

Engineering and Administrative Noise Controls for the Mining Industry

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The U.S. Mine Safety and Health Administration's (MSHA) health standard for occupational noise exposure (30 CFR Part 62), became effective on September 13, 2000. An important feature of this revised noise standard is the emphasis it places on implementing and using feasible engineering and administrative noise controls to maintain a miner's noise exposure at or below the permissible exposure level (PEL). In an attempt to help answer questions regarding the feasibility of engineering and administrative noise controls, MSHA developed and issued a Program Information Bulletin (PIB) 04-18, "Technologically Achievable, Administratively Achievable, and Promising Noise Controls (30 CFR Part 62)." This article discusses the terms 'feasible,' 'achievable,' and 'promising' in terms of engineering and administrative noise controls.

On September 13, 1999, MSHA published its final comprehensive rule for Health Standards for Occupational Noise Exposure,¹ which replaced MSHA's existing standards for occupational noise exposure in coal mines (three rules) and metal and nonmetal mines (two rules). It established performance-oriented, uniform requirements to protect the nation's miners from occupational noise-induced hearing loss. It was derived in part from existing MSHA noise standards and from the U.S. Department of Labor's (USDOL) occupational noise exposure general industry standard promulgated by OSHA (the Occupational Safety and Health Administration). The rule became effective September 13, 2000.

Under this rule, mine operators in the coal sector and metal and nonmetal sectors are required to use all feasible engineering and administrative controls to reduce a miner's noise exposure to the PEL. The rule does not place preference on the hierarchy of controls – the use of engineering controls over administrative controls. "MSHA intends for mine operators to have a choice of which type of control they use, as long as mine operators use all feasible controls necessary to bring a miner's exposure to within the PEL."² The standard does not permit the use of 'credit' for personal protection equipment in lieu of feasible engineering and administrative controls as previously allowed under the old coal noise regulations.

Following the effective date of the rule and its implementation, there were many questions from the mining community, equipment manufacturers and from within the agency with respect to the definition and identification of feasible engineering and/or administrative noise controls. A 'feasible' control is one that is both technologically (or administratively) and economically achievable.³ Therefore, a "feasible control" has two components – it must be both technologically achievable and economically achievable.

Program Information Bulletin (PIB)

An interprogram group, named the 1 MSHA Noise Committee, was assembled within MSHA to examine the agency's implementation of the noise rule to address questions regarding feasible engineering and administrative noise controls and enforcement of the noise standard within MSHA and the regulated community.

PIB 04-18 "Technologically Achievable, Administratively Achievable and Promising Noise Controls (30CFR Part 62) has been reissued as PIB 08-12, under the same title and may be found at the following website: www.msha.gov/regs/complian/PIB/2008/pib08-12.pdf. It was updated to include new noise controls for drills, continuous miners, stone saws and roof bolting machines.

Based on a paper presented at Noise-Con 2007, Institute of Noise Control Engineering, Reno, NV, October, 2007.

One of the committee's recommendations was to develop a guidance document that would explain the issues behind feasibility determinations and identify those engineering and administrative noise controls that were found to be technologically achievable. A draft PIB was posted on the MSHA website in December 2004, and stakeholders had the opportunity to comment on the draft PIB. Following discussions with the regulated community and the National Institute for Occupational Safety and Health (NIOSH), the final document was issued on August 2, 2004.⁴ Additionally, it was incorporated into the Coal Mine Health Inspections Procedures Handbook, Chapter 3, Noise, and the Metal and Nonmetal Health Inspections Procedures Handbook, Chapter N, Noise.

The purpose of PIB 04-18 is to provide guidance on technologically and administratively achievable engineering and administrative noise controls, and to identify those noise controls that offer promise for further investigation. The PIB has six goals:

1. Raise the level of awareness and knowledge about noise controls in the mining community.
2. Drive progress in the engineering control arena.
3. Encourage innovation in noise controls.
4. Engage manufacturers in the design and development of quieter mining equipment.
5. Retrofit existing mining equipment with noise controls.
6. Assist in focusing research efforts in problem areas.

