



Workplace Noise Management Guideline



Issue 1

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Acknowledgements

The CMPA would like to acknowledge those who contributed to the development of this guideline titled “CMPA Workplace Noise Management Guideline.”

Author: David McKelvie – DMcK Management Pty Ltd trading as **Safe Mix**

Consultative Advisory Team for CMPA Noise Management Guideline 2016

Graeme Campbell - SLR

Ron Kerr – Conundrum Holdings Pty Ltd.

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Disclaimer

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1. Overview

This Workplace Noise Management Guideline (Guideline) together with the CMPA's Work Safely Reference Manual aims to support members in meeting the requirements of the Victorian Occupational Health and Safety Act 2004 and the Victorian Occupational Health and Safety Regulations 2017.

In doing so, the CMPA endeavours to:

- Provide members with appropriate management practices required to minimise potential health and safety risks associated with noise arising from construction materials industry operations; and
- Assist members in establishing and maintaining a Work Plan that defines operational activity so as to obtain and sustain an Extractive Industry Work Authority.

2. Scope

This Workplace Noise Management Guideline is specific to noise arising from the workplace e.g., occupational noise and its potential impact on workers through exposure within the workplace and focuses on the following:

- Noise Legislation;
- Noise Hazards;
- Potential Impacts associated with Hazardous Noise;
- Noise Monitoring & Measurement;
- Noise Control; and
- Audiometric Testing and Audiological Examinations.

This Workplace Noise Management Guideline does not include reference to environmental noise and its potential impact on the community, Refer CMPA Environmental Noise Guidelines

Attachments to this Guideline:

- Attachment A – Noise Hazard ID Checklist

3. Relevant Legislation, Policy and Resource Materials

References and Guidance Materials

- WorkSafe Guidance Note “Audiometric (hearing) testing 2013”;
- Managing Noise and Preventing Hearing Loss at Work, Safe Work Australia Code of Practice;
- AS/NZS 1269 Occupational Noise Management;
- AS/NZS1269.1 Occupational Noise Management Measurement and Assessment of Noise Immission and Exposure Guidance;
- WorkSafe Compliance code – Noise, Edition 1 March 2018;
- Control of Noise in Quarries, Health and Safety Executive (UK); and
- Seton Australia Pty Ltd Website - <https://www.seton.net.au>
- Tinnitus Association of Victoria - <https://www.tinnitus.org.au>

Legislation

- Victorian Occupational Health and Safety Act 2004 (Victorian OHS Act 2004)
- Victorian Occupational Health and Safety Regulations 2017 (Victorian OHS regulations 2017)

Overview

Workplace noise is regulated through the Victorian OHS Act 2004 and specifically the Victorian OHS Regulations 2017-part 3.2 Noise, inclusive of the following divisions:

- Division 1—Duties of designers, manufacturers and suppliers of plant;
- Division 2—Duties of employers; and
- Division 3—Audiometric tests and audiological examinations.

The WorkSafe Victoria Compliance Code Noise Edition 1 March 2018 has been established to provide practical guidance to employers about how to comply with their duties under the OHS Act and OHS Regulations.

Employers Duties

An employer’s primary duty under the regulations is to ensure, so far as is reasonably practicable, that workers and other workers are not exposed to health and safety risks arising from exposure to noise hazards in the workplace.

Employers must ensure that;

- The noise a worker is exposed to at the workplace does not exceed the exposure standard for noise;
- They consult with relevant workers when making decisions in regards to noise control that may affect those workers; and
- They provide ongoing audiometric testing to a worker who is frequently required to use Hearing Protection Devices (HPDs) to protect the worker from hearing loss associated with

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noise that is equal to or exceeds the exposure standard. (Refer Section 9 Health Surveillance).

Workers Duties

Workers have a duty to take reasonable care for their own health and safety and that they do not adversely affect the health and safety of other workers.

Workers must comply with any reasonable instruction and cooperate with any reasonable policy or procedure relating to health and safety at the workplace.

For example, if HPDs are provided by the employer conducting the business the worker must use them in accordance with the information, instruction and training provided.

Designers, Manufactures, Suppliers & Installers Duties

Designers, manufacturers, suppliers, importers and installers of plant or structures that could be used for work must:

- Ensure the plant is designed and manufactured so that its noise emission is as low as reasonably practicable; and
- Provide information about the noise emission values of the plant and any conditions necessary for minimising the risk of hearing loss and other harm.



Example of Sound Proof Operators Cabin

Due Diligence Requirements

Company Directors, have a duty to exercise due diligence to ensure that the business complies with the OHS Act and Regulations.

Due diligence is defined as taking reasonable steps to:

- Acquire and keep up to-date knowledge of WHS matters;
- Maintain an understanding of the nature of the operations, inclusive of hazards and risks ;
- Ensure appropriate resources and processes to eliminate or minimise risks to health and safety are available and used;
- Ensure appropriate processes for receiving and considering information regarding incidents, hazards and associated risks and responding in a timely way;
- Implement processes for complying with any duty or obligation under WHS legislation; and
- Verify the provision and the use of the resources and processes referred to above.

In summary, Directors must undertake all reasonable steps to ensure that the business has and uses appropriate resources and processes to eliminate or minimise risks that arise from noise hazards as far as is reasonably practicable.

What does Reasonably Practicable mean?

Section 20 of the Victorian Occupational Health and Safety Act 2004 sets out what is meant by “so far as is reasonably practicable” and lists five matters that require consideration and must be taken into account:

- The likelihood of a worker being exposed to harm;
- The potential seriousness of that harm;
- What is known, or ought to be known, about the risk;
- How to eliminate the risk, and
- The availability, suitability and the cost of eliminating or reducing the risk.




4. WHS Responsibilities

As stated in the previous section of this guideline there are many specific Workplace Health and Safety duties under the OHS Act and the OHS Regulation specific to hazardous noise.

Depending on the workplace management arrangements these duties, i.e., responsibilities may be allocated to various persons, e.g., the Quarry Owner (Work Authority holder), Site Manager or Supervisor, OHS Representative or other workers.

It is important that these responsibilities are documented within position descriptions, responsibility statements or other documents. A review of the progress in enacting these responsibilities should be conducted on an annual basis or post noise monitoring and measurement where results identify exposure levels equal to or above the exposure standard

	<p style="font-size: small; margin: 0;">WHS MS</p> <p style="margin: 0;">Quarry Supervisor - WHS MS Responsibilities Statement</p>												
<p>Quarry Supervisors are responsible for supporting the Operations Manager with the implementation and maintenance of the operational aspects of the WHS MS.</p> <p>These WHS MS specific responsibilities are listed in this Quarry Supervisor - WHS MS Responsibilities Statement.</p> <p>Quarry Supervisors will acknowledge their understanding of and commitment to these responsibilities</p> <p>I (.....) the appointed Quarry Supervisor acknowledge and accept these responsibilities.</p> <p>Where these responsibilities are not in my view achievable for whatever reason I commit to discussing such with the Operations Manager to seek resolution.</p>													
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5. Introduction to Noise

What is Noise?

