20 Coal Fatal Accidents (CY – 2013)

- 7 Machinery
- 6 Powered Haulage
- 2 Roof Fall
- 2 Fall of Face/Rib (Face and Rib outburst)
- 1 Hoisting
- 1 Exploding Vessels Under Pressure
- 1 Other (Drowning)

States where fatalities occurred

- West Virginia – 6
- Illinois – 4
- Pennsylvania - 2
- Kentucky – 2
- Wyoming – 2
- Indiana - 1
- Ohio – 1
- Utah – 1
- Alabama – 1

- There were 14 underground fatalities and 6 that occurred on the surface.

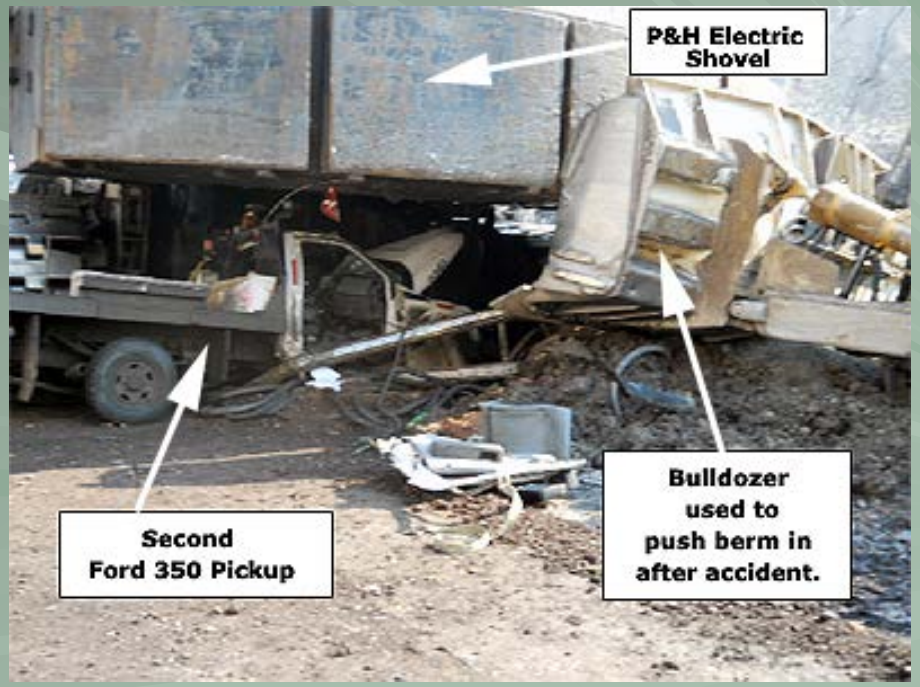
- Three of the fatalities involved supervisors.

- Four fatalities could have been prevented with a proximity detection system. The equipment involved in these fatalities are as follows.
  - Continuous mining machine
  - Coal scoop
  - Coal hauler
  - Shuttle car

Root Causes

- Failure to
  - Implement programs, policies, and procedures to ensure safety
  - Train miners
  - Maintain equipment in safe operating condition
  - Perform adequate examinations
  - Implement safety measures contained in approved plans
  - Ensure adequate visibility for equipment operators
  - Eliminate or adequately mitigate known safety hazards
  - Have required plans that were adequate for the mining conditions
  - Properly use equipment that provides safety for miners

Machinery


P&H Electric Shovel
Second Ford 350 Pickup
Bulldozer used to push berm in after accident.

