CAI-2008-08

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

UNDERGROUND COAL MINE

FALL OF ROOF ACCIDENT
April 22, 2008

at

Mine No. 1
Osaka Mining Corporation
Appalachia, Wise County, Virginia
ID No. 44-07150

Accident Investigator

Russell Dresch
Electrical Engineer

Originating Office
Mine Safety and Health Administration
District 5
P.O. Box 560, Wise County Plaza
Norton, Virginia 24273
Ray McKinney, District Manager

RELEASE DATE: November 19, 2008

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OVERVIEW

At approximately 8:55 a.m., on Tuesday, April 22, 2008, David Sizemore, roof bolting machine operator, was fatally injured and Marvin Music, mining machine operator, received non-life threatening injuries when a portion of the mine roof and rib collapsed. The accident occurred while Music was operating a remotely controlled continuous mining machine loading coal and rock into a shuttle car. Both miners were in the #7 Entry about 17.5 feet outby the last row of permanently installed roof support. Sizemore was standing closely behind Music talking and observing the operation. Rock fell from the mine roof and rib between the right rib and three installed 72 inch torque tension roof bolts. One of the roof bolts broke at the time of the fall. The portion of the mine roof and rib that fell, striking both miners, measured approximately 6 feet long and was 3 feet wide at the inby end and 19 inches wide at the outby end by up to 14 inches thick.

GENERAL INFORMATION

Osaka Mining Corporation's Mine No. 1, I.D. No. 44-07150, is an underground coal mine located one mile from State Route 78N, adjacent to Route 685, near Appalachia, Wise County, Virginia. Cumberland Resources Corporation, located in Wise, Virginia, is the parent company of Osaka Mining Corporation. The principal officers for the mine at the time of the accident were:

Thomas Asbury	Safety Director
Hagy Barnett	Superintendent
John Mullins	Section Foreman

Employment is provided for 45 underground miners and two surface miners. The miners work on two production shifts and one maintenance shift per day, five days per week. The miners were developing the 1 North Mains with seven entries on 80 foot entry centers by 70 foot crosscut centers. The approximate distance from the surface to the section is 13,100 feet and there is 794 feet of overburden over the coal bed. The mine produces an average of 1,500 tons of raw material daily from the one development section.

Two remotely controlled continuous mining machines, which are not operated concurrently, are used to extract coal. The coal is transported from the face by shuttle cars. It is transported to the surface by a belt conveyor system. Diesel and battery-powered, rubber-tired, self-propelled mantrips are used to transport both men and materials. Two roof bolting machines are used to install permanent roof support.

The mine has 4 drift openings into the Imboden Seam, which ranges from 60 to 96 inches in mining height. The average height in the 001 Section was 84 inches. One mine fan blowing 111,000 cubic feet of air per minute into the mine provides ventilation. The section face areas are ventilated with line curtains utilizing the blowing system of face ventilation. Laboratory analysis of return air samples collected on April 1-4, 2008, revealed an average methane liberation rate of 38,375 cubic feet per day.

MSHA completed the last regular health and safety inspection of the mine on April 18, 2008. The Non-Fatal Days Lost (NFDL) injury incidence rate for the mine in 2007 was 2.28 compared to a National NFDL rate of 4.64.

DESCRIPTION OF THE ACCIDENT

On Tuesday, April 22, 2008, at approximately 6:30 a.m., the day shift crew, under the direction of John Mullins, section foreman, entered the mine via a diesel-powered,

rubber-tired, self-propelled mantrip. They arrived on the active working 001 Section at about 6:50 a.m. and began normal operations.

The crew members were in the following locations before the accident. Charles Fields Jr., section mechanic, was in the #2 Entry at the left-side continuous mining machine replacing worn bits. Dennis Gibson, shuttle car operator, was unloading his shuttle car at the feeder in the #4 Entry. Curtis Fleenor and Walter Gibson, roof bolting machine operators, were installing roof support in the #4 Left Crosscut. James Ramey II, scoop operator, was in the #4 Left Crosscut assembling roof bolts. He was waiting to clean the area. Mullins was in the face of the #4 Entry waiting for the roof bolting crew to finish in the #4 Left Crosscut so he could prepare that area for the next cut.

The right-side roof bolting machine was parked in the crosscut between #6 and #7 Entries. Eric Stallard, utility man, had trammed a scoop loaded with supplies to this roof bolting machine. Christopher Huff and David Sizemore, roof bolting machine operators were located at the roof bolting machine. Sizemore was operating the right-side roof bolting machine on this shift because the employee normally assigned to this job was absent. Sizemore's normal duties were to operate a diesel-powered, rubber-tired, self-propelled tractor and clean around the belt conveyor system. The ventilating air from #7 Entry face, where mining was on-going, was traveling through the crosscut from the #6 to the #7 Entry. Sizemore indicated he wanted to get away from the dust being created by the operation of the continuous mining machine. Huff and Sizemore went to the #7 Entry to talk with Marvin Music, mining machine operator. After some discussion, Huff returned to the roof bolting machine and Sizemore remained in the #7 Entry. While Music was operating the continuous mining machine, Huff and Stallard went outby the working area in the #6 Entry to avoid the dusty environment. In between the operation of the continuous mining machine, Huff and Stallard would load supplies onto the roof bolting machine. They also went to speak with Roger McCoy, shuttle car operator, and then returned to the roof bolting machine.

Music was using the remotely controlled continuous mining machine in the #7 Entry. He had finished the cut, backed out and cut the left-side corner. He repositioned the mining machine back into the #7 Entry and was loading coal and rock onto a shuttle car. McCoy was maneuvering the shuttle car behind the continuous mining machine.

