

UNITED STATES  
DEPARTMENT OF LABOR  
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Surface Nonmetal Mine  
(Cement)

Fatal Sliding Material Accident

September 22, 2003

Borton L. C. (A129)  
Hutchinson, Reno County, Kansas

Dorchester Excavating Inc. (1KU)  
Holly Hill, Orangeburg County, South Carolina

at

Holcim (US) Inc. – Holly Hill Facility  
Holcim (US) Inc.  
Holly Hill, Orangeburg County, South Carolina  
Mine I.D. No. 38-00014

Investigators

Donald L. Collier  
Supervisory Mine Safety and Health Inspector

James M. McCarthy  
Mine Safety and Health Inspector

Jose J. Figueroa  
Mine Safety and Health Inspector

Michael C. Superfesky, P.E.  
Civil Engineer

Gerald P. Pifer, P.E.  
Civil Engineer

Wayne L. Maxwell  
Mine Safety and Health Specialist

Originating Office  
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Michael A. Davis, District Manager

## OVERVIEW

Antonio Gonzalez, laborer, age 39, was fatally injured on September 22, 2003, when material toppled from an earthen wall and buried him.

The excavation was being dug to allow the installation of a concrete retaining wall needed to widen a roadway adjacent to a warehouse. Gonzalez and two co-workers were in the excavation removing material that had fallen into the footer. They also were straightening and cleaning rebar from a footer that had been poured previously.

The accident occurred because the procedures used to perform work in the excavation were inadequate. No examination and testing of ground conditions was conducted. The walls had not been sloped or supported to protect persons working in the excavation. No training was provided for the employees regarding the health and safety aspects and the safe work procedures while working in an excavation.

## GENERAL INFORMATION

Holcim (US) Inc. – Holly Hill Facility, a surface quarry and cement plant owned and operated by Holcim (US) Inc., was located at 200 Safety Street, Highway 453, Holly Hill, Orangeburg County, South Carolina. The principal operating official was Jeffrey Ouhl, plant manager. The mine normally operated three 8-hour shifts a day, seven days a week. Total employment was 110 persons.

Borton, L.C. (Borton), an independent contractor, was contracted by Holcim to perform various construction projects at the mine. Borton was located at 200 E 1<sup>st</sup> Avenue, Hutchinson, Reno County, Kansas. The principal operating official was Thayne E. Stewart, superintendent. The contractor normally worked one 10-hour shift a day, five days a week. Total employment was 27 persons at this site. The victim was an employee of Borton.

Dorchester Excavating Inc. (Dorchester) was contracted by Holcim to perform various excavation projects, including excavation for the retaining wall where the accident occurred. Dorchester was located at 200 Safety Street, Highway 453, Holly Hill, Orangeburg County, South Carolina. The principal operating official was Welby E. Walkup, president. The contractor normally worked one 10-hour shift a day, 5 days a week. Total employment was 16 persons at this site.

The Holcim (US) Inc. – Holly Hill Facility was a multiple bench limestone mine. Material was extracted by bucket wheel, conveyed to a belt wagon, crushed, and transferred to a belt conveyor system that delivered it to a storage facility where it was stockpiled. The final product was used at the mine site to produce cement which was sold in bulk and bag for use in the construction industry.

The last regular inspection at this operation was completed August 11, 2003.

## DESCRIPTION OF ACCIDENT

On August 14, 2003, a project began to widen a roadway along the old Dorchester Warehouse. Part of the project included site excavation to build a concrete retaining wall. The first two sections of the wall had been completed without incident. The accident occurred during excavation for the third and final section of the wall. Rebar in the footer extended from the last completed section and needed straightened and cleaned prior to setting the building forms to pour the last section of the wall. This work was necessary because a portion of the excavation had been dug to the top of the footer level three days before the accident.

When the first two sections of the wall were excavated, material had sloughed off and crane pads were used to shore up the sides of the excavation. However, no shoring was used during the excavation of the final section for the retaining wall.

On the day of the accident, Antonio Gonzalez (victim) reported to work at 7:00 a.m., his normal starting time. Three Borton employees, Gonzalez, Raul Cruz, laborer, and Roberto G. Ortega, Sr., skilled laborer/carpenter, were to work in the excavation to remove excess soil using shovels and to straighten bent rebar protruding from the retaining wall and footer with pry bars.

Rogelio Lopez, Borton foreman, and Kevin D. Cove, project manager for Holcim, visited the excavation site at 7:50 am. Gonzalez, Ortega, and Cruz were working in the excavation. Cove asked Lopez why the crane pads were not being used. Lopez told Cove that the excavation had not been dug deep enough for the crane pads to be set. Lopez stated that the crane pads may not be needed because the wall looked smooth and no sloughing had occurred during the extraction of earth for this section. Cove then left the area.