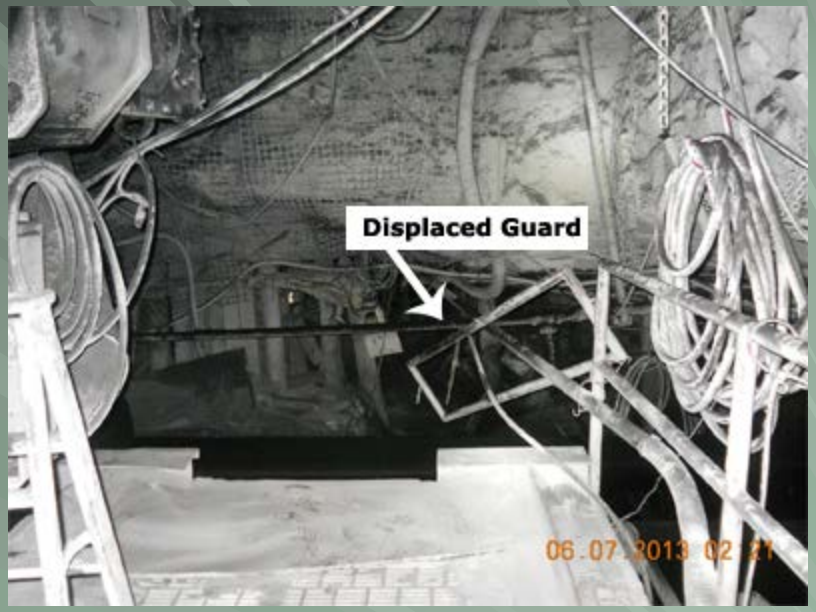
Machinery

- Ensure the power is off and the equipment is blocked against motion prior to performing maintenance.
- Devise safe methods to complete tasks involving large objects, massive weights, or where the release of stored energy is a possibility.
- Ensure that there is sufficient space around equipment to enable work to be performed safely.
- Consult and follow the manufacturer's recommended safe work procedures for maintenance tasks and monitor work to ensure procedures are followed.
- Ensure that contractors have safe work procedures in place for the specific task and machine.
- Before performing any job, consider all hazards and implement formal procedures that address possible hazards.
- Install and maintain proximity detection systems. See the proximity detection single source page on the MSHA website.
- Develop programs, policies, and procedures for starting and tramming remote controlled continuous mining machines.
- Frequently review, retrain, and discuss avoiding the "RED ZONE" areas when operating or working near a remote controlled continuous mining machine.
- Train all production crews and management in the programs, policies, and procedures and ensure that they are followed.
- Before loosening hydraulic hoses or components, determine if they are supporting something or trapping pressure.

Machinery Best Practices Cont'd.

- Ensure warning labels are visible. Check them regularly and replace any labels that are illegible.
- Ensure the grade is within equipment capabilities and equipment braking and steering systems function as designed.
- Establish procedures that require smaller vehicles to maintain a safe distance from large mobile equipment. Provide training in those procedures.
- Designate specific roadways or provide alternate routes for light duty vehicles in high activity or congested areas.
- Task train miners adequately on the equipment they will operate.
- Maintain a safe distance from the edge of the highwall.
- Ensure adequate berms are in place.
- Be familiar with your work environment. Before beginning work, look at the area, walk around it, and plan the safest way to move the material and maneuver the equipment.
- Ensure illumination is adequate when work is performed during non-daylight hours.
- Maintain control of equipment at all times during operation.
- Ensure that personnel operating mobile equipment always wear a seat belt.
- Keep all high pressure hydraulic hoses free from pinch points, sharp edges and abrasive areas.
- Use whip checks at connection points.
- Train miners regarding the dangers associated with hydraulic hoses on long wall faces.

Powered Haulage



Powered Haulage Best Practices

- Block or secure equipment being raised against motion so it cannot suddenly shift.
- Always be aware of the stored potential energy when raising or lowering items.
- When lifting items and the desired height cannot be reached, block the item in position and lower the lifting device to establish a higher base.
- Ensure that personnel are trained to recognize hazardous work procedures where inadvertent movements could cause injury.
- Train miners to establish and use effective means of communication while operating and working around mobile equipment.
- Know your location relative to the movement of mobile equipment and never position yourself between any piece of equipment in motion and a stationary object. Assume the equipment operator has not seen you, unless eye contact is confirmed and signal your presence to equipment operators.
- Install and utilize proximity detection systems on continuous mining machines and haulage equipment.
- When operating equipment, sound audible warnings when traveling around turns or blind spots, through ventilation curtains, and any other time the equipment operator's visibility is limited or obstructed.
- Check guards along belt conveyors for stability and good repair.
- Train all employees thoroughly on the dangers of working or traveling around moving conveyor belts.

Powered Haulage Best Practices Cont'd

- Perform thorough workplace examinations. Inspect the work areas for all potential hazards including places that persons may fall from or through.
- Provide belt conveyor stop and start controls at areas where miners must access both sides of the conveyor. Provide these areas with adequate crossing facilities (e.g. cross-overs or cross-unders).
- Use transparent curtain for check and line curtains in the active face areas.
- Energize the lights in the direction of travel when operating haulage equipment.
- Ensure that chains, wire ropes, and hooks are properly attached or rigged.
- Inspect devices for signs of wear such as rust, metallic loss, fraying of rope, broken strands in cables, elongation of metal, etc.
- Maintain off-track haulage roadways from bottom irregularities, debris, and wet or muddy conditions that affect the control of the equipment.
- Always ensure that visibility is not obstructed in the direction of travel and across the equipment being operated.