Sizemore was standing closely behind Music's right side along the right rib of the #7 Entry about 17.5 feet outby the last row of permanently installed roof support. The miners were about 100 feet inby survey spad 597. At approximately 8:55 a.m., rock fell from the mine roof and rib between the right rib and three installed roof bolts. One of the roof bolts broke at the time of the fall (see Photograph 2). The portion of the mine roof and rib that fell, striking both miners, measured approximately 6 feet long and was 3 feet wide at the inby end and 19 inches wide at the outby end by up to14 inches thick. Music was thrown toward the shuttle car as the rock hit his right shoulder. Sizemore

fell onto his left side and against the rib as the rock hit him. The rock came to rest on the lower part of his legs.

As Music was getting up, he and McCoy yelled for help. McCoy and Music went to aid Sizemore. Huff heard the call for help and ran to get Mullins and other crew members. Stallard went to the accident scene. He, McCoy and Music lifted the rock and pulled Sizemore's legs from under it.

Huff found Mullins in the #4 Entry and notified him of the accident. Mullins proceeded to the accident scene. D. Gibson saw someone running, thought there was an accident, and went to the right-side continuous mining machine. Huff went to the left-side roof bolting machine and notified Fleenor, W. Gibson, and Ramey. The three miners, along with Huff, proceeded to the accident scene.

Music told Stallard to call outside and inform them of the accident. He also told Stallard to have someone bring the first-aid kit, backboard and mantrip. The mine phone was located in the #4 Entry, outby the belt conveyor feeder. Stallard, on the way to the phone, met the other miners near the #6 Entry. He told them to get the first-aid kit, backboard and mantrip. Mullins arrived at the accident scene and assessed the situation. He also shouted for the miners to bring the first-aid kit and mantrip. Mullins left the #7 Entry and traveled toward the phone.

D. Gibson followed Stallard as he continued to the phone. D. Gibson called outside to Hagy Barnett, superintendent, and informed him of the accident. Barnett asked if Sizemore was conscious and if he needed a med-flight. D. Gibson left the phone and relayed the questions to Mullins, who was coming to the phone. Mullins said Sizemore was conscious and to get the med-flight. D. Gibson went back to the phone and relayed the message. Mullins and Stallard started back to the accident scene.

At 8:59 a.m., Barnett called the 911 emergency number and requested an ambulance and med-flight. Barnett told Allen Wolfe, outside man, about the accident and that an ambulance and med-flight were on the way. Wolfe began to monitor the phones. Barnett gathered his gear and proceeded underground on a mantrip.

After meeting Stallard in the #6 Entry, W. Gibson and Ramey went to the power center in the #5 Entry and Fleenor went to the mantrip. W. Gibson and Ramey picked up the first-aid kit and backboard and traveled to the accident scene. First-aid was administered to control the bleeding and they made Sizemore as comfortable as possible.

Fields, unaware of the accident, started toward the #4 Entry to get tools. When he reached the #4 Entry, D. Gibson informed him of the accident. Fields encountered Stallard as they both were traveling to the accident scene.

Fleenor moved the mantrip closer to the accident scene. Sizemore refused to let the miners put a neck brace on him. The fallen rock impeded the placement of the backboard even after the rock was slightly moved. Sizemore's extraction was also delayed because he initially refused to be put on the backboard. The miners were able to place Sizemore on the backboard on his left side and carried him to the mantrip. As they were leaving, Barnett arrived on the section.

At 9:28 a.m., Wolfe recorded that Sizemore was being transported to the surface. Barnett followed Sizemore's mantrip, stopping at each belt drive to call to the surface and make Wolfe aware of their location. Fields, Huff, McCoy, and Ramey rode the mantrip with Sizemore while Music trammed it to the surface. Ramey continued to administer care to Sizemore while others on the mantrip stabilized him. During the trip, Sizemore asked to stop the mantrip to catch his breath. Music complied with the request and stopped for about 30 seconds. Wolfe recorded that Sizemore arrived outside at 9:54 a.m.

Sizemore's care was transferred to rescue personnel from Appalachia Rescue Squad (ARS) and Med-flight. Medical care was provided including Cardio Pulmonary Resuscitation (CPR). They decided to transport him by ambulance to Holston Valley Medical Center (HVMC) in Kingsport, Tennessee. ARS's ambulance left the mine site at 10:22 a.m. with Sizemore. They decided to transfer Sizemore to the Med-flight at Wellmont Lonesome Pine Hospital (WLPH) in Big Stone Gap, Virginia. They arrived at WLPH's helipad at 10:33 a.m. At 11:01 a.m., the Med-flight arrived at HVMC. Sizemore was pronounced dead at HVMC at 11:15 a.m., by Dr. George Testerman.

INVESTIGATION OF THE ACCIDENT

On April 22, 2008, at about 9:45 a.m., Allen Wolfe, outside man, called Michael Clements, special investigations supervisor, to inform MSHA of the accident. A 103(k) order was issued to ensure the safety and health of persons in the affected area of the mine until the investigation could be completed. Russell Dresch, electrical engineer, and Hagel Campbell, ventilation specialist, arrived at about 11:00 a.m. at the mine site. A joint investigation team was established consisting of MSHA, Virginia Department of Mines, Minerals, and Energy (DMME) and company personnel. Preliminary information was gathered before proceeding underground. The accident scene was examined, photographs were taken and measurements for a scale drawing were recorded.

A total of 16 interviews were conducted on April 23, 24, and May 5, 2008. Thirty eight people participated in the investigation. The on-site portion of the investigation was completed, and the 103(k) order was terminated, on April 30, 2008. Personnel from the Approval and Certification Center (A&CC) examined the broken bolt, bolt plate and

draw rock shield on June 3, 2008. Personnel from the Pittsburgh Safety and Health Technology Center (PSHTC) tested roof bolts obtained from the mine on June 4, 2008. Matco Associates, Inc. examined the broken bolt and tested the metal from a roof bolt to determine if they met the applicable standards and to determine the mode of failure. The reports from A&CC, PSHTC, and Matco were finalized on September 4, 2008.

DISCUSSION

Accident Site

Derrick Collins and Jerry Long, roof bolting machine operators, installed roof support in the #7 Entry during the owl shift April 21-22, 2008. They installed about four rows of pattern roof bolts with the required supplemental bolts. They did not identify any hazardous roof conditions in the area where the accident occurred.