Noise is a sound that is not necessarily wanted by the receiver because it may be unpleasant, loud, interfere with their hearing, and disturb their concentration or impact negatively on their way of living.

Noise pollution takes place when there is either an excessive amount of noise or an unpleasant sound that causes temporary or permanent disruption in the natural background noise and may result in harm to human hearing.

This definition is usually applicable to sounds or noises that are unnatural in either their volume or their production and are often generated by industry.

What is Sound?

Sound is the energy “things” produce when they vibrate, forcing the air all around it to vibrate as well.

As the air moves it carries energy in all directions. Eventually even the air inside your ears starts vibrating and that is when you begin to perceive energy as a sound.

Sound travels out from a definite source (such as a noisy machine) and has to have something to travel through (known as a medium), such as air, water, glass, or metal.

The first worker to discover that sound needs a medium was an English scientist Robert Boyle (1627–1691). He carried out an experiment where he set an alarm clock ringing, placed it inside a large glass jar, and while the clock was still ringing, sucked all the air out with a pump. As the air gradually disappeared, the sound died out because there was nothing left in the jar for it to travel through.

In short, there are two different aspects to sound.

There is a physical process that produces sound energy to start with and sends it shooting through the air, and there is a separate psychological process that happens inside our ears and brains, which convert the incoming sound energy into sensations we interpret as noises, speech, and music etc.



Sound Carriage

Sound waves lose energy as they travel. That is why we can only hear things at certain distances and why sounds travel less well on blustery days when the wind dissipates their energy than on calm days.

The speed of sound in air (at sea level) is about 1220 km/h (340 metres per second). Compared to light waves, sound waves creep along at a snail's pace—about a million times slower.

You see lightning much sooner than you hear it because the light waves reach you pretty much instantly, while the sound waves take about 5 seconds to cover each 1.6 km.



Workplace Noise

Noise is a common hazard across all industry that has the potential to adversely affect the health of exposed workers.

The construction materials industry has the potential, without effective controls being in place, to generate hazardous noise levels through many processes inclusive of the operation of fixed plant, mobile equipment and road trucks, the undertaking or maintenance and the blasting of hard rock.



Noise Hazards

A hazard is anything with the potential to cause harm to the safety and health of people, to equipment, property or to the environment.

Risk is the likelihood and possible consequences of exposure to the hazard.

Exposure to noise is cumulative and a worker may perform a number of noisy work activities over time which, in combination, may expose the worker to hazardous noise.

Identification of noise hazards must be undertaken in consultation with your workers and their HSR where applicable. As a guide, if you need to raise your voice to communicate with someone about one metre away, the surrounding noise is likely to be hazardous to hearing.

A checklist is provided to assist in the identification of noise hazards in your workplace.

Refer attachment A – Noise Hazard ID Checklist.

Regular inspections of the workplace, talking to workers and observing how tasks are carried out will assist you to identify noise hazards.

Attachment A - Noise Hazard ID Sheet

Site		Conducted by	
Site Location		Date	

Yes to any of the following indicates the need to carry out a further assessment potentially inclusive of a noise assessment if exposure to the noise cannot be immediately controlled.

Hazard Identification Questions	Yes	No
Is a raised voice needed to communicate with someone about one metre away?		
Do your workers notice a reduction in hearing over the course of the day? (This may only become noticeable after work, for example, needing to turn up the radio on the way home)		
Are your workers using noisy powered tools or machinery?		
Are there noises due to impacts such as metal hammering, rock hammering, pneumatic impact tools or explosive sources such as explosive powered tools?		
Are HPDs used for some work?		
Do your workers complain that there is too much noise or that they can't clearly hear instructions or warning signals?		
Do your workers experience ringing in the ears or a noise sounding different in each ear?		
Do any long-term workers appear to be hard of hearing?		
Have there been any workers' compensation claims for noise induced hearing loss?		
Has a determination i.e. monitoring & measurement of an employee's exposure to noise recorded levels equal to or above the exposure standard of 85 decibels (A-weighted) averaged over an eight-hour period, or a peak level of 140 decibels (C-weighted).		
Do the results of audiometry tests indicate that past or present workers have hearing loss?		
Actions	Whom	When

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Where noise can be immediately controlled, do so; otherwise enter the noise hazard into the relevant document to plan and establish its control, e.g., Issue of Resolution Procedure, Site Hazard Register or Site Action Plan.

Information regarding noise levels from the manufacturers or suppliers of existing plant and equipment used at the workplace should be obtained or the purchaser may set supplier objectives such as new plant or equipment improving on noise level of the old plant or equipment being replaced.

Common Sources of Hazardous Noise

The Construction Materials industry generates many sources of noise from types of various equipment and activities:

Quarries, Sand and Materials Recycling Plants

- Mobile Equipment - loaders, excavators, drills, rock hammers, dump trucks, reverse alarms, water carts, graders, dozers;
- Fixed Plant - crushers, screens, pug mills, conveyors, start-up sirens, hydraulic power packs, compressors, water pumps;
- Blasting, and blast warning sirens;
- Maintenance and workshop activities; and
- Road transport.



Concrete Plants

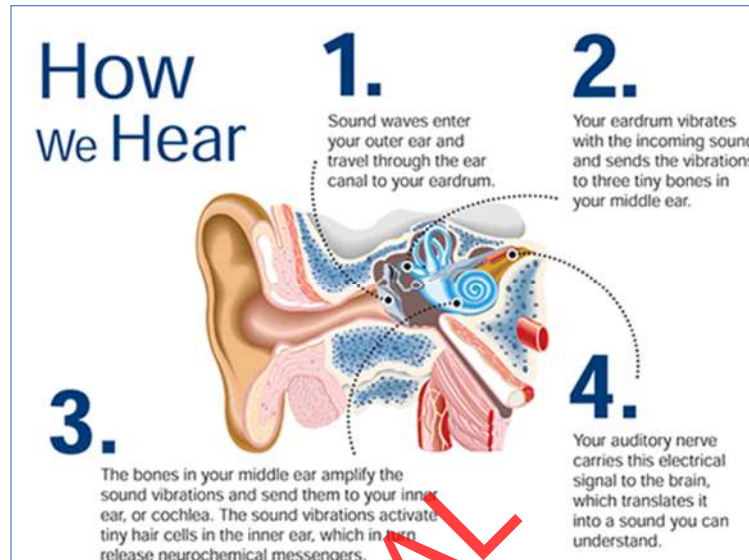
- Mobile Equipment – loaders;
- Fixed Plant – conveyors, alarms, bin filling, compressors, vibrators;
- Loading agitators and slumping/mixing loads;
- Maintenance and workshop activities;
- De-dagging agitators;
- Road transport; and
- Public address systems.



