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SUBJECT: Technologically Feasible Engineering and Administrative Noise Controls (30 CFR Part 62)

Scope

This Program Information Bulletin (PIB) affects surface and underground coal and metal/nonmetal mines.

Purpose

The Mine Safety and Health Administration (MSHA) has been asked to provide guidance to operators, miners, miners' representatives, contractors, and equipment manufacturers on technologically feasible engineering and administrative noise controls.

Information

This document provides guidance on the technological feasibility of engineering noise and administrative controls for surface and underground coal, metal and nonmetal mines. This document includes a listing of technologically feasible controls for several types of mining machinery used in mines. Many of the controls listed in the attachment are in use throughout the mining industry and have been referenced by MSHA in prior noise control documents. Also included in this PIB are more recently developed noise controls that MSHA has evaluated under actual mining conditions and found to be

effective and technologically feasible. For those noise controls offering potential for noise reduction (promising), MSHA will further evaluate their demonstrated effectiveness during in-mine production usage and updated information will be made available.

This PIB does not address economic feasibility.

Due to the large variety of mining equipment, mining methods and environmental conditions in mines, there may well be circumstances in which a described control is not technologically feasible for a specific application. Recognizing this, MSHA will evaluate such circumstances on a case-by-case basis to determine the technological feasibility of a listed control.

This PIB provides guidance on taking a practical approach to reducing miners' exposure to noise. Section 2 of this PIB is a checklist of simple, straightforward ways to control noise exposure.

Examples of administrative controls are provided in Section 3 of this PIB. Their applicability and feasibility should be considered and discussed on a case-by-case basis to determine which if any are applicable in a given situation. MSHA's policy states that labor/management agreements will not be affected by the noise standard. MSHA will not require an operator to hire additional workers in order to "exhaust" all feasible administrative controls.

Noise standards in 30 CFR Part 62 equate administrative and engineering controls and require that, when an employee's noise exposure exceeds the permissible exposure level (PEL), technologically feasible engineering and administrative controls be utilized to reduce employee exposure at or below the PEL. If such controls fail to reduce exposure at or below the PEL, personal protection equipment shall be provided and used. These standards do not permit the use of personal protection in lieu of feasible engineering or administrative controls. A control or a combination of controls which achieves at least a 3 dBA exposure reduction are considered significant and technologically feasible even if they fail to reduce the exposure to the PEL. "If a miner's noise exposure continues to exceed the PEL despite the use of all feasible engineering and administrative controls, the mine operator must continue to use the engineering and administrative controls to reduce the miner's noise exposure to as low a level as feasible." (30 CFR Part 62.130(b)).

While MSHA believes the listed controls are currently the most effective in reducing miner noise exposure, mine operators are not restricted in their selection of controls to those technologically feasible controls described in the attachment. They may use other

administrative or engineering controls to comply with MSHA's noise standard. We encourage the mining industry to share controls that have been implemented and found to be successful in minimizing a miner's exposure to noise. Please contact Technical Support with noise control advances in the mining industry. This PIB will be updated as new feasible technologies and controls become available.

Section One
Descriptions of Technologically Feasible and Promising Noise Controls
Introduction

MSHA considers the engineering and administrative controls contained in this Program Information Bulletin (PIB) to be technologically feasible controls or to offer potential as noise controls (promising) which, when used either singly or in combination, have a demonstrated effectiveness of reducing a miner's noise exposure by at least 3 dBA. For those controls denoted as "promising," both MSHA and NIOSH are further evaluating their demonstrated effectiveness during in-mine production usage and updated information will be made available.

While the noise controls compiled in this PIB are on a machine/equipment basis, noise is an occupational exposure standard and not an equipment-based standard. Compliance with the noise standard is determined by the miner's personal exposure and not the sound levels generated by the piece of equipment. Therefore, the miner's total noise exposure should be examined from an occupational viewpoint and not solely on a machine or equipment basis. All sources/tasks that generate noise must be identified and considered when determining appropriate noise controls and their effects. Engineering noise controls should be applied to those occupational noise sources and tasks that will yield a significant reduction in the miner's total noise exposure.

The implementation of retrofit noise controls involves the use of individual devices, systems and/or materials designed for the specific purpose of reducing noise. Acoustical devices include, but are not limited to cabs, enclosures, barriers, mufflers, and silencers which decrease sound levels to which the miner is exposed, or other electro-mechanical or video systems which reduce the amount of time miners are exposed to hazardous noise.