Ronald Turner, section foreman for the owl shift, inspected the 001 Section during a preshift examination from 4:20 to 5:25 a.m. on April 22, 2008. The preshift record was called to the outside at 5:50 a.m. and states no hazardous conditions were seen on the section. It further states the section and section haulways appeared safe to work and travel at time of exam. No methane was detected and oxygen readings were 20.9 percent.

John Mullins, section foreman, arrived on the 001 Section at about 6:50 a.m. and conducted an onshift examination. He examined all of the entries and observed no hazardous conditions in the #7 Entry.

After arriving on the 001 Section, Charles Fields Jr., section mechanic, went to the continuous mining machine in the #7 Entry. The machine was approximately 25 feet outby the site of the accident. He replaced worn bits and checked the water pressure on the machine. Fields did not notice any hazardous conditions in the area.

James Ramey II, scoop operator, went into the #7 Entry before it was mined that day. He prepared the area for cutting coal by bundling the curtain to the roof. A citation was issued for this violation but it was determined to not be a contributing factor to the accident. Ramey traveled and worked along the right rib and through the site of the accident. He did not observe any hazardous conditions in this area.

Eric Stallard, utility man, was in the crosscut between #6 and #7 Entries before the accident occurred. He saw no hazardous roof conditions but was not in close proximity to the site of the accident.

Before the accident, Christopher Huff, roof bolting machine operator, was briefly in the #7 Entry. He did not identify any hazardous conditions.

Roger McCoy, shuttle car operator, was in the #7 Entry. He had hauled several shuttle cars of coal and rock from the face before the accident and his car was being loaded when the accident occurred. McCoy did not identify any hazardous roof conditions in this area.

Marvin Music, mining machine operator, was loading coal and rock in the #7 Entry prior to and during the accident. He did not recognize any hazardous roof conditions. He received non-life threatening injuries due to the fall of roof and rib.

Three miners, McCoy, Music and Sizemore (the victim), were in the immediate area of accident. McCoy stated he heard the fall, but did not see it happen. Music did not hear anything that would indicate the rock was separating from the roof and rib and he also did not see it fall.

David Sizemore, roof bolting machine operator, was operating the right-side roof bolting machine on April 22, 2008, because the employee normally assigned to this job was absent. Sizemore's normal duties were to operate a diesel-powered, rubber-tired, self-propelled tractor and clean around the belt conveyor system. He had over 11 years experience as a roof bolting machine operator for Cumberland Resources Corporation. Most of his mining experience, prior to this, involved operating a roof bolting machine.

Music and Ramey are emergency medical technicians certified in Advanced First-aid.

Roof Strata

The average mining height of the 001 Section is 84 inches. Roof conditions along the section are varied with complex geology. The immediate roof consists of laminated sandstone and shale up to 3.5 feet. Above that, the stratum becomes sandy shale with coal streaks and coal spurs ranging from three to eight feet. Slickenside slips are present in some locations on the section. Slickenside formations are polished rock masses within the mine roof which are prone to falling if they are not provided with adequate support. The approved Roof Control Plan describes the roof strata as 10 to 15 feet of shale with 85 to 90 feet of sandstone above the shale.

The accident occurred in the #7 Entry where the mine roof strata consisted of laminated sandstone and shale. Several test holes were examined in the #7 Entry and across the section with a Roof Strata Scope. The first test hole examined was located approximately 15 feet outby the accident scene in a three way intersection. A separation was detected at two feet and three feet with no separation observed from three feet to eight feet. The mine roof appeared to consist of laminated sandstone and

shale up to the three foot level, and sandy shale with coal streaks from three feet to eight feet. The other test holes examined in the #7 Entry were consistent with the first. In the #1, 6 and 7 Entries where the sandstone was coming down and interacting with the shale, low to moderate angle slickenside slips were present. The slips were falling out up to 2.5 feet high during the mining process. The immediate shale roof in the center entries (#2, 3, 4 and 5) was more firm where the sandstone rises higher into the main roof.

The portion of the mine roof and rib that fell striking both miners, measured approximately 6 feet long by 3 feet wide at the inby end and 19 inches wide at the outby end by 0-14 inches thick, see Appendix B - Photograph 1. Sandstone has a density of approximately 145 pounds per cubic foot. The rock is about 5.44 cubic feet which corresponds to a weight of about 790 pounds.

Roof Support

The primary roof support for this mine is torque tension roof bolts. They are ¾ inch diameter, 72 inch long rebar with 8 inch square steel bearing plates and 18 inch square steel draw rock shields (see Photograph 2). The bolts are fully grouted with resin which anchors the bolt to the surrounding strata. During installation, the bolt must be set between torque values of 160 to 225 pounds. Supplemental roof supports used at this mine are ⅞ inch diameter, 8 foot super bolts and ⅝ inch diameter, 12 foot cable bolts. Both of these bolts incorporate a similar 8 inch square steel bearing plate and may include a draw rock shield.

The minimum roof support for this mine as outlined in the Roof Control Plan is torque tension roof bolts with super bolts or cable bolts. Grade 40 or grade 60 torque tension roof bolts are the primary roof support. They are called pattern bolts which are installed four bolts per row in 20 foot wide entries and five bolts per row in 22 foot wide entries. The rows are spaced 4 feet apart. The Roof Control Plan required the roof bolting machine operator to gauge the torque value of one bolt from the first row of bolts installed and one out of every fourth bolt installed thereafter. Supplemental roof support consisting of two 10 foot cable bolts or two 10 foot super bolts are installed between every other row of pattern bolts in 20 foot wide entries. The #4 Entry (conveyor belt entry) was developed 22 foot wide and required a minimum of three 10 foot cable bolts or three 10 foot super bolts installed between every other row of pattern bolts.

