*This presentation is for illustrative and **general** educational purposes only and is not intended to substitute for the official MSHA Investigation Report analysis nor is it intended to provide the sole foundation, if any, for any related enforcement actions.*

GENERAL INFORMATION

Coal Mine Fatal Accident 2003-22

Operator:	Warrior Coal LLC
Mine:	Cardinal Mine
Accident Date:	August 20, 2003
Classification:	Roof Fall
Location:	District10, Hopkins Co., Kentucky
Mine Type:	Underground
Employment:	220
Production	14,400 tons/day

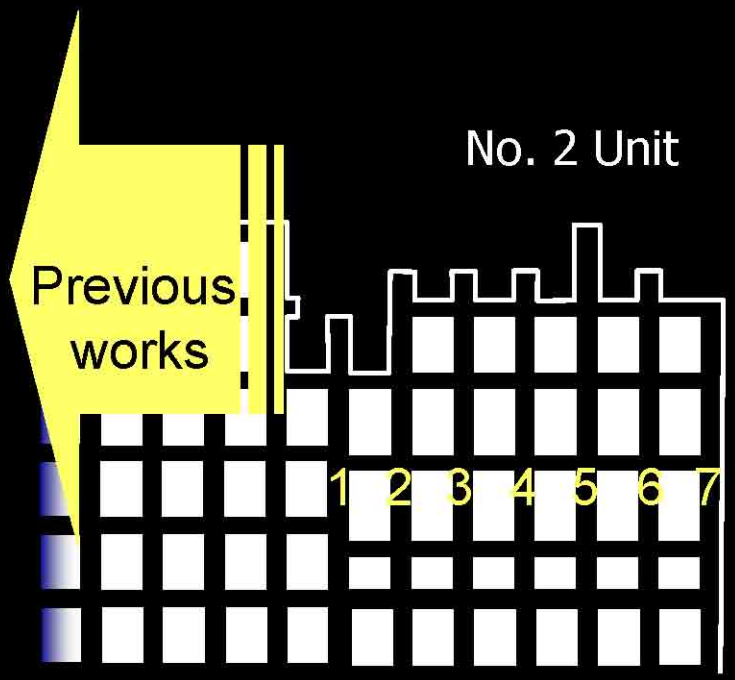
OVERVIEW

Coal Mine Fatal Accident 2003-22

- On August 20, 2003, a 52-year old unit foreman, was fatally injured when he was struck by a section of rock that fell from between two rows of roof bolts.
- The rock measured 11’ x 4’ x 0-3” thick.
- The falling material comprised of several pieces estimated to weigh a total of 1,600 pounds.
- The fall cavity was bounded by several steeply angled slickensides and intersected on by a tight, vertical joint.
- Bolt spacing adjacent to the fall was within roof control plan specifications.

ACCIDENT DETAILS

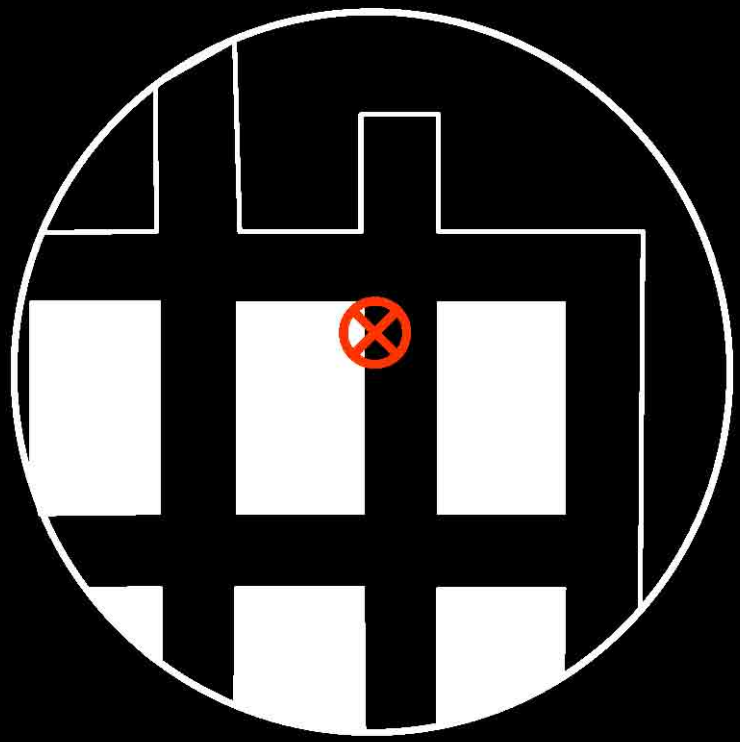
Coal Mine Fatal Accident 2003-22



- The unit foreman entered the mine with his crew at 7:00 a.m. and arrived on the No. 2 Unit around 7:20 a.m.
- Production began at 7:30 a.m. and the shift proceeded normally.
- At approximately 1:40 p.m., the continuous mining machine finished extracting coal from the crosscut to the right of the No. 6 entry.