Acoustical materials can reduce noise either by absorbing or blocking sound waves, or both. These materials are generally referred to as absorption, barrier, and composite materials, and they can effectively increase the effectiveness of other noise control devices. "Appropriate acoustical materials" must be selected based on a sound noise

control engineering basis that is commensurate to the task, properly installed, used and maintained. Also, mine operators should be aware of the flammability properties of the acoustical materials they plan on using and determine that they conform to MSHA's flammability guidelines.

In general, a noise control device is specified by the Original Equipment Manufacturer (OEM) that is available for a specific piece of equipment will yield better results than those provided by a third party or fabricated. However, much success in the mining industry in reducing noise levels has been realized through the design, production, installation, and use of noise controls developed by third party after-market sources or individual mine operators. In the case of non-OEM noise controls, a detailed investigation and evaluation should be conducted on the machine or the environment to identify noise sources and the development of detailed instructions and specifications for the selection of "appropriate acoustical materials" and for the construction, fabrication, and installation of equipment-based noise controls.

Noise controls are effective when they are properly selected, installed, used, and maintained. Care should be taken in their selection such that they are appropriate to the equipment design, and do not have a harmful effect on the operation or performance of the machinery on which they are installed. The application and use of noise controls should not cause a hazard to any miners.

For the purposes of this PIB, an "environmental cab" or "environmental booth" includes the structure plus the application and installation of "appropriate acoustical materials" to the inside areas of the cab or booth (e.g., absorption materials, composite materials or acoustical floor mat), and an appropriate air filtration/air conditioning system. A "skin kit" is a sectionalized cab (e.g., a 4-section metal cab without acoustical materials) that is attached to the roll-over protection systems (ROPS)/falling object protection system (FOPS) on a piece of mobile surface equipment.

This PIB contains descriptions of technologically feasible noise controls or controls offering promise for the following equipment:

Air Arcing
Air-actuated or Air-operated Cylinders
Augers - Surface
Auxiliary Ventilation Fans
Car Shakers and Rotary Dumps
Channel Burners
Continuous-Mining Machines / Augers / Loaders (Underground)

Cranes / Draglines / Shovels Equipped with Operator Cabs
Cranes / Draglines / Shovels Not Equipped with Operator Cabs
Crusher and Associated Equipment
Diesel - Locomotives
Diesel - Underground Diesel-Powered Equipment
Dredges
Drills – Jumbo Drills
Drills – Truck Mounted/Blast Hole/Air Track
Hand-Held Percussive Tools
Longwalls
Man Trips
Mills / Processing Plant / Preparation Plants including Breakers at Anthracite Mines
Mobile Equipment - Surface
Roof Bolting Machines
Scalers
Stone Saws

Air Arcing

MSHA considers the following administrative noise controls, or a combination of these controls, to be feasible and effective in reducing the noise exposure of miners air/arc welding. Air arcing is a major tool used in bucket maintenance on draglines and other similar equipment. A welder's noise exposure depends on the amount of time spent using the air arcing equipment during the work shift.

- Limit the duration of air arc welding per shift;
- Rotate welding personnel; and
- Other administrative controls, such as not performing side-by-side air arc welding.

Other noise controls that have been identified to show promise for reducing the amount of time when there would be a need for the use of air arcing on a dragline or similar machine include:

- Improve blasting techniques to result in smaller material with a reduction in required bucket maintenance
- Minimize backdragging on the bucket to decrease bucket tooth wear

Other alternative methods that offer promise in reducing the welder's noise exposure

due to the use of air arc cutting include the use of alternate rods (certanium and cronatron gouging rods) or a plasma torch with a gouging tip. These methods may be appropriate only in specific applications.

Air-Actuated or Air-Operated Cylinders

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of miners working around air-actuated or air-operated cylinders:

- Use of mufflers on exhaust outlets/ports;
- Use of a hose extension on exhaust ports; and
- Use of barriers or enclosures.

Augers - Surface

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of miners operating or working around surface augers.

- Environmental cabs that include "appropriate acoustical materials" (see Section One Introduction) applied to internal surfaces;
- Exhaust mufflers and redirection of exhaust;
- Proper selection and application of acoustical material to the operator's compartment; and
- Application of "appropriate acoustical materials" (see Section One Introduction) to line the engine compartment.

