

Mid-Year Summary of 2014 Fatal Accidents at Metal/Nonmetal Mines with Preventative Recommendations

Fourteen miners in the metal and nonmetal mining industry were killed as a result of accidents from January 1 to June 30, 2014.

In the first six months of the year, five of the fatalities occurred at underground mines; nine were at surface mines. Four of the miners killed were supervisors. Fatalities continue to occur that could be prevented using Personal Protective Equipment and Lockout-Tagout best practices.

Five of the fatalities occurred in the first quarter of the year. Two miners died in **Fall of Person** accidents and two miners died in **Falling/Sliding Material** accidents. One miner died as a result of **Powered Haulage** accident. Two of the fatalities were **contractors**.

Nine miners were killed in a surge of accidents that occurred in the second quarter of 2014. Three miners were killed in **Machinery** accidents. Two miners died as a result of **Powered Haulage** accidents. Two miners were killed in a **Fall of Rib** accident. One miner died due to a **Hoisting** accident and another miner was killed in an **Explosion of Gas** accident. One of the fatalities was a **contractor**.

When completed, a detailed investigation report of each fatality is posted on the MSHA website at: <http://www.msha.gov/fatals/fab.htm>

Here is a brief summary of these accidents:

Three miners were killed in Powered Haulage accidents.

A 56-year old contract belt operator with 4 months of experience was killed at an iron ore mine. The victim was cleaning a return idler inside the frame of a belt conveyor when he became entangled between the return idler and the belt.

A 57-year-old co-owner with 1 year of experience was killed at a gypsum mine. The victim was driving an all terrain vehicle on the mine site to place signs around the perimeter of the mine. He lost control of the vehicle while traveling on a steep hill and it overturned onto him.

A 20-year-old groundman with 9 weeks of experience was killed at a sand and gravel mill. The victim was unloading a rail car using a mobile rail barge truck conveyor and was caught in the feed end of the conveyor.

Three miners were killed in Machinery accidents.

A 58-year-old truck driver with 3½ years of experience was killed at a sand and gravel mine. An excavator was loading material in a haul truck parked at the pit. When the victim exited the truck, he was struck by the excavator bucket and pinned against the truck.

A 50-year-old contract dozer operator with 23 years of experience was killed at a fire clay mine. He had been operating a dozer pushing clay in the pit and was found lying five feet behind the dozer.

A 53-year-old miner with 32 years of experience was killed at an underground gold mine. The victim was drilling with a jackleg drill when his clothing became entangled in the drill steel of the machine.

Two miners were killed in Falling/Sliding Material accidents.

A 50-year-old supervisor with 27 years of experience was killed at a sand and gravel mine. The victim was at a backfill site and approached an 80-foot high bank when it failed, engulfing him.

A 64-year-old foreman with 32 years of experience was seriously injured when he was struck by a section of plastic water pipe as it was being moved by an excavator. The victim was transported to a hospital where he died three days later as a result of his injuries.

Two miners were killed in Fall of Person accidents.

A 34-year-old contract laborer with 6 months of experience was killed at a cement operation when attempting to access an elevator in the finish mill. When the victim opened the elevator door on the fourth floor landing, he stepped into the elevator shaft and fell approximately 51 feet to the top of the elevator car located on the ground floor.

A 27-year-old contract mechanic with 2 years of experience was injured at an underground limestone mine. The victim was repairing a hydraulic pump on a scaler when he fell from an attached walkway approximately five feet to the ground. He was airlifted to a hospital where he died the next day.

Two miners were killed in a Fall of Rib accident.

A 53-year-old scaler with 8 years of experience and a 29-year-old scaler with 8 years of experience were killed at an underground limestone mine. The miners were in a basket on a boom truck scaling a pillar about 40 feet above the mine floor. Large slabs of rock fell from the rib and struck an outrigger and the back of the truck, causing the boom to fall to the mine floor.

One miner was killed in a Hoisting accident.

A 36-year-old shaft repairman with 18 years of experience was killed at an underground silver mine. Two miners were working in a shaft standing on a work platform attached to a skip. The skip was hoisted and the victim was crushed between the skip and the shaft timber.

One miner was killed in an Explosion of Gas accident.

A 41-year-old production supervisor with 19 years of experience was killed at a sand and gravel mine. The victim and two contract workers were attempting to remove an impeller that was seized onto the threaded shaft of a centrifugal pump. After several failed attempts to unscrew the impeller, heat from a torch was applied to the enclosed hub on the impeller. While applying heat, the hub exploded and metal fragments struck the victim.

Best Practices

Effective safety and health management programs save lives. Workplace examinations can identify and eliminate hazards that kill and injure miners. Effective and appropriate training, including task training, helps ensure miners recognize and understand hazards and how to control or eliminate them.