ACCIDENT DETAILS

Coal Mine Fatal Accident 2003-22



ROOF CONTROL PARAMETERS

48”, 5/8 diameter fully grouted bolts

4’ between rows, 5’ between bolts w/in a row

6” square, domed plates

8⅜” x 18¼” x 1¾” wood headers

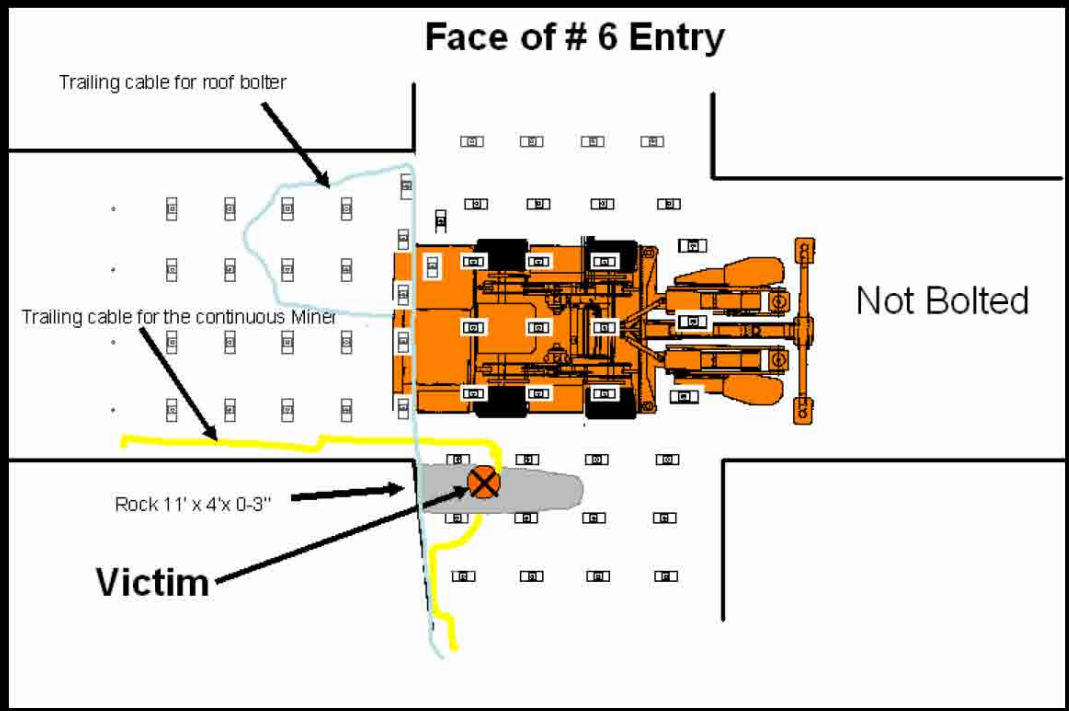
FOSROC B23–4’–H10 resin

Fletcher RRII-13BC-F roof bolting machine

- The unit foreman was helping a co-worker relocate the trailing cable for the continuous miner near the outby edge of the last open crosscut in the No. 6 entry.
- The mining height was 7’ and the entry width averaged 19 ½’.

ACCIDENT DETAILS

Coal Mine Fatal Accident 2003-22



- As the unit foreman bent over to pick up the cable, falling rock struck both the him and his co-worker.
- The co-worker was hit with a glancing blow, knocking him away from the remaining falling material.
- The foreman was forced to the mine floor by the rock and fatally injured.

ACCIDENT DETAILS

Coal Mine Fatal Accident 2003-22

- The fallen material consisted of several pieces of immediate roof that fell from between permanent supports.

PHYSICAL FACTORS

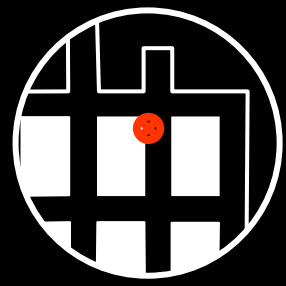
Coal Mine Fatal Accident 2003-22

- The Cardinal mine extracts coal from the Kentucky No. 11 seam that averages about 65 inches in height.
- Overburden in the area where the accident occurred averages 584 feet.
- No mining had been conducted above or below the No. 11 coal seam in the area.

  The immediate roof is composed of shale, claystone and limestone.
- A carbonaceous shale and a fossiliferous claystone occur in varying thicknesses immediately above the coal seam and are referred to locally as “the gob”.
- The claystone reportedly is present throughout the mine and is usually less than six inches thick.
- The shale reportedly is present in limited areas and tends to be thinly to very thinly bedded (up to 2.5 inches).
- Slickensides are common in the gob (especially in the shale).