MSHA considers the following engineering noise controls to offer promise:

- Use of a barrier between the engine and the operator.

Auxiliary Ventilation Fans

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of miners working around auxiliary ventilation fans.

- Use of silencers matched to the fan;
- Use of barriers or enclosures for work areas to minimize occupational exposures;

and

- Institution of good maintenance such as sealing air leaks and wrapping of ventilation tubing joints.

MSHA has identified other items that offer promise in reducing the exposure of miners that may be in the vicinity of auxiliary ventilation fans including:

- Use of flexible connections between the fan and ventilation tubing;
- Use planning to locate fans away from areas where miners spend a significant amount of time;
- Use damping materials on tubing and fan blades; and
- Use of several tube sections lined with appropriate acoustical materials at the inlet side of the fan on an exhausting face ventilation system.

Car Shakers and Rotary Dumps

Car shakers and rotary dumps are used to empty railroad cars containing coal or other materials. On a car shaker, electromagnets attach to the top of the car and vibrate the car so that the material falls out the bottom. A rotary dump grabs the car and rotates it, emptying it from the top.

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of miners working around car shakers or rotary dumps:

The following technologically feasible controls are available for car shakers:

- Operator environmental control booth that includes "appropriate acoustical materials" (see Section One Introduction) applied to internal surfaces.

The following controls are available for a rotary dump:

- Operator environmental control booth that includes "appropriate acoustical materials" (see Section One Introduction) applied to internal surfaces; and
- Use of radio remote controls to move the operator away from the dump.

The following controls offer promise in reducing the noise exposure of car shaker operators:

- Use of a top pad attenuator;

- Use of foot pads; and
- Use of air-actuated cushions.

Channel Burners

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of miners operating channel burners:

- Automation of the channel burner to replace manual channel burners for the majority of cuts. A handheld channel burner may be needed to initiate the cut or other specialty cuts;
- Use of an automated channel burner with a control booth and video monitoring system to observe the cut;
- Use of remote controls; and
- Use of appropriate pressures for the fuel/air mixture as per manufacturer's specifications. Use of oxygen as a fuel as opposed to air operation.

While MSHA considers the following alternatives to be technologically feasible in reducing the noise exposure of a miner operating a channel burner, the feasibility of their use must be evaluated on a case-by-case basis.

- Use of a slot drill in combination with a 3-sided or portable enclosure for the operator;
- Use of a diamond wire saw; and
- Use of a water jet cutter as an alternative method.

MSHA considers the following control to show promise in reducing a miner's noise exposure:

- Use of quiet tips on the burner.

Continuous-Mining Machines / Augers / Loaders (Underground)

MSHA considers the following engineering and administrative noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of miners operating on or around this equipment.

- Use of a remote control with proper positioning of the operator;
- Use of treated auger cutting heads on auger miners (e.g., the application of

stiffening gussets to the helix and filling of voids with sand);
- Proper maintenance such as replacing bent or misaligned conveyor flights or sides and use of a chain with proper tension or one having an automatic chain tension device;
- Use of constrained layer damping on the conveyor pan (e.g., the application of visco-elastic materials covered with wear steel to isolate the chain and flights from the conveyor pan line); and
- Limiting the amount of time the conveyors run empty.

MSHA considers the following engineering, administrative controls and work practices to have promise in reducing the noise exposure of miners working on continuous miner sections:

- Use of a clear barrier between the operator and pan line;
- Use of sand-filled conveyor decks;
- Insulate/enclose motors and pump housings where it has been demonstrated that they are a significant noise source;
- Use vibration isolation mounts on motors/pumps where it has been demonstrated that they are a significant noise source;
- Use of a chain conveyor with coated flights;
- Use of isolated cutting bits (e.g., the application of vibration isolation materials between the bits/block and the drum); and
- Use of sand-filled cutting heads.

The following noise controls offer promise for dust scrubbers associated with continuous-mining machines:

- Use a silenced fan housing
- Use of sleeve-style attenuators;
- Use of fan spray systems;
- Use of bolt-on attenuators;
- Use of "appropriate acoustical materials" (see Section One Introduction) applied to the dust scrubber; and
- Maintaining proper fan blade clearance.

