



MINING INDUSTRY
OCCUPATIONAL
SAFETY & HEALTH



MINERALS COUNCIL
SOUTH AFRICA

HOW DOES NOISE

affect me as an employee or employer?





Gunshot
(140-162 dB)



Jet taking off
(140 dB)



Jackhammer
(130 dB)



Firecrackers
(125 dB)



Rock concerts
(120 dB)



Snowmobile riding
(110 dB)



Headphones
(Same as a chainsaw) (100 dB)



Motorcycle
(95 dB)



Lawnmower, Truck
traffic (90 dB)



Dog barking
(70 dB)



Normal conversation
(50-60 dB)

LOUD



Loudness in decibels (dB)



SOFT

140 dB

130 dB

120 dB

110 dB

100 dB

90 dB

80 dB

70 dB

60 dB

50 dB

40 dB

30 dB

20 dB

10 dB

0 dB

NOISE LEVELS

160 dB

Immediate physical damage

130 dB

Immediate pain threshold

115 dB

Risk of hearing damage
in 15 minutes

105 dB

Risk of hearing damage
in 1 hour

95 dB

Risk of hearing damage
in 4 hours

85 dB

OSHA hearing protection
regulations start here

75 dB

"Non-hazardous" noise

50 dB

Comfortable sound

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INTRODUCTION

Noise is part of everyday life, but too much noise can cause permanent and disabling hearing loss. With hearing loss, conversation becomes difficult or impossible, your family could complain about the radio or TV being too loud, you have trouble using the telephone, and you may be unable to sleep. By the time you notice this hearing loss, it's probably already too late to stop it.

However, there is no need for your hearing to be damaged, either at work or at home. It's both the employer's and employee's (your own) responsibility to protect your hearing and work together on developing/implementing of measures to reduce the risk of noise-induced hearing loss.

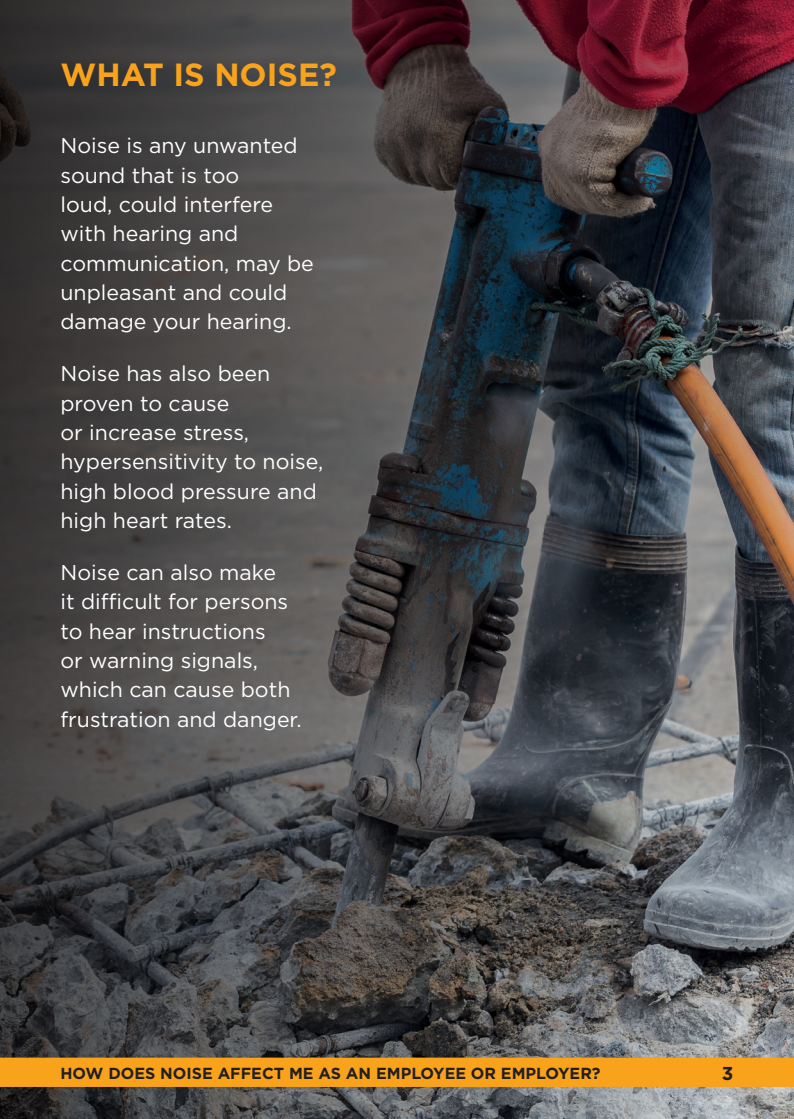


WHAT IS NOISE?

Noise is any unwanted sound that is too loud, could interfere with hearing and communication, may be unpleasant and could damage your hearing.

Noise has also been proven to cause or increase stress, hypersensitivity to noise, high blood pressure and high heart rates.

