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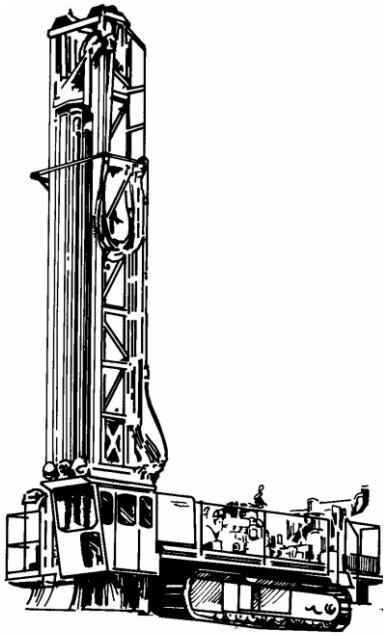
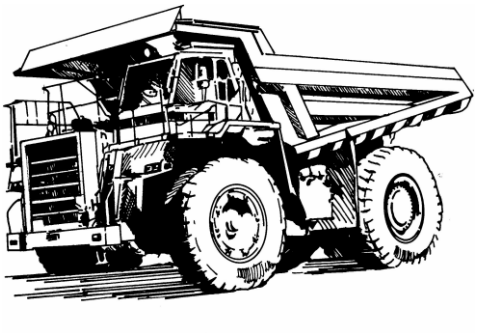
Noise Control Resource Guide –
Surface Mining

U. S. Department of Labor
Mine Safety and Health Administration
(May 2012 Revision)





U.S. Department of Labor
Mine Safety and Health Administration

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NOISE CONTROL RESOURCE GUIDE – SURFACE MINING

PREFACE

The Mine Safety and Health Administration's (MSHA) Noise Control Resource Guide series is a compendium of resource information and guidance for reducing miners' noise exposures at coal and metal and nonmetal surface mines, underground mines, and mills and preparation plants. The Noise Control Resource Guides represent the Agency's continuing efforts to assist mine operators in lowering noise exposure, preventing miner hearing loss, and achieving compliance with the Occupational Noise Exposure Standard (30 CFR Part 62).

Within this guide, you will find information that will help you:

- Identify noise sources on surface mining machinery.
- Determine the availability of engineering noise controls from original equipment manufacturers (OEMs) for new equipment.
- Identify sources of retrofit noise controls from the OEMs and after-market suppliers of noise controls, and in some cases, provides information on engineering controls that can be designed, fabricated, and installed at the mine site.
- Identify contacts for machinery suppliers and suppliers of sound and vibration controls and materials.

Technical experts and practitioners in the field of noise in the mining industry, as well as manufacturers of noise control equipment, provided information contained in this noise control resource guide. The material found in this guide should be considered a resource and not be construed to be a mandatory requirement. This guide should be used in conjunction with MSHA Program Information Bulletin (PIB) P11-45 "Technologically Achievable, Administratively Achievable and Promising Noise Controls (30 CFR Part 62)".

Due to the variability of the mining environment, it would be difficult to compile a document that would present controls that are feasible in each and every situation. The individual noise controls or series of controls found herein can reduce the exposure of most miners; however, they must be designed, tailored, and implemented according to the specific situation. Questions regarding technical applicability and feasibility of the controls to a specific mining situation should be referred to the local MSHA office.

DISCLAIMER

These guides are a compendium of resource information and guidance for reducing a miner's overexposure to noise. However, it is not an "all encompassing" answer to every problem dealing with overexposure to noise. There are three things the reader should keep in mind:

1. Every type of equipment used in mining operations is not included in these guides. Only the more common equipment types are discussed.

2. With regard to manufacturers of mining equipment and distributors of control products, the industry is a very dynamic one. Companies change names, merge, go out of business, relocate, etc. Thus, some of the information contained in the appendices may not be the most current. It is suggested that the reader may want to explore the Internet, or some of the monthly periodical magazines for current manufacturer/distributor information.

3. Reference to manufacturers is made to facilitate understanding and does not constitute an endorsement by the Mine Safety and Health Administration.

INTRODUCTION

MSHA promulgated Health Standards for Occupational Noise Exposure for the metal, nonmetal, and coal mining industry (30 CFR Part 62) in an effort to reduce the number of miners who will experience a material impairment of hearing. Part 62 establishes the full shift Permissible Exposure Level (PEL) at a Time Weighted Average over eight hours (TWA_8) of 90 dBA (100% Dose) and establishes an Action Level (AL) at a TWA_8 of 85 dBA (50% Dose). The operator is required to enroll affected miners in a Hearing Conservation Program if the AL is met or exceeded. If the PEL is exceeded, the mine operator is required to use all feasible engineering and/or administrative controls to reduce miner's exposure to the PEL.

The Noise Control Resource Guides deal with noise controls that are available on types of mining equipment typically used in different mining environments. The first guide covers surface mining; the second, underground mining; and the third, mills and preparation plants.

These guides will reference the type of mining equipment and noise controls that are available from the manufacturer of the equipment or as a retrofit for the equipment. If the cost of the control is well established and reliable, this information is also included. The guides do not address generic administrative controls that are universally accepted as being effective, i.e., rotation of workers, time limitations, distance, etc. However, if specific administrative controls have been shown to provide significant noise reduction, these administrative controls will be discussed with the equipment or the process. The guides also contain appendices that list equipment manufacturers, noise control products, aftermarket manufacturers, reference sources and contact information; however, these lists are not all inclusive.

NOISE EXPOSURE REDUCTION

In general, the amount of noise reduction achievable by and the technologically achievability of a given noise control or a group of noise controls is widely variable and must be considered on a case-by-case basis. The amount of noise reduction that can be obtained from an individual noise control or suite of controls is dependent on a large number of factors:

- Type and model of machine
- Number and types of controls implemented
- Physical environment in which the machine is used
- Acoustical environment in which the machine is used
- Type of work the machine is performing
- Presence of other noise sources in the environment
- The degree to which the machine is noise-controlled prior to the installation of additional retrofit noise controls
- Quality of materials that are selected and used
- Quality of the installation of the controls
- Quality of the maintenance program for the machine
- Maintenance of noise controls
- Use of engineering controls in combination with administrative controls
- Experience of operator in using the machine

For these reasons, each of the machine and noise controls shown in this guide do not have specified noise reductions. Such figures are only obtainable after a complete acoustical investigation is conducted on each individual machine. Each noise control case study has a set of conditions that are unique to it.

Since the noise standards treat engineering controls equally with administrative controls, one may use either engineering or administrative controls or a combination of both to reduce miner's exposures. Each noise control guide is a valuable source of information for mine operators to use when deciding what type of mitigative action is best suited for the conditions encountered at their operation. In addition to the applicability of the control, the operator will need to consider the specific materials used when installing an engineering control. It is important to remember that the effectiveness of any engineering control used to reduce noise exposures is dependent on the appropriately selected, correctly installed, and properly maintained acoustical material. As with most everything used in the mining industry, if an effective maintenance program is not put in place, the noise control will not last. Sometimes noise controls are expensive. It is in the operator's best interest to maintain the controls so as to reap the benefits of their investment.

DOSE FROM MULTIPLE NOISE SOURCES

Special considerations should be afforded to multiple noise sources, a situation common in the mining industry. Multiple noise sources present unique challenges in their measurement and control. The effectiveness of noise controls on multiple noise sources needs to be systematically evaluated in light of their contribution to a miner's exposure. To further illustrate this, consider the following:

When it is determined that there are multiple noise sources that contribute to a miner's noise exposure, and that these sources expose the miner to high levels of noise in a serial fashion, general noise control practices would direct you to lower the sound level of the highest noise source. However, noise exposure (dose) is a function of the sound level AND the amount of time the miner is exposed to the noise. Therefore, in planning which noise source(s) to treat, it is important to look at the sound level and the exposure time.

Table 1 illustrates the roles of sound level and exposure time. A particular miner's exposure is comprised of four levels and intervals: S1, a source of 90 dBA for 4 hours; S2, a source of 95 dBA for 2 hours; S3, a source of 100 dBA for 1 hour; and S4, a source of 88 dBA for 1 hour.

Table 1. – Data for Example Calculations Involving Multiple Sound Sources

Source	Sound Level (dBA)	Measured Exposure Time (Hr.)	Allowable Exposure Time (Hr.)	% Contribution to PEL Dose
S1	90	4	8	50
S2	95	2	4	50
S3	100	1	2	50
S4	88	1	-	0
S3 mod	97	1	3.05	33
S1 mod	87	4	-	0
S2 mod	92	2	6.1	33

The miner's exposure [S1 + S2 + S3 + S4], computed in terms of percent dose compared to the permissible exposure level (PEL), with a 90 dBA threshold for 8 hours, is 150% [50 + 50 + 50 +0].

By treating only the highest sound level source (S3) by application of an engineering noise control and reducing it from 100 dBA to 97 dBA (S3 mod), the miner's exposure [S1 + S2 + S3 mod + S4] would be 133% [50 + 50 + 33 + 0].

However, if the source to which the miner is exposed for most of the time (S1) is modified to obtain a 3 dBA reduction from 90 to 87 dBA [S1 mod], the impact is to reduce the miner's exposure [S1 mod +S2 + S3 + S4] to 100% [0 + 50 + 50 + 0]. Actually, a noise control yielding only a 1 dBA reduction applied to (S1) would achieve the same result.

If sources (S1) and (S2) are treated by 3 dBA each reductions from 90 dBA to 87 dBA and from 95 dBA to 92 dBA obtained, the miner's resultant exposure [S1 mod + S2 mod + S3 + S4] would be 83% [0 + 33 + 50 + 0].

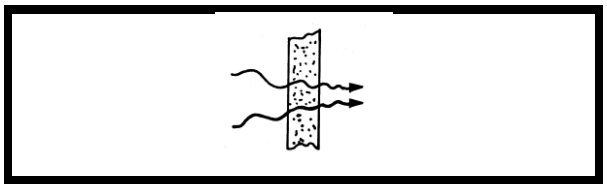
It is very important when conducting noise control work to examine the makeup of the miner's full shift noise exposure. The exposure may not be based solely on the highest sound level or the longest exposure time. It is the total noise dose, not just the individual sound levels or exposure times.

ACOUSTICAL MATERIALS

Acoustical materials can reduce noise either by absorbing or blocking sound waves, or damping vibrations. These materials are generally referred to as absorption, barrier, composite, and damping materials, and they can substantially increase the effectiveness of other acoustical devices. Selection of appropriate acoustical materials must be made based on a firm noise control engineering basis and commensurate to the task, properly installed, used, and maintained.

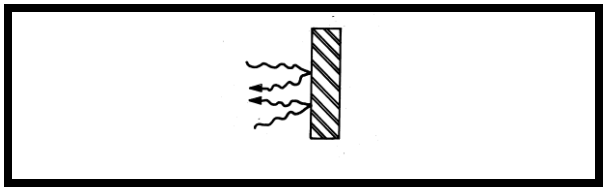
Acoustical devices include, but are not limited to, mufflers, silencers and enclosures. Absorption, barrier, composite, and damping/isolation materials are defined as follows:

Absorption



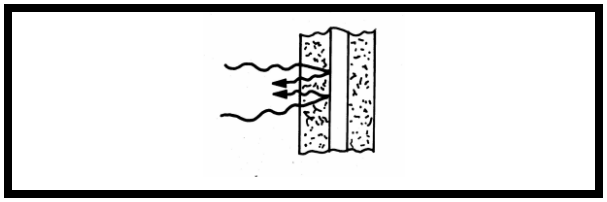
A material designed to absorb sound waves. It is not intended to be used for blocking sound waves. Some examples of absorption materials are foam and fiberglass. It may be used inside a cab or enclosure to prevent the reverberation of sound waves.

Barrier



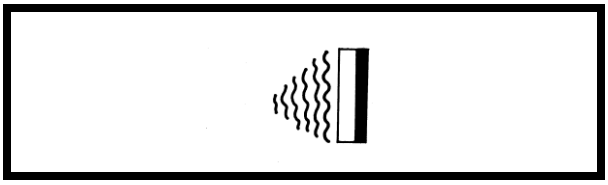
A material designed to block sound waves. It does not absorb sound waves. A typical use of barrier materials would be on the firewall of a bulldozer to block low frequency engine noise. Some examples of sound barriers are mass-loaded vinyl curtains, lead, plywood, glass, steel, and concrete.

Composite



A material designed to both absorb and block sound. It may be used to provide additional barrier qualities to an enclosure or operator cab as well as absorption of radiating sound waves. Some examples are combinations of foam, vinyl, fiberglass, and lead.

Damping/Isolation



Materials designed to damp, remove the ring from vibrating surfaces, and decouple source from structure.

FLAMMABILITY GUIDELINES

Although current MSHA regulations do not restrict the use of acoustical materials due to their flammability characteristics, MSHA has established a voluntary guideline regarding the flame spread index of acoustical materials. These indices were established based upon the results of ASTM E-162 – Radiant Panel Tests. Basically, a flame spread index of 25 or less is recommended for acoustical materials installed on equipment used in underground mines and a flame spread index of 50 or less for acoustical materials installed on equipment used at surface operations. Prior to the selection, installation and use of acoustical materials, operators should be aware of their flammability properties.

INSTALLATION METHODS

Acoustical materials may be installed in the following ways:

1. Adhesives – The use of an industrial adhesive requires a thorough cleaning of the surface area. The adhesive should then be applied according to the manufacturer's specifications. While the use of adhesives is economical and effective for installing the materials, the material cannot be removed intact and a potential hazard may exist from toxic fumes if subjected to intense heat. Also special solvents, that may have special conditions for use to avoid potential toxicity problems, may be needed to remove the adhesives.