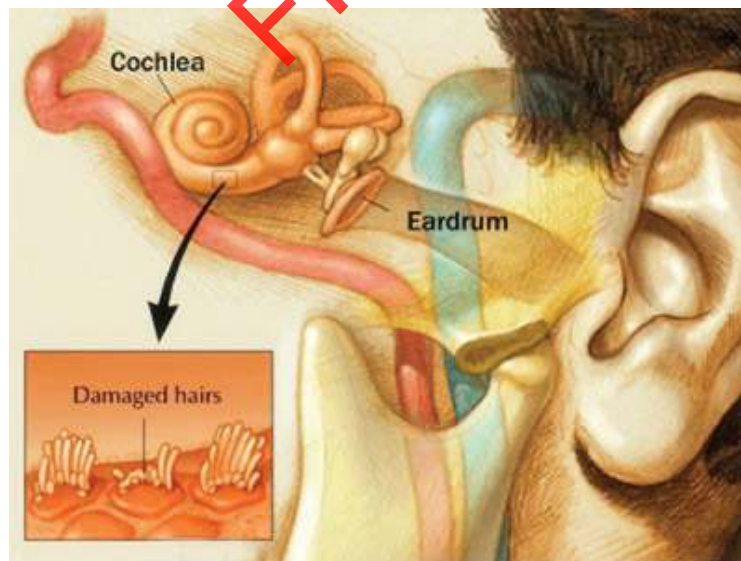
6. Potential Impacts associated with Hazardous Noise

Noise Induced Hearing Loss and Tinnitus

Hazardous noise affects the functioning of the inner ear, which may cause temporary hearing loss. After a period of time away from noise, hearing may be restored. With further exposure to hazardous noise, the ear will gradually lose its ability to recover and the hearing loss will become permanent and is known as Noise Induced Hearing Loss.



Permanent hearing loss results from the destruction of hair cells in the inner ear. These hair cells cannot be replaced or repaired by any presently known medical treatments or technology.



Usually, hazardous noise first affects the ability to hear high-frequency (high-pitched) sounds. This means that even though a worker can still hear some sounds, conversation will start to sound 'muffled' and a worker may find it difficult to understand what is being said.

Communication difficulties occur especially when there are competing background noises. Modern hearing aids may improve the ability to hear speech but they are unable to completely restore the clarity of the full hearing function.

Workers exposed to hazardous noise may also experience Tinnitus, which could become permanent. Tinnitus is a physical condition, experienced as noises or ringing in the ears or head when no such external physical noise is present. When severe, it may disrupt sleep, reduce concentration, make people extremely irritable and lead to depression.

The degree of hearing loss that occurs is dependent on how loud the noise is, how long someone is exposed to it and, to some extent, individual susceptibility. The frequency or pitch can also have some effect on hearing loss since high-pitched sounds are more damaging than low-pitched ones.

Hearing loss can also result from exposure to sudden loud noises, such as explosions, gun shots or heavy hammering. These types of noises are commonly referred to as impact noises and, if loud enough, can cause immediate, permanent damage. Permanent hearing loss may also be accompanied by tinnitus.

In summary, Noise Induced Hearing Loss is an irreversible condition that can have a terrible impact on a worker's life. If you are exposed to loud noise continually over a period of time, the nerve receptors in your inner ear may eventually die, and once that damage occurs it cannot be repaired.

Physical and Psychological Hazards

Noise can also be a physical hazard through distraction or disturbance, e.g., an unexpected loud impact noise may distract you from the task you are carrying out.

Continual hazardous noise in a workplace may also lead to impacts such as stress and fatigue.



7. Noise Monitoring & Measurement

Overview

The OHS Regulations state that an employer must conduct a determination i.e. monitoring & measurement of an employee's exposure to noise if, based on reasonable grounds, there is uncertainty as to whether the employee is or may be exposed to noise that exceeds the noise exposure standard.

Uncertainty can arise when noise in the work environment is variable, there are multiple sources of noise and the duration of an employee's exposure varies.

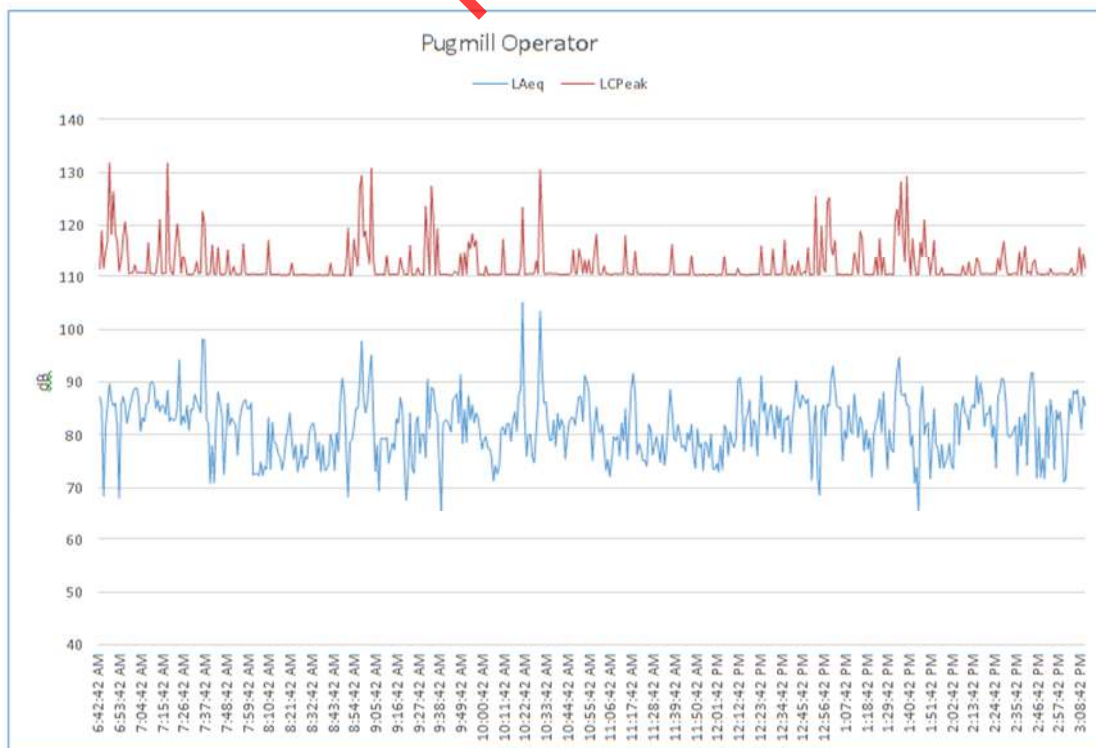
Where workers' exposure to noise varies from day to day, the determination needs to take that into account. As a general rule, the worst case scenario needs to be measured.