While some of the specific circumstances of these accidents remain under investigation, here are some of the best practices that can prevent them:

Powered Haulage Accidents

These deaths can be prevented by following these Best Practices:

- Establish policies and procedures for conducting specific tasks on belt conveyors.
- Before beginning any work, ensure that persons assigned to clean belt conveyors are task trained and understand the hazards associated with the work to be performed.
- Do not perform work on a belt conveyor until the power is off, locked, and tagged, and machinery components are blocked against motion.
- Never clean pulleys or idlers manually while belt conveyors are operating.
- Identify hazards around belt conveyor systems, design guarding, and securely install the guarding to ensure miners do not contact moving parts.
- Ensure that operators are properly task trained before operating mobile equipment they may not be familiar with.
- Maintain operating speeds consistent with road grades and conditions.
- Load equipment and/or supplies properly on mobile equipment to ensure stability during operation.
- Ensure that persons are trained, including task training, to understand the hazards associated with the work being performed.
- Establish and discuss safe work procedures before beginning work. Identify and control all hazards associated with the work to be performed and use methods to properly protect persons.
- Conduct work place examinations before beginning any work.
- Position mobile conveyors to eliminate exposure of moving parts before operating.
- Identify hazards around conveyor systems, design guards, and or emergency stop systems before putting into operation.

- Always provide and maintain guarding sufficient to prevent contact with moving machine parts.
- Do not wear loose fitting clothing when working near moving machine parts.
- Do not place yourself in a position that will expose you to hazards while performing a task.
- Provide and maintain a safe means of access to all working places.

Machinery Accidents

These deaths can be prevented by following these Best Practices:

- Establish and discuss safe work procedures before beginning work. Identify and control all hazards associated with the work to be performed and use methods to properly protect persons.
- Ensure that persons are trained, including task-training, to understand the hazards associated with the work being performed and to understand safe job procedures for elimination of the hazards before beginning work.
- Ensure that haul truck operators remain in their trucks when being loaded.
- Communicate with mobile equipment operators and ensure they acknowledge your presence. Stay in the line of sight with mobile equipment operators.
- Ensure that you make eye contact with mobile equipment operators before approaching their work areas. Never assume the equipment operator sees you.
- Never place yourself in a location where equipment operators can't see you.
- Before operating equipment, always ensure other miners are clear and safely positioned.
- Monitor persons routinely to determine safe work procedures are followed.
- Do not place yourself in a position that will expose you to hazards while performing a task.
- Maintain control of mobile equipment while it is in motion.
- Set the parking brake and lower the bull dozer blade to the ground before dismounting equipment.
- Never jump from mobile equipment.
- Always wear a seat belt when operating mobile equipment.
- Monitor persons routinely to determine safe work procedures are followed.
- Conduct work place examinations before beginning any work.
- Stop the drill rotation when performing tasks near the rotating steel.
- Provide safe routing of hoses and cables so they are not close to the rotation of the drill.
- Do not assign a person to work alone in areas where hazardous conditions exist that would endanger his or her safety.
- Do not wear loose fitting clothing when working around drilling machinery.
- Keep work areas clean and free of tripping hazards.

Falling/Sliding Material Accidents

These deaths can be prevented by following these Best Practices:

- Establish and discuss safe work procedures before beginning work. Identify and control all hazards associated with the work to be performed and the methods to properly protect persons.
- Task train all persons to recognize all potential hazardous conditions and to understand safe job procedures for elimination of the hazards before beginning work.
- Prior to beginning work and as ground conditions warrant during the shift, examine all pit, highwall, slope, and bank conditions. Be especially vigilant for these conditions after each rain, freeze, or thaw.
- Use mining methods that ensure pit, highwall, slope, and bank stability and safe working conditions.
- Correct hazardous conditions by working from a safe location.
- Stay clear of potentially unstable areas.
- Wear suitable hard hats where falling objects may create a hazard.
- Stay clear of a suspended load.
- Attach taglines to loads that may require steadying or guidance while suspended.
- Implement measures to ensure persons are properly positioned and protected from hazards while performing a task.
- Monitor persons routinely to determine safe work procedures are followed.

Fall of Person Accidents

These deaths can be prevented by following these Best Practices:

- Immediately report any elevator problems to management.
- Ensure that any problems affecting the safety of an elevator are repaired promptly.
- Ensure that elevator door interlocks, that prevent the door from being opened unless the elevator car is present, are functional.
- Ensure that elevator doors will not open unless an elevator car is at the floor landing.
- Install audible signals that sound when the elevator car is at the landing prior to the doors opening.
- Train all persons to be aware of their surroundings when entering or exiting an elevator car.
- Ensure that persons are trained, including task-training, to understand the hazards associated with the work being performed.
- Establish and discuss safe work procedures before beginning work. Identify and control all hazards associated with the work to be performed and use methods to properly protect persons.
- Conduct work place examinations before beginning any work.
- Do not place yourself in a position that will expose you to hazards while performing a task.
- Ensure effective gates, safety chains, or railings are used and properly maintained where openings may exist that could pose a hazard.