2. Stud Welding – This method involves the use of a stud welder to attach a threaded, copper-coated stud to a metal surface such as a cab wall. The stud welder consists of a capacitance discharge unit and a hand-held triggering device, which holds the stud in place for welding. Upon release of the charge, an arc is struck between the tip of the stud and the metal surface, heating a small area. Simultaneously, the stud is plunged into the molten metal and the weld is completed. For a good quality weld the metal paint must be removed from the metal. The acoustical material is placed over the stud and secured with a rubber-cover button. This cover button not only holds the material in place, but offers a physical protection from the metal stud. The stud-welding method requires little surface preparation and allows for the removal and reinstallation of the materials for maintenance or repairs.

3. Bolts and Straps – Material may be held in place utilizing metal straps, which are secured by bolts and nuts at each end. This type of installation allows for easy removal and replacement of the acoustical material without damage. A perforated metal covering may be used in place of the straps to secure and protect the acoustical material.

4. Stick-on Studs – This method involves the use of threaded studs pre-welded to a metal disc having a self-adhesive backing. Surface preparation involves a thorough cleaning to remove oil, grease, or other contaminants. These studs may be attached to all types of surfaces. The materials are then pushed over the studs and held in place with a rubber-cover button. In some situations the weight of the acoustical materials may have an effect on the load bearing characteristics of the stick-on studs. Care should be taken.

COMPLIANCE ASSISTANCE

MSHA has produced several documents to aid the mining industry in complying with Part 62. These include:

- Hearing Protector Noise Reduction Rating List
- Compliance Guide to MSHA's Occupational Noise Exposure Standard – IG 33
- A Guide to Conducting Noise Sampling – IG 32
- Audiometric Testing Reference Guide for MSHA's Occupational Noise Exposure Standard – IG 57
- Program Policy Letter No. P04-IV-I and P04-V-1 Noise Enforcement Policy
- Program Information Bulletin (PIB) No. P08-12 "Technologically Achievable, Administratively Achievable and Promising Noise Controls" (30 CFR Part 62) dated June 18, 2008
- Program Information Bulletin (PIB) No. P11-45 "Technologically Achievable, Administratively Achievable and Promising Noise Controls" (30 CFR Part 62) dated June 20, 2011

MSHA will work with mine operators, miners, labor unions, industry associations, noise partnerships, mining equipment and noise control manufacturers, noise engineering professionals, and the National Institute for Occupational Safety and Health (NIOSH) in updating this document to reflect new solutions and experiences in controlling occupational noise exposures in the mining industry.

These compliance assistance documents are all available at MSHA's web site at www.msha.gov.

SURFACE MINING NOISE CONTROLS

In surface mining, there is a wide variety of equipment used as well as site-specific mining practices, etc. The first recommendation in controlling noise is to identify the highest noise exposure tasks and the sources that contribute to the miner's noise exposure. Thus, it may be necessary to examine all aspects of the work shift and the equipment operated by the specific miner, as well as the equipment which may be positioned in close proximity to the miner.

1. Engineering Controls

The application of engineering noise controls to surface mining equipment may, in general terms, be a more complicated task compared to underground or processing facilities. In the case of new equipment, it is most advantageous to purchase the equipment from the manufacturer with the noise controls already engineered into the unit. If there is the availability of a fully-treated operator cab, then in many cases, the fully treated operator cab would be the most effective means of protecting the miner from overexposure. In the holistic approach, the treated cab would protect the miner from dust, temperature extremes, as well as overexposure to high sound levels. In the case of retrofit engineering controls on existing equipment, this may

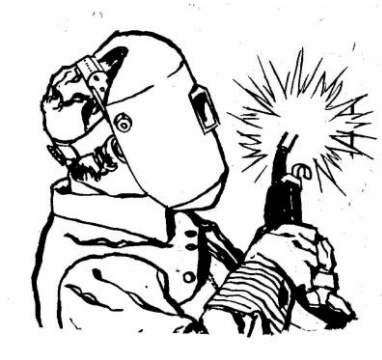
necessitate the removal of the equipment from the job site. In many instances, the noise controls can be applied during a scheduled rebuild. In some situations, the utilization of radio remote controls to remove the miner from the close proximity of the equipment may be considered.

2. Administrative Controls

There are many possible combinations of administrative controls that may be used to reduce a miner's noise exposure. A few general techniques to consider are time management, including maintenance during idle time and work rotation. Also, dividing routine work between different work shifts and changing actual shift lengths are other examples of administrative controls that may be utilized. However, because of the site-specific work practices, administrative controls need to be considered on a case-by-case basis.

AIR/ARC GOUGING

Air/Arc gouging is a process used throughout the mining industry to cut or gouge metal. A specially designed rod is placed into a modified holder that also houses a compressed air line. An electric arc is established between the rod tip and the base metal surface then compressed air is directed from the rod holder at the molten metal to literally blow it away. This process is commonly used to repair existing welds on bulldozer blades or dragline buckets etc.



1. Original Equipment Manufacturer (OEM)

Most welding supply company's offer the specially designed rod used in this process.

2. Retrofit Noise Controls

There is none available at this time.

3. Alternative Technology

Copper-clad carbon rods can be substituted with alternate metal gouging rods and methods. The following table lists products and manufacturers that have alternate technology that produce lower noise levels than the standard copper-clad rods when used for the same application. Each manufacturer should be contacted for applicability of their product to each process or situation.

Alternate Technology Which Produce Lower Noise Levels	
Manufacturer	**Product**
Certanium	Certanium Rod
Cronatron Welding Systems, Inc.	Cronatron Rod
Rockmont Research & Alloys, Inc.	Electra Rod
Magnum Manufacturing, Inc.	Magnum Rod
Hypertherm, Inc.	Hypertherm-Plasma Arc
Petrogen International, LTD	Petrogen *
***** Metal cutting tool only, unable to gouge.	

4. Administrative Controls

A. Discourage side-by-side gouging on shovel or dragline buckets.

B. Reduce air-pressure to a minimum.

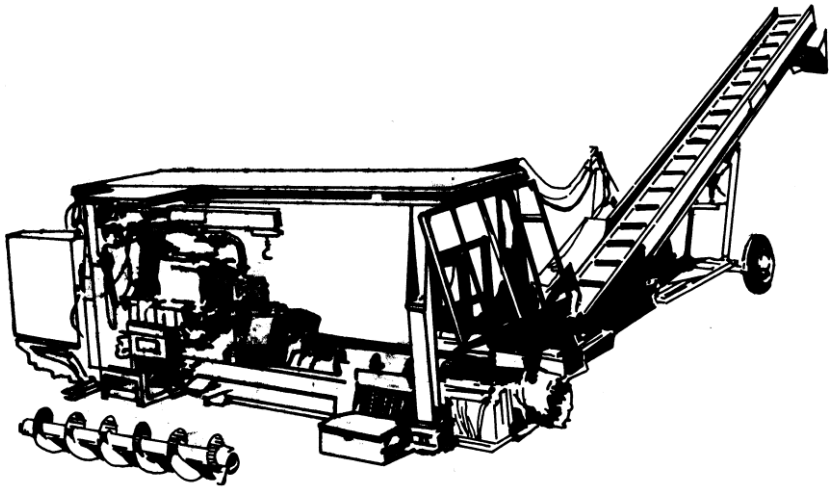
C. Use constant voltage air arc gouging techniques instead of constant current air arc gouging techniques.

D. Use constant current air arc gouging techniques at the lowest effective current and air pressure.

E. Use constant voltage air arc gouging techniques at the lowest effective voltage and air pressure.

AUGERS – SURFACE

Surface augers are utilized by strip mine operators when the overburden is too thick to be removed economically. Large diameter holes are drilled into the coal bed by an auger. The auger consists of a cutting head with screw-like extensions. As the auger turns, the head breaks the coal and the screw carries it back into the open where it dumps onto a conveyor.

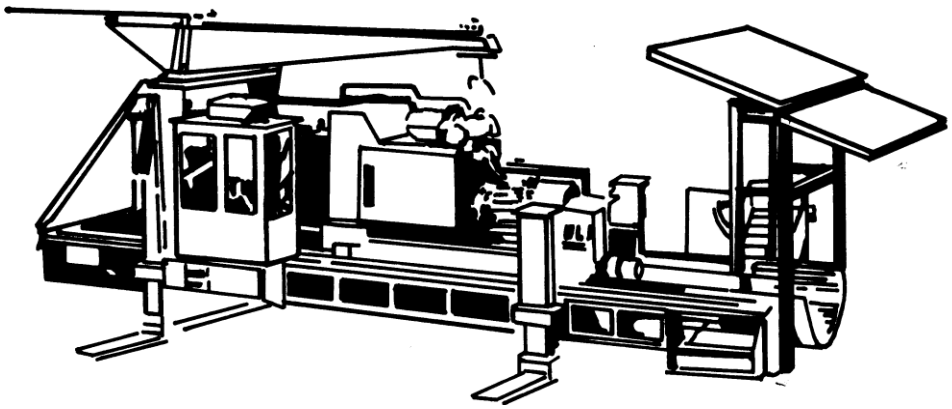


1. Original Equipment Manufacturers (OEM)

The following table illustrates OEMs offering noise controls for new surface augers. Local dealers should be contacted for availability and further details.

Noise Control Availability from OEMs			
Manufacturer	**Treated Cab Standard/Optional**	**Treated Engine Housing Standard/Optional**	**Muffler**
Brydet Development Co.	X	X	X
Salem Tool Company	Optional	X	X
"X" indicates product availability.			

For surface augers without noise controls, retrofit noise controls are needed. Details regarding retrofit approaches are in Section 2.



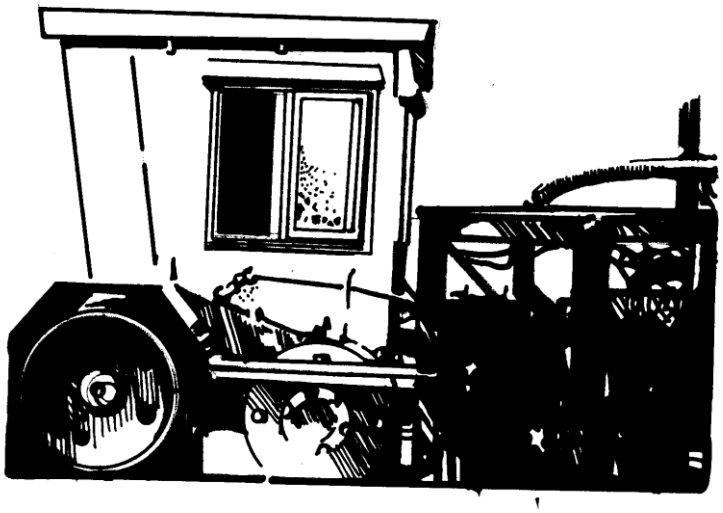
Surface Auger with Operator Cab

2. Retrofit Noise Controls

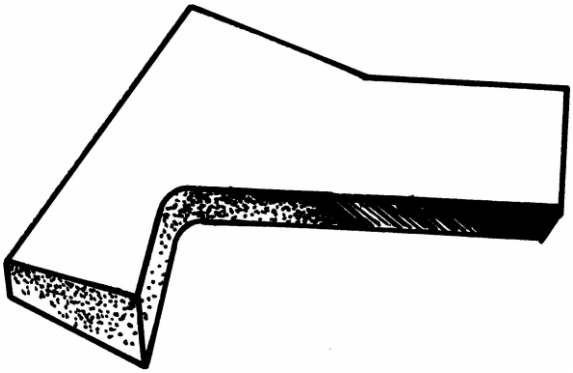
A commercially available operator cab is an effective noise control for a surface auger. The following table illustrates OEMs offering retrofit noise controls for surface augers. Local dealers should be contacted for further details.

Retrofit Noise Control Availability from OEMs	
Manufacturer	**Treated Cab**
Brydet Development Company	X
Salem Tool Company	X
"X" indicates product availability.	

Additional retrofit noise controls consist of the construction of homemade cabs from sheet metal or flame-retardant plywood. Engine enclosures and noise barriers located between the miners and the diesel engines are also effective noise controls. Costs will vary depending upon size and local material pricing.



Example of a Home-Made Cab



Acoustical Absorption Material

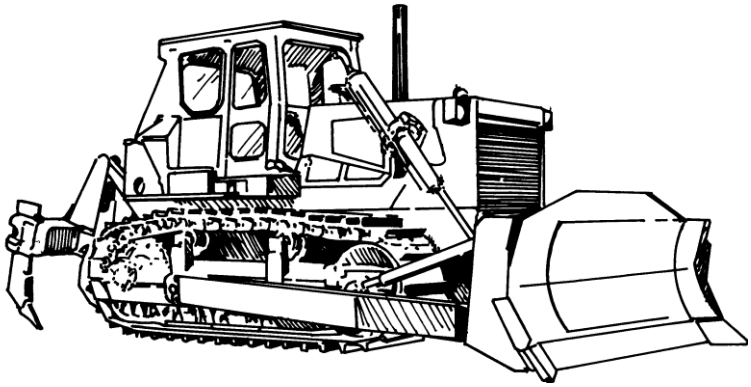
Homemade cabs should be lined with an acoustical absorption material. Absorption material costs vary with supplier. Appendix B lists sources for purchasing acoustical materials.

C. Alternative Technology

There is no alternative technology.

BULLDOZERS

Bulldozers are used throughout the mining industry (both above and, to a limited extent, below ground). They are primarily utilized to push overburden. They can also be used with a ripper blade (attached on the rear) to expose new material or they can serve as an auxiliary power source for pan scrappers.



