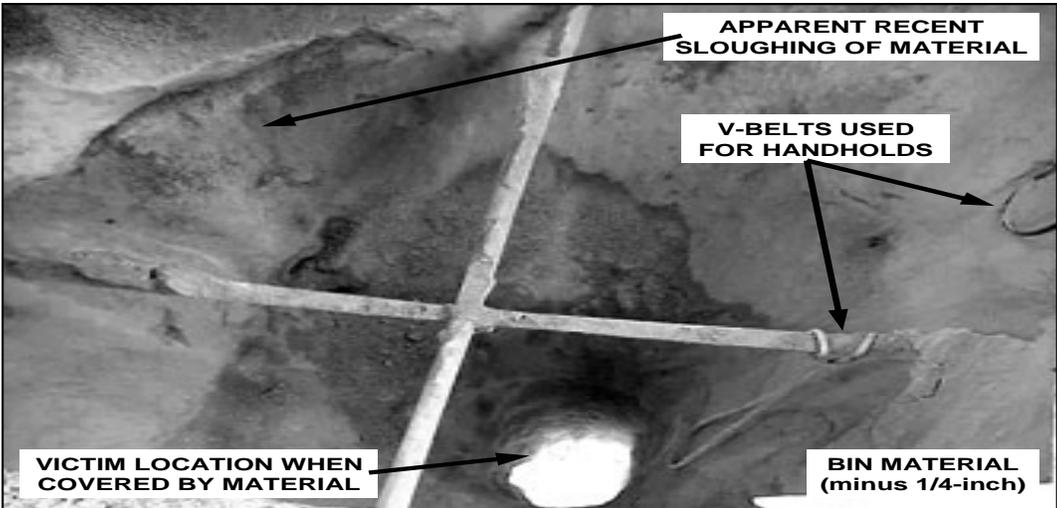


Figure 3 (View Looking Down into Bin)

OVERVIEW

Clint Bloomfield, laborer, age 23, was fatally injured on March 11, 2005, when he entered an enclosed dust bin and was engulfed by sliding material. The victim was attempting to dislodge material that had adhered to the walls of the bin when the material suddenly broke free.

The accident occurred because management failed to establish safe work procedures and methods for cleaning the bins. The victim had not been task trained in the health and safety aspects and safe work procedures relating to the task being performed. It was a practice at this mine for employees to enter bins without being equipped with a safety belt or harness with a lifeline attached. A second person similarly equipped was not present to adjust or keep the victim's lifeline tight.

GENERAL INFORMATION

Grassy Stone LLC, a crushed limestone mine, owned and operated by Grassy Stone LLC, was located along Kentucky Highway 9, about sixteen miles north of Grayson, Carter County, Kentucky. Principal operating officials were Russell C. Wilson, superintendent, and Clyde Smith, supervisor. The mine operated two 10-hour shifts a day, six days a week. Total employment was 15 persons.

Limestone was drilled and blasted in the quarry, loaded into haulage trucks by front-end loader, and hauled to the primary crusher. The material was crushed, screened, and stockpiled by conveyor belt and front-end loader. The finished products were sold for use in the construction industry.

The last regular inspection of this operation was completed on January 12, 2005.

DESCRIPTION OF ACCIDENT

On the day of the accident, Clint Bloomfield (victim), reported for work at 4:00 p.m., his normal starting time. His usual duties included cleanup work throughout the plant so he began his shift cleaning spilled material from under the primary crusher conveyor belt. At about 8:30 p.m., he and Clyde Smith, foreman, stopped to discuss making repairs to the bucket of the backhoe. Afterwards, he met up with his father, Calvin Bloomfield, laborer, to begin cleaning the Dust Bins.

It took little time to prepare for cleaning the bins as the plant machinery was not operated on the second shift. After the discharge chute door at the bottom of the #2 Dust Bin was opened to allow loose material to flow through the bin, both Clint and Calvin Bloomfield accessed the upper deck of the tower to enter the bins.

Shortly after Clint Bloomfield entered the bin, Calvin Bloomfield, who was working in the #1 bin, heard a call for help. Calvin Bloomfield immediately exited #1 dust bin and entered # 2 dust bin where he found his son completely covered with limestone dust. He attempted to move the material and expose the victim's head, but was unsuccessful. After working about 20 minutes, Calvin Bloomfield realized his efforts were in vain so he exited the bin and ran to the backhoe parked below. He contacted Robert Weddington, welder, on the CB Radio who radioed Smith who telephoned 911 for emergency assistance.

Smith used a come-a-long to open the bin's north chute door to allow loose material to flow through the bin until the victim's head was exposed. Weddington and Joey Davis, welder, entered the bin and placed the EMS supplied oxygen mask on the victim's face.

The victim was recovered through the bottom of the bin, and placed on a stretcher. The Carter County Coroner arrived on the scene at 11:24 p.m. and pronounced the victim dead. Death was attributed to asphyxiation.