Diesel - Locomotives

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of miners working around this equipment:

- Environmental cabs that include appropriate acoustical materials applied to internal surfaces;
- Proper application of "appropriate acoustical materials" (see Section One Introduction) to the inside of the operator's compartment;
- Mufflers; and
- Use of video cameras with monitors to view the rail and loading process.

MSHA considers the following engineering noise controls to offer promise:

- Use of smooth rail joints;
- Good machine and track maintenance;
- Use of composite wheels to prevent wheel-track squeal;
- Enclose the transmission;
- Application of sound damping materials to the floorboards at the transmission.

Diesel - Underground Diesel-Powered Equipment

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of miners operating underground diesel-powered equipment (e.g., LHDs, shuttle cars, haul trucks, tractors, generators, graders, scoops):

- Environmental cabs that include "appropriate acoustical materials" (see Section One Introduction) applied to internal surfaces;
- Exhaust mufflers; and
- Use of "appropriate acoustical materials" (see Section One Introduction) to reduce noise from the engine and transmission compartments.

MSHA considers the following controls to show promise in reducing miner noise exposures:

- Redirection of the exhaust away from the operator; and
- Remote controls

Draglines, Shovels, and Cranes Not Equipped with Operator Cabs

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the operator's noise exposure:

- Install a barrier behind the operator to block the noise path of the diesel engine from reaching the operator compartment. The barrier may be flexible, constructed of acoustical vinyl curtain, or rigid;
- Seal all openings (e.g., holes, cracks, openings around controls) to prevent outside noise from entering the operator compartment;
- Use of "appropriate acoustical materials" (see Section One Introduction) installed on the surfaces of the operator compartment, to the roof, sliding door, partition (if rigid) and any other available surface; and
- Exhaust muffler on the diesel engine.

The following engineering noise controls are considered technologically feasible and effective in reducing the mechanic/greaser/oiler's noise exposure:

- Muffler on diesel engine; and
- Silencers on air discharge valves.

The following administrative noise controls are considered technologically feasible and effective in reducing the mechanic/greaser/oiler's noise exposure:

- Limit time spent in engine compartment when the machine is running; and
- Perform cleanup duties when the dragline is not operating.

Draglines, Shovels, and Cranes Equipped with Operator Environmental Cabs

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the operator's noise exposure:

- Use of the existing OEM environmental cab including "appropriate acoustical materials" (see Section One Introduction) applied to the interior surfaces.

Normally, the existing OEM environmental cab will be sufficient for assuring the operator's compliance.

The following engineering controls offer promise for reducing the oiler and mechanic's noise exposure and should be considered on a case-by-case basis:

- Addition of a barrier in front of MG sets, or where feasible, enclosing the MG sets. (May require additional ventilation or air conditioning.); and
- Silencers on cooling fan motors.

The following administrative controls also offer promise for reducing the oiler's noise exposure:

- Reduce the time spent in engine house by utilizing the following:

    - Automatic lubrication system;
    - Silencers on compressed air discharge lines;
    - Remotely monitored temperature sensors;
    - Remotely monitored oil level gauges;
    - Remotely monitored video coverage of strategic areas;
    - Perform cleanup during downtimes for repairs/maintenance; and
    - Rotate the oiler and machine operator.

The oiler and mechanic, due to their work demands, must spend time in the noisy environment of the engine house. The isolation of the MG sets by either constructing a partial barrier in front of the sets or by totally enclosing them would reduce the sound levels. The implementation of this control would most likely require additional ventilation or air-conditioning for the MG sets.

Dredges and Associated Equipment

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of the dredge operator:

- Environmental cab/booth that includes "appropriate acoustical materials" (see Section One Introduction) applied to internal surfaces;
- Use of pump enclosures;
- Use of engine barriers;
- Engine mufflers;
- Use of resilient screen decking;
- Use of barriers around pneumatic equipment;
- Redirection of the exhaust; and
- Use of enclosures / barriers at transfer points.

MSHA considers the following engineering noise controls to offer promise:

- Use of video technology to remove miners from noise sources.

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Drills - Jumbo Drills

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of miners operating jumbo drills:

- Environmental cabs that include "appropriate acoustical materials" (see Section One Introduction) applied to internal surfaces;
- Use of a barrier such as a windshield or use of a windshield with flexible curtain material around the perimeter of the canopy;
- Use of a barrier between the engine/compressor and the operator;
- Use of the "appropriate acoustical materials" (see Section One Introduction) at the operator's position; and
- Exhaust mufflers.