1. Original Equipment Manufacturers (OEM)

The following table illustrates OEMs offering full cabs on their new bulldozers. Local dealers should be contacted for availability and cost.

Noise Control Availability from OEMs			
Manufacturer	**Fully-Treated Cab**	**Muffler**	**Air-Conditioning**
Caterpillar	X	X	X
Fiat-Allis (New Holland)	X	X	X
International	X	X	X
J. I. Case (CNH Global)	X	X	X
John Deere	X	X	X
Komatsu	X	X	X
VME (Michigan)	X	X	X
"X" indicates product availability.			

The manufacturer of new equipment should be consulted for details regarding noise levels inside the cab. If new equipment is purchased with a bare cab, or for older equipment without noise controls, additional retrofit controls are needed. For details regarding retrofit approaches, refer to Section 2.

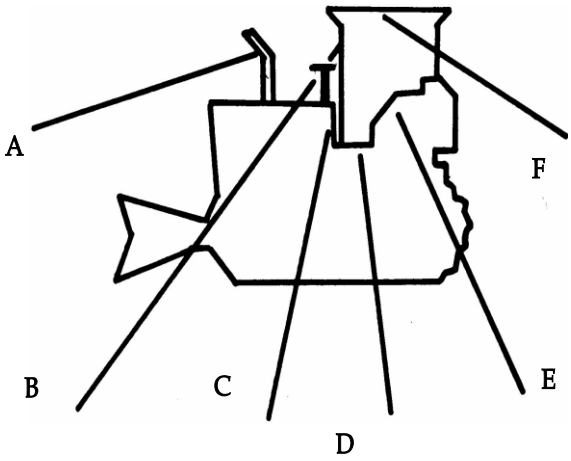
2. Retrofit Noise Controls

This section is for dozers without cabs and for dozers with untreated cabs. Cabs for dozers can be supplied directly to the mining companies by the aftermarket companies. Partial lists of these companies are in Appendix C.

The effectiveness of noise controls on retrofit cabs is dependent upon the quality of both materials and installation. If a pre-cut acoustical material kit is not available, the materials may be purchased in bulk form using Appendix B as a guide. If air-conditioning is needed, the companies below provide this service:

Eagle Eng & Mfg., Inc.	Welcome, Minnesota	(800) 533-0528 (800) 722-0577 in MN
Red-Dot Corp.	Seattle, Washington	(206) 575-3840

The following are the major areas where noise controls should be applied on a bulldozer with a retrofit cab:



Areas Where Noise Controls May Be
Applied to a Bulldozer

A. Engine Exhaust

Install an exhaust muffler and extend the stack above the top of the cab, directed to the rear of the machine.

B. Control Levers

Install rubber "boots" around the base of the control levers to prevent engine noise from entering operator area.

C. Firewall

Install composite material on the firewall to prevent engine noise from entering the cab.

D. Floor

Tighten down any loose floor plates. Cover the floor with an acoustical floor mat material to prevent transmission noise from entering the cab. Cut the floor mat so as to minimize openings for floor pedals, yet permit their full movement.

E. Seat

Install barrier or composite material on the base of the seat to prevent noise from traveling from the transmission access area into the cab.

F. Ceiling/Wall

Cover reflective surfaces on the inside of the cab with a sound absorbing material. If a full cab is not available, a front shield may be installed. The noise reduction obtained will typically be less than that for a full cab.

The following are the major areas where noise controls should be applied on a dozer without a cab:

1. Engine
2. Control Levers
3. Firewall
4. Floor
5. Seat
6. Front Barrier Shield

Steps A through F have been described previously. These are the requirements for a front barrier shield:

A. Front Barrier Shield

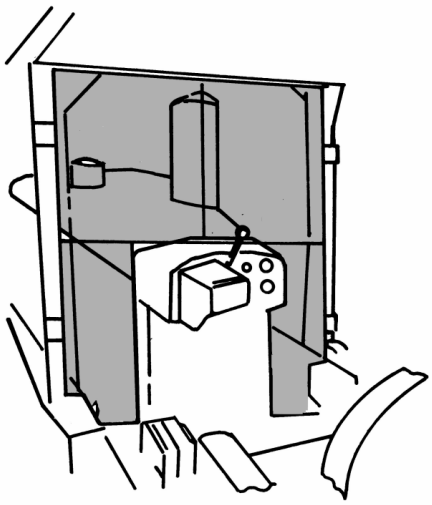
The front barrier shield must be installed to isolate the operator from the engine and the exhaust noise.

B. Mounting Device

The front barrier shield is attached to the bulldozer by any of several means such as welding, "U"-bolts, straps, etc. If welded, it must be done by a certified welder, according to manufacturer's directions, so as to not violate the certification of the ROPS and FOPS.

C. Seals

The gap at the top and base of the barrier, along with the gap around the cowl, must be sealed using closed-cell material, such as rubber, to prevent noise from leaking around the barrier.



Installed Front Barrier Shield

3. Alternative Technology

Radio remote control systems are now becoming available for a wide range of equipment. The use of bulldozers having radio remote controls, in conjunction with an appropriate exhaust muffler, can reduce operator noise exposure. A partial listing of manufacturers of radio remote control systems is as follows:

Black Box, Incorporated
Main Street
Glen Williams, Ontario L7G 3T6
Canada
Phone: 905.873.0141
Fax: 905.877.1809

Catron, Incorporated
58 West Shenago Street
Sharpsville, Pennsylvania 16150-1198
Phone: 412.962.3571
Fax: 412.962.4310

Futaba Corporation of America
2170 William Pitt Way
Irvine, California 92618
Phone: 714.455.9888

Joy Mining Machinery
177 Thorn Hill Road
Warrendale, Pennsylvania 15086
Phone: 724.779.4500

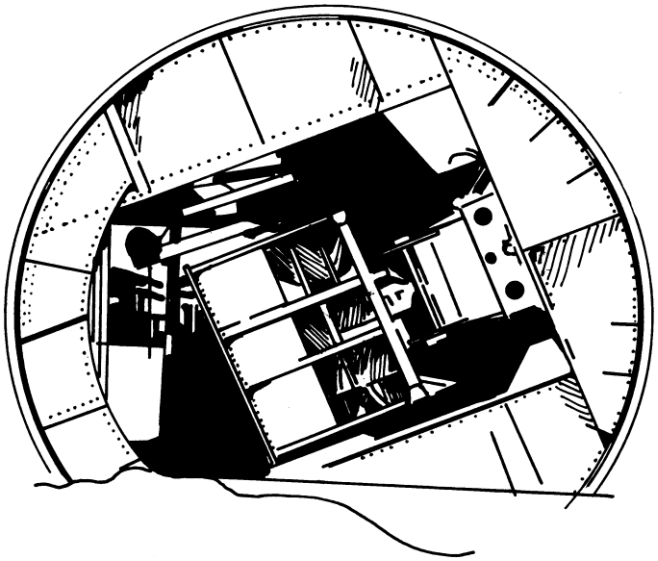
Moog Incorporated–Industrial Division586
Electrohydraulic Servocontrol
Department T
East Aurora, New York 14052
Phone: 716.652.2000

Tunnel Radio of America
33868 Southeast Eastgate Circle
Corvallis, Oregon 97333-2248
Phone: 541.758.5637
Fax: 541.758.1417

Vectran Corporation
4 Studebaker
Oakmont, Pennsylvania 15139
Phone: 412.826.3100

CAR SHAKERS

Car shakers are electromagnets that come to rest on the bottom of rail dump-cars. Their function is to literally shake the body of the rail car, so that all of the material inside falls out. They are typically used in the coal and cement industries.



1. Original Equipment Manufacturers (OEM)

The following table illustrates OEMs offering noise controls for car shakers. Local dealers should be contacted for availability and further details.

Noise Control Availability from OEMs					
Manufacturer	**Retrofit**	**Foot Pads**	**Top Attenuator**	**Muffler**	**Air Actuated Cushion**
Allis (METSO)	None	None	None	None	None
Branford Vibrator Company (Cougar Vibration Company)	None	None	None	None	None
General Kinematics	None	None	None	None	None
Hewitt-Robins (Goodman-Hewitt)	None	X	None	None	None
Iskco Ltd.	None	None	None	None	None
Kinergy Corporation	X	None	X	X	None
Martin Engineering	None	None	None	X	X

Noise Control Availability from OEMs					
Manufacturer	**Retrofit**	**Foot Pads**	**Top Attenuator**	**Muffler**	**Air Actuated Cushion**
Vibco	None	None	None	None	None
Global Manufacturing	None	None	None	X	None
Reynolds	None	None	None	None	None
"X" indicates product availability.					

Additional retrofit noise controls are available for car shakers that do not meet specific noise standards. Details are given in Section 2.

Hewitt-Robins (Goodman-Hewitt)	Foot pads for cars can be added.
Kinergy Corporation	Top attenuators are standard on most models, but can be purchased separately, depending upon the model.
Martin Engineering	Air actuated cushions, which eliminate metal-on-metal impact, are available.

2. Retrofit Noise Controls

A. Rotary Dump

Install rotary dump to replace car shake-out.

B. Impact Pads

Mount impact pads to shaker.

C. Operator Control Booth

A commercially-available operator control booth can be purchased or a home-made booth can be fabricated. An acoustically-treated enclosure can be constructed from either flame-retardant plywood or sheet metal.

The structure can be supported by either treated lumber posts or angle iron framework. Safety glass should be used for windows. The interior of the booth should be treated with fiberglass absorptive material. This material will absorb sound that enters the booth.

3. Alternative Technology

Radio remote control systems are now becoming available for a wide range of equipment. The use of car shakers having radio remote controls can offer substantial noise reductions. A partial listing of manufacturers of radio remote control systems is as follows:

Black Box, Incorporated
Main Street
Glen Williams, Ontario L7G 3T6
Canada
Phone: 905.873.0141
Fax: 905.877.1809

Catron, Incorporated
58 West Shenago Street
Sharpsville, Pennsylvania 16150-1198
Phone: 412.962.3571
Fax: 412.962.4310

Futaba Corporation of America
2170 William Pitt Way
Irvine, California 92618
Phone: 714.455.9888

Joy Mining Machinery
177 Thorn Hill Road
Warrendale, Pennsylvania 15086
Phone: 724.779.4500

Moog Incorporated–Industrial Division586
Electrohydraulic Servocontrol
Department T
East Aurora, New York 14052
Phone: 716.652.2000

Tunnel Radio of America
33868 Southeast Eastgate Circle
Corvallis, Oregon 97333-2248
Phone: 541.758.5637
Fax: 541.758.1417

Vectran Corporation
4 Studebaker
Oakmont, Pennsylvania 15139
Phone: 412.826.3100

CHANNEL BURNERS

Channel burners are usually a home-made piece of equipment. Channel burners are devices used to cut granite or similar materials in the dimension stone industry. They are broadly classified as either hand-held or automatic. Both types use a mixture of either air or oxygen and diesel fuel. The hand-held is essentially a long tube with a flame at one end that is passed over stone to create a deep channel by shattering the rock. The automatic version raises and lowers the tube as it travels over a small section of rail track.

1. Original Equipment Manufacturer (OEM)

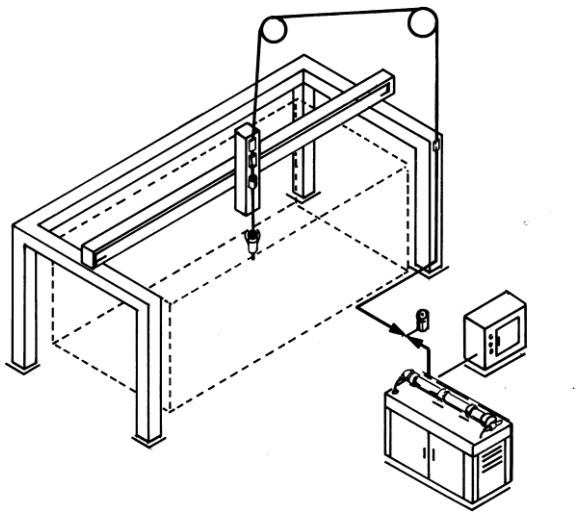
Currently, there is no known OEM for hand-held manual channel burners (referred to also as "wands").

2. Retrofit Noise Controls

Currently, there are no known retrofit noise controls for hand-held manual channel burners (referred to also as "wands").

3. Alternative Technology

An automated channel burner may be considered as alternative methods for using the hand-held channel burner (wand).

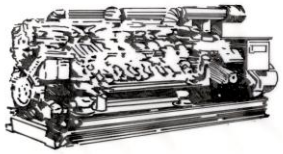


Automatic Channel Burner

OEMs Who Offer Automated Channel Burners			
Manufacturer/Distributor	**Automated Channel Burner**	**Waterjet Cutter**	**Wire Diamond Saws**
Thermal Channeling (706) 283-4505	X	None	None
John Lutz (706) 283-7528	X* *Ramjet Airburner	None	None
NedJet Cutting Systems, Inc. (508) 798-8546	None	X	None
Precision Stonecraft	None	None	X
"X" indicates product availability.			

COMPRESSORS

An air compressor is driven by either a power take off, an internal combustion engine, or an electric motor to generate compressed air. This air is typically used to power drills on surface operations.



1. Original Equipment Manufacturers (OEM)

The following lists OEMs offering standard noise control equipment on new compressors. Local dealers should be contacted for specific needs and details.

A. Joy Technologies (Diesel)
B. Sullair (Diesel)
C. Gardner-Denver (Diesel)
D. Ingersoll-Rand (Electric)

2. Retrofit Noise Controls

Use prudent site planning to locate noise-generating equipment away from work areas and especially entrances to slopes or shafts.