The actual pattern bolts found on the section, including the #7 Entry, were grade 60 and exceeded the minimum required amount. Across the section six pattern bolts were installed per row. The width of the #7 Entry was less than 20 feet throughout the heading requiring only 4 bolts per row. The correct amount of supplementary roof support was installed throughout the section. The miners alternated between installing

8 foot super bolts and 12 foot cable bolts. The Roof Control Plan was exceeded by using 12 foot cable bolts instead of 10 foot cable bolts.

The mine roof in the #7 Entry was permanently supported as required by the Roof Control Plan, except for one provision. The Roof Control Plan required (2 or 3) 10 foot super bolts or 10 foot cable bolts to be installed between every other row of pattern bolts. Eight foot super bolts were installed instead of 10 foot super bolts. These bolts were installed between every fourth pattern bolt. A citation was issued for this violation but it was determined not to be a contributing factor to the accident.

As stated before, the torque value of the pattern bolts must be set between 160 to 225 pounds during installation. The torque value must be checked soon after installation of the bolt because later roof loading will alter this value. The two roof bolting machines on the 001 Section were tested to determine if they were delivering the correct amount of torque to the roof bolts during installation. Both roof bolting machines provided torque values within the desired range for the pattern bolts as shown in Table 1. The different readings between the two instruments are due to typical testing non-repeatability and inherent error.

	MSHA Reading (Pounds)	Company Reading (Pounds)
Left-side Roof Bolting machine Operator Side	165	180
Left-side Roof Bolting machine Off Side	190	170
Right-side Roof Bolting machine Operator Side	175	180
Right-side Roof Bolting machine Off Side	170	165

Table 1 - Torque Values of Roof Bolting Machines

The roof bolting machine operators stated they did not make all of the required torque value checks while installing the pattern bolts. A citation was issued for this violation but it was determined to not be a contributing factor to the accident. The checks that were made by the miners confirmed that the bolts were installed within the required torque range. Also, the results from testing the torque values of the roof bolting machines substantiate that the pattern bolts were installed within the torque range.

The three roof bolts surrounding the rock were not installed through it. These bolts had bearing plates and draw rock shields. The edges of the draw rock shields on the inby and outby roof bolts that were closest to the rock were bent downward; indicating the rock was partially over these shields. The edges of the draw rock shield and bearing plate attached to the middle roof bolt that were closest to the rock were also bent downward. The middle roof bolt broke as a result of the fall. This indicates the edge of the rock was over more of the draw rock shield and bearing plate (see Appendix B - Photograph 2).

On June 4, 2008, personnel from the MSHA Pittsburgh Safety and Health Technology Center (PSHTC) tested three roof bolts obtained from the mine. These roof bolts were from the lot of bolts recently installed in the mine before the accident. The tests were conducted to ensure the bolts met the ASTM F432-95 Standard Specifications for yield load and ultimate (breaking) load of the bolts. Also, the tensioning nuts were tested to ensure they were capable of withstanding the ultimate load of the bolt. The ASTM minimum values for a grade 60 bolt are 20,000 pound-force (lbf) for yield load and 30,100 lbf for ultimate load. The three roof bolts exceeded the minimum strength requirements for yield load and ultimate load as shown in Table 2. The roof bolts broke in the body of the bolt, indicating the tensioning nuts were capable of withstanding the ultimate load of the roof bolts. The full report of the roof bolt testing can be obtained from PSHTC.

	Yield Load (Pound-Force)	Ultimate Load (Pound-Force)
Roof Bolt #1	20,500	32,900
Roof Bolt #2	21,400	33,000
Roof Bolt #3	21,000	33,000

Table 2 - Load Values of Roof Bolts

Personnel from the MSHA Approval and Certification Center (A&CC) examined the broken bolt, bolt plate and draw rock shield on June 3, 2008. The middle roof bolt broke 5 inches from the head-end of the bolt, where the threads of the bolt end (see Appendix B - Photograph 3). Examination of the roof bolt piece revealed it was bent. The bend may have occurred during installation of the bolt. Also, examination of the roof bolt piece, bearing plate and draw rock shield showed that no damage had occurred to them from moving equipment or other sources. The full report, indexed under PAR No. 95335, can be obtained from A&CC.

Personnel from Matco Associates, Inc. examined the broken bolt and tested the metal from a roof bolt to determine if they met the applicable standards and the mode of failure. The full report can be obtained from A&CC. The following conclusions were made by the Matco personnel.

1. The failed bolt met the applicable specification requirements identified in ASTM F432-95.
2. The failure occurred due to brittle fracture that resulted from a combination of poor fracture toughness properties of the bolt material, coupled with the presence of a large notch defect introduced during installation.

3. Low material strength contributed to formation of the notch defect during installation. The evaluation of the bolt suggests it was subject to a larger bend angle than ten degrees, however, the actual value is not accurately known. Insufficient controls on the chemical composition allowed for poor fracture toughness properties.
4. A combination of melt practice and chemical composition modifications are warranted to improve the bolt strength and fracture toughness.
5. A detailed review of all applicable specification requirements is strongly recommended to eliminate similar failures in the future.

MSHA technical support personnel met with Matco personnel at Matco's facilities on August 26, 2008.

Conclusions: Tech Support concludes the following from the Matco report and the follow-up discussions from the meeting:

1. The Matco failure analysis is a plausible explanation of the mode of failure of the Osaka Mine bolt.

2. The bolts from this lot meet the applicable ASTM standard (ASTM F432-95). There is not sufficient evidence to warrant removing bolts from this lot from service.

3. The fracture toughness properties of mine roof bolts can and should be improved through a complete review of the standard and the adoption of better controls on chemical and mechanical properties and deoxidation of the steel.

Interim Actions:

1. The most likely explanation of the bolt failure mechanism, based on the evidence, involves a notch defect that may have been introduced during installation of the bolt at an angle. MSHA Technical Support will assist CMS&H to develop an information bulletin to the industry to emphasize the importance of the use of angle compensating devices required by 75.204(f)(8) to mitigate against the possibility of notch defects occurring during installation.