Employees from Dorchester Excavating Inc. arrived at the site at 9:30 am to continue extracting earth to the desired level. While material was excavated, the three Borton employees worked intermittently in and out of the excavated area. Thayne E. Stewart, superintendent for Borton, visited the site at 11:00 am and determined that the excavation had been dug to the desired depth.

At approximately 11:15 a.m., as Gonzalez, Ortega, and Cruz were on the floor of the excavation straightening rebar, material on the south wall of the excavation suddenly toppled. All three employees started to run toward the north side of the excavation. Cruz was able to escape without injury, Ortega was buried up to his chest, and Gonzalez was completely covered by the material.

The trackhoe operator was loading excavated material into a haul truck and saw the accident occur. He immediately used his phone to call for emergency assistance.

Ortega managed to extricate himself from the material but suffered broken ribs and cracked vertebrae. Recovery operations were initiated to locate Gonzalez. At 11:53 a.m., he was found buried under approximately two feet of material and no vital signs were present. Emergency medical personnel arrived and Gonzalez was pronounced dead at the scene.

## INVESTIGATION OF THE ACCIDENT

MSHA was notified of the accident at 12:15 p.m., on September 22, 2003, by a telephone call from Sandra Griffin, human resources assistant for Holcim, to James M. McCarthy, mine safety and health inspector. An investigation was started that day. An order was issued under the provisions of Section 103(k) of the Mine Act to ensure the safety of the miners. MSHA's accident investigators traveled to the mine, made a physical inspection of the accident scene, interviewed employees, and reviewed conditions and work procedures relevant to the accident. MSHA conducted the investigation with the assistance of mine management and employees.

## DISCUSSION

### Location of the Accident

The accident occurred in an excavation along the north side of the old Dorchester Warehouse. This excavation was being dug to construct a concrete retaining wall as part of a project to widen an existing roadway.

### Equipment

The track-mounted excavator was a Komatsu PC220LC-6. The excavator was owned by Dorchester Excavating, Inc. and operated by their employees. The excavator was equipped with 1.6 cubic yard bucket and had a digging reach of 32 feet, 10 inches.

### Excavation

The excavated area measured 18 to 20 feet high on the south wall, 6½ feet high on the north wall and was 15 to 18 feet wide, and about 60 feet long. Approximately 25 feet of the 60 foot wall, and the entire height of the wall (18 to 20 feet), fell when the material toppled.

Marl material was placed in the bottom of the footer and tamped using the Komatsu PC220 LC excavator. The material was compacted with a Dresser Model 835 smooth drum compactor.

### Concrete Retaining Wall

The concrete wall was being constructed along the embankment adjacent to and beneath the north side of the old Dorchester Warehouse, across the roadway from the motor control center for the raw mills.

The wall was being built as part of a project to widen a roadway from the motor control room to the warehouse. The wall would also support the ground adjacent to the warehouse. It was about 5 feet from the building at the point of the excavation failure. The concrete wall was to be about 158 feet long and one foot thick. It was planned that the wall would be constructed in three sections. Embankments for the two previous sections had been supported with crane pads. Excavation for the wall began on August 14, 2003. Approximately 104 feet of the wall had been completed prior to the accident occurring.

#### Crane Pads

The crane pads were 6-inch by 6-inch timber sets bolted together. Each set measured 16 feet long and 40 inches wide. They were originally designed to set outriggers to stabilize mobile cranes. It was decided to use these crane pads for excavation shoring when material sloughed from the walls of the excavation because they were readily available at the mine site. Four full sets of crane pads were available. Another set of damaged crane pads was at the site. This set measured 6 inches deep, 40 inches wide, and 12 feet long and had been broken during removal from the previous installation.

A steel shoring mat that measured 8 inches deep, by 50 inches wide, by 19 feet long had previously been used. This limited amount of shoring material was not sufficient to supply support for the entire exposed excavation walls. Borton's bid on this project specified an additional cost if sheet pilings were necessary. These sheet pilings were interlocking steel plates that were driven into the ground so exposed earthen walls would be supported to protect persons entering an excavation to work. The final bid did not include provisions for sheet pilings.

The crane pads were hoisted into place using the excavator and nylon slings and set onto the tamped marl base material. The tops of the crane pads were secured using wire ropes connected to anchors installed in the concrete floor of the warehouse. On the first and second pours, the crane pads had been anchored to rebar driven into the ground, on the warehouse floor level, about 20 feet from the top of the embankment. The sections of rebar were 4 feet long, with 2 feet exposed above ground, and varied between 6 to 10 feet apart. Reportedly, the pads were usually placed skin to skin. Sometimes plywood was nailed between them, with separations as large as two feet. The crane pads were further secured by tamping marl material against the foot of the pads.

