

Noise Control in Metal/Nonmetal Mining



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Noise is one of the most pervasive health hazards in mining and it affects nearly every miner.

Last September, the Mine Safety and Health Administration (MSHA) promulgated a new noise rule that becomes effective on September 13, 2000. This rule replaces the old noise rules (which are nearly 30 years old) for coal mines and metal/nonmetal mines. The new rule regulates all miners' noise exposures under a uniform rule.

Studies have shown that about 36,900 miners would be expected to incur hearing impairment under the old standards. Of these miners, approximately 23,600 work in metal/nonmetal mining.

MSHA's new noise rule is designed to minimize the number of hearing impairment cases through comprehensive program requirements that include engineering and administrative noise controls and hearing conservation programs, which require audiometric testing, exposure determination, training, use of hearing protectors and record keeping.

Massive, powerful and inherently

noisy machines and pieces of equipment are used in mining to extract minerals efficiently from the earth. Fortunately, noise emitted by much of this equipment can be controlled through the effective use of feasible engineering noise controls. In addition, mine operators can apply feasible administrative noise controls to reduce miners' noise exposures to the permissible level. Mine operators can use any combination of these two noise controls to reduce a miner's exposure to the permissible level.

The application of effective retrofit noise engineering controls may require some expertise. This article discusses some of the noise controls used to quiet common machines and equipment in metal/nonmetal mining. MSHA intends to publish a noise control handbook for the mining industry that will cover more mining machines and equipment than can be discussed in this article. Many mine operators should be able to address their noise problems with the information provided.

Bulldozers can be quieted using a muffler, operator's cab and suitable noise control materials. Mufflers are available for diesel engines. The muf-





fler must be appropriate for the engine's size and back pressure for optimal performance. The engine's manufacturer can recommend appropriate mufflers. To maximize the noise reduction provided by the muffler, the exhaust must be directed away from the cab and the exhaust stack lengthened to be above the top of the cab.

A well-built and maintained operator's cab can substantially reduce a miner's noise exposure. Besides the original equipment manufacturer, many after-market manufacturers sell cabs for bulldozers. The model of the cab must be appropriate for the model and size of bulldozer in order to be effective. One important parameter for effective cabs is a good seal. The gaskets around the doors and windows need to be maintained. Holes allow noise to penetrate the cab, which negates much of the cab's noise reduction benefit. All holes, no matter how small, must be plugged. The cab should be equipped with a heater and air conditioner for maximum effectiveness. With these devices, the miner

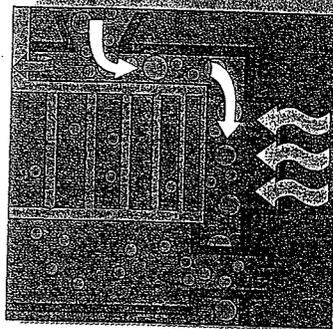
can operate the machine while the doors and windows remain closed.

Besides blocking all holes, the interior of the cab should be treated with acoustical material that absorbs noise entering the cab. Acoustical material should be applied to all available surfaces in the cab to obtain maximum absorption. For safe operation, the operator's vision must not be blocked. The effectiveness of acoustical material depends on the frequency of the noise. Manufacturers can provide advice for selecting the appropriate acoustical material. All acoustical material should be fire resistant.

Front-end loaders and haul trucks can be noise-controlled using methods much like those used on bulldozers. Adding a suitable muffler to the diesel engine and installing a suitable cab are the first and most important steps.