2. Since the physical evidence suggests the possibility of the bolt failure being due, in part, to bending during installation, there was the potential that other bolts installed at this mine were also significantly bent upon installation which may have induced fractures thereby weakening the bolts. MSHA personnel reviewed a representative sample of bolt installations at this mine for bent bolts by looking at the attitude of the bearing plates. Some of the roof bolts examined were installed where angle compensating devices should have been used. A citation

was issued for this violation but it was determined not to be a contributing factor to the accident. Additionally, bolter operators at the mine were made clearly aware of the importance of proper installation techniques and the potential consequences of tightening the bolt against excessively angled roof orientations.

Long Term Actions: A complete review of the ASTM standard should be undertaken to address improvements in the specifications which will improve the fracture toughness properties of the steel used in the manufacture of mine roof bolts.

ASTM F 432-95 is a voluntary consensus standard developed by roof support manufacturers for the mining industry. The current version has been in effect since 1995 but it is reviewed periodically by a working group comprised of all of the US and some of the foreign manufacturers of roof support products. Technical Support will bring the Matco report and the associated concerns to the attention of the working group members for their consideration.

ROOT CAUSE ANALYSIS

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

Root Cause: Angle compensating devices were not utilized. As a result, the roof bolt was bent and fractured during its installation which affected its loading capacity.

Corrective Action: The mine operator has included a specialized washer into the assembly of all pattern bolts. This washer reduces the bending affect on the roof bolt during its installation. Also, current with the release of this report, MSHA is developing an informational bulletin to emphasize the importance of the use of compensating devices required by 75.204(f)(8) to mitigate against the possibility of notch defects occurring during installation.

Root Cause: Insufficient controls on the chemical composition during the steel manufacturing process allowed for poor roof bolt fracture toughness properties.

Corrective Action: A combination of melt practice and chemical composition modifications are warranted to improve the bolt strength and fracture toughness.

Root Cause: A factor contributing to this accident is the location of the victim at the time of the rock fall.

Corrective Action: The mine operator submitted a revision to the Roof Control Plan to the district manager on April 28, 2008. The revision was approved on April 29, 2008, and included the following provision:

> All persons will be in a safe location, outby the continuous mining machine operator, while coal is to be cut, mined or loaded. The number of persons positioned at the continuous mining machine will be limited to those necessary to facilitate the mining process. When persons other than those necessary to facilitate the mining process enter the area, the mining process will stop. Persons shall not be allowed to congregate in the area surrounding the continuous mining machine when coal is being cut, mined, or loaded.

The mine operator reviewed the Roof Control and Ventilation Plan with all personnel on April 29-30, 2008.

CONCLUSION

The accident occurred because angle compensating devices were not utilized during the roof bolting process. As a result, the roof bolt was bent and fractured during its installation which reduced its loading capacity. Insufficient controls on the chemical composition during the steel manufacturing process allowed for poor roof bolt fracture toughness properties. Also, the victim was unnecessarily in close proximity to the mining machine operator.

Approved by:

Ray McKinney
District Manager

11/19/08
Date

ENFORCEMENT ACTIONS

Section 103(k) order No. 6629298 issued April 22, 2008, to Osaka Mining Corporation, Mine No. 1: A fatal roof fall accident occurred at this operation on April 22, 2008. This order is issued to assure the safety of all persons at this operation. It prohibits all activity on the 001-0 MMU until MSHA has determined that it is safe to resume normal mining operations in the area. The mine operator shall obtain prior approval from an authorized representative for all actions to recover and/or restore operations to the affected area. Affected area: 001-0 MMU

Section 104(a) citation No. 7305055 of Code of Federal Regulations (CFR) 75.204(f)(8) issued November 18, 2008. An angle compensating device was not used to install a torque tension roof bolt where the angle from the perpendicular to the bearing plate was greater than 5 degrees. This roof bolt was located in the #7 Entry approximately 95 feet inby survey spad number 597, along the right rib. This roof bolt broke during a roof fall that led to a fatal accident on April 22, 2008.

APPENDIX A - Persons Participating In The Investigation

The following people provided information and/or were present during the investigation.

Osaka Mining Corporation

Hagy Barnett	Superintendent
Ronald Turner	Section Foreman, Owl Shift
John Mullins	Section Foreman, Day Shift
Charles Fields Jr.	Section Mechanic
Marvin Music	Mining Machine Operator
Dennis Gibson	Shuttle Car Operator
Roger McCoy	Shuttle Car Operator
Edward Dorton	Roof Bolting Machine Operator, Day Shift
Curtis Fleenor	Roof Bolting Machine Operator, Day Shift
Walter Gibson	Roof Bolting Machine Operator, Day Shift
Christopher Huff	Roof Bolting Machine Operator, Day Shift
Derrick Collins	Roof Bolting Machine Operator, Owl Shift
Jerry Long	Roof Bolting Machine Operator, Owl Shift
James Ramey II	Scoop Operator
Eric Stallard	Utility man

Cumberland Resources Corporation

Rick Craig	Vice President of Operations
Thomas Asbury	Safety Director
Larry Coeburn	Safety Analyst
Forrest Lambert	Safety Analyst
Stephen Hodges	Attorney
Marko Rajkovich	Attorney

Virginia Department of Mines, Minerals and Energy

Frank Linkous	Chief, Division of Mines
Carroll Green	Mine Inspector Supervisor
John Thomas	Mine Inspector Supervisor
Gary Cutting	Coal Mine Technical Specialist
Randy Moore	Coal Mine Inspector
Sammy Fleming	Coal Mine Inspector
Hershiel Hayden, Jr.	Coal Mine Inspector
Jerry Scott	Coal Mine Inspector
Mike Willis	Mine Safety Engineer

Mine Safety and Health Administration

Ray McKinney	District Manager
Nicholas Rasnick	Assistant District Manager, Inspection Division
Benjamin Harding	Conference & Litigation Representative
Russell Dresch	Electrical Engineer
Fred Martin	Educational Field Services Specialist
Johnny Turner	Coal Mine Safety and Health Inspector, Roof Control
David Smith	Coal Mine Safety and Health Inspector, Roof Control
Hagel Campbell	Coal Mine Safety and Health Inspector, Ventilation