While MSHA considers the following alternatives to be feasible in reducing the noise exposure of a miner operating a jumbo drill, the technologic feasibility of its use must be evaluated on a case-by-case basis.

- Hydraulic drills.

MSHA considers the following controls to show promise in reducing miner noise exposures:

- Remote controls;
- Use of ceramic or other non-metallic centralizers on the drill assembly;
- Programmable jumbo drills (computer automated); and
- Wet drilling where it can be implemented due to the jumbo drill's design and when compatible with the geology and the mining method.

Drills – Truck Mounted / Blast Hole / Air Track

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of miners operating drills:

- Environmental cabs that include "appropriate acoustical materials" (see Section One Introduction) applied to internal surfaces;
- Exhaust mufflers and redirection of the exhaust away from the operator;

- Use of "appropriate acoustical materials" (see Section One Introduction) to treat the operator's compartment;
- Use of portable enclosures / barriers for the operator;
- Use of a barrier between the engine /compressor and the operator;
- Use of silencers on air release nozzles;
- Relocation of the air compressor away from the air track drill; and
- Remote controls.

MSHA considers the following controls to show promise in reducing miner noise exposures:

- Wet drilling where it can be implemented due to the drill's design and is compatible with the geology and the mining method.

Hand-Held Percussive Tools

MSHA considers the following engineering noise control, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of miners operating percussive tools:

- Exhaust muffler;
- Body muffler; and
- Piping exhaust away from the operator.

Longwall

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of miners working around the longwall mining system.

- Use of automated shearer where practical;
- Use of automated jacks where practical;
- Stage loader automation where practical;
- Use of memory cut where practical;
- Use of remote operation where practical and does not cause a hazard to the operator.

MSHA also considers the following noise controls to offer promise in reducing the noise exposure of the shearer operators and other miners working around the longwall mining system.

- Use of barriers where appropriate;
- Application of "appropriate acoustical materials" (see Section One Introduction);
- Proper maintenance such as use of proper chain tensioning and flight spacing;
- Position the miner to minimize exposure to noise;
- Use of video cameras to monitor the cutting and other functions to limit miner exposure;
- Enclose motors, gears, pumps where demonstrated to be a significant noise source and can be done without damage to the equipment;
- Damping of enclosures and panels where demonstrated to be a significant noise source;
- Use of water-cooled motors instead of air-cooled motors where feasible and when the motors are a significant source of noise exposure;
- Use of an enclosure for the other miners (e.g., headgate operators) when feasible;
- Use of isolated cutting bits on the longwall drum (e.g., the application of vibration isolation materials between the bits/block and the drum); and
- Use of sand-filled cutting heads.

Man Trips

Mantrips and other similar modes of transportation should be considered as a significant potential noise source that should be examined when attempting to reduce a miner's noise exposure.

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of miners working around and riding in man trips:

- Muffler(s);
- Motor enclosure for those machines where the motor is a major noise source; and
- A passenger compartment treated with "appropriate acoustical materials" (see Section One Introduction), or fully enclosed.

MSHA considers the following controls to show promise in reducing miner noise exposures:

- Use of smooth rail joints;
- Good machine and track maintenance; and
- Use of composite wheels to reduce wheel-rail squeal.

Mills/Processing Plants/Coal Preparation Plants (including Breakers at Anthracite Mines)

Miners working in mills, processing plants, coal preparation plants and breakers at anthracite mines, typically encounter high sound levels and are mobile occupations. Consequently, it is usually necessary to identify where and which tasks contribute the most to the miner's total noise exposure. The successful reduction of a miner's noise exposure depends on the application of engineering and administrative controls to identify locations and tasks which contribute the most to the miner's overall noise exposure. Therefore, the application of these controls must be evaluated on a case-by-case basis.

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of miners working in coal preparation plants and metal/nonmetal processing plants and mills:

- Acoustically treated control booths;
- Full or partial enclosures without a top around equipment or miner work locations;
- Acoustic baffles suspended above enclosures;
- Resiliently backed mill liners;
- Chute liners;
- Covered chute enclosures;
- Dead boxes and impact pads;
- Resilient screen decking;
- Electro-mechanical sensing devices to limit exposure times;
- Video technology to limit exposure time; and
- Bin-level indicators.