#### Collapse of the Excavated Face

The material that fell measured about 20 feet high, 25 feet wide and 2½ feet deep. Approximately 75 tons of material fell. The area of collapse started on the east end of the finished section of the retaining wall. Vegetation that had been growing along the top of the bank, adjacent to the warehouse, was found along the outer limit of the sloughed material, indicating that the face toppled.

#### Soil Composition

The majority of the material in the excavated face consisted of fill placed prior to construction of the warehouse. The fill material consisted predominantly of silts and sands and contained a significant amount of small-diameter tree branches and roots. A tree trunk, that measured approximately 15 inches in diameter, and a root ball, that measured approximately 5 feet, was exposed approximately 11 feet below the top of the excavated face. It appeared that the root ball had fallen from a void located approximately two feet above. The consistency of the soil and the depth of the root ball indicated that this was not virgin material. The excavation consisted of granular material with minimal cohesive strength.

#### Weather

Weather on the day of the accident was clear, dry, and warm. There had been no significant precipitation during the week prior to the accident.

#### Training and Experience

Gonzalez had worked at this operation for 1 year and 1 month. He had not received training in accordance with 30 CFR, Part 46. He had not received task training regarding working in excavations.

## ROOT CAUSE ANALYSIS

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

Causal Factor: Examinations had not been conducted to evaluate the ground conditions. The composition of the material had not been evaluated prior persons working in the excavation. The material had minimum cohesive strength and had sloughed during construction of two sections of wall that had previously been built.

Corrective Action: Ground conditions should be carefully examined to determine hazards prior to performing tasks and as conditions change during the work shift.

Causal Factor: The excavated walls had not been sloped to a safe angle or supported to prevent the material from collapsing. Shoring material was not being used when the accident occurred. The limited amount of shoring material found at the site was not sufficient to support the entire face of the excavation.

Corrective Action: Procedures should be established to ensure excavations are sloped to a safe angle or supported when persons are required to enter them to conduct work activities. Procedures should be implemented to ensure employees are trained regarding safe procedures for excavating, including sloping to a safe angle or shoring. Boxes or appropriate material to shore excavations should be provided.

Causal Factor: A risk assessment to determine possible hazards and establish safe work procedures was not conducted prior to excavating for the retaining wall.

Corrective Action: Procedures should be implemented that require risk assessments to be conducted that identify potential hazardous conditions. Any potential hazards identified should be corrected prior to performing the task. Employees should be trained and knowledgeable of the procedures involved in conducting a task risk assessment.

Causal Factor: Task training had not been provided to employees to ensure that safe and proper work procedures were established and followed.

Corrective Action: Procedures should be established that ensure all employees are task trained and knowledgeable regarding the health and safety aspects of the work they are assigned.

## CONCLUSION

The accident occurred because safe work procedures, including task training, examination and testing of ground conditions, and support of the excavation walls had not been established and followed. The walls had not been sloped or supported to prevent hazards to persons working in the excavation.

## VIOLATIONS

Holcim (US) Inc.

Order No. 611146 was issued on September 22, 2003, under the provisions of Section 103(k) of the Mine Act:

A fatal accident occurred at this operation on September 22, 2003 when a contract employee was working in a trench. He, along with two other contract employees, were preparing to build forms to receive concrete for a retaining wall when a section of earth wall, about 17 feet high, slid, totally covering the victim with about two feet of earth. This order is issued to assure the safety of persons at this operation and prohibits any work in the affected area until MSHA determines that it is safe to resume normal

operations. The mine operator shall obtain prior approval from an authorized representative for all actions to recover and/or restore operations in the affected area.

Citation No. 6111454 was issued on October 16, 2003, under the provisions of Section 104(a) of the Mine Act for violation of 30 CFR 56.3200:

A laborer, employed by a contractor, was fatally injured at this operation on September 22, 2003, when an unsupported earthen wall collapsed and buried him. The victim and two co-workers were working inside an excavation that was about 16 feet deep. Ground conditions that created hazards to persons working inside the excavation were not taken down or supported prior to work commencing.

Citation No. 6111455 was issued on October 16, 2003, under the provisions of Section 104(a) of the Mine Act for violation of 30 CFR 56.3401:

A laborer, employed by a contractor, was fatally injured at this operation on September 22, 2003, when an unsupported earthen wall collapsed and buried him. The victim and two co-workers were working inside an excavation that was about 16 feet deep. The mine operator failed to ensure that ground conditions were being examined or tested prior to work commencing.

Citation No. 6111456 was issued on October 16, 2003, under the provisions of Section 104(d)(1) of the Mine Act for violation of 30 CFR 46.12(a)(2):

A contractor employee was fatally injured at this operation on September 22, 2003, when a trench wall collapsed and buried him. The victim and two co-workers were removing tools which they had been using inside the trench, in preparation of installing forms for a concrete wall. The production operator failed to provide information to the contractor regarding the obligation of the contractor to comply with MSHA regulations, including the requirements of Part 46. Failure to provide this information to ensure that the contractors comply with MSHA regulations, including Part 46 training, constitutes more than ordinary negligence and is an unwarrantable failure to comply with the mandatory safety standard.