INVESTIGATION OF ACCIDENT

MSHA was notified of the accident at 9:45 p.m., on March 11, 2005, by a telephone call from Russell Wilson, superintendent, to Arthur Ellis, assistant district manager. 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. The next day MSHA's accident investigation team traveled to the mine, conducted a physical inspection of the accident scene, interviewed persons, and reviewed conditions and work practices relevant to the accident. MSHA conducted the investigation with the assistance of mine management and employees.

DISCUSSION

Location

There were no drawings of the bins and it could not be determined when the bins were installed. The general layout of the # 2 Dust Bin is shown in Figure 1. The accident occurred in the # 2 Dust Bin, one of five bins located side-by-side on the southeast side of the plant. At the time of the accident, these bins were used to store material that had passed through the plant. There was no evidence that indicated whether the victim lost his balance, whether material on which he was standing gave way, or how he was engulfed inside the bin. There were no eye witnesses to the accident.

Work Practice

Bins were cleaned by loosening or punching the material from the walls of the bins, primarily by using steel bars. The lengths of steel bars found in the plant measured 8.6 feet, 9.4 feet, and 13.8 feet. Cleaning of the bins occurred from the access grating at the top of the bins. The caked material was also loosened by pushing a steel rod through the material from the bottom bin opening. The material from underneath the bins was accessed by standing on the bed cap of a haulage truck. Employees also worked inside the bins. The bottom discharge door or gate would be opened enough to allow loose material to fall from the bin. Employees entered the bin by holding onto old V-belts attached to a rod that spanned the access area. Three of the five bins were cleared of caked material in this manner.

No. 2 Bin

The bin measured 12 feet by 12 feet at the top and had vertical sides for the top 7 feet. The bottom portion of the bin consisted of a hopper with four sides tapering at approximately 50 degrees from the horizontal. The sides of the bin sloped to a 2-foot by 2-foot opening at the bottom. Two cross braces were set perpendicular to each other inside the bin. The braces crossed at the center of the bin and were approximately 10 feet above the bottom of the bin. The bottom of the bin was located approximately 17 feet above ground level.

The opening at the bottom of the bin was provided with a clamshell-type gate that consisted of two doors. One door was pneumatically operated by controls located on the ground level. The second clamshell door was functional but did not contain a means to open or close pneumatically. The bin was originally designed to discharge material through the bottom doors into trucks that pulled under the bin.

A side chute was located on the sloping portion of the bin, and according to company officials, this modification to the bins was made by previous mine owners. The opening for the side chute was 19 inches wide by 11.6 inches high. The top of the opening was approximately 20 inches below the transition from the vertical sides to the sloping sides of the bin. The centerline of the side chute for the # 2 Dust Bin was offset laterally from the center of the bin by 32 inches to route the chute past the plant's structural members. The side chute was closed with a slide gate; however, the gate was wired open as part of the normal operation. The chute discharged onto a 36-inch conveyor belt that transferred the material onto another belt that transferred it to a stockpile.

Illumination at the bins was provided by a fixed 1000-watt metal-halide lamp located on the conveyor to the fines material stockpile, about 90 feet from the # 2 Dust Bin. A large amount of material was caked on the sides of the bin. Evidence was visible inside the bin indicating a section of the caked material had recently sloughed off. A "pie-shaped" section of material was estimated to be 6 feet long on one side and 8 feet along the top. The thickness of the section varied from about 8 inches along the top to a thin layer near the center of the bin. The wedge material weighed approximately 800 pounds. Conditions inside the # 2 Dust Bin following the accident are shown in Figure 3.

Material had adhered to the sides of the # 2 Dust Bin. The material thickened toward the bottom of the bin to a narrow, nearly cylindrical opening. See Figure 3. The opening extended through the caked material to the bottom bin door. Material in the bin appeared to have a significant percentage of fines, that is, material passing through a No. 200 sieve. A dry gradation check of a sample of material, obtained from a pile of material on the ground underneath the #2 Dust Bin, indicated the content of fines was about 25%. This made the material prone to "caking," especially when it absorbed moisture, which also inhibited the free flow of the material.

A portion of the caked material inside the bin had been dug out in the corner of the bin where the side chute was located. The dug out area was roughly 3 feet in diameter at its base. The base of the dug out area was approximately at the same level as the top of the side chute, but the chute opening was still covered with caked material. This is the area where the victim would likely have been digging prior to the accident in his attempt to clear the No. 2 Dust Bin side chute.

At the time of the accident, there were six V-belts hanging in the # 2 Dust Bin (Figure 2 and 3). Three V-belts were hanging from a 3/4-inch bar located above the top edge of the bin. Two of the belts had a second belt looped on them, forming a belt of double length. The single belt extended about 4 feet from the bar. One of the double belts extended about 7.5 feet down from the bar and the other doubled belt was embedded in the bin material. Another belt was looped over one of the cross braces inside the bin. Given the cross brace location and the length of the belt, the end of this belt was located about 7 feet above the bottom of the bin.