Other noise controls that have been identified to show promise for reducing the noise emitted from screens and other sizing devices include:

- Replacement of spring mounts with vibration isolation mounts made of rubber, ROSTA mounts, and air bags; and
- Use of "double isolation" mounting methods.

However, due to the engineering parameters involved in this type of equipment and the forces generated being transferred to the structure, their use should be considered on a case-by-case basis in conjunction with the equipment manufacturer.

Also showing promise is the replacement of large size screens with banana screens, screens having both a horizontal and vertical component. Due to height requirements, banana screens may be applicable only in certain situations.

Mobile Equipment -- Surface

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of miners operating surface mobile equipment (e.g., bulldozers, front-end loaders, trucks, graders, scrapers):

- Environmental cabs (primarily on equipment manufactured since the mid-1970s) that include "appropriate acoustical materials" (see Section One Introduction);
- Exhaust mufflers;
- Redirection of the exhaust away from the operator;
- Installation of a full or partial skin kit to the ROPS/FOPS; and
- "appropriate acoustical materials" (see Section One Introduction) to treat the operator's compartment.

MSHA considers the following controls to show promise in reducing miner noise exposures:

- Remote controls

Portable Crushers/Screening Plants and Associated Equipment

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of crusher operators:

- Acoustically treated environmental control booths isolated from the main structure through the use of vibration-isolation techniques or through physical isolation (permanent or portable);
- Remotely controlled picks;
- Video monitoring of plant operations;
- Sound damping material at transfer points;
- Chute liners;
- Resilient screen decking;
- Barriers, especially on traveled walkways;
- Mufflers; and
- OEM controls on diesel engine/generator sets.

Roof Bolting Machine

MSHA considers the following engineering controls and work practices, or a combination of these controls and work practices, to be technologically feasible and effective in reducing a miner's noise exposure when working on or around a roof bolting machine.

- Sharp drill bits;
- Starter drill steel to begin the hole;
- Use of straight drill steel (one piece and with thick wall, if conditions and dust collection allow);
- Replacement of worn or defective drilling components (e.g., drill pot bushings or bearings, worn steel, bent steel);
- Maintenance of manufacturer-recommended drilling parameters for thrust, torque, and rotational speed; and
- Wet drilling (where it can be implemented due to the roof bolter design and when compatible with the geology and mining method).

MSHA considers the following engineering controls or work practices to offer promise in reducing a miner's noise exposure but should be evaluated on a case-by-case basis.

- Automated dust collection system or actuation of the dust collection system motors only during drilling, or use of administrative control to accomplish the same task;
- Exhaust conditioner (water box) and/or manufacturer-recommended exhaust muffler;
- Controls for optimizing the drilling parameters (drill feedback system);

- Water misting system;
- Grommet to isolate the drill steel and chuck;
- Acoustical liner in the tool tray; and
- Damped drill steels.

Scalers

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of miners working around scalers:

- Environmental cabs that include "appropriate acoustical materials" (see Section One Introduction) applied to internal surfaces;
- Use of "appropriate acoustical materials" (see Section One Introduction) to on the inside surfaces of existing cabs;
- Seal any openings (e.g., around the gear controls, doors); and
- Muffler.

MSHA considers the following engineering control to offer promise in reducing a miner's noise exposure but should be evaluated on a case-by-case basis.

- Barrier between the engine and the operator.

Stone Saws

MSHA considers the following engineering noise controls, or a combination of these controls, to be technologically feasible and effective in reducing the noise exposure of the stone saw operator:

- Operator booth with "appropriate acoustical materials" (see Section One Introduction) applied to internal surfaces; and
- Barrier between the saw and the operator.

Methods that offer promise in reducing the noise exposure of miners using stone saws include:

- Quiet or composite blades; and
- Wet sawing systems.

There are two types of cutting blades. One is a silent core blade that is laminated. The other is a composite blade with filled expansion slots. These are available for all existing saws. Blade maintenance and the type of saw blade also are important factors.

Section Two
Practical Approach to Reducing Miner's Noise Exposure

MSHA believes that there is a practical approach that can be taken to reduce a miner's exposure to noise. The following questions should be addressed as part of the noise control process. Beside the reduction of noise exposure as the desired outcome, often, proper maintenance, work practices, and procedures identified below may result in increased efficiency and less down-time for equipment.