The determination needs to be done by a suitably competent person. The more complex the situation, the more knowledgeable and experienced the person needs to be. Some employers may be able to do the determination themselves, but many will need someone to do it for them.

A competent person is one who has through training and experience;

- Understands what is required by the OHS Regulations for noise;
- Knows how to check the performance of and calibrate the instruments prior to and during testing, and;
- Knows how to use the instruments and take the measurements properly; and can interpret and report the results of the noise measurements;

Persons who may be suitably qualified to do a noise determination include occupational health and safety consultants, occupational hygienists, acoustical consultants and hearing conservation consultants.



Example – Personal Noise Dosimetry Graph

Understanding the Decibel Scale

The decibel (dB) scale is a logarithmic scale and it works in a different way to the scale on a ruler, which is a linear scale.

On a ruler, a distance of 20 cm is twice as long as a distance of 10 cm.

The logarithmic decibel scale goes up in powers of ten: every increase of 10 dB on the scale is equivalent to a 10-fold increase in sound intensity which broadly corresponds with a doubling in loudness.

This means that a sound of 20 dB is 10 times more intense than a sound of 10 dB and a 30 dB sound is 100 times more intense.

Sounds high up the decibel scale from above 85 dB carry so much energy that damage to your hearing shall occur.

Typical Sound level in dB	Equivalent Noise Exposures - Sound source
140	Jet engine at 30 metres
130	Rivet hammer
120	Rock drill
110	Chain saw
	Angle grinding
100	Sheet-metal workshop
90	Lawnmower
85	Front End loader
80	Kerbside heavy traffic
	Metal Lathe
70	Loud conversation
60	Normal conversation
40	Quiet radio music
30	Whispering
20	Quiet urban room
10	Rustling leaves
0	Hearing threshold

4. RESULTS

Table 4.1 Sound Pressure Level Measurements

Location	Result (dB)	
	L _{Aeq}	L _{CPeak}
Primary Crusher		
- inside Control Room	64.0	102.1
- platform outside control room	93.3	121.1
- ground level	95.0	123.4
Secondary Crusher / Screen 1		
- ground level	98.6	117.5
- lower platform	99.0	122.1
Crusher 3 / 4		
- ground level	95.8	112.4
- lower platform	98.1 - 101.5	115.2 – 117.6
Screen 2		
- ground level	91.2	108.5
- lower platform	102.9	123.4
Screen 3		
- ground level	80.2	103.1
- lower platform	78.9	104.5
Screen 4		
- ground level	81.1	103.3
Pugmill		
- inside control room	75.1	102.8
- platform outside control room	92.0	126.3

Example – Sound Pressure Level Measurements in a Quarry

8. Workplace Exposure Standard

Victoria's workplace noise exposure standard is a level of 85 decibels (A-weighted) averaged over an eight-hour period, and a peak level of 140 decibels (C-weighted).

The standard relates to noise measured at the worker's ear and doesn't account for any protection which may be provided by HPDs. Higher noise levels are allowable for short exposure durations and conversely lower noise levels are acceptable for longer exposure periods.

Whether the exposure standard is exceeded depends on the level of the noise involved and how long a worker is exposed to that noise.

The table below demonstrates the combinations of various exposure levels and the total length of time someone can be exposed to that particular noise level before the standard is exceeded.

Exposure level dB	Maximum exposure time to ensure that 85 dB(A) is not exceeded
85	8 Hours
88	4 Hours
91	2 Hours
94	1 Hour
97	30 Minutes
100	15 Minutes
103	7.5 Minutes
106	3.8 Minutes
109	1.9 Minutes
112	57 Seconds
115	28.5 Seconds
118	14.3 Seconds
121	7.1 Seconds
124	3.6 Seconds
127	1.8 Seconds
130	0.9 Seconds

Multiple sources of sound need to be taken into account when calculating whether the exposure standard is likely to be exceeded. For example, if someone is exposed to 88dB for three hours and then 121dB for five seconds the exposure standard would be exceeded for that worker.

9. Noise Determination

Noise determination, i.e., measurement and monitoring must be undertaken taking into account the requirements of AS/NZS1269.1 Occupational Noise Management Measurement and Assessment of Noise Immission and Exposure Guidance.

The determination may be simple or complex depending on what is causing the noise and the nature of the work.

The determination needs to be done during a typical workday and must take into account the following factors:

- The level of noise to which the employee is exposed;
- The duration of exposure;
- Plant and other sources of noise at the workplace;
- Systems of work at the workplace (i.e., how the job is done), and
- Any other relevant factors.

Noise measurements should be taken at 0.1 to 0.2 m from the worker's ear canal entrance over a period of time that is representative of the noise produced during the tasks.

In most situations the use of a hand-held integrating sound level meter will produce the most useful information for choosing appropriate noise control measures. In situations where workers are highly mobile or access for the worker taking the measurement is difficult or unsafe, it may be more appropriate to use personal sound exposure meters also known as dose meters.



**Personal Sound
Exposure Meters**



**Hand-Held Integrating
Sound Level Meter**

Noise measurements should include the combined noise levels of all the tools, machines and processes present as well as the background noise from the general operation of the plant and mobile equipment, trucks etc. To identify which noise sources, contribute most to workers' exposures, the noise from each source or work activity should also be measured separately.

If a group of workers is exposed to identical sources of noise and their exposure is likely to be the same, then you do not need a separate assessment for each worker. A representative assessment can be done for one or more of the workers.

Records of Determination

A record of the determination must be established and maintained. Either the employer shall receive a report, i.e., Record of Determination from the consultant who undertakes the determination or shall establish their own report.

The report shall contain the results of the determination and describe how the employer has taken into account:

- The level of noise to which the worker is exposed;
- The duration of exposure;
- Plant and other sources of noise at the workplace; and
- Any other relevant factors.