Experience and Training

The victim had 50 weeks and 4 days mining experience. Reportedly, he had received 30CFR, Part 46 new miner training; however, documentation was not available to show details of the training. The majority of the training was provided by a person not listed on the training plan.

Weather

When the accident occurred, the temperature was in the low 30's and freezing rain was falling.

ROOT CAUSE ANALYSIS

The following causal factors were identified:

Causal Factor: Management policies and controls were inadequate. Procedures had not been established to ensure employees were protected from the sliding material hazards when they entered the #2 Dust Bin. Miners entered this bin and routinely cleared blockages but were not provided with safety belts or harnesses attached to lifelines. A second person was not present to ensure the lifeline was kept tight.

Corrective Action: A risk assessment should be performed to identify all possible hazards. Management should develop written procedures that require the use of fall protection, an attendant, and the use of staging or platforms when necessary to enter a bin.

Causal Factor: Management policies and controls were inadequate and failed to ensure that miners received training in the health and safety aspects and safe work procedures related to cleaning bins. There was no documentation to verify that the victim was adequately task trained on how to safely unplug or clean the plant bins.

Corrective Action: Procedures should be developed and implemented to safely enable miners to clean bins. All miners should be required to be trained in the safe work procedures when bin entry is necessary.

CONCLUSION

The accident occurred because management failed to establish safe operating procedures and methods for bin cleaning. The victim had not received training in the health and safety aspects relating to the task being performed. He was not wearing a safety belt or harness with a lifeline attached. A second person similarly equipped was not present to adjust or keep the victim's lifeline tight.

VIOLATIONS

Order No. 6108219 was issued on March 11, 2005, under the provisions of Section 103(k) of the Mine Act:

A fatal accident occurred at this operation on March 11, 2005. A miner was attempting to clean the buildup of lime dust from the inside of the #2 Dust Bin when a portion of the material broke free and engulfed the employee. This order is issued to assure the safety of all persons at this operation. This order prohibits all activity in the areas of bins #1 through #5 until MSHA has determined that it is safe to resume normal operations in this area. The mine operator shall obtain prior approval from an authorized representative for all actions in the affected area.

This order was terminated on March 16, 2005. Conditions that contributed to the accident have been corrected and normal mining operations can resume.

Citation No. 6079347 was issued on March 14, 2005, under the provisions of Section 104(d)(1) of the Mine Act for violation of 30 CFR 56.16002:

A fatal accident occurred at this mine on March 11, 2005, when a laborer was entrapped by caving material inside the #2 Dust Bin. The laborer had climbed into the bin and was attempting to scale down a build-up of material which had adhered to the bin walls. A ladder, platform, or staging had not been provided for this procedure, and the discharge equipment had not been locked out. The victim was also not wearing a safety belt or harness with a lifeline attached, and no second person similarly equipped was present to adjust or keep the victim's lifeline tight. Failure to ensure that these safety items were provided and used constitutes more than ordinary negligence and is an unwarrantable failure to comply with a mandatory standard.

This citation was terminated March 16, 2005. A safety training session was conducted at 8:00 a.m. on March 16, 2005, with employees regarding written policy, procedures, and mechanical changes that have been implemented for bin maintenance and cleaning.

Citation No. 6079348 was issued on March 14, 2005, under the provisions of Section 104(a) of the Mine Act for violation of 30 CFR 46.7a:

A fatal accident occurred at this mine on March 11, 2005, when a laborer was entrapped by caving material inside the #2 Dust Bin. The laborer had climbed into the bin and was attempting to scale down a build-up of material which had adhered to the bin walls. The victim had not received task training on safe work procedures for bin cleaning, nor had he been trained in the mandatory safety standards which applied to the tasks he was performing at the time of the accident.

This citation was terminated on March 16, 2005. A safety training session was conducted at 8:00 a.m. on March 16, 2005, with employees regarding written policy, procedures, and mechanical changes that have been implemented for bin maintenance and cleaning.

Approved by: _____ Date: _____

Michael A. Davis
District Manager

APPENDIX A

Persons Participating in the Investigation

Grassy Stone LLC

| | |
|----------------------|------------------------------|
| Russell C. Wilson | superintendent |
| Clyde Smith | supervisor |
| David A. Wilson | safety administrator |
| Robert B. Weddington | welder |
| Joey S. Davis | welder |
| Calvin Bloomfield | laborer and father of victim |

Daniels Law Firm, Inc

| | |
|--------------------|----------|
| Gene W. Bailey, II | attorney |
|--------------------|----------|

Mine Safety and Health Administration

| | |
|------------------|--|
| Larry R. Nichols | supervisory mine safety and health inspector |
| Roger W. Rowe | mine safety and health inspector |
| John W. Fredland | civil engineer |
| Carol L. Tasillo | civil engineer |
| Deborah B. Combs | mine safety and health specialist |