PHYSICAL FACTORS

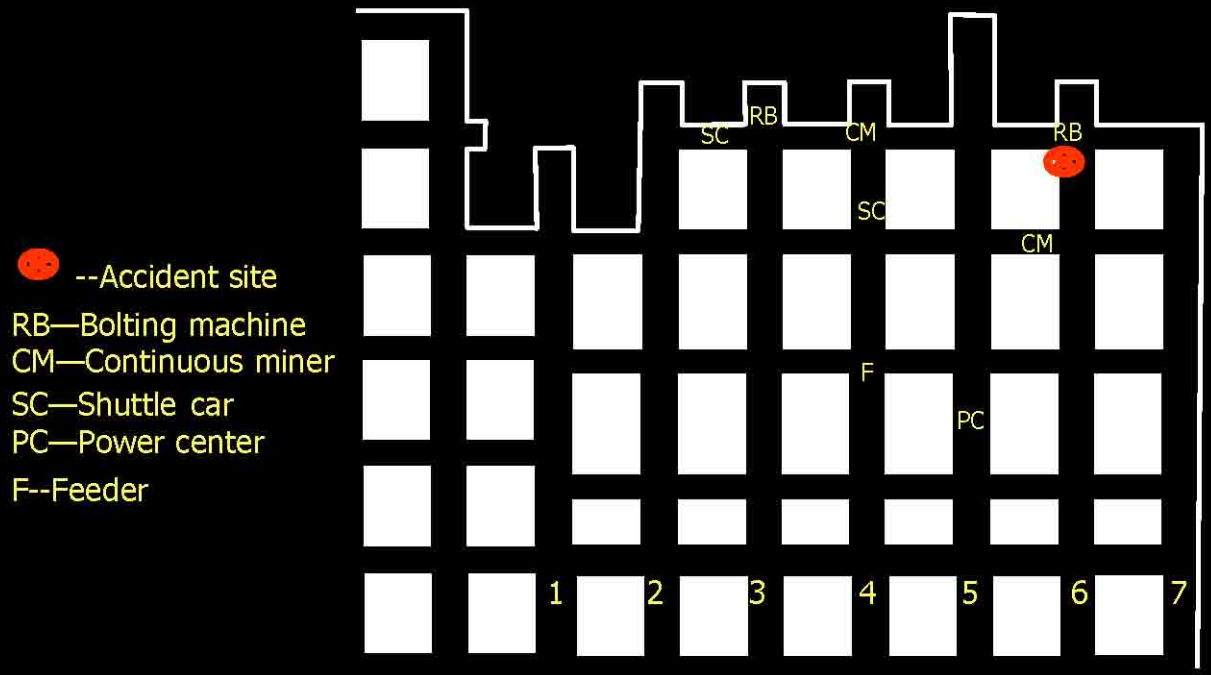
Coal Mine Fatal Accident 2003-22



- Pillar spalling was typically limited to pillar corners.
- Roof damage appeared to occur most frequently at the roof/rib interface near the inby pillar corners.
- Roof and rib conditions on the section generally were good.

PHYSICAL FACTORS

Coal Mine Fatal Accident 2003-22



- The roof where the fall occurred had been supported during the second shift on August 19.
- Pre-shift and On-Shift examinations of this area failed to detect visible hazardous conditions of the roof and ribs.
- Slickensides, bedding planes, and localized cutter roof conditions contributed to instability of the slab at the accident site

ROOT CAUSE ANALYSIS

- ***Causal Factor:*** The standards, policies, and administrative controls in use at the mine were inadequate to identify the hazardous roof condition and did not ensure that the roof was supported or adequately controlled to protect persons from hazards from falls of roof.
- ***Corrective Actions:*** Through revisions to the approved roof control plan, the spacing of the permanent roof bolts was changed from 4' wide and 5' on center to 3½' wide and 4½' on center. The size of the wooden headers positioned between the 6" x 6" roof bolt plates and the mine roof was increased from 18" in length to 26". Reducing the area between the roof bolt spacing across the entry and between the advancing rows of roof support reduces the likelihood in addition to the size of gob falling from between the permanent roof support. In addition, all underground employees were retrained to improve their recognition of roof conditions which require further actions.

Coal Mine Fatal Accident 2003-22

CONCLUSION

The victim was fatally injured while helping move the trailing cable for the right side continuous mining machine to the opposite side of the No. 6 entry when he was struck by a section of rock falling from between the rows of permanent roof support. The falling material comprised of several pieces that were estimated to weigh a combined total of 1,600 pounds. The fall cavity was bounded by several steeply angled slickensides and intersected on the inby side by a tight, vertical joint. Bolt spacing adjacent to the fall was within roof control plan specifications. The accident occurred because the unsafe roof condition was not identified and redressed.

ENFORCEMENT ACTIONS

104 (a) citation for a violation of 30 CFR 75.202(a).

A fall of roof measuring 11 feet long by 4 feet wide and varying from 0 to 3 inches in thickness occurred on the No. 2 Unit (MMU 002) at the outby rib line of the last open crosscut in the No. 6 entry which resulted in a fatal accident. Persons were working and traveling in this area that was not supported or otherwise controlled to protect miners from related falls of the roof.

Coal Mine Fatal Accident 2003-22

BEST PRACTICES

- Conduct a thorough visual examination of the roof, face, and ribs immediately before any work is started, and thereafter as conditions warrant.
- Conduct sound and vibration roof tests where appropriate *(see 30 CFR 75.211b).*
- Always be alert for changing roof conditions.
- Know and follow the provisions of the approved roof control plan.
- Add additional roof supports where necessary.

Coal Mine Fatal Accident 2003-22