The report shall be kept for as long as it remains relevant and shall be made accessible as required to all relevant workers or HSRs.

Workplace Changes

A noise assessment should be conducted where change to the physical work environment or an introduction of new or modified plant and equipment has the potential to create a noise hazard.

Where new plant and equipment is to be introduced through purchase lease or hire arrangements the invitation to tender should specify a maximum acceptable level of noise emission.

If plant is to be purchased directly, without tender, noise emission data should be obtained from suppliers to enable the plant with the lowest practicable noise level to be selected.

Any design or re-design of workplace environment and its associated equipment should take into account any potential noise hazards and identify controls to ensure noise levels are reduced as far as is reasonably practicable.



10. Noise Control - Hierarchy of Controls

The Victorian OHS Regulations require duty holders to work through a hierarchy of control to choose the control measure that most effectively eliminates or reduces the risk associated with the noise hazard as far as is reasonably practicable.

The hierarchy ranks the ways of controlling the risk of hearing loss from noise from the highest level of protection and reliability to the lowest so that the most effective controls are considered first.

Hierarchy of Controls for Noise		
Elimination	<i>Eliminate the need to use a particular piece of plant, equipment, or process</i>	Safe Place Controls
Substitution	<i>Substitute the hazard with plant or processes that are quieter</i>	
Isolation	<i>Isolate the noise by using distance, barriers, enclosures, sound-absorbing surfaces</i>	
Engineering	<i>Modify equipment to reduce hazardous noise levels, e.g., sound-absorbing surfaces</i>	
Administration	<i>Provide training, signage, safe work instruction, job re-design, worker rotation</i>	Safe Worker Controls
PPE	<i>Provide and train workers in the use of Hearing Protection Devices (HPDs)</i>	

Effective risk control generally involves a combination of controls from different levels across the Hierarchy of Controls.

In the short term, controls may be limited to lower-level Safe Worker Controls e.g., Administrative and PPE controls until the planning and establishment of higher-level Safe Place Controls, e.g., Elimination, Substitution, Isolation and Engineering is undertaken.

Where short term lower-level Safe Worker Controls cannot reduce the risk to an acceptable level, the exposure of workers to the activity or environment must cease until higher level Safe Place Controls are implemented.

Elimination Controls

The most effective control measure is to eliminate the source of noise completely, for example, by ceasing to use noisy plant and equipment and not introducing equipment that generates hazardous noise in the workplace.

Substitution

Substitute the source of noise with plant or equipment that generates less noise whilst remaining efficient.

- Use battery powered rather than air powered tools where practical;
- Use mesh guards instead of plate metal where being impacted by rock, lower materials drop height, line chutes with rubber absorption mats; and
- Use synthetic screen mats or cloths to replace the traditional metal plate or woven wire.

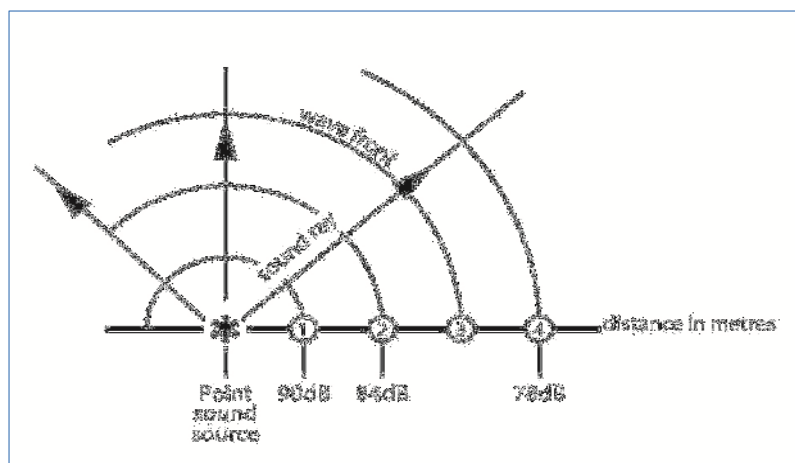
Isolation Controls

Isolate the source of noise by:

- Enclosing crushing and screening plant or batch plant discharge / mixing stations in a building internally clad with sound absorbent materials;
- Establishing enclosures or sound proof covers around noise sources;
- Using barriers or screens to block the direct path of sound;
- Locating noise sources further away from workers;
- Fully enclose generators taking into account the ventilation of fume.
- Using remote controls to operate noisy plant and/or equipment from a distance; and
- Locating fixed plant in pit surrounded by rehabilitated benches that reflect or absorb sound.

Sound spreading in an open space away from reflecting surfaces and measured at a certain distance from the source is reduced by about 6 dB for each doubling of that distance. Sound is reduced less when spreading inside an enclosed space.

If a small sound source produces a sound level of 90 dB(A) at a distance of 1 m, the sound level at 2 m distance is 84 dB(A), and at 4 m is 78 dB(A), etc.



Extract from SWA Code of Practice - Managing Noise and Preventing Hearing Loss at Work

Engineering Controls

Engineering controls involves altering, modifying and adding to plant, equipment, buildings and structures to either eliminate or reduce the source and/or level of hazardous noise.

Engineering controls require on going inspection and assessment to ensure their effectiveness and they do not create other operational issues.

Mobile Equipment:

- Self-adjusting and/or 'broadband' reverse alarms fitted to off road mobile equipment;
- Sound suppressed drilling rigs;
- Well maintained roadworthy road trucks fitted with high efficiency mufflers; and
- Sound absorbing linings fitted to off road engine covers.

Processing Plant:

- Internally clad buildings with sound absorbing materials where hazardous noise is generated;
- Reducing the drop height of larger aggregates;
- Sound absorbent stone baffles and/or chute linings to reduce both noise and wear;
- Feed bin and load hoppers lined with sound absorbent, wear resistant materials;
- Sand maintained at suitable moisture content so as not to be reliant on bin vibrators to discharge materials;
- Sound absorbing linings at impact points, for example, chutes and feeders;
- Minimise the number of transfer points and the height material falls;
- Utilise sound absorbing screening media where material quality can be maintained for example, synthetic or rubber screen mats;
- Enclose sound radiating surfaces where possible, for example, screens and gyratory crusher chamber;
- Utilise flexible rubber mountings under all crushers, to avoid metal on metal contact;
- Place stockpiles to absorb noise;
- Fully enclose and sound suppress generators.
- Utilise plant automation. For instance: automating the crushing chamber levels will minimise the occurrence of 'rock on steel' noise; and
- Repairing loose and rotating parts, replacing worn bearings, gears and squealing conveyor idlers.