APPENDIX B - Victim Information

Accident Investigation Data - Victim Information

Event Number: 4 1 5 6 9 4 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. Last Four Digits of SSN:	5. Degree of Injury:
David H. Sizemore	*M*	*61*	*3962*	*01 Fatal*

6. Date(MM/DD/YY) and Time(24 Hr.) Of Death:	7. Date and Time Started:
a. Date: 04/22/2008 b.Time: 11:15	*a. Date: 04/22/2008 b.Time: 6:30*

8. Regular Job Title:	9. Work Activity when Injured:	10. Was this work activity part of regular job?
012 Roof bolter (twinhead right side)	*042 Observe operation*	Yes | No X

11. Experience	Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days
a. This Work Activity:	*30*	*0*	*0*	b. Regular Job Title:	*30*	*0*	*0*	c: This Mine:	*2*	*12*	*0*	d. Total Mining:	*30*	*0*	*0*

12. What Directly Inflicted Injury or Illness?	13. Nature of Injury or Illness:
121 Back mine roof, hanging wall	*370 Multiple Injuries*

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

15. Company of Employment:(If different from production operator)
Operator
Independent Contractor ID: (if applicable)

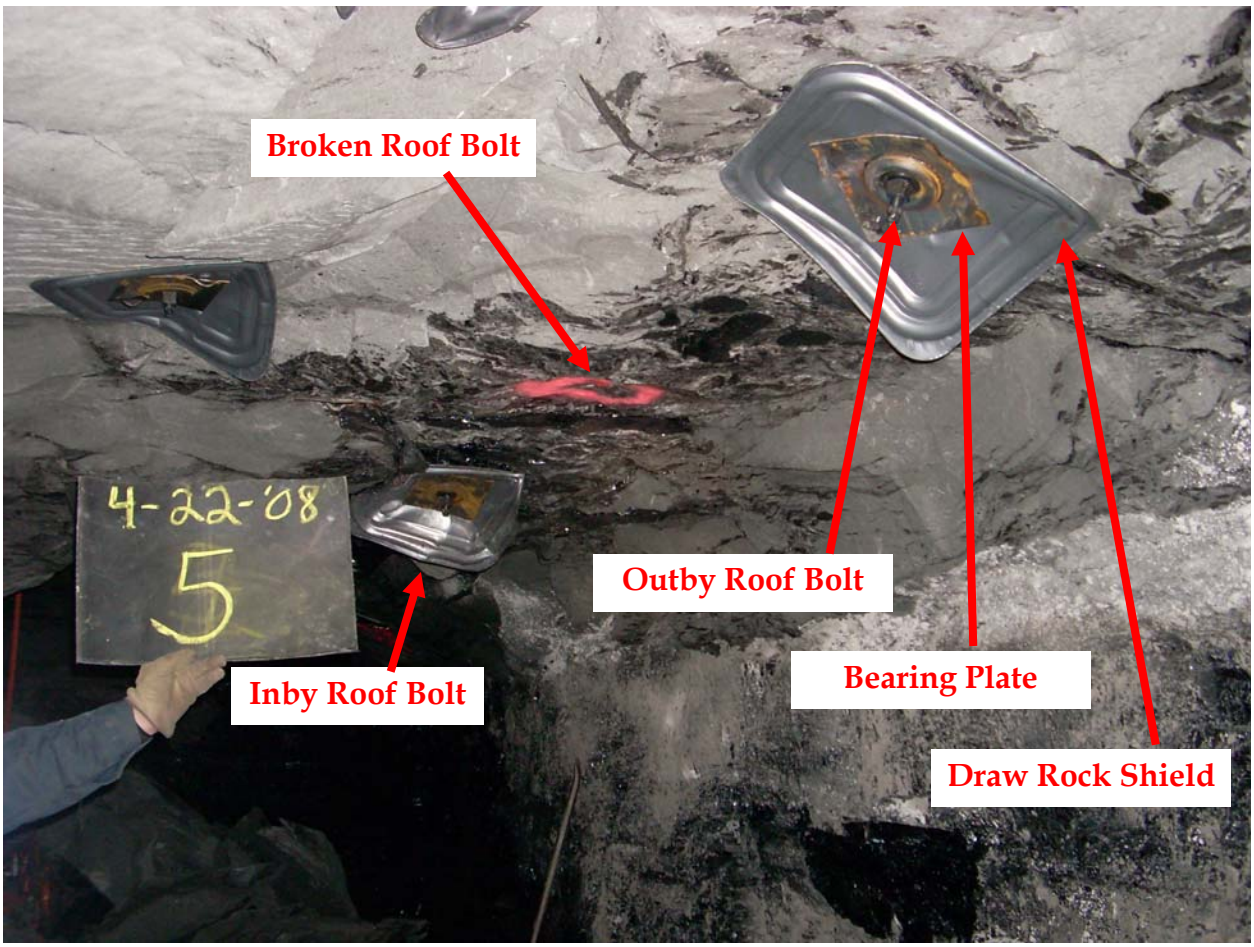
16. On-site Emergency Medical Treatment:
Not Applicable: | First-Aid: | CPR: | EMT: X | Medical Professional: | None:

17. Part 50 Document Control Number: (form 7000-1)

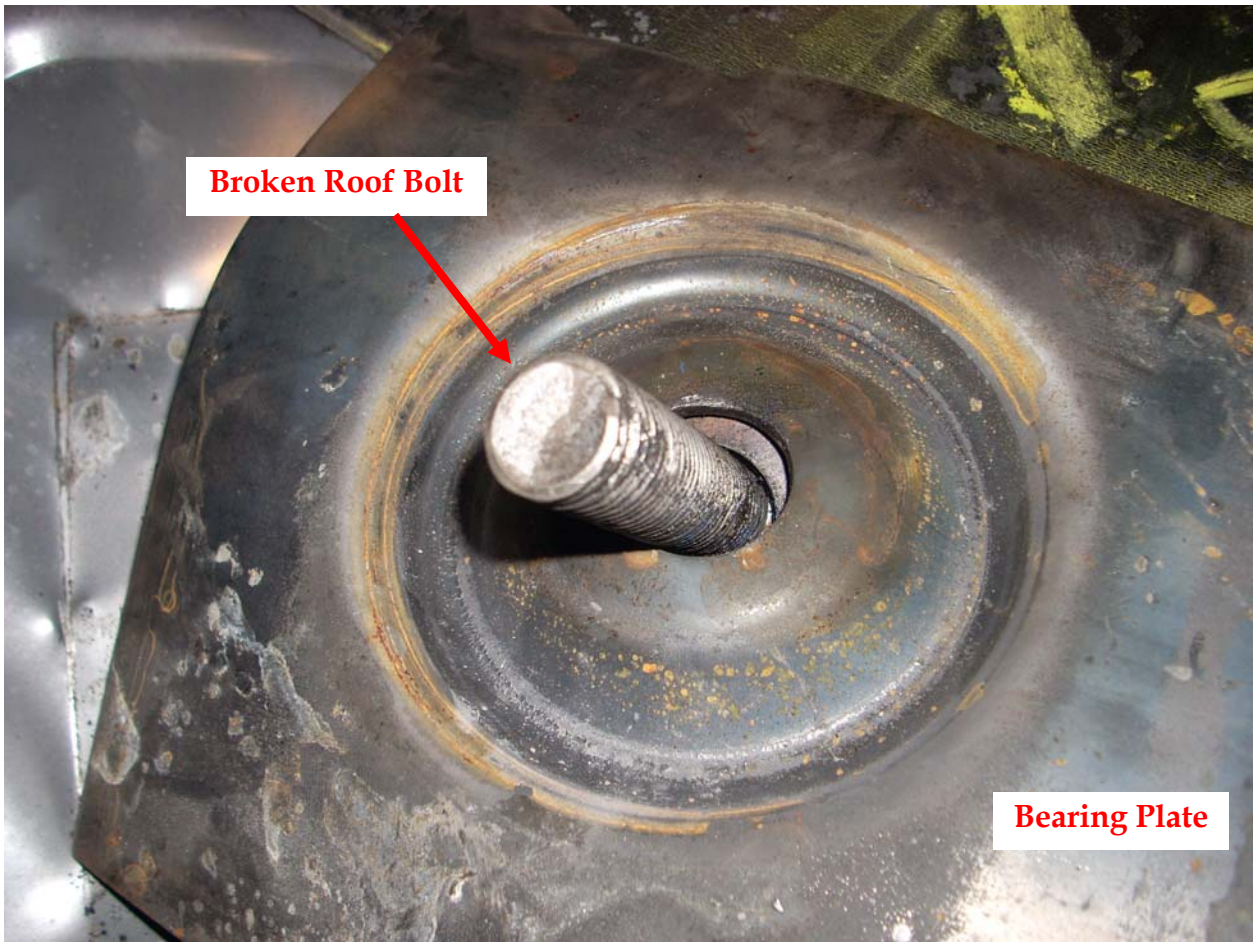
18. Union Affiliation of Victim: *9999* *None (No Union Affiliation)*