Use prudent site planning to eliminate cumulative noise levels of equipment.

Provide noise barriers or enclosures around high noise level equipment.

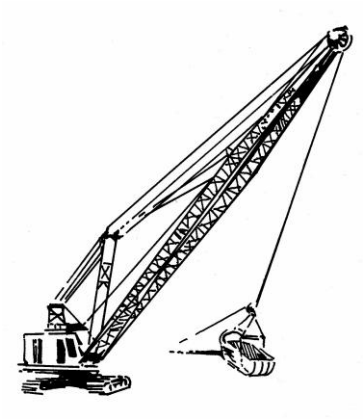
Construct or install a barrier of plywood or other material to reduce exposure to noise from diesel engine. An alternate would be to set up the compressor at a remote location away from normal work areas.

3. Alternate Technology

The use of electric compressors eliminates noise associated with diesel engines.

CRANES

Cranes are machines designed for lifting and transporting heavy weights from above. Typically, cranes are used to position equipment in quarries, lift blocks of stone, or lift heavy parts in repair shops.



1. Original Equipment Manufacturers (OEM)

The following table illustrates OEMs offering noise controls for new cranes. Local dealers should be contacted for availability and further details.

Noise Control Availability from OEMs			
Manufacturer	**Acoustically-Treated Cab**	**Sound Suppression Kit**	**Muffler**
Manitowoc	X	None	X
Koehring	X	X	X
Mannesmann Demag	X	None	X
National Crane (Manitowoc)	X	None	X
American Crane	X	None	X
Marathon Letourneau	X	None	X
Komatsu Dresser	X	None	X
Bucyrus Erie	X	None	X
P&H	X	None	X
"X" indicates product availability.			

2. Retrofit Noise Controls

A. Exhaust Muffler

An exhaust muffler should be installed if there is none present or if the existing muffler is faulty. The exhaust should be directed away from the operator.

B. Acoustical Material Added to Operator Area

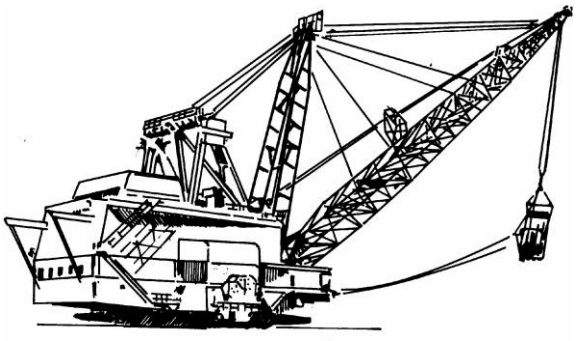
In smaller cranes, install a barrier behind the operator to provide isolation from the low frequency noise emitted from the diesel engine. The barrier can be composed of a mass-loaded, vinyl material suspended from roller hooks mounted in a barn track or a flame-retardant plywood or metal wall containing a door. Fiberglass absorptive material should be placed on the ceiling and other flat surfaces in the operator's compartment. This material will absorb any sound which enters the cab. Suppliers of these materials are listed in Appendix A.

3. Alternative Technology

There is no alternative technology.

DRAGLINES

A dragline is a type of excavating equipment which casts a cable-hung bucket a considerable distance and then collects the loose material by pulling the bucket back toward itself with a second cable. It then elevates the bucket and dumps the material on a spoil bank.



1. Original Equipment Manufacturers (OEM)

The following table illustrates OEMs offering noise controls for draglines. Local dealers should be contacted for specific needs and details.

Noise Control Availability from OEMs	
Manufacturer	**Standard Sound-Suppressed Environmental Cab w/air-conditioning and muffler(s)**
Bucyrus Erie Company (Bucyrus International)	X
P & H Mining	X
Indresco, Inc. -- Marion Division (Bucyrus International)	X
Manitowoc Engineering	X
Mannesmann Demag Corporation	X
Northwest Engineering Company (Telex)	X
"X" indicates product availability.	

2. Retrofit Noise Controls

Retrofit noise controls kits are unavailable from the OEMs.

In smaller draglines, all openings to the engine and hoist/drag assemblies should be sealed off from the operator's compartment and sound-absorptive material installed on the walls and roof of the compartment. A barrier should be installed behind the operator to provide isolation from the low frequency noise emitted by the diesel engine. The barrier can be composed of a mass-loaded, vinyl material suspended from roller hooks mounted in a barn track or a flame-retardant plywood or metal wall containing a door. In larger draglines, if possible, motor generator (MG) sets should be isolated with a sound barrier. Care must be taken not to restrict air flow around the MG sets causing overheating. Sound damping material can be applied to the surfaces of specific components, such as hoist and drag transmissions, to reduce radiated sound. Sound absorptive/barrier/damping materials are available from a number of manufacturers. Suppliers of these materials are listed in Appendix A.

Sound from fans (cooling, exhaust) may be reduced by changing fan speed and pitch.

Other potential engineering controls include, but are not limited to, the use of closed circuit TV for monitoring areas of high noise levels; heat and vibration sensors for monitoring in a quiet area; and installation of automatic lubrication systems.

Replacement parts are commercially available for the exhaust systems, (i.e. manifold, mufflers, pipes, clamps) from the engine manufacturer, or the following suppliers:

Donaldson Company, Inc.
1400 W. 94th Street
Minneapolis, MN 55431
Phone: 612.887.3330

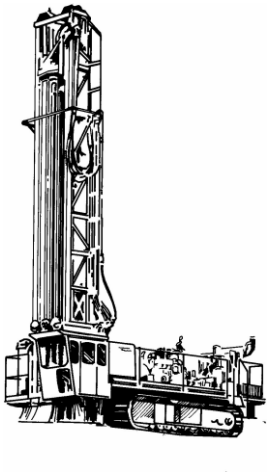
Nelson Industries, Inc.
P.O. Box 428
Stoughton, WI 53589
Phone: 608.873.4200

3. Alternative Technology

There is no alternative technology.

DRILLS – SURFACE

Drills are designed to penetrate the earth. They range in size from hand-held to over-the-road-size trucks. Some of the most common are blast-hole drills, slot drills, trimming drills, and jackhammer drills. Drills are generally classified as percussive, rotary, or hydraulic.



1. Original Equipment Manufacturers (OEM)

The following table illustrates OEMs offering noise controls for new drills. Local dealers should be contacted for availability and further details.

Noise Control Availability from OEMs		
Manufacturer	**Exhaust Mufflers**	**Cab with Acoustical Treatment for Medium and Large Drills**
Ingersoll-Rand	X	X
Reed-Gardner/Denver	X	X
Erie	X	X
Tamrock/Driltech	X	X
Joy Mfg./Sullivan Ind.	X	X
Gill	X	X
"X" indicates product availability.		

2. Retrofit Noise Controls

Medium and Large Size Drills - The following table illustrates OEMs offering retrofit noise control packages. Local dealers should be contacted for availability and further details.

Retrofit Noise Control Availability from OEMs			
Manufacturer	**Exhaust Mufflers**	**Cab with Acoustical Treatment for Medium and Large Drills**	**Other Treatments**
Ingersoll-Rand	X	X	Barrier shield available for small drills
Reed-Gardner/Denver	X	X	None
Drill Tech	X	X	None
Erie	X	X	None
Tamrock	X	X	None
Joy Manufacturing	X	X	None
Gill	X	X	None
Novamac	X	X	Noise shield for P212V model
"X" indicates product availability.			

If retrofit noise control kits or options are not commercially available, the following illustrates the "do-it-yourself" approach that can be installed on-site.

A. For Medium and Large-Size Drills

1. Exhaust Mufflers

Install an appropriate exhaust muffler if one is not present.

2. Operator Cab with Acoustical Treatment

These are available from the OEM. There may be some cases where additional work needs to be conducted before the cab can be installed, such as relocating hoses or controls. This will add to the cost of the retrofit installation. Some cabs may also be available through a specialty cab company or third party.

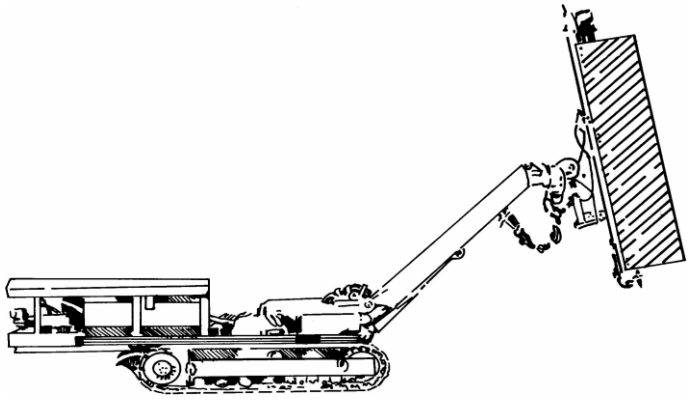
B. Small-Size Drills (Air Tracks)

1. Exhaust Mufflers

Install an appropriate exhaust muffler, making sure it is matched to the engine specifications.

2. Barrier Shield

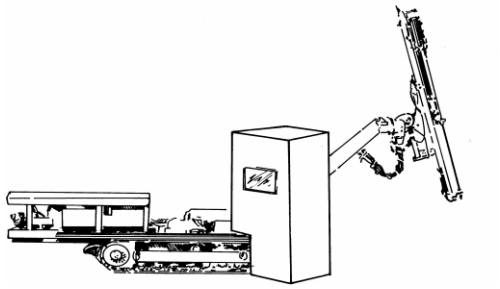
Mount shield on the drill mast by installing an angle iron framework to the mast of the drill and then cover the framework with readily available material, such as conveyor belting or plywood. An "acoustic shadow zone" is created at the drill controls. When the drill operator stands inside this "acoustic shadow zone," the sound levels are typically reduced by 4-10 dBA. The following illustrations depict the barrier shield. For maximum effectiveness and safety, the barrier shield should be shaped as an "L" and extended from approximately 15 inches above the ground to 8 feet up the mast.



Barrier Shield Mounted on a Drill Mast

3. "Do-It-Yourself" Operator Cab

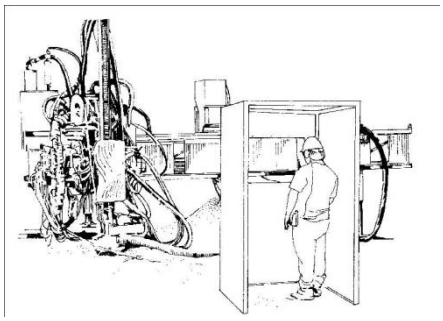
At numerous mine sites that have been investigated, the operator has constructed an operator cab on the drill unit. These cabs can be constructed of sheet metal or flame-retardant plywood. The inside of the cab is lined with an acoustical material. Depending upon the specific drill, the cab can be attached to the drill unit at the mast or at the tramming controls. Once the drill steel is started, the drill operator moves into the cab to observe the drilling. In some situations, automatic drill steel changers can also be utilized, thus permitting the drill operator to remain in the cab for longer periods of time. Typical noise reductions have been 10 dBA or more. In most cases, there will be no instability or balance problems associated with mounting the cab on the drill unit. The following illustration depicts one of these "do-it-yourself" operator cabs.



Drill with Make-Shift Cab Attached

4. Three-Sided-Enclosure

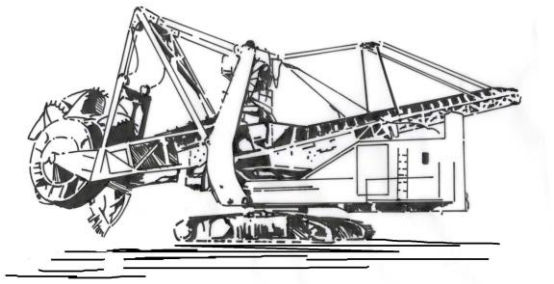
Drills can be equipped with umbilical or radio-remote controls. Using this approach, the drill operator is relocated to a distance from the drill in an area of lower sound levels. In most cases, the OEM must be contacted for availability of radio remote controls for this application. Additionally, a portable three-sided operator's enclosure, as shown below, that can be moved along with the drill, is very effective when used in conjunction with a remote control. The enclosure could have wheels and handles for transport. A fixed base with an eye-hook can be used, which is moved with another piece of mining equipment. The driller, while standing within the enclosure, would be surrounded by three sides and a ceiling giving him adequate protection against high sound levels.



Portable Operator Enclosure

EXCAVATORS - BUCKET WHEEL

Bucket wheel excavators dig with multiple buckets mounted on the circumference of a rotating wheel structure. The wheel discharges the material onto a conveyor belt, which terminates into a hopper or a truck. These machines are generally utilized for overburden excavation or reclamation work.



1. Original Equipment Manufacturers (OEM)

The following table illustrates OEMs offering noise controls for new bucket wheel excavators as standard equipment. Local dealers should be contacted for availability and further details.

Noise Control Availability from OEMs	
Manufacturer	**Acoustically-Treated Cabs**
Krupp Industries	X
O&K Orenstein & Kopper	X
Robins Engineers	X
"X" indicates product availability.	

For bucket wheel excavators without noise controls, additional retrofit noise controls are needed.

2. Retrofit Noise Controls

This section deals with bucket wheel excavators without any noise controls. The effectiveness of the retrofit noise controls is dependent upon the quality of both the acoustical materials and the installation.

The following manufacturers should be contacted for information regarding retrofit noise control kits or options.

Retrofit Noise Control Availability from OEMs	
Manufacturer	**Acoustical Treatment for Cabs**
Krupp Industries	Price varies with size
Robins Engineers	Price varies with size

The following are the major areas where retrofit noise controls should be considered.