Metal Chute	dB(A)
No lining	119
Loose conveyor belt lining	116
25 mm thick rubber lining	102

Examples of lining a chute to reduce the noise level,

Administrative Controls

Noise Management Training

Workers who are potentially exposed to hazardous noise should undertake an induction on commencement of employment that introduces the immediately required noise controls and general awareness training at periodical intervals that covers the following topics:

- The sources of hazardous noise on your site;
- The tasks at the workplace that have the potential to give rise to hearing loss and the likely noise exposure level;
- Health effects of exposure to excessive noise;
- Controls to reduce personal exposure to hazardous noise;
- The detrimental effects hearing loss and tinnitus have on the quality of life, both at work and socially;
- Use, fitting and care of HPDs;
- How to fit, wear, clean, store and maintain HPDs;
- How to report defects in HPDs and noise control equipment or raise any concerns regarding hazardous noise; and
- The purpose and nature of audiometric testing

Records of the training including detail of content, names of attendees, their acknowledgement of the training and any assessment results should be maintained for at least 7 years post-employment.

Work Practices

Where a work practice exposes workers to potentially hazardous noise a work instruction document in the form of a Safe Work Procedure (SWP) or Safe Work Method Statement (SWMS) should include the following information;

- The requirement to use HPDs where and when; and
- How to ensure controls for exposure to hazardous noise are working effectively.

Work schedules should be established so that noisy work is done when only a few workers are present, e.g., the required workers, however, not after hours of operation.

Employers should consider rotating workers when undertaking tasks that expose workers to hazardous noise to reduce the period of exposure.

Workplace Hazard Inspections

Workplace Hazard Inspections should be undertaken on a scheduled and routine basis and should be inclusive of the inspection of all physical controls to reduce hazardous noise.

Signage

Hearing Protection Device (HPD) signage shall be located in all locations where noise levels exceed or have the potential to exceed the exposure standard. The signage shall:

- Comply with 'AS 1319 – Safety Signs for the Occupational Environment;
- Be erected at the noise source, for example, next to the bench grinder or to the entrance where the noise is being generated such as the entrance to plant rooms; and
- Be erected at all areas where HPDs are required.



Purchase, Hire and Lease of Plant or Equipment

Suppliers of plant and equipment have a duty under the Victorian OHS Regulations to provide details of the noise emissions being generated from the plant and equipment that they supply.

Prior to the purchase, hire, and lease of plant or equipment to the site, the risk associated with potential noise hazards should be identified and where applicable, controlled as far as is reasonably practicable.

Where potential noise hazards are identified and cannot be immediately controlled to an acceptable level through either Safe Place or Safe Worker controls, the introduction should not proceed.

Either an alternate supply is identified, or a risk assessment shall be conducted in consultation with relevant workers to ascertain whether the hazardous noise can be either eliminated or reduced to an acceptable level through the adoption of certain controls.



Design, Manufacture, Supply and Install

Designers, manufacturers, suppliers, and installers all have a duty under the Victorian OHS Regulations to provide details of the noise emissions being generated from their intended design, manufacture, supply or installation.

Employers have a duty under the Victorian OHS Regulations to ensure they request and take into account these supplier details and act on them accordingly with the objective of reducing the introduction of hazardous noise as far as is reasonably practicable.

When designing, manufacturing, supplying, or installing new plant and equipment any risk associated with potential noise hazards should be identified and where applicable, controlled as far as is reasonably practicable.

Audiometric Testing and Audiological Examinations

Audiometric Testing

Audiometric testing involves measuring a worker's hearing levels using an electro-acoustic instrument (audiometer) equipped with earphones.

Audiometric testing needs to be performed by a person who has the appropriate training or qualifications and has relevant experience.

The testing may be conducted within, or external to the workplace. Persons who perform audiometric testing need to also have a sound knowledge of the OHS Regulations. Persons who may meet these criteria include:

- Ear, nose, and throat specialists;
- Audiologists, and
- Persons who have successfully completed an appropriate industrial screening audiometry course and have maintained practical experience.

All workers who are potentially exposed to noise equal to or greater than the exposure standard and are required to wear HPDs must undertake audiometric testing:

- Within three months of an employee starting work;
- At 2 year intervals thereafter;
- When reasonably requested to do so by an HSR; and
- Where practicable on exit from employment.

Before introducing an audiometric testing program, you must consult with your workers and their HSR as applicable. It is important that workers understand that the aim of the testing is to evaluate the effectiveness of control measures to protect their hearing.

Employers must ensure the audiometric service provider compiles a report or provide test results to enable the comparison between consecutive audiometric tests.

Each worker tested must be given a copy of their own report as soon as reasonably possible after the employer receives it.

Only with the consent of the worker should you provide their results to other parties.

Audiological Examinations

An audiological examination involves examining a worker's ear and assessing their hearing levels to establish the type and cause of any hearing disorder. Examinations need to be provided by a suitably qualified person such as an audiologist or an ear nose and throat specialist.

If the results of two or more audiometric tests over a period not exceeding two years indicate a reduction in hearing levels equal to or greater than 15dB at 3000, 4000 or 6000 Hz, an employer must provide for the worker to undergo an audiological examination as soon as reasonably possible. For example, if a worker undergoes yearly audiometric tests, and the hearing loss found each time is found to be 7.5 decibels, they will need to be referred as it meets the 15dB over two years testing.

Employers must ensure they receive a report from the audiological examination provider for each worker tested that contains the examination results and states whether the worker has suffered hearing loss that is likely to be due to exposure to noise.

Each worker must be given a copy of their own report as soon as reasonably possible after the employer receives it.

If the result of the audiological examination indicates that the cause of the hearing loss is likely to be due to exposure to noise then the employer must review and, if necessary, revise, risk control measures that have been put in place to control the worker's exposure to noise.

Record Keeping

Employers must retain any audiometric test results and audiological examination reports as a confidential record for as long as for as long as the affected worker is employed by the employer although the CMPA recommends that employers retain the reports in a secure and confidential manner for 7 years post-employment.

It should be noted that the audiometric tests and audiological examination reports that employers provide will be considered by hearing loss assessors in the event a worker makes a claim for impairment benefits.

CMPA Health Surveillance Resources

CMPA Medical Practitioner Guidelines and Medical forms are available at www.cmpavic.asn.au

These guidelines and medical forms are designed to assist employers who operate construction material processing businesses in meeting the requirements of the *OHS Act 2004* and its Regulations in relation to monitoring their workers' health.