APPENDIX C - Photographs

Photograph 1 - Fallen Roof and Rib Rock

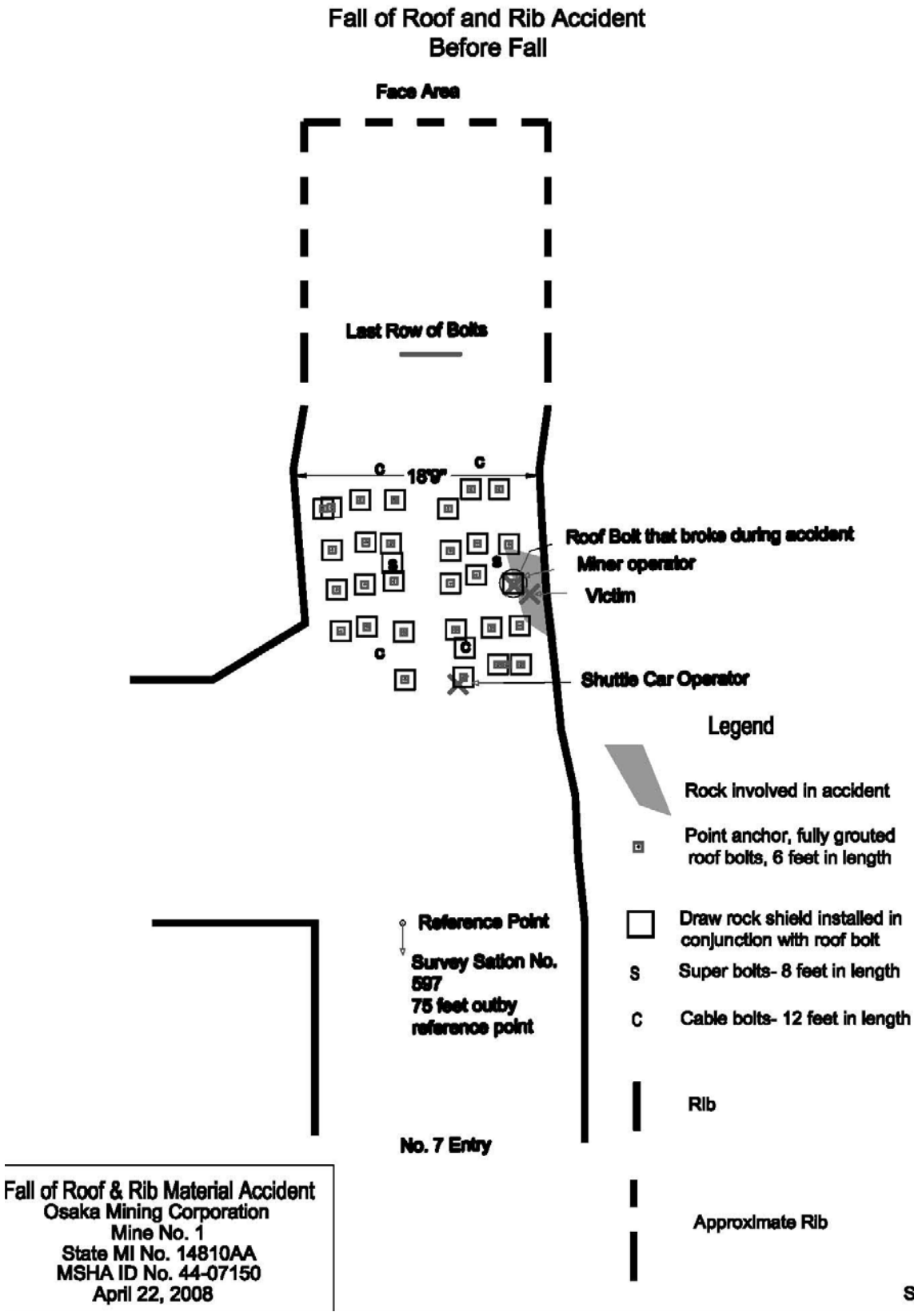


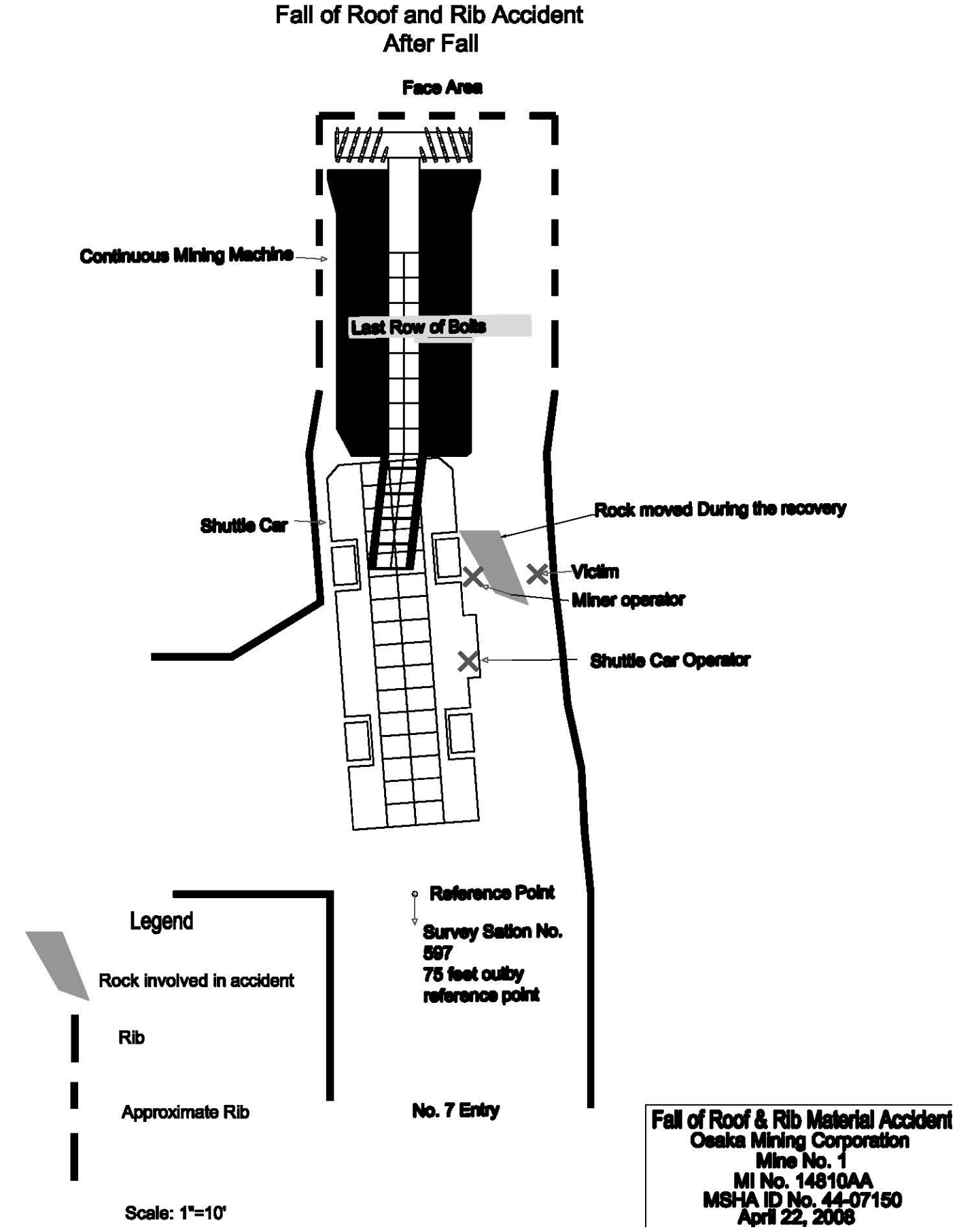
Photograph 2 - Roof and Rib Fall Cavity with Roof Bolts



Photograph 3 - Broken Roof Bolt

APPENDIX D – Sketches




Fall of Roof and Rib Accident
After Fall
Face Area
Continuous Mining Machine
Last Row of Bolts
Shuttle Car
Rock moved During the recovery
Victim
Miner operator
Shuttle Car Operator
Reference Point
Survey Sation No.
597
75 feet outby
reference point
Legend
Rock involved in accident
Rib
Approximate Rib
No. 7 Entry
Scale: 1"=10'
Fall of Roof & Rib Material Accident
Osaka Mining Corporation
Mine No. 1
MI No. 14810AA
MSHA ID No. 44-07150
April 22, 2008