Noise can also make it difficult for persons to hear instructions or warning signals, which can cause both frustration and danger.



HOW HEARING WORKS

We all know we use our ears to hear, but understanding the way the ear works will help us understand why we need to protect our hearing better.

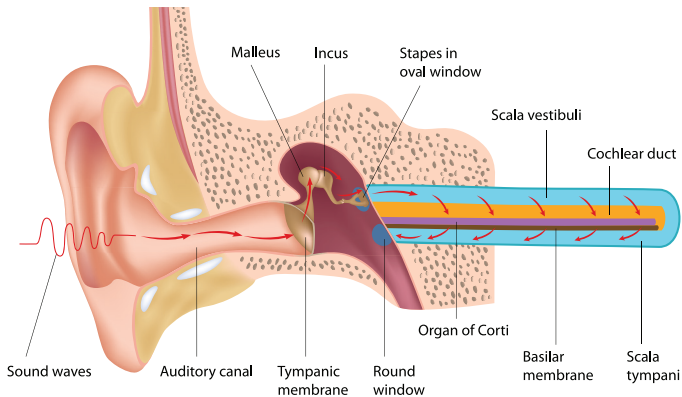
When a sound is made, it sends out **sound waves** that travel into your **ear canal** and cause the **eardrum** to vibrate.

The **eardrum** then sends those vibrations to three tiny bones called **ossicles**, which tap each other and pass the vibrations on to the **cochlea** in the inner ear.

The **cochlea** is spiral-shaped and has **tiny hairs** inside it.

These hairs move according to the sound which entered the ear and are attached to **nerves** which send messages to the brain enabling humans to hear and understand all the different sounds.

Mechanism of hearing



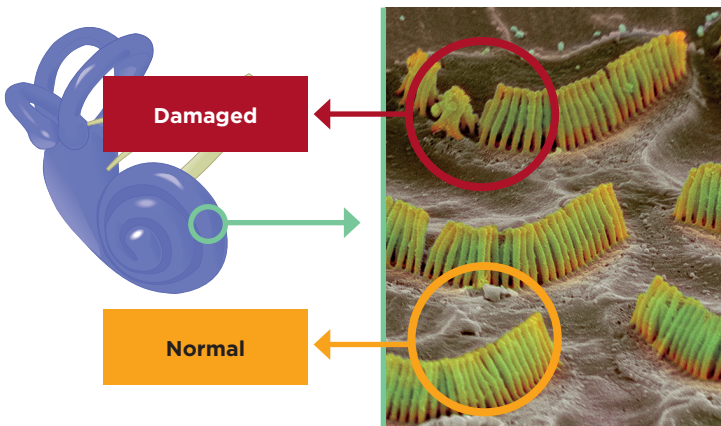
HOW NOISE CAUSES HEARING LOSS

Exposure to loud noise may cause wear and tear on the hairs or nerve cells in the cochlea that send sound signals to the brain.

When these hairs or nerve cells are damaged (get pushed flat), some sound signals cannot be sent to the brain that well anymore, and hearing loss occurs.

This hearing loss can last for a short time until the hairs recover and manage to rise up again. However, if this continues, the hairs or nerve cells can become permanently damaged and die, which results in permanent hearing loss that cannot be fixed.

Inner ear hair cells



HOW NOISE CAUSES HEARING LOSS

CONTINUED

Hearing loss can happen to anyone, is permanent and disabling. This can be hearing loss that is gradual because of exposure to noise over time, or sudden, caused by an exposure to an extremely loud noise. For example, if someone is exposed to a loud noise like an explosion, they could experience a type of damage known as acoustic trauma.

Hearing loss is not only caused from exposure to workplace noise. If you listen to music or TV too loudly at home or in a club, it can also cause you to lose your hearing. Studies show an alarming increase in hearing loss in youngsters as they attend loud rock music concerts and/or use portable radios/cellphones with earphones.



IS MY HEARING AT RISK?

If any of the following apply to you, noise might be a risk to you:

- The noise is intrusive or disturbing
- You have to raise your voice to have a normal conversation with someone who is close to you
- You use noisy power tools, machinery or being exposed to impact noise (such as hammering, drop forging, pneumatic impact tools, lawnmower) without wearing hearing protection
- You have reduced hearing ability or a ringing sound in your ears after being exposed to noise, even if it is better by the next morning

EFFECTS OF NOISE

Hearing loss is not the only problem when you are exposed to noise. People may develop tinnitus (a ringing, whistling, buzzing or humming in the ears), which is stressful, as it can disturb your sleep and disrupt your lifestyle. You may have noticed this after being exposed to a loud noise. It usually goes away after a while, but it is a warning sign of being exposed to too much noise. There is also no known cure for this, but it can be managed by going through tinnitus retraining therapy.



EFFECTS OF NOISE CONTINUED

There are a few other problems that can also result from exposure to noise. For example, workers who have noisy workplaces and who suffer hearing loss are absent from work more often