Pre-employment health assessment - the objectives are to determine whether an employee is fit for the proposed job and to obtain a baseline assessment for future health monitoring.

Periodic health monitoring - is aimed to assess at the earliest opportunity the detrimental effects on ongoing workers from the identified construction material processing hazards but also to assess those workers with a medical condition that may expose them or other workers to risk to their health.

Silica specific periodic health monitoring –

Issue 1 April 2022









Periodicity of health monitoring in regard to RCSD will be determined by the results of personal exposure levels:

- For those workers who are exposed to crystalline silica (i.e., $> 0.02 \text{ mg/m}^3$), health monitoring should include spirometry and a medical examination every year and a chest x-ray every 4 years;
- For those workers who are exposed to low levels of silica (i.e., $< 0.02 \text{ mg/m}^3$), health monitoring should include spirometry and a medical examination every 4 years and a chest x-ray only when there is a significant change identified on monitoring results.

Exit health assessments – is aimed to assess the possible detrimental effects on health of workers at the time they leave the company.

FINAL

11. Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) Requirements							
							
YES	YES	YES	AR	AR	AR	YES	Yes

A pictogram in a SWP/SWMS that directs PPE as YES being mandatory and AS being as required

Usage of HPDs

HPDs such as ear-muffs or ear-plugs should be used in the following circumstances;

- When the risks associated with hazardous noise exposure cannot be eliminated or reduced to an acceptable level by other more effective control as listed in the Hierarchy of Controls;
- As a short term Safe Worker control until long term Safe Place controls are implemented; and
- Where further protection is required over and above what has been achieved using other noise controls.

Selection of HPDs and Protection Factor

HPDs should be selected;

- In consultation with workers who will be wearing them considering the comfort, weight, fit and clamping force of the HPD;
- In accordance with AS/NZS 1269.3 Occupational Noise Management – Hearing Protector Program;
- What other PPE the worker needs to wear, such as, hard hats, safety glasses and goggles, respirators, face shields or welding mask and how these will affect HPDs fit and comfort;
- Considering the suitability for the nature of the working environment and the work tasks, and
- Taking into account recent results of noise monitoring ensuring the class of protection aligns with the level of exposure as per the table below.

SWA - recommended class of hearing protector	
Class	Measured exposure LAeq,8h dB(A)
1	Less than 90
2	90 to less than 95
3	95 to less than 100
4	100 to less than 105
5	105 to less than 110

Inspection of Hearing Protection Devices

HPDs must be regularly inspected to ensure they remain in clean and in effective working condition. The inspections should check that:

- Ear Muff seals are undamaged;
- The tension of headbands is not reduced;
- Compressible Ear Plugs are soft, pliable and clean; and
- If disposable Ear Plugs are used, they should only be worn once.

Type of Hearing Protection Devices

Electronic Earmuffs

Electronic Earmuffs have the required technology to connect to a two-way radio system for communication in high noise environments.



Sound Management Earmuffs

Sound Management Earmuffs blocks out other noise while voice frequencies can be heard more clearly with less distortion.



Hard Hat Earmuffs

Hard Hat Earmuffs snap in place during use and swing back when not needed and provide a means of securing the hard hat to head when the worker is leaning over.



Ear Plugs

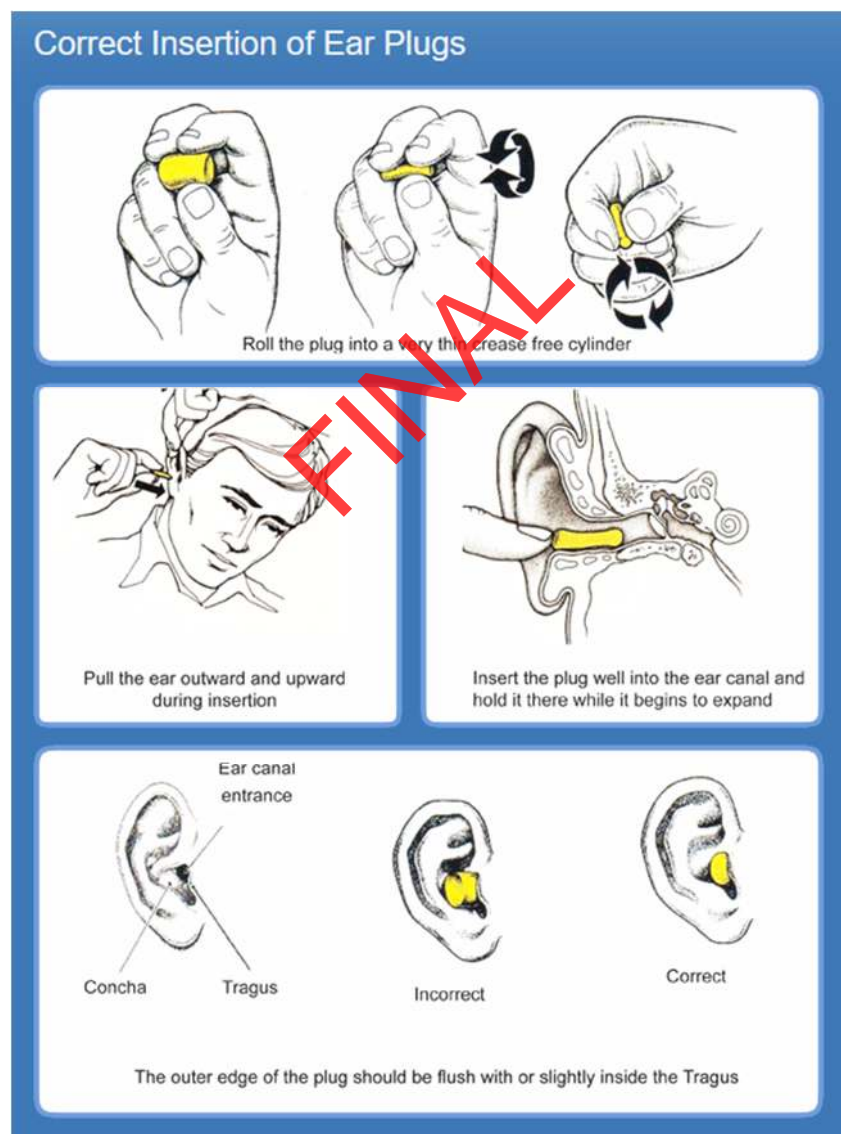
A large range of ear plugs are available to suit many requirements.

Ear plugs can be a personal hygiene hazard in some circumstances where due to the nature or work, e.g., maintenance tasks, they are inserted with dirty hands.