A. Operator's Control Area

The most effective retrofit noise control for bucket wheel excavators is an acoustically-treated operator's cab. If the cab structure is not present, then either a custom cab builder should be contacted or a "do-it-yourself" cab should be built by maintenance personnel. A list of custom cab building companies appears in Appendix C. These manufacturers have numerous cabs available for a wide range of equipment. In some situations, where a large number of custom cabs are needed, the custom cab manufacturer may design and fabricate the cab for installation on the specific machine.

For a "do-it-yourself" cab installation, the following overview focuses on the areas of prime concern regarding cab design.

1. A rigid frame work of tubular steel should be employed.

2. The outer surface should be constructed of sheet metal or plywood.

3. The inside surfaces should be treated with the appropriate acoustical materials.

4. Doors and windows should be composed of safety glass and sealed to prevent leaks.

5. An environmentally-controlled interior should be provided, consisting of heating/air-conditioning and a filtered air supply.

B. Exhaust System for Diesel Engines

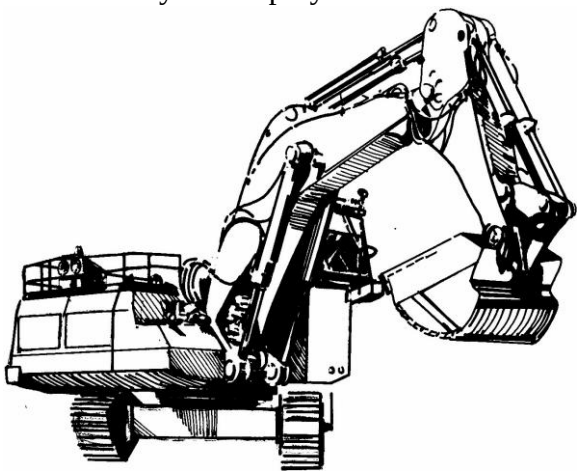
The exhaust system for diesel engines should be equipped with an appropriate exhaust muffler, directed away from the operator.

3. Alternative Technology

There is no alternative technology.

EXCAVATORS - WHEEL OR TRACK

Excavators are mounted on either wheels or tracks and are diesel powered hydraulically operated. They can be configured as a hoe to dig down and back, toward itself, or as a shovel that digs up and away from itself. They are employed in removal of overburden or ore loading.



1. Original Equipment Manufacturers (OEM)

The following table illustrates OEMs offering noise controls for new wheel or track excavators as standard equipment. Local dealers should be contacted for availability and further details.

Noise Control Availability from OEMs	
Manufacturer	**Acoustically-Treated Cab**
Badger Equipment	X
Caterpillar	X
Dresser/Komatsu	X
Gradall Hydraulic	X
Koehring Hydraulic	X
Liebherr America	X
Melroe Bobcat	X*
Takeuchi Manufacturing, Ltd.	X*
"X" indicates product availability. * Some models	

For excavators without noise controls, additional retrofit noise controls are needed. For details regarding retrofit noise control applications, refer to Section 2.

2. Retrofit Noise Controls

This section deals with excavators without noise controls. The effectiveness of the retrofit noise controls is dependent upon the quality of both acoustical materials and its installation.

Major areas where retrofit noise controls should be considered include:

A. Operator's Control Area

The most effective retrofit noise control for wheel or track excavators is an acoustically-treated operator's cab. If the cab structure is not present, then either a custom cab builder should be contacted or a "do-it-yourself" cab should be built by maintenance personnel. A list of custom cab builders appears in Appendix C. These manufacturers have numerous cabs available for a wide range of equipment. In some situations, where a large number of custom cabs are needed, the custom-built cab manufacturers may design and fabricate the cab for installation on a specific machine.

For a "do-it-yourself" cab installation, the following overview focuses on the areas of prime concern regarding cab design.

1. A rigid frame work of tubular or angle iron steel should be employed.

2. The outer surface should be constructed of flame-retardant plywood or sheet metal.

3. Inside surfaces should be treated with the appropriate acoustical materials.

4. Doors and windows should be composed of safety glass and well-sealed to prevent leaks.

5. An environmentally-controlled interior should be provided consisting of heating/air-conditioning and a filtered air supply.

B. Exhaust System for Diesel Engines

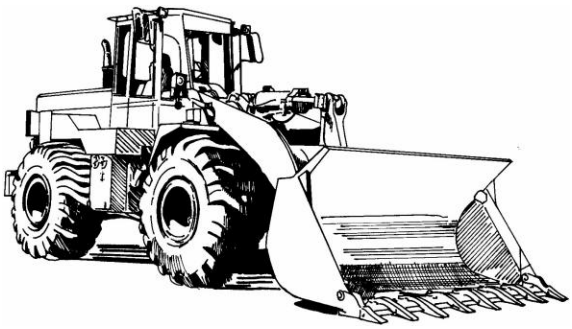
The exhaust system for diesel engines should be equipped with an appropriate exhaust muffler.

3. Alternative Technology

There is no alternative technology.

FRONT-END LOADERS

A front-end loader is a wheel- or crawler-mounted tractor with a front-mounted bucket. It is utilized in excavating, loading, and transporting material. Because of its versatility, it is found in a wide variety of mining applications. Its articulated frame gives the machine excellent maneuverability. Standard equipment is noted; optional equipment shows cost.



1. Original Equipment Manufacturers (OEM)

The following table illustrates OEMs offering noise controls for new front-end loaders. Local dealers should be contacted for further details.

Noise Control Availability from OEMs			
Manufacturer	**Fully-Treated Cab**	**Optional Cab**	**Muffler**
Caterpillar	X	None	X
Coyote	X	None	X
Kawasaki	X	None	X
Komatsu/Dresser	X	None	X
Marathon/LeTourneau	X	None	X
Hitachi	X	None	X
Fiat-Allis	X	None	X
O&K Trojan	X	None	X
Terex	X	None	X
Unit Rig (Dart)	X	None	X
VME America	X	None	X
Case	None	X	X

Noise Control Availability from OEMs			
Manufacturer	**Fully-Treated Cab**	**Optional Cab**	**Muffler**
Kobelco	None	X	X
Mitsui	X*	X*	X
Waldon	None	X**	X
Melroe (Bobcat)	None	X	X
"X" indicates product availability. **Larger models *Smaller models			

For front-end loaders without sound suppressed cabs, retrofit noise controls are needed. For details regarding retrofit noise controls, refer to Section 2.

2. Retrofit Noise Controls

The following table illustrates OEMs offering retrofit noise controls for front-end loaders. Local dealers should be contacted for further details.

Retrofit Noise Control Availability from OEMs	
Manufacturer	**Treated Cab**
Case	X
Kobelco	X
Mitsui	X
Waldon	X
Melroe (Bobcat)	X
"X" indicates product availability.	

Additional retrofit noise controls are aftermarket add-on cab kits. Appendix C lists dealers of aftermarket cab kits.

Existing cabs should be lined with acoustical material to absorb and/or block-out sound. Appendix B lists sources for purchasing acoustical materials.

3. Alternative Technology

Radio remote control systems are now becoming available for a wide range of equipment. The use of radio remote controls on front-end loaders, in conjunction with an appropriate exhaust muffler, can reduce operator noise exposure. A partial listing of manufacturers of radio remote control systems is as follows:

Black Box, Incorporated
586 Main Street
Glen Williams, Ontario L7G 3T6
Canada
Phone: 905.873.0141
Fax: 905.877.1809

Catron, Incorporated
58 West Shenago Street
Sharpsville, Pennsylvania 16150-1198
Phone: 412.962.3571
Fax: 412.962.4310

Futaba Corporation of America
4 Studebaker
Irvine, California 92618
Phone: 714.455.9888

Joy Mining Machinery
177 Thorn Hill Road
Warrendale, Pennsylvania 15086
Phone: 724.779.4500

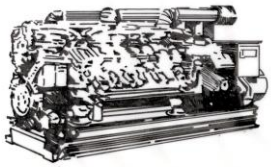
Moog Incorporated–Industrial Division
Electrohydraulic Servocontrols
Department T
East Aurora, New York 14052
Phone: 716.652.2000

Tunnel Radio of America
33868 Southeast Eastgate Circle
Corvallis, Oregon 97333-2248
Phone: 541.758.5637
Fax: 541.758.1417

Vectran Corporation
2170 William Pitt Way
Oakmont, Pennsylvania 15139
Phone: 412.826.3100

GENERATORS - DIESEL ELECTRICAL

Generators convert one form of energy into another; specifically, mechanical energy into electrical. These machines are an excellent mobile source of power and are used extensively on surface mining operations to power conveyor belts, sizing screens, crushers, pumps, and other auxiliary machinery.



1. Original Equipment Manufacturer (OEM)

Caterpillar offers noise controls as standard equipment on new generators. Local dealers should be contacted for specific needs and details.

2. Retrofit Noise Controls

When laying out work sites, electrical generators and other noise generating equipment should be located away from work areas and especially entrances to slopes and shafts.

Noise barriers or enclosures should be installed around high noise level equipment.

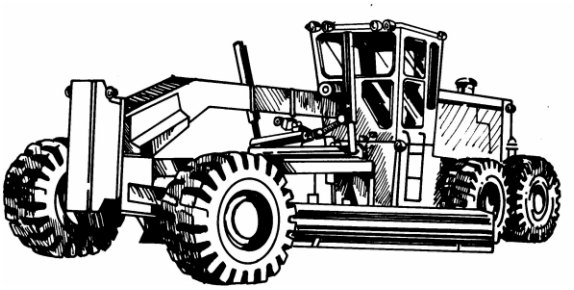
Barriers of plywood or other similar material should be constructed to reduce exposure to noise from diesel engines. An alternative would be to set up the generator at a remote location away from routine work areas.

3. Alternate Technology

There is no alternative technology.

GRADERS

Graders are either a self-propelled or towed machine with a centrally located blade that can be angled to cast material to either side. They are commonly utilized to maintain haulage roads and in reclamation work.



1. Original Equipment Manufacturers (OEM)

The following table illustrates OEMs offering noise controls for new graders. Local dealers should be contacted for availability and further details.

Noise Control Availability from OEMs					
Manufacturer	**Cab**	**Acoustic Material in Cab**	**Muffler**	**Optional Sound Suppression Kits**	**Optional Engine Side Hood**
Kolman/Athey	X*	X	X	X*	None
Caterpillar	X	X	X	X	X
John Deere	X	X	X	None	None
Komatsu/Dresser	X	X	X	X*	X
"X" indicates product availability.				*Optional	

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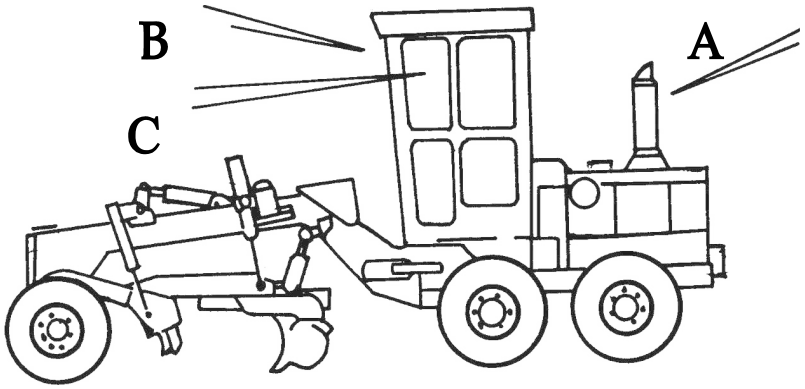


Locations for Retrofit Noise Controls

2. Retrofit Noise Controls

A. Exhaust Muffler

An exhaust muffler should be installed if there is not one present or if the existing muffler is faulty.

B. Acoustically-Treated Cab

If no cab exists, an acoustically-treated cab should be added to the grader. Cabs should be equipped with acoustical materials as well as air conditioning for operator comfort.

C. Acoustical Material Added to Existing Cab

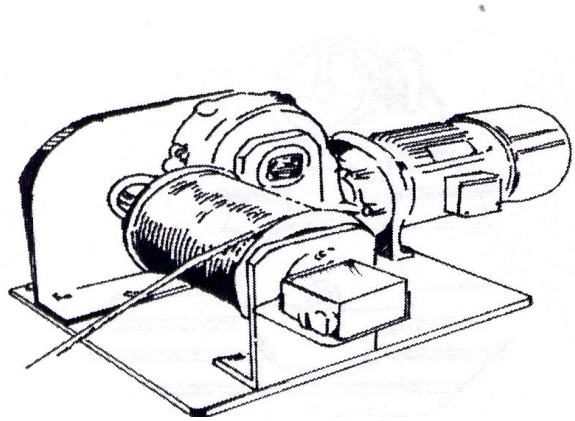
If there is an existing cab on the grader and a noise problem still exists, the cab should be treated with acoustical material. Since the major noise sources (the exhaust, the engine, and fan) are behind the operator, the rear wall of the cab should be treated with a composite-type acoustical material. This material, consisting of a high-density, vinyl septum sandwiched between two layers of fiberglass provides a barrier to sound which enters from the rear, as well as an absorber of sound that enters the cab. The rest of the cab should be treated with fiberglass absorption material. The floor should be treated with an acoustical floor mat to block sound caused by structural vibrations entering through the floor area.

3. Alternative Technology

There is no alternative technology.

HOISTS

Hoists are utilized to move equipment, material, or miners into and out of mines. They are also an intricate part of the lifting capability of a dragline.



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1. Original Equipment Manufacturer (OEM)

Nordberg is the only OEM offering noise controls as standard equipment on new hoists. Local dealers should be contacted for specific needs and details.

2. Retrofit Noise Controls

Use prudent site planning to locate noise generating equipment away from work areas and especially entrances to slopes or shafts.