Roof Fall

Victim (Operator)

Survivor (Helper)

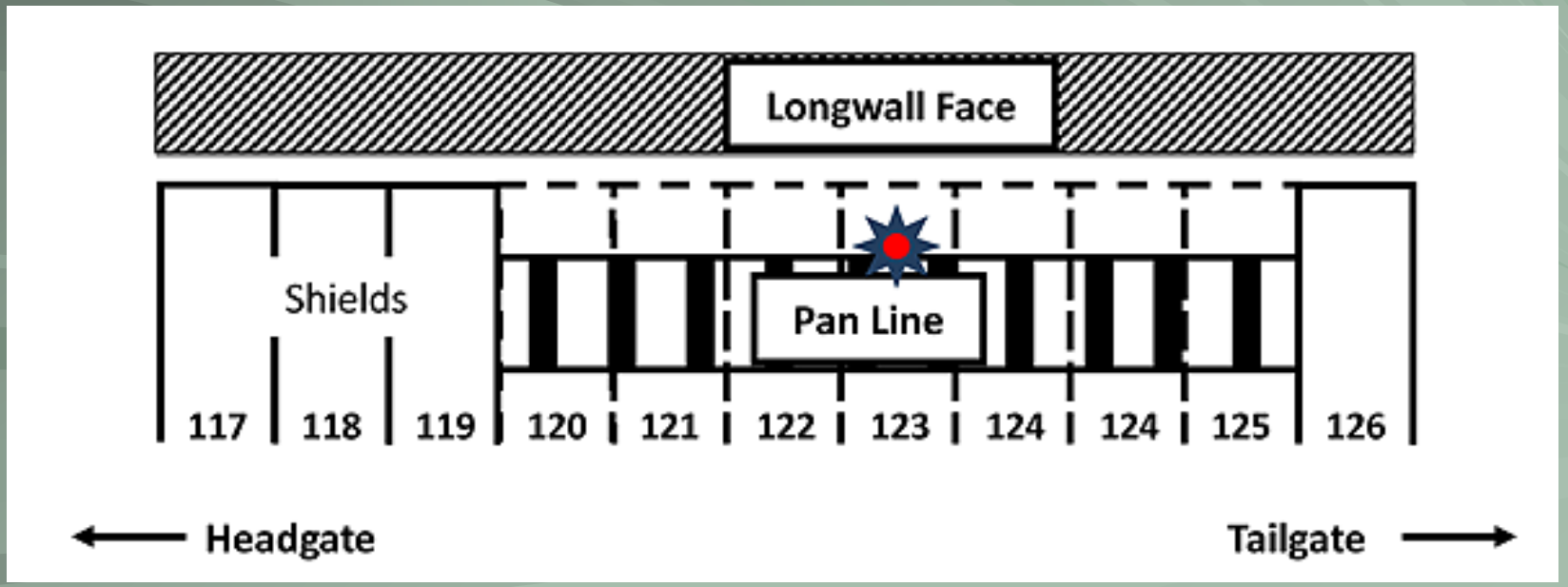
Roof Fall Accident Prevention Best Practices

- Conduct frequent and adequate examinations of the roof, face, and ribs. Be alert for changing conditions at all times. When hazardous conditions are detected, danger off access to the area until it is made safe for work and travel.
- Develop and follow safe rib bolting procedures. Consult the manufacturer's recommendations.
- Adequately support, or scale down, any loose roof or rib material from a safe location before working or traveling in the area.
- Ensure that Automated Temporary Roof Support systems on all roof bolting machines are maintained in good working condition.
- Ensure that the approved Roof Control Plan is followed and is suitable for the geologic conditions encountered at the mine. If conditions change and cause the plan to no longer be suitable, the plan must be revised to provide adequate support for the control of the roof, face, and ribs.

Roof Fall Accident Prevention Best Practices Cont'd.