This practice may lead to ear infections and in these circumstances ear muffs are more appropriate.

Other issues with ear plugs include:

- They are often not fully inserted; therefore, the required protection is compromised; and
- The ear muff leads often entangle and dislodge for the ear.



Courtesy of Tinnitus Association of Victoria

Issue 1 April 2022

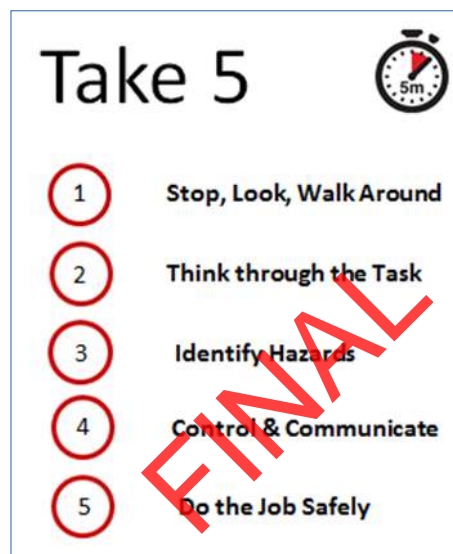
Personal Risk Awareness when wearing HPDs

The use of HPDs, in particular Electronic Earmuffs and Sound Management Earmuffs, or a combination or Ear Plugs Covered by Ear Muffs may restrict a worker from hearing other workplace noise, in particular approaching mobile equipment, road trucks or light vehicles.

When considering the selection of HPDs it is important that the workplace environment, the associate work practices and traffic movements are taken into account.

Workers wearing HPDs that restricts the worker from hearing other workplace noise should:

- ***1st - Identify these other potential hazards prior to commencing the task;***
- ***2nd - Establish Exclusion Zones around their working area; and***
- ***3rd - Utilise Visual Personal Risk Awareness to ensure their safety***



Review of Hazardous Noise Controls

Once risk controls have been implemented, they should be reviewed and monitored in consultation with relevant workers and HSRs to ensure that they:

- Have either eliminated the risk or reduced the risk to an acceptable level;
- Do not create another hazard;
- Allow a worker to conduct their work safely in a safe environment; and
- Are sustainable and are maintaining that risk at the targeted level.

12. Definitions

Units of Noise

Unit	Description
dB	<i>Decibels, a logarithmic unit of measurement for the loudness of sound</i>
dBA	<i>'A' weighted decibels, which approximates how the human ear responds to noise at moderate levels</i>
dBC	<i>'C' weighted decibels, which approximates how the human ear responds to noise at very high levels</i>
LAeq	<i>"Equivalent Sound Level" It is common practice to measure noise levels using the A weighting setting built into all sound level meters. LAeq is the main unit used for assessing Occupational Noise</i>
Leq	<i>"Equivalent Sound Level" Leq is the preferred method to describe sound levels that vary over time, resulting in a single decibel value which takes into account the total sound energy over the period of time of interest.</i>
SLC80	<i>Sound level conversion. Is a standard that hearing protection is measured against. An SLC80 rating indicates that the hearing protection will provide at least the listed attenuation to at least 80% of users</i>

Other Definitions

Acoustic Calibrator	<i>A device for applying a sound pressure of known level to the microphone of a sound measuring system, for the purpose of calibration</i>
Acoustic or Acoustical	<i>Means containing, producing, arising from, actuated by, related to, or associated with, sound.</i>
Attenuation	<i>Means a reduction in the magnitude of sound.</i>
Audiogram	<i>A chart or table relating to a worker's hearing threshold levels for pure tones to frequency.</i>
Audiometric Test	<i>The measurement of the hearing threshold levels of a worker by means of monaural pure tone air conduction threshold tests</i>
A-Weighting	<i>A standardised frequency response used in sound measuring instruments, specified in Australian Standard AS 1259. Historically it was developed to model the human ear response at low sound levels. However, A-weighting is now frequently specified for measuring sounds irrespective of level and studies have shown a relationship between the long-term exposure to A- weighted sound pressure levels and hearing damage risk.</i>
Background Level	<i>The sound of the normal quiet state of the area without the presence of intrusive, man-made noise sources. Distant traffic is included in the background because it is so widespread.</i>
C-Weighting	<i>A standardised frequency response used in sound measuring instruments, specified in Australian Standard AS 1259.13. Historically it was developed to model the human ear response at high sound levels. It is now used to measure peak noise levels.</i>
Frequency	<i>Also known as pitch: pitch of a sound is determined by the rate of vibration, or frequency, of the sound wave.</i>
Hazardous Noise	<i>Noise that exceeds the exposure standard for noise in the workplace</i>
Impact Noise	<i>The sound created when a surface is struck by an object</i>
Muffled	<i>To make a sound quieter</i>
NIHL	<i>Noise Induced Hearing Loss.</i>
Octave-Band Levels	<i>The pitch or frequency of sound, divided into octave bands for the purposes of design and assessment. Each octave band represents a frequency range, from low to high. A design based on octave-band criteria enables more targeted control of low-frequency noise</i>
Reverberation	<i>The persistence, by echo or reflection, of sound in an enclosure after the emission by the source has stopped.</i>
Tinnitus	<i>Ringling or other noises in the head or ears which can be caused by exposure to excessive noise.</i>

13. Attachments to this Document

Attachment A - Noise Hazard ID Sheet

Site		Conducted by	
Site Location		Date	

Yes to any of the following indicates the need to carry out a further assessment potentially inclusive of a noise assessment if exposure to the noise cannot be immediately controlled.

Hazard Identification Questions	Yes	No
Is a raised voice needed to communicate with someone about one metre away?		
Do your workers notice a reduction in hearing over the course of the day? (This may only become noticeable after work, for example, needing to turn up the radio on the way home)		
Are your workers using noisy powered tools or machinery?		
Are there noises due to impacts such as metal hammering, rock hammering, pneumatic impact tools or explosive sources such as explosive powered tools?		
Are HPDs used for some work?		
Do your workers complain that there is too much noise or that they can't clearly hear instructions or warning signals?		
Do your workers experience ringing in the ears or a noise sounding different in each ear?		
Do any long-term workers appear to be hard of hearing?		
Have there been any workers' compensation claims for noise induced hearing loss?		
Has a determination i.e., monitoring & measurement of an employee's exposure to noise recorded levels equal to or above the exposure standard of 85 decibels (A-weighted) averaged over an eight-hour period, or a peak level of 140 decibels (C-weighted).		
Do the results of audiometry tests indicate that past or present workers have hearing loss?		
Actions	Whom	When