Noise barriers or enclosure should be installed around high noise level equipment.

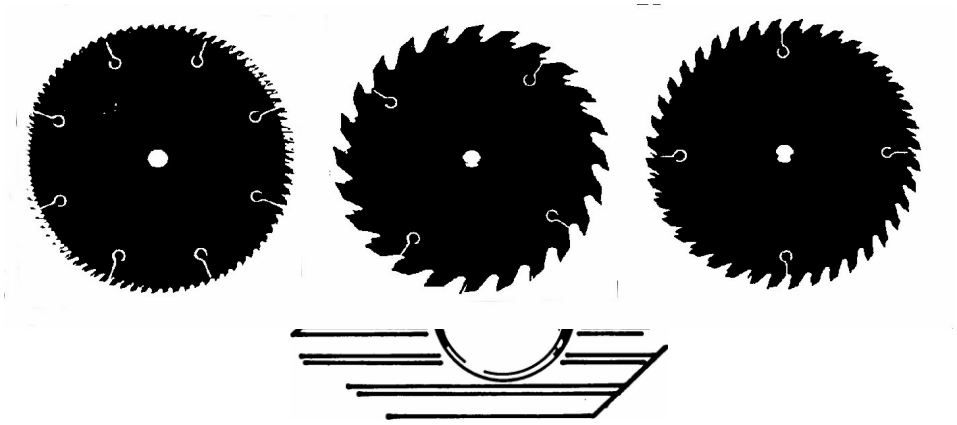
A commercially available control booth or a home-made booth should be constructed to isolate the hoist operator. An acoustically treated enclosure can be constructed from flame retardant plywood or sheet metal. The structure can be supported by treated lumber posts or iron framework. Install safety glass for windows and treat interior of booth with fiberglass absorptive blanket material.

3. Alternate Technology

There is no alternative technology.

SAWS – STONE

Stone saws vary in size, from small hand-held units to those with a 10-foot diameter blade. They are utilized to shape small landscaping blocks, cut thin sheets of granite or marble, and cut slate into blocks for roofing material or other cutting purposes.



1. Original Equipment Manufacturer (OEM)

The following OEM offers noise controls as standard equipment for new saws. The local dealer should be contacted for availability and further details.

W. F. Meyers Company, Inc.

For stone cutting saws without noise controls, retrofit noise controls are needed. For details regarding retrofit approaches, refer to Section 2.

2. Retrofit Noise Controls

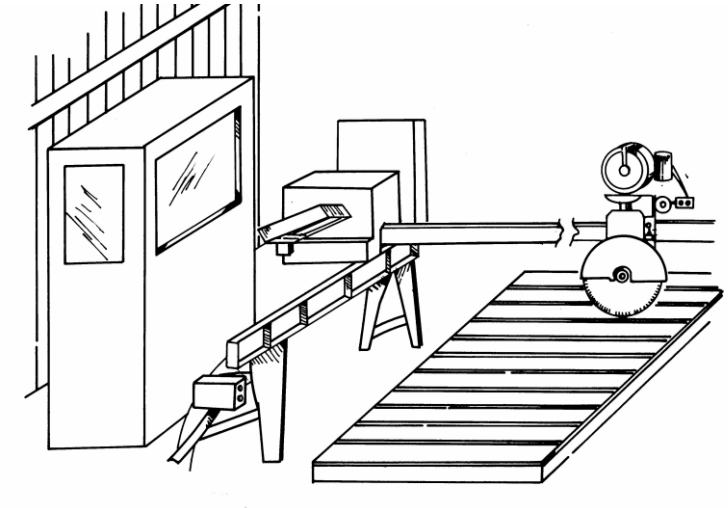
This section deals with retrofit noise controls for stone cutting saws. The following list does not necessarily contain all sources of listed items. Local distributors and service representatives should be contacted for availability.

Noise controlled cutting blades are available for existing saws.

The following lists the sources for these blades.

Retrofit Noise Control Availability from OEMs		
Manufacturer/Distributor	**Composite Blade Laminated**	**Silent Core Blade - w/filled expansion slots**
W. F. Meyers Company, Inc.	X	X
Sawing Systems, Inc.	X	None
Park Industries	X	None
New England Diamond	X	None
Consolidated Diamond	X	None
Con-Cut Blades	X	None
"X" indicates product availability.		

In addition to the above, the following retrofit measures may be implemented (refer to illustration below):



Remote Control Operation from Operator Booth

A. A barrier or enclosure may be placed between the saw operator and the saw.

B. Sound absorption material may be installed inside the saw blade guard.

C. The saw may be remotely operated from an operator booth.

D. The entire sawing operation may be automated which would minimize operator exposure.

3. Alternative Technology

The following equipment/technology may be considered as alternative methods for cutting stone with circular stone saws.

List of OEMs Providing an Alternate Method for Stone Cutting				
Manufacturer/Distributor	**Automated Channel Burner**	**Waterjet Cutter**	**Narrow Belt Block Saw**	**Diamond Wire Saw**
Thermal Channeling	X	None	None	None
John Lutz	X	None	None	None
Park Industries	None	None	X	None
Standish Steel, Inc.	None	None	X	None
Precision Stonecraft	None	None	None	X
NedJet Cutting Systems, Inc.	None	X	None	None
"X" indicates product availability.				

SCRAPERS

Scrapers are unique machines because of their ability to excavate material in thin horizontal layers, transport the material a considerable distance and then spread the material. All units have two axles and articulated body designs. There are four basic configurations which differ in the number of engines and whether or not they have an elevator to assist in material loading. Scrapers are most commonly utilized in topsoil removal, general reclamation and overburden removal.

1. Original Equipment Manufacturer (OEM)

The following table illustrates OEMs offering noise controls for new scrapers. Local dealers should be contacted for availability and further details.

Noise Control Availability from OEMs		
Manufacturer	**Sound Suppressed Cab**	**Air-Conditioning Unit & Muffler**
Caterpillar	X	X
John Deere	X	X
Komatsu	X	X
Terex	X	X

Maximum noise reduction can be achieved by installing an acoustically-treated cab.

2. Retrofit Noise Controls

Unfortunately, due to space limitations in the operator's cab area, only a limited amount of retrofit noise controls can be incorporated. These controls can be summarized as follows:

A. Replacement of cracked windows and cracked door seals in the cab area.

B. Installation of a composite-type acoustical material to the interior wall areas of the cab.

C. Installation of an absorptive-type acoustical material to the interior ceiling area of the cab.

D. Installation of a skid-resistant acoustical floor mat material to the floor are of the cab, making sure that any foot pedals and controls have complete freedom of movement.

E. Installation of an appropriate exhaust muffler.

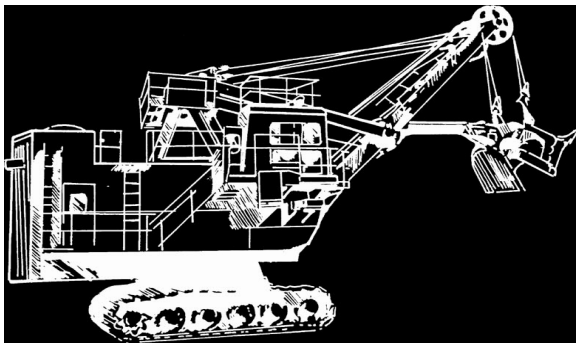
F. Installation of heating, air-conditioning and filtered air units for the operator's comfort and incentive to keep doors/windows closed during operation.

3. Alternative Technology

There is no alternative technology.

SHOVELS

There are two types of shovels in service: the loading shovel and the stripping shovel. The primary difference is in the size, with the stripping shovel being the larger of the two. Stripping shovels are primarily utilized to remove overburden in strip mines, while loading shovels are used to load large haulage trucks.



1. Original Equipment Manufacturers (OEM)

The following table illustrates OEMs offering standard equipment on new shovels. Local dealers should be contacted for specific needs and details.

Noise Control Availability from OEMs		
Manufacturer	**Sound Suppressed Cab**	**Air-Conditioning Unit & Muffler**
Bucyrus Erie Company	X	X
Caterpillar, Inc.	X	X
Harnischfeger	X	X
Indresco, Inc.--Marion Division (Bucyrus International)	X	X
Kobelco America, Inc.	X	X
Komatsu Dresser Company	X	X
Liebherr-America, Inc.	X	X
Mannesmann Demag Corp.	X	X
"X" indicates product availability.		

2. Retrofit Noise Controls

Retrofit noise controls are not available from the OEMs.

In smaller shovels all openings to the engine and cable pulley assemblies should be sealed off from the operator's compartment. Sound-absorptive material should be installed on the walls and roof of the operator's compartment. Install a barrier behind the operator to provide isolation from the low-frequency noise emitted from the diesel engine. The barrier can be composed of a mass-loaded vinyl material suspended from roller hooks mounted in a barn track or a flame-retardant plywood or metal wall containing a door. Sound absorptive/barrier materials for installation in the operator's compartment are available commercially from a number of manufacturers. Suppliers of these materials are listed in Appendix B.

Other potential engineering controls include, but are not limited to, the use of closed circuit TV, heat and vibration sensors, and the installation and use of automatic lubrication systems.

Replacement parts are commercially available for the exhaust systems (i.e., manifold, mufflers, pipes, clamps) from the engine manufacturer or the following suppliers:

Donaldson Company, Inc.
1400 West 94th Street
Minneapolis, Minnesota 55431
Phone: 612.887.3330

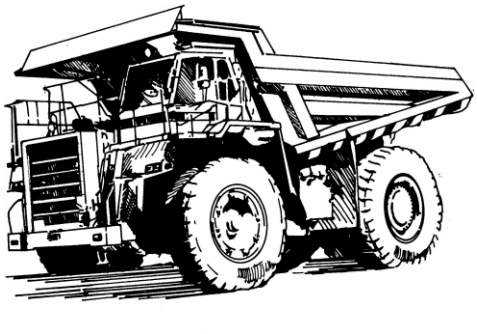
Nelson Industries, Inc.
P.O. Box 428
Stoughton, Wisconsin 53589
Phone: 608.873.4200

3. Alternative Technology

There is no alternative technology.

TRUCKS

Two basic truck designs are utilized in surface mining: the rear dump and the bottom dump. Truck bodies are filled by front-end loaders, hydraulic excavators, electric shovels, and bucket wheel excavators. They have either two or three axles, depending upon their size. In most cases, the noise control packages are standard equipment on these machines.



1. Original Equipment Manufacturers (OEM)

The following table illustrates OEMs offering noise control packages for new trucks. Local dealers should be contacted for availability and further details.

For trucks without noise controls, additional retrofit noise controls are needed. For details regarding retrofit approaches, refer to Section 2.

Noise Control Availability from OEMs	
Manufacturer	**Environmental Cab**
Atlas Copco Wagner	X
Caterpillar, Inc.	X
Dresser--Haulpak Division	X
Indresco, Inc.--Jeffrey Division	X
Kress, Inc.	X
Liebherr Mining Truck	X
Mack Truck, Inc.	X
Moxy Truck of America	X
Payhauler Corporation	X
Terex Division	X
Unit Rig	X

Noise Control Availability from OEMs	
Manufacturer	**Environmental Cab**
VME North America	X
Volvo Construction Equipment	X
"X" indicates product availability.	

2. Retrofit Noise Controls

This section is for trucks without noise controls. The effectiveness of noise controls is dependent upon the quality of both acoustical materials and installation.

Typically, acoustical absorptive material is applied on all cab interior walls (a composite material is placed on the firewall) and ceiling. An acoustical floor mat is installed on the floor. All openings to the outside are closed, and cracked or missing window glass is replaced. This treatment reduces airborne and structure-borne noise. Depending upon the size of the cab, the price range for these controls varies.

With an installation of this type, a filtered ventilation system with temperature control should be integrated into the cab.

Finally, a commercially-available muffler, compatible with the engine system, should be installed. If the muffler is located near the cab, then the exhaust end should be directed above the cab and away from the operator.