Fall of Rib Accidents

These deaths can be prevented by following these Best Practices:

- Establish safe work procedures and train all persons to recognize and understand these procedures.
- Discuss safe work procedures before beginning work. Identify and control all hazards associated with the work to be performed and the methods to properly protect persons.
- Always examine, sound, and test for loose ground in areas before starting to work, after blasting, and as ground conditions warrant. Always wear fall protection where there is a danger of falling.
- Scale loose material from a safe position and location.
- Test for loose material frequently during work activities.
- Install ground support in roof and ribs where conditions warrant.
- Use equipment with a reach that reduces the possibility of the equipment being struck by falling material.
- Position equipment to keep outriggers and boom from being struck by falling material.

Hoisting Accidents

These deaths can be prevented by following these Best Practices:

- Develop and implement a standard operating procedure (SOP) for the safe operation of hoists. Post these procedures near the hoist control panels in a conspicuous location and ensure persons are trained in these procedures.
- Establish and discuss safe work procedures before beginning work. Identify and control all hazards associated with the work to be performed and use methods to properly protect persons.
- Identify safe anchor points for fall protection and train all persons to understand the hazards related to fall protection and hoisting operations.
- Communicate work activities prior to beginning a task and maintain communications throughout the shift.
- Install audible and visual alarms which have adequate delay time to ensure persons are clear of impending hoist movement.
- Ensure all miners are accounted for before movement of the hoist.
- Conduct thorough examinations of all hoisting equipment and safety mechanisms on a daily basis. Ensure that persons conducting these examinations are trained adequately. Correct any deficiencies identified immediately.

Explosion of Gas Accidents

These deaths can be prevented by following these Best Practices:

- Establish and discuss safe work procedures before beginning work. Identify and control all hazards associated with the work to be performed and use methods to properly protect persons.
- Train all persons to understand the hazards associated with the work being performed.

- Do not apply heat or open flame where enclosed spaces such as impeller hubs, mounted tires, suspension struts, or tanks may be subject to explosion except as directed by the manufacturer.
- Always examine materials before applying heat, cutting, or welding to ensure gases from the applied heat can vent.
- Never apply heat to materials before ensuring that flammables/combustibles/explosive materials are not present.
- Never apply heat to materials where pressure build up is possible.
- Do not apply heat or open flame where lubricants, oil, or grease are present.
- Use special tools, provided by the manufacturer, to loosen an impeller on a pump.
- Refer to the maintenance manual, warning labels on the pump, or contact the manufacturer for special safety precautions.

Violations of the priority standards identified as **Rules to Live By** continue to be cited during investigations of mine fatalities. While not all of the fatality investigations have been completed and enforcement action taken, Rules to Live By standards continue to be identified in many of those fatalities. During inspections, MSHA's inspectors continue to discuss, with miners and supervisors, the root causes of these fatalities and the ways to prevent recurrences.

Three **contractors** were killed at metal and nonmetal mines in the first half of 2014. Contractors and mine operators should ensure that contractors are properly trained and following the mine's safety policies and procedures. Contractors and mine operators should coordinate operations at the mine to ensure that safety and health management programs are in place and are effective, all workplace examinations are performed, and safe work procedures are followed.

The importance and value of effective **safety and health management programs** helps send miners home safely at the end of their shifts. A thorough, systematic review of all tasks and equipment to identify hazards is the foundation of a well-designed safety and health management program. Many root causes of fatal accidents show that management policies, procedures, and controls were inadequate and failed to ensure that persons were protected from hazards that could have been identified and then eliminated or controlled. Mine operators and contractors need to implement effective safety and health management programs and periodically review, evaluate, and update them. If an accident or near miss occurs, find out why and act to prevent a recurrence. If changes to equipment, materials, or work processes introduce new risks into the work environment, address them immediately.

Conducting **workplace examinations** every shift can prevent injuries and deaths when safety and health hazards are **found and fixed**. Miners are protected when workplace examinations are conducted and hazards are identified and eliminated.

Through June 2014, 4 of the 14 (29%) miners killed had 1 year or less of mining experience. Providing effective and appropriate **training, including task training**, to

miners is a key element in ensuring their safety and health while at work. Mine operators and Part 46 and Part 48 trainers need to train miners and supervisors to take appropriate measures to find and eliminate the conditions that lead to injuries and deaths. Effective and appropriate training ensures that miners recognize hazards and understand how to control or eliminate them.

Take action to prevent additional injuries and deaths. Printable posters regarding the causes of some of these accidents can be found on the Alerts/Hazards section of MSHA's website, www.msha.gov. Fatalgrams describing each fatality and Best Practices to prevent a recurrence can also be found on the agency's website.

Miners deserve a safe and healthy workplace and the right to go home safe and healthy at the end of every shift, every day. Working together makes that happen.