The PIB is organized into three main sections:

1. Description of technologically achievable, administratively achievable, and promising noise controls.
2. Practical approach to reducing a miner's noise exposure.
3. Some examples of administrative controls.

Administrative and technologically achievable noise controls have demonstrated effectiveness used either singly, or as part of a suite of noise controls under actual mining conditions and are known to reduce sound levels and miner noise exposure in most cases.⁵ Basically, there are two types of noise controls. A "technologically achievable" control is limited to engineering controls that are mechanical in nature, such as a silencer, application of acoustic materials, or a change in the design of a piece of equipment. An engineering control is technologically achievable if, through reasonable application of existing products, devices or work methods, with human skills and abilities, it can be applied to the noise source. The control does not have to be "off-the-shelf," but it must have a realistic basis in present technical capabilities. An "administratively achievable" control reduces noise exposure by limiting the amount of time that a miner is exposed to noise through such actions as rotation of miners to areas with lower sound levels, rescheduling of tasks, and modifying work activities.

The PIB discusses two categories of noise controls; administratively and technologically achievable controls with a subcategory of 'conditional' controls; and 'promising' noise controls.

There are four aspects of administratively and technologically achievable noise controls:

1. They reduce sound levels or exposure time as demonstrated in widespread application on similar types of equipment operating as part of similar mining methods, or alternately demonstrated as part of a scientifically designed study in which the results can be generalized.
2. They reduce noise exposure (3 dBA equivalent in dose when used either singly or in combination) of miners performing the usual duties associated with the mining method and equipment and based on measured miner noise exposure (dose).
3. They reduce miners' exposure to the PEL.
4. An engineering noise control does not necessarily have to be

prefabricated or off the shelf but must have a realistic basis in present technology.

The sub-category of a control that is 'conditional' is more restrictive:

- Its effectiveness depends on the conditions that exist at the mine site.
- The installation and use of the control may create a collateral health or safety hazard that must be addressed.

MSHA recognized that by identifying those noise controls that it recognizes as either technologically and/or administratively achievable it would give the impression that it would be an enforcement checklist. Within the PIB, however, MSHA reiterated its position with respect to the listed controls:

- One size does not fit all.
- It would evaluate each set of circumstances on a case-by-case basis to determine achievability of a listed control.
- There may be circumstances where the described control is not technologically or administratively achievable.

Because of these concerns, prior to issuing a noise citation, an inspector must make a feasibility determination examining the listed controls and their application to the conditions existing at the specific mine. If the mine operator has failed to implement all feasible engineering and administrative controls to reduce the miner's noise exposure to the PEL, a citation would be issued. If the mine operator has implemented all feasible engineering and administrative controls, and the miner's exposure continues to exceed the PEL, then there is a 'P-code' process that would be employed, and no citation would be issued.

MSHA has acknowledged that there are instances where all feasible engineering and administrative controls are being used, and a miner's noise exposure cannot be reduced to the PEL. MSHA uses the letter 'P' as an action code in its database to designate that an overexposure condition remains even though all feasible engineering and administrative controls are in place. Thus, a P-code is an administrative device that allows MSHA to track these situations. The term P-code derives from the requirement to wear protective equipment; i.e. the mine operator must provide the appropriate hearing protection to the affected miner, and the miner must wear the hearing protection when an exposure remains above the PEL and a P-code has been issued for the affected occupation.

As previously noted, one of the purposes and goals of the PIB is to identify engineering and administrative noise controls that offer promise for further investigation or research. Technologically and administratively promising noise controls offer potential for noise reduction by having demonstrated effectiveness but may lack evaluation and/or documentation in terms of significant reduction of a miner's noise exposure either used singly or as part of a suite of noise controls. Promising noise controls:

- Have a potential for reducing sound levels or exposure time based on laboratory or limited field studies.
- Have a potential to reduce miner noise exposure based on time studies of miners performing usual duties associated with the mining methods and equipment.
- May require further development, refinement, study, or research.
- Are being developed or studied by manufacturers, industry, and government.
- May have real potential that mine operators and manufacturers may want to consider participating in cooperative research studies to further evaluate these controls.

Generally, a technologically and administratively promising noise control would not be required to be considered when a feasibility determination is being made. With respect to all the listed controls in the PIB, the identified controls are currently the most effective in reducing miner noise exposure. Mine operators are not restricted in their selection of controls to those described in the document. The suite of options available to the operator is consistent with the performance-oriented nature of the noise rule. Other controls can be used to comply with the noise standard. MSHA encourages the mining industry to share information regarding controls that have been implemented and found to be successful in reducing a miner's exposure to noise with industry personnel,

equipment manufacturers, NIOSH, and MSHA.

Implementation, Additional Activities and Evaluation

The Coal Mine Health Inspections Procedures Handbook, Chapter 3, Noise, and the Metal and Nonmetal Health Inspections Procedures Handbook, Chapter N, Noise, established consolidated procedures and guidelines for conducting noise sampling, evaluating the results and verifying that the mine operator is in compliance with the noise standard. The chapter also details the P-code policy for coal and metal and nonmetal mines and discusses technologically achievable engineering and administrative noise controls.⁶ It provides instructions to MSHA's enforcement personnel on how to determine feasibility of engineering and administrative noise controls in response to a miner's full-shift exposure to noise in excess of the PEL and incorporates the noise control PIB. It requires that a feasibility determination is to be made each time a noise citation is contemplated based on the situation and conditions found at the specific mine site.

Following the issuance of PIB 04-18, and the Health Inspection Procedures Handbooks, MSHA conducted other outreach activities including:

- Specialized, extensive training of MSHA inspectors and health specialists.
- Sponsor noise stakeholder meetings or noise control conferences (with the Coal Noise Partnership).
- Conduct applied engineering work evaluating promising noise control technologies.
- Develop the MSHA Noise Control Resource Guides for distribution and posting on its website.
- Develop and post a series of hearing-loss prevention toolbox talks on the MSHA website.

These activities were conducted to provide extensive technical information and explain enforcement policy and procedures to the regulated community. Additionally, it was done to encourage equipment manufacturers to partner with mine operators and governmental agencies to design, produce, and market equipment that will help protect a miner's hearing.

MSHA tried to be responsive to the concerns of the mining community in terms of the health standard for occupational noise exposure, 30 CFR Part 62. The PIB has had an immediate impact in that mine operators and equipment manufacturers know what is expected in terms of equipment design, with noise issues being an important aspect. All parties are on the same level field in terms of technologically achievable noise controls. Enforcement of the mining noise standard is more uniform. There are incentives to develop, test and determine effectiveness of new noise control technologies. Areas for technical research and evaluation have been identified in the PIB.

Conclusions

At this time, it is difficult to assess the impact of PIB 04-18 on the mining industry. As with many health issues, the development of occupational noise-induced hearing loss is a chronic issue, rather than acute. However, it has been well accepted that controlling noise exposures prevents the loss of hearing in our nation's miners. Sustained efforts, on the part of the entire mining community, are necessary to develop and apply noise control technology and techniques to prevent hearing loss and the further degradation of hearing in the mining population.

References

1. Federal Register, Vol. 64, No. 176, Monday, September 13, 1999, Rules and Regulations, pp. 49548-49637.
2. Ibid, p. 49595.
3. Ibid, p. 49576.
4. MSHA Program Information Bulletin No. P04-18, "Technologically Achievable, Administratively Achievable and Promising Noise Controls (30 CFR, Part 62)
5. Ibid, p. 2
6. Coal Mine Health Inspections Procedures handbook, Chapter 3, Noise, Metal and Nonmetal Health Inspections Procedures Handbook, Chapter N, Noise, PH89-V-1 (14)(March 2005), Mine Safety and Health Administration.



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