Maintenance

Y	N	N/A	
O	O	O	1. Are all existing noise controls maintained?
O	O	O	2. Are mechanical components / systems adequately maintained?
O	O	O	3. Are bolts tight, covers and compartments secure to prevent noise exposures?
O	O	O	4. Do smooth transitions exist between rail tracks?
O	O	O	5. Are openings around doors and between compartments sealed? Are air conditioners installed?
O	O	O	6. Is the air conditioning in booths and enclosures maintained?
O	O	O	7. Are filters replaced on a scheduled basis for all air conditioners?

Work Practices

Y	N	N/A	
O	O	O	8. Are sharp cutting tools used?
O	O	O	9. Do dust collection systems operate only when needed?
O	O	O	10. Are proper thrust, rotational speed, torque and chain tensioning being used?
O	O	O	11. Are good work practices being employed?
O	O	O	12. Are there work practices that result in unnecessary exposure?
O	O	O	

			13. Are conveyors operated either wet or with materials?
O	O	O	14. Are doors and windows to cabs and booths kept closed?
O	O	O	15. Are radios turned off or the volume reduced as low as possible?
O	O	O	16. Is the exposed miner maintaining the greatest distance from the noise source while still being able to do his/her job?
O	O	O	17. What kind of cleanup or maintenance, e.g., hand shovels vs. small loaders?
O	O	O	18. Do miners spend their breaks near high noise areas?
O	O	O	19. Do miners park equipment in high noise areas for waiting, loading or dispatching?
O	O	O	20. Do miners stand next to high noise areas?
O	O	O	21. Are manufacturer's air pressure recommendations followed for air-operated equipment?
O	O	O	22. Are manufacturer's recommendations / maintenance schedules, etc. followed?
O	O	O	23. Are air hoses used for cleanup rather than manual tools, vacuuming or wash down with water?
O	O	O	24. Is equipment located in such a manner to minimize miner exposures?

Engineering / Administrative Controls

Y	N	N/A	
O	O	O	25. Are all feasible engineering and administrative controls installed and used in accordance with the feasibility PIB?
O	O	O	26. Are environmental cabs used on surface mobile equipment?
O	O	O	27. Can a TV camera/monitor be used to observe critical operations thus limiting a miner's exposure?
O	O	O	28. Can a remote control system be used to remove an operator from a noisy environment?
O	O	O	29. Are exhausts directed away from miners?
O	O	O	30. Can miners be rotated to reduce exposure?
O	O	O	

31. Has the proper type of acoustical materials, including flammability properties, been selected to suit the job?

O	O	O	32. When new or used equipment is purchased, are noise controls included? Is sound level exposure data provided?
O	O	O	33. Do impact points employ vibration damping materials?
O	O	O	34. Do barriers separate miners and noise sources?
O	O	O	35. Can noisy machines be replaced by quieter ones?
O	O	O	36. If multiple noise sources are present, can barriers be installed to prevent the combined effects of sources?
O	O	O	37. Is cleanup performed when the plant is running?
O	O	O	38. Are high noise areas identified with warning signs?
O	O	O	39. Are workers instructed to avoid these high noise areas?
O	O	O	40. Do you have a "Buy Quiet" program at your mine for new and used equipment?
O	O	O	41. Has noise been considered in operational design?

Section Three
Some Examples of Administrative Controls

MSHA considers the following administrative controls to be applicable in many mining situations but should be assessed on a case-by-case basis and discussed with miners, miners' representatives and mine operators during the inspection process.

1. Adjust work schedules.
   - Share work tasks and/or rotate workers.
   - Schedule work tasks during quiet periods.
   - Limit duration of work shifts.
2. Utilize work practices to lower noise exposures.
   - Position miners in quieter locations without increasing safety risks.
   - Provide quiet areas while taking breaks.
   - Limit the duration of noisy tasks.
   - Restrict or limit miner access to high noise areas.
3. Use of real-time noise dosimetry / instrumentation to monitor and prevent overexposures.
4. Use remote sensing technology and video monitoring.

DRAFT

Background
Overexposure to occupational noise continues to be a pervasive health problem. As such, MSHA would like to offer its assistance to mine operators in the implementation of the noise standard.

Authority
30 CFR Part 62

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