3. Alternative Technology

Radio remote control systems are now becoming available for a wide range of equipment. The use of radio remote controls on a haulage truck, in conjunction with an appropriate exhaust muffler, can offer substantial noise reductions. A partial listing of manufacturers of radio remote control systems is as follows:

Black Box, Incorporated
Glen Williams, Ontario L7G 3T6
Canada
Phone: 905.873.0141
Fax: 905.877.1809

Catron, Incorporated
58 West Shenago Street
Sharpsville, Pennsylvania 16150-1198
Phone: 412.962.3571
Fax: 412.962.4310

Futaba Corporation of America
4 Studebaker
Irvine, California 92618
Phone: 714.455.9888

Joy Mining Machinery
177 Thorn Hill Road
Warrendale, Pennsylvania 15086
Phone: 724.779.4500

Moog, Incorporated–Industrial Division
Electrohydraulic Servocontrols
Department T
586 Main Street
East Aurora, New York 14052
Phone: 716.652.2000

Tunnel Radio of America
33868 Southeast Eastgate Circle
Corvallis, Oregon 97333-2248
Phone: 541.758.5637
Fax: 541.758.1417

Vectran Corporation
2170 William Pitt Way
Oakmont, Pennsylvania 15139
Phone: 412.826.3100

APPENDIX A

A Partial Listing of Machine Manufacturers

Allis Mineral Systems (METSO)
20965 Crossroads Circle
Waukesha, WI 53186
Phone: 262.717.2500
Fax: 262.717.2501
www.metso.com

American Crane Corporation
202 Raleigh Street
Wilmington, NC 28412-6363
Phone: 910.395.8500
Fax: 910.395.8547
www.americancrane.com

Atlas Copco Wagner, Inc.
4424 North East 158th Avenue
Portland, OR 97230
Phone: 503.255.2863
Fax: 503.255.7175
www.atlascopco.com

Badger Construction Equipment
217 Patenaude Drive
Winona, MN 55987
Phone: 507.454.1563
www.badgerequipment.com

Brandford Vibrator Company
(Cougar Vibration Company)
150 John Downey Drive
New Britain, CT 06051
Phone: 860.826.4106
Fax: 860.826.4739
www.cougarvibration.com

Brydet Development Corporation
16867 State Route 83
Coshocton, OH 43812
Phone: 740.623.0455
www.brydet.com

Bucyrus International, Inc.
(Caterpillar)
1100 Milwaukee Avenue
South Milwaukee, WI 53172
Phone: 414.768.4000
Fax: 414.768.4474
www.mining.cat.com

Cronatron Welding Systems, Inc.
3805 Ridgecrest Court
Virginia Beach, VA 23456
Phone: 757.560.0196 MOBILE
Knichols@CronatronWelding.com

Case Corporation
700 State Street
Racine, WI 53404
Phone: 414.636.6011
Fax: 414.636.7809
www.casecorp.com

Consolidated Diamond
443 Newark Pompton Turnpike
Wayne, NJ 07470
Phone: 973.694.2400
Fax: 973.694.2863

Caterpillar
100 NE Adams Street
Peoria, IL 61629
Phone: 309.675.1000
www.mining.cat.com

Coyote Loader Sales, Inc.
6721 Chittenden Road
Hudson, OH 44236
Phone: 330.650.5101
Fax: 330. 650.5105

Donaldson Company, Inc.
1400 W 94th Street
Minneapolis, MN 55431
Phone: 612.887.3131
www.donaldson.com

FiatAllis
New Holland Construction Equipment
621 State Street
Racine, WI 53402
Phone: 888.365.6423
www.newholland.com

General Kinematics Corp
5050 Ricket Road
Crystal Lake, IL 60014
Phone: 815.455.3222
www.generalkinematics.com

Gill Rock Co., Inc.
903-905 Cornwall Road
Lebanon, PA 17042
Phone: 717.272.3861
Fax: 717.272.4140
www.gillrockdrill.com

Global Manufacturing, Inc.
1801 East 22nd Street
Little Rock, AR 72206
Phone: 501.374.7416
Fax: 501.376.7147
www.globalmanufacturing.com

Gradall Industries, Inc.
406 Mill Avenue South West
New Philadelphia, OH 44663
Phone: 330.339.2211
www.gradall.com

Hager Equipment Co., of Alabama, Inc.
1901 Morgan Road S. E.
Bessemer, AL 35022-4812
Phone: 205.424.1363
www.hagerequipment.com

Harnischfeger Industries, Inc.
3600 South Lake Drive
St. Francis, WI 53235
Phone: 414.486.6400
http://www.joyglobal.com

Hewitt-Robins Conveyor
(Goodman Hewitt Conveyor)
40 Fairfield Place
West Caldwell, NJ 07006
Phone: 973.777.5500
www.goodman-hewitt.com

Hypertherm
12304 South 18th Street
Jenks, OK 74037
Phone: 918.299.9676
www.hypertherm.com/

Indresco, Inc.
617 West Centre Street
Marion, OH 43302
Phone: 614.383.5221
Fax: 614.382.2052

Ingersoll Rand
1495 Valley Center Parkway
Bethleham, PA 18017
Fax: 610.882.8847
www.ingersollrand.com

Iskco Ltd.
P. O. Box 13274
Maumelle, AR 72113-0274
Phone: 501.812.0220
www.iskco.com

John Deere Company
1175 East 90th Street
Davenport, IA 52804
Phone: 319.388.4200
Fax: 319.388.4503
www.deere.com

Joy Mining Machinery
177 Thorn Hill Road
Warrendale, PA 15086
Phone: 724.779.4500
www.joyglobal.com

Joy Mining Machinery
2101 West Pike Street
Houston, PA 15342
Phone: 724.873.4200
www.joyglobal.com

Joy Mining Machinery
26161 Old Trail Road
Abingdon, VA 24210
Phone: 540.628.4141
www.joyglobal.com

Kinergy Corporation
7310 Grade Lane
Louisville, KY 40219
Phone: 502.366.5685
Fax: 502.366.3701
www.kinergy.com

Kobelco America, Inc.
12755 South Kirkwood Road
Stafford, TX 77477
Phone: 281.240.4800
Fax: 281.240.4906
www.kobelcoamerica.com

Koehring Cranes, Inc.
106 12th Street South East
Waverly, IA 50677
Phone: 319.352.3920

Kolman Athey
1839 South Main St.
Wake Forest, NC 27587-9289
Phone: 919.556.5171
Fax: 919.556.9503

Komatsu Mining Systems, Inc.
440 North Fairway Drive
Vernon Hills, IL 60061
Phone: 847.970.4100
www.komatsuamerica.com

Komatsu Dresser Company
200 Tri-State International
Lincolnshire, IL 60069
Phone: 708.831.6700
Fax: 703.831.7211

Kress Corporation
PO Box 229
Brimfield, IL 61517
Phone: 309.446.3395
Fax: 309.446.9625

Krupp Canada
1177 11th Avenue Southwest
Suite 405
Calgary, Alberta T2R 0G5
Canada
Phone: 403.245.2866
Fax: 403.245.2866
www.krupp-ag.com

Letourneau, Inc.
PO Box 2307
Longview, TX 75606-2307
Phone: 903.236.6535
Fax: 903.236.6585
www.letourneauinc.com

Liebherr Mining Truck, Inc.
4100 Chestnut Avenue
Newport News, VA 23605-2496
Phone: 804.245.5251

Lutz Equipment Company
1851 Morning Glory Drive
Elberton, GA 30635
Phone: 706.283.7428

Mack Trucks
(Volvo Group)
2100 Mack Boulevard
Allentown, PA 18104
Phone: 610.395.6801 or
866.298.6586
www.macktrucks.com

Magnum Manufacturing, Inc.
Eric Wolfe
8979 Lager Road
Phelan, CA 92371
Phone: 760.868.6748
www.magnumusa.com

Manitowoc Cranes, Inc.
PO Box 70
Manitowoc, WI 54221-0070
Phone: 920.684.6621
Fax: 920.683.6277
www.manitowoc.com

Mannesman Demag Corporation
29201 Aurora Road
Cleveland, OH 44139
Phone: 440.248.2400
Fax: 440.248.3874

Martin Engineering
1424 Wellington
Lansing, MI 48910
Phone: 517.487.5826
Fax: 517.374.7414
www.martin-eng.com

Melroe Company (Bobcat)
112 North University Drive
Fargo, ND 58108-6019
Phone: 701.241.8700
Fax: 701.241.8704
www.bobcat.com

Mitsui
1000 Town Center
Suite 1800
Southfield, MI 48075
Phone: 248.357.3300
Fax: 248.355.3572
www.mitsui.com

Moxy Trucks of America
611 Shepherd Drive
Cincinnati, OH 45215-2168
Phone: 513.563.9330 or 800.423.5923
Fax: 513.733.9180
www.moxytrucks.com

National Crane Corporation
11200 North 148th Street
Waverly, NE 68462
Phone: 402.786.6300
Fax: 402.786.6363

Nedjet Cutting Systems, Inc.
Worchester, MA
Phone: 508.798.8546
www.nedcorp.com

Nelson Industries
1801 U. S. Highway 51/138
PO Box 428
Stoughton, WI 53589-0428
Phone: 608.873.4200
Fax: 608.873.1552
www.nelsondiv.com

Novamac Industries, Inc.
449 Meloche
Dorval, Canada H9P2W2
www.novamac.com

O&K Trojan
Orenstein & Koppel, Inc.
8055 Troon Circle, Suite A
Austell, GA 30168-7849
Phone: 770.739.0100
Fax: 770.739.0194
rrussell@oandk.com
www.oandk.com

P&H Mining Company
4400 West National Avenue
PO Box 310
Milwaukee, WI 53201-0310
Phone: 414.671.4400
Fax: 414.671.7604

Park Industries
6301 Saukview Drive
St. Cloud, MN 56303
Phone: 800.328.2309
Fax: 320.251.8126

Payhauler Corporation
1333 N. Kirk Road
Batavia, IL 60510
Phone: 630.879.6100 or 800.323.5210
Fax: 630.879.6148

Petrogen International,LTD
Milt Heft
P.O. Box 1778
San Leandro, CA 94577
Phone: 510.569.7877
petrogen@petrogen.com

Precision Stonecraft, Inc.
2033 Castleway Lane
Atlanta, GA 30345
Phone: 404.634.8040
Fax: 404.634.2266
www.stonecraft.net

Rockmount Nassau, Inc.
11909 NE 95th St
PO Box 2909
Vancouver WA 98668
Phone: 800.272.7637
Fax: 360.254.2332
www.weldit.com

Salem Tool Company
PO Box 760
London, KY 40743-0760
Phone: 606.528.2963
Fax: 606.528.0026

Sawing Systems, Inc.
2918 Cherry Street
Knoxville, TN 37917
Phone: 453.525.0600
www.sawingsystems.com

Takeuchi Manufacturing Co.
1525 Broadmoor Blvd.
Buford, GA 30518
Phone: 770.831.0661

Tamrock Drilltech, Inc.
PO Box 338
Alaghua, FL 32616
Phone: 904.462.4100
Fax: 904.462.3247

Tamrock Loaders EJC
860 Westlake Parkway
Atlanta, GA 30336
Phone: 404.346.6820 or
800.TAMROCK
Fax: 404.346.6821

Terex Americas
PO Box 3107
Tulsa, OK 74107
Phone: 918.446.5581
Fax: 918.446.9752
www.terex.com

Unit Rig
(Division of Terex Corporation)
PO Box 3107
Tulsa, OK 74101
Phone: 918.446.5581
Fax: 918.445.5950
www.unitrig.com

Vibco Inc.
75 Stillson Road
P. O. Box 8
Wyoming, RI 02898-0008
Phone: 401.539.2392
Fax: 401.539.2584

VME Americas, Inc.
(Formerly Euclid-Hitachi)
23001 Euclid Avenue
Cleveland, OH 44117
Phone: 216.383.3000
Fax: 216.383.3187

W. F. Meyers Company, Inc.
1017 14th Street
Bedford, IN 47421
Phone: 812.275.4485 or 800.457.4055
Fax: 812.275.4055

Waldon, Inc.
201 West Oklahoma Avenue
Fairview, OK 73737
Phone: 405.227.3711
Fax: 405.227.2165
www.waldoninc.com

APPENDIX B

Buyer's Guide for Noise Control Products
(Reproduced with permission of *Sound and Vibration* magazine.)
This information is also available www.sandv.com under Issues ->
Buyers Guides -> July Issue ->Buyer's Guide to Products for Noise and Vibration Control

Sound Absorptive Materials
1. Felts
2. Foams
3. Glass Fiber
4. Mineral Fiber
5. Perforated Sheet Metal
6. Spray-On Coatings
7. Wall Treatments

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www.earsc.com
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2. Masking Noise Generators
3. Panels
4. Unit Absorbers
5. Wall Treatments

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3. Sealants and Sealing Tapes
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www.soundfighter.com
(4)

Soundown Corporation
16 Broadway
Salem, MA 01970
Phone: 978.745.7000
Fax: 978.745.0900
info@soundown.com
www.soundown.com
(5)

Vibro-Acoustics
727 Tapscott Rd.
Toronto, Ontario,
Canada M1X 1A2
Phone: 416.291.7371
Fax: 416.291.8049
info@vibro-acoustics.com
www.vibro-acoustics.com
(2, 4)

Vibration Damping Materials
1. Active Dampers
2. Adhesives
3. Constrained-Layer Composites
4. Coatings
5. Sheets
6. Tapes

3M E-A-R
7911 Zionsville Rd.
Indianapolis, IN 46268
Phone: 877.327.4332
Fax: 317.692.3111
info@earsc.com
www.earsc.com
(3, 5, 6)

Advanced Antivibration Components – AAC
2101 Jericho Turnpike
New Hyde Park, NY 11040
Phone: 516.328.3662
Fax: 516.328.3365
info@vibrationmounts.com
www.vibrationmounts.com
(5, 6)

American Acoustical
Products/Ward Process
311 Hopping Brook Rd
Holliston, MA 01746
Phone: 508.429.1165
Fax: 508.429.8543
info@aapusa.com
www.aapusa.com
(1-3, 5)

Barry Controls
82 South St
Hopkinton, MA 01748
Phone: 800.227.7962
Fax: 508.417.7224
info@barrycontrols.com
www.barrycontrols.com
(1, 3)

Blachford, Inc.
1400 Nuclear Drive
West Chicago, IL 60185
Phone: 630.231.8300
Fax: 630.231.8321
info@blachford.com
www.blachford.com
(2-6)

Industrial Noise Control, Inc.,
401 Airport Rd.
North Aurora, IL 60542
Phone: 800.954.1998
Fax: 800.420.4928
info@industrialnoisecontrol.
www.industrialnoisecontrol.
com
(4, 5)

Kinetics Noise Control, Inc.,
6300 Irelan Place
Dublin, OH 43017
Phone: 877.457.2695
Fax: 614.889.0540
info@kineticsnoise.com
www.kineticsnoise.com
(2, 4, 5)

McGill Air Silence, LLC,
2400 Fairwood Ave.
Columbus, OH 43207-2700
Phone: 614.829.1200
Fax: 614.829.1488
info@mcgillairsilence.com
www.mcgillairsilence.com
(2, 4, 5)