#### Borton L.C.

Citation No. 6111457 was issued on October 16, 2003, under the provisions of Section 104(d)(1) of the Mine Act for violation of 30 CFR 56.3200:

A laborer, employed by a contractor, was fatally injured at this operation on September 22, 2003, when an unsupported earthen wall collapsed and buried him. The victim and two co-workers were working inside an excavation that was about 16 feet deep. Work had been conducted inside the excavation for several days and the operator was aware that loose ground had previously sloughed off the walls. Failure to ensure that ground conditions that created hazards to persons working inside the excavation were taken down or supported constitutes more than ordinary negligence and is an unwarrantable failure to comply with the mandatory safety standard.

Order No. 6111458 was issued on October 16, 2003, under the provisions of Section 104(d)(1) of the Mine Act for violation of 30 CFR 56.3401:

A laborer, employed by a contractor, was fatally injured at this operation on September 22, 2003, when an unsupported earthen wall collapsed and buried him. The victim and two co-workers were working inside an excavation that was about 16 feet deep. Work had been conducted inside the excavation for several days and the operator was aware that loose ground had previously sloughed off the walls. Failure of the supervisor or other designated persons to examine and test ground conditions prior to

work being performed in the area constitutes more than ordinary negligence and is an unwarrantable failure to comply with the mandatory safety standard.

Citation No. 6111459 was issued on October 16, 2003, under the provisions of Section 104(a) of the Mine Act for violation of 30 CFR 46.7(a):

A contractor employee was fatally injured at this operation on September 22, 2003, when a trench wall collapsed and buried him. The victim and two co-workers were removing tools which they had been using inside the trench, in preparation for installing forms for a concrete wall. Task training had not been provided to the miner before performing this new task of working in and around trenches, including health and safety aspects of the tasks, safe work procedures of the task, and the mandatory health and safety standards pertinent to this task.

Dorchester Excavating Inc.

Citation No. 6111460 was issued on October 16, 2003, under the provisions of Section 104(a) of the Mine Act for violation of 30 CFR 56.3200:

A laborer, employed by a contractor, was fatally injured at this operation on September 22, 2003, when an unsupported earthen wall collapsed and buried him. The victim and two co-workers were working inside an excavation that was about 16 feet deep. Work had been conducted inside the excavation for several days and the operator was aware that loose ground had previously sloughed off the walls. Ground conditions that created hazards to persons working inside the excavation were not taken down or supported.

Citation No. 6111461 was issued on October 16, 2003, under the provisions of Section 104(a) of the Mine Act for violation of 30 CFR 56.3401:

A laborer, employed by a contractor, was fatally injured at this operation on September 22, 2003, when an unsupported earthen wall collapsed and buried him. The victim and two co-workers were working inside an excavation that was about 16 feet deep. Work had been conducted inside the excavation for several days and the operator was aware that loose ground had previously sloughed off the walls. The supervisor or other persons were not designated to examine and test ground conditions prior to work being performed in the excavation.

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_  
Davis  
District Manager

Michael A.



## APPENDIXES

- A. Persons Participating in the Investigation
- B. Persons Interviewed

## APPENDIX A

### Persons Participating in the Investigation

#### Holcim (US) Inc.

Jeffrey Ouhl	plant manager
Kevin D. Cove	project manager
Deborah A. Lightfoot	human resource manager
John L. Jerrels	human resource/safety representative

#### Borton L.C.

Joe L. Keating	director of safety
Thayne E. Stewart	superintendent
Rogelio N. Lopez	foreman
Raul Cruz	laborer
Roberto G. Ortega, Sr.	skilled laborer/carpenter

#### Dorchester Excavating, Inc.

Welby E. Walkup	president
Rodney S. Burbage	vice president
Jesse M. Eargle	track hoe operator

#### Mine Safety and Health Administration

Donald L. Collier	supervisory mine safety and health inspector
James M. McCarthy	mine safety and health inspector
Jose J. Figueroa	mine safety and health inspector
Michael C. Superfesky	civil engineer
Gerald P. Pifer	civil engineer
Wayne L. Maxwell	safety and health specialist

## APPENDIX B

### Persons Interviewed

#### Holcim (US) Inc.

Jeffrey Ouhl	plant manager
Kevin D. Cove	project manager
John L. Jerrels	human resource/safety representative

#### Borton L.C.

Joe L. Keating	director of safety
Thayne E. Stewart	superintendent
Rogelio N. Lopez	foreman
Raul Cruz	laborer
Roberto G. Ortega, Sr.	skilled laborer/carpenter

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