- Ensure that the approved Roof Control Plan support provisions are suitable for the geological conditions at the mine and that the plan is followed.
- Develop a map of geologic features, so additional support can focus on those areas.
- Maintain proper entry widths and pillar dimensions.
- Develop a safe procedure to align Mobile Roof Supports with the lift being mined.
- Install and examine test holes regularly for changes in roof strata.
- Take additional measures when hazards associated with draw rock are encountered, such as mining shorter cuts and decreasing roof bolt spacing.
- When joints are encountered, install adequate supplemental support.

Fall of Face & Rib Outburst



Fall of Face and Rib Outburst Prevention Best Practices

- Ensure that the approved roof control plan provisions are suitable for the geological conditions at the mine and that the plan is followed.
- Ensure that the pillar dimensions and mining method are suitable for the conditions.
- Ensure that roof and rib control methods are adequate for the depth of cover and for the potential effects of any mines above or below active workings.
- Develop a map of geological features and anomalies to determine orientation as a means to predict when and where they will be encountered during mining, so additional roof support can focus on those areas.
- Conduct frequent and adequate examinations of roof, face, and ribs. Be alert for changing conditions. When hazardous conditions are detected, danger off access to the area until it is made safe for work and travel.
- Maintain proper entry widths and pillar dimensions.

Fall of Face and Rib Outburst Accident Prevention Best Practices Cont'd.

- When gob falls have been delayed for periods that exceed routine intervals for the mining conditions, evaluate the area and consider evacuating miners and equipment to a safe area until the fall occurs.
- Use a bar of suitable length and design for removing loose or unconsolidated material.
- Support the exposed longwall roof, face, and ribs by mechanical means in the immediate work area.
- Train all miners in hazard recognition and safe work practices that are assigned to perform work on the longwall face.
- Apply additional safety precautions in areas where geological changes and anomalies in strata are present.
- Post a certified foreman at the work area when maintenance is being performed.
- De-energize the face conveyor, notify the headgate operator, and disconnect power at the control station while work is being performed on the face conveyor (pan). Do not energize the conveyor until all persons are off the face side of the conveyor and the conveyor is supported adequately from inadvertent movement.

Hoisting

Hoisting Best Practices

- Ensure that an adequate delay time is provided between the activation of visual and/or audible alarms and the movement of the hoist, so that workers can react and move clear of dangerous areas.
- Conduct thorough examinations of all hoisting equipment and safety mechanisms on a daily basis. Ensure that persons conducting these examinations are trained adequately and any deficiencies identified are corrected immediately.
- Discuss work procedures and identify all hazards associated with the work to be performed along with the methods to properly protect persons.
- Communicate work activities prior to beginning the work and maintain communications during the work activity.
- Develop and implement a standard operating procedure for the safe operation of service hoists and man hoists, train all of the miners involved in hoisting operations, and post these procedures near the hoist control panels in a conspicuous location.
- Provide redundant safety mechanisms that provide a more fail proof check of the system before the hoist can be operated.
- When possible, secure the cage mechanically to prevent cage motion due to suspension rope stretch during loading or other unintended motion.
- Design electrical safety circuits so that an open circuit does not represent an unsafe condition and the functioning of the safety circuit should not be solely dependent on a single programmable electronic system.
- Ensure that the hoist is inoperable during loading and unloading operations.

Exploding Vessels Under Pressure

Exploding Vessels Under Pressure Accidents Best Practices

- When troubleshooting or testing pressurized systems, position yourself in a safe location, away from any potential sources of failure.
- When possible, block access to areas where pressurized cylinders, tanks, or other vessels are located while the equipment is in operation and under pressure.
- Train miners in the proper maintenance of and the dangers associated with working around pressurized cylinders, tanks, and other vessels that have the potential to explode or rupture.
- Ensure the ratings of hydraulic components are compatible with their intended use.
- Use the proper tools and equipment for the job.
- Inspect, examine, and evaluate all materials that are being used in the installation, replacement, or repair of pressurized systems to ensure they are suitable and meet minimum manufacturer's specifications.
- Examine and inspect hydraulic components for defects periodically.

Other (Drowning)

Drowning Prevention Best Practices

- Conduct a risk assessment prior to performing work and ensure that miners use proper equipment, tools, and procedures to eliminate hazards.
- Provide hazard training to all personnel working on or near an impoundment for recognition of hazards associated with the impoundment.
- Set up a communications protocol when persons are working alone.
- Wear properly fitted personal floatation devices (PFD) when working around bodies of water.
- Never assume an employee is knowledgeable in the task they are being assigned.