Moog CSA Engineering, Inc.
2565 Leghorn St.
Mountain View, CA 94043
Phone: 650.210.9000
Fax: 650.210.9001
info@csaengineering.com
www.csaengineering.com
(1, 3)

PAC International, Inc.
6585 Whispering Sands Dr.
Las Vegas, NV 89131-2221
Phone: 866.774.2100
Fax: 866.649.2710
info@pac-intl.com
www.pac-intl.com
(11)

RPG Diffusor Systems, Inc.
651-c Commerce Drive
Upper Marlboro, MD 20774
Phone: 301.249.0044
Fax: 301.390.3602
info@rpginc.com
www.rpginc.com
(3, 5)

Silentium
2 Bergman St.
Tamar Science Pk.
Rehovot 76703, Israel
Phone: +972.8.946.8664
Fax: +972.8.946.8604
info@silentium.com
www.silentium.com
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16 Broadway
Salem, MA 01970
Phone: 978.745.7000
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www.soundown.com
(3-5)

Taylor Devices, Inc.
90 Taylor Dr.
N. Tonawanda, NY 14120
Phone: 716.694.0800
Fax: 716.695.6015
info@taylordevices.com
www.taylordevices.com
(1)

The Soundcoat Company
1 Burt Drive
Deer Park, NY 11729
Phone: 800.394.8913
Fax: 631.242.2246
info@soundcoat.com
www.soundcoat.com
(2, 3-5)

Vibration Isolation Systems
1. Active Isolators
2. Bases
3. Cable Isolators
4. Elastomeric
5. Floating Floors
6. Machinery Mounts
7. Pipe Connectors
8. Pneumatic
9. Seismic
10. Steel Spring
11. Vibration Dampers

3M E-A-R
7911 Zionsville Rd.
Indianapolis, IN 46268
Phone: 877.327.4332
Fax: 317.692.3111
info@earsc.com
www.earsc.com
(4, 6, 11)

Acoustical Surfaces
123 Columbia Court N.
Chaska, MN 55316
Phone: 952.448.5300
Fax: 952.448.2613
info@acousticalsurfaces.com
www.acousticalsurfaces.com
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2101 Jericho Turnpike
New Hyde Park, NY 11040
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Fax: 516.328.3365
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Hopkinton, MA 01748
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www.barrycontrols.com
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info@eckelusa.com
www.eckelusa.com
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ECORE International
715 Fountain Ave
PO Box 989
Lancaster, PA 17601
Phone: 866.883.7780
Fax: 717.295.3414
info@qtsoundcontrol.com
www.ecoreintl.com/
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Fabreeka International, Inc.
1023 Turnpike St.
Stoughton, MA 02072
Phone: 800.322.7352
Fax: 781.341.3983
info@fabreeka.com
www.fabreeka.com
(4-6, 8, 10, 11)

Industrial Acoustics Co. Inc.
1160 Commerce Ave.
Bronx, NY 10462
Phone: 718.931.8000
Fax: 718.863.1138
info@industrialacoustics.com
www.industrialacoustics.com
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ITT - Enidine Inc.
7 Centre Dr.
Orchard Park, NY 14127
Phone: 716.662.1900
Fax: 716.662.1909
info@enidine.com
www.enidine.com
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Keene Building Products
5910 Landerbrook Dr.
Ste #210
Mayfield Heights, OH 44124
Phone: 877.514.5336
Fax: 440.605.1120
info@keenebuilding.com
www.keenebuilding.com
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Dublin, OH 43017
Phone: 877.457.2695
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www.kineticsnoise.com
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Maxxon Corp.
920 Hamel Rd.
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Hamel, MN 55340
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www.maxxoncorporation.com
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2565 Leghorn St.
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Sorbothane Inc.
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The VMC Group
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Fax: 416.291.8049
info@vibro-acoustics.com
www.vibro-acoustics.com
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Silencers
1. Active Attenuators
2. Ducts
3. Duct Silencers
4. Electric Motor Silencers
5. Fan Silencers
6. Filter Silencers
7. General Industrial Silencers
8. High-Pressure Exhaust Silencers
9. Intake and Exhaust Silencers
10. Pulsation Dampers
11. Splitter/Louvre Silencers

Acoustical Surfaces
123 Columbia Court N.
Chaska, MN 55316
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Fax: 952.448.2613
info@acousticalsurfaces.comwww.acousticalsurfaces.com (2-5, 8, 9)

Allied Witan Co.
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Fax: 440.237.9633
info@alwitco.com
www.alwitco.com
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www.barrycontrols.com
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Eckel Industries
Acoustic Division
155 Fawcett St.
Cambridge, MA 02138
Phone: 617.491.3221
Fax: 617.547.2171
info@eckelusa.com
www.eckelusa.com
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Exair Corporation
11510 Goldcoast Dr.
Cincinnati, OH 45249-1621
Phone: 513.671.3322
Fax: 513.671.3363
info@exair.com
www.exair.com
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George Koch Sons, LLC.
10 S. Eleventh Avenue
Evansville, IN 47712
Phone: 888.873.5624
Fax: 877.726.5427
info@kochllc.com
www.kochllc.com
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Industrial Acoustics Co.
1160 Commerce Ave.
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www.industrialacoustics.com
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North Aurora, IL 60542
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www.industrialnoisecontrol.com
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Kinetics Noise Control, Inc., 6300 Irelan Place
Dublin, OH 43017
Phone: 877.457.2695
Fax: 614.889.0540
info@kineticsnoise.com
www.kineticsnoise.com
(2, 3, 5, 7-9, 11)

McGill Air Silence, LLC,
2400 Fairwood Ave.
Columbus, OH 43207-2700
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www.mcgillairsilence.com
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Metal Form Manufacturing
5960 W. Washington St.
Phoenix, AZ 85043
Phone: 602.233.1211
Fax: 602.233.2033
info@mfmca.com
www.mfmca.com
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Silentium
2 Bergman St.
Tamar Science Pk.
Rehovot 76703, Israel
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Fax: +972.8.946.8604
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Soundown Corporation
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Phone: 416.291.7371
Fax: 416.291.8049
info@vibro-acoustics.com
www.vibro-acoustics.com
(1, 3, 5, 7, 9, 11)

APPENDIX C

Partial Listing of Aftermarket Cab Manufacturers,
Suppliers of Stud-Welding Systems

I. MOBILE SURFACE EQUIPMENT CAB MANUFACTUERS

Angus-Palm
315 Airport Drive
Watertown, SD 57201
Phone: 605.886.5681
Fax: 605.886.6179
www.angus-palm.com
OEM Cabs, ROPS & Custom Metal Fabrications

Cabs, Rops & Attachments, Inc.
8725 S. Gravel Pit Road
Iron River, WI 54847
Phone: 800.743.3993
Fax: 715.372.8950
www.cabs-rops.com
New and Reconditioned Cabs

Custom Products of Litchfield
1715 South Sibley Avenue
Litchfield, MN 55355-0070
Phone: 800.222.5463
Fax: 320.693.7252
www.800cabline.com
Custom-made Cabs

Kenco Manufacturing
P.O. Box 837
Atoka, OK 74525
Phone: 580.889.5222
Fax: 580.889.7151
www.kencomfg.com
New Cabs

Lake Superior Cabs, Inc.
121 West Harney Road
Esko, MN 55733
Phone: 800.328.1823
Fax: 218.879.4640
www.lakesuperiorcabs.com
Reconditioned Cabs, ROPS Skin Kits

Lankota, Inc.
270 West Park Avenue
Huron, SD 57350
Phone: 866.526.5682
Fax: 605.352.2927
www.lankotagroup.com
New and Retrofit Custom Cabs

Saf-T-Cab Inc.
P.O. Box 2587
Fresno, CA 93745
Phone: 800.344.7491
Fax: 559.268.5822
www.saftcab.com
Aftermarket Cabs

Sims Cab Depot
P.O. Box 340
200 Moulinette Road
Long Sault, Ontario, Canada K0C 1P0
Phone: 800.225.7290
Fax: 613.534.2182
www.cabdepot.com
Aftermarket Cabs and ROPS

II. STUD WELDERS, STUDS, COVER BUTTONS

Nelson Stud Welding
9008 S. Thomas Avenue
Bridgeview, IL 60455
Phone: 708.430.3770
Fax: 708.430.3975
www.nelsonstud.com

Stud Welding Company
750 Glen Avenue
Moorestown, NJ 08057
Phone: 800.523.5092
Fax: 856.866.1818
www.studweldingco.com

III. STICK-ON STUDS (SELF-ADHESIVE BACK)

Barrier Corporation
9806 SW Tigard Street
Tigard, OR 97223
Phone: 503.639.4192
Fax: 503.684.1515
www.barriercorp.com

APPENDIX D

Literature References

I. TRADE JOURNALS

Industrial Hygiene News
Rimbach Publishing, Inc.
8650 Babcock Boulevard
Pittsburgh, PA 15237
Phone: 800.245.3182
Fax: 412.396.9720
www.rimbach.com

Industrial Maintenance and Plant Operation
Advantage Business Media
P.O. Box 3574
Northbrook, IL 60065
Phone: 847.559.7560
Fax: 847.291.4816
www.impomag.com

Modern Materials Handling
EH Publishing Network
P.O. Box 1496
Framingham, MA 01701
Phone: 800.315.1578 x 294
Fax: 508.663.1599
www.mmh.com

New Equipment Digest
Penton Media, Inc.
1300 East 9th Street
Cleveland, OH 44114
Phone: 216.696.7000
Fax: 216.696.8208
www.newequipment.com

Pollution Equipment News
Rimbach Publishing, Inc.
8650 Babcock Boulevard
Pittsburgh, PA 15237
Phone: 800.245.3182
Fax: 412.396.9720
www.rimbach.com

II. MAGAZINES

Aggregates Manager
Randall Reilly Publishing
2340 S River Road, # 202
Des Plaines, IL 60018
(847) 636-5060
Fax: (847) 636-5077
www.aggman.com

Coal Age
Mining Media, Inc.
8751 East Hampden Avenue, Suite B-1
Denver, CO 80231
Phone: 303.283.0640
Fax: 303.283.0641
www.coalage.com

EHS Today
Penton Media, Inc.
1300 East 9th Street
Cleveland, OH 44114
(216) 696-7000
Fax: (216) 696-8208
www.ehstoday.com

Engineering & Mining Journal
Mining Media, Inc.
8751 East Hampden Avenue, Suite B-1
Denver, CO 80231
(303) 283-0640
Fax: (303) 283-0641
www.e-mj.com

Industrial Safety & Hygiene News
2401 W Big Beaver Rd, Ste 700
Troy, MI 48084
Phone: 847.763.9534
Fax: 847.763.9538
www.ishn.com

Occupational Safety & Health
1105 Media, Inc.
9201 Oakdale Ave., Ste 101
Chatsworth, CA 91311
Phone: 818.814.5200
Fax: 818.734.1522
www.ohsonline.com

Rock Products
Penton Media, Inc.
330 North Wabash Avenue,
Suite 2300
Chicago, IL 60611
(312) 595-1080
Fax: (312) 595-0295
www.rockproducts.com

Sensors
Questex Media Group
275 Grove Street, Suite 2-130
Newton, MA 02466
Phone: 888.552.4346
Fax: 617.219.8310
www.sensorsmag.com

Sound & Vibration
P.O. Box 40416
Bay Village, OH 44140
Phone: 440.835.0101
Fax: 440.835.9303
www.sandv.com

Urgent Communications
Penton Media, Inc.
330 North Wabash Avenue,
Suite 2300
Chicago, IL 60611
(312) 595-1080
Fax: (312) 595-0295
www.urgentcomm.com

III. GOVERNMENT PUBLICATIONS

"Noise Abatement of a Pneumatic Rock Drill," Report of Investigations (RI) 7998, U.S. Department of Interior (DOI), U.S. Bureau of Mines (USBM), 1974.

"Noise Reduction of a Pneumatic Rock Drill," RI 8082, DOI, USBM, 1975.

"Noise Control Proceedings," Informational Circular (IC) 8686, DOI, USBM, 1975.

"Noise Control of Diesel-Powered Underground Mining Machines," IC 8837, DOI, USBM, 1979.

"Summary of Noise Controls for Mining Equipment," U.S. Department of Labor (DOL), Mine Safety and Health Administration (MSHA), 1985.

"Bulldozer Noise Control," Contract Number J0177049 Bolt, Beranek, and Newman, Inc., DOI, USBM, 1980.

"Front-End Loader Noise Control," Contract Number J0395028, Bolt, Beranek, and Newman, Inc., DOI, USBM, 1980.

"Mining Machinery Noise Control Guidelines," DOI, USBM, 1983.

"Improving Barrier Insertion Loss," IR 1117, DOL, MSHA, 1980.

"Compendium of Materials for Noise Control," NIOSH Publication No. 80-116, 1980.

"Fabrication Manual for a Reduced-Noise Auger Miner Cutting Head," IC 8971, DOI, USBM, 1984.

"Retrofit Noise Control Modifications for Crushing and Screening Equipment in the Nonmetallic Mining Industry—An Applications Manual," IC 8975, DOI, USBM, 1984.

"Noise Control of an Underground Continuous Miner-Auger Type," Informational Report (IR) 1056, DOL, MSHA, 1977.

"In-Plant Partial Noise Enclosures for the Mining Industry," IR 1154, DOL, MSHA, 1993.

IV. REFERENCE BOOKS

"Noise Control for Buildings and Manufacturing Plants", Bolt, Beranek, and Newman, Inc., 1981.

"Noise and Vibration Control," Leo Beranek, 1971.

"Handbook of Noise Control," Cyril Harris, 1957.