Drills are another common piece of mining equipment. The most effective method of controlling the miner's noise exposure is to outfit the drill with a cab. Many drills are too small

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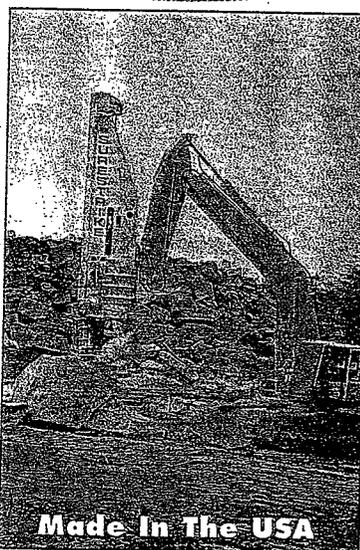
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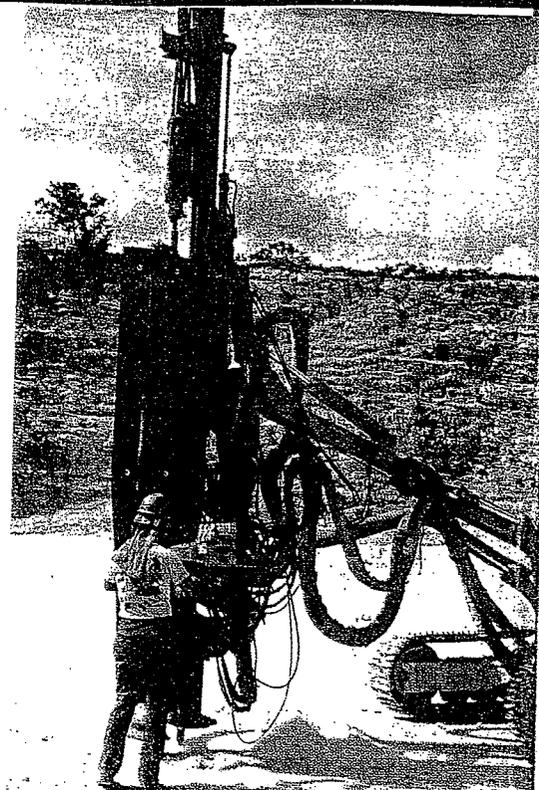
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to install an operator's cab. The noise exposure of miners who operate these drills can be reduced by using partial barriers. A partial barrier can be constructed on the drill mast with used conveyor belting and steel angle irons. The barrier partially blocks the noise from the miner.

Air compressors for air track drills should be moved from the vicinity of the miner. Because the noise must travel a longer distance, this reduces the miner's noise exposure. Another

control option may be to pipe the drill exhaust air to an unattended location. This can be accomplished by using a rubber hose attached to the exhaust air outlet. Employing these two controls significantly reduces the noise exposure of a miner operating an air track drill.

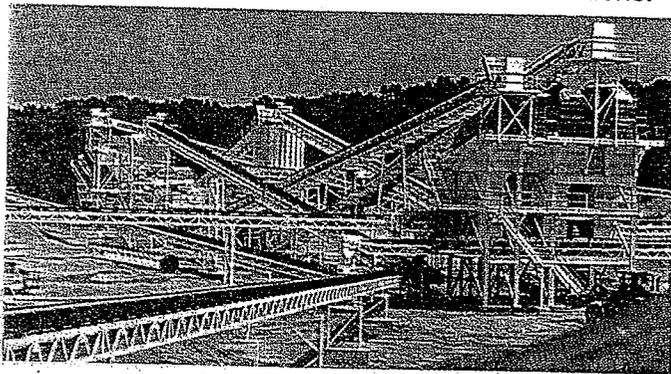
The mine operator must maintain the controls after the noise engineering controls have been implemented. Noise controls do not differ from other maintenance work to keep the equip-



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ment in peak operating condition. Damaged or deteriorated engineering noise controls must be repaired or replaced if these controls are required to be implemented due to excessive noise levels. If removed for maintenance work, they must be reinstalled on the machine or equipment.

Most mining machine and equipment manufacturers have developed noise control packages for their machines and equipment. Typically, modern mining machines are much quieter than older machines. Some manufacturers offer the noise controls as an optional package while others equip all their machines with the noise control package.

Many manufacturers of modern mining machinery and equipment have reduced the sound levels to which miners are exposed. According to some manufacturers, the sound level at the miner's ear is less than 85 dBA. Typically, under the new noise rule, these miners would not have to be included in a hearing conservation program. Consequently, mine operators should consider including a noise requirement in their specification package when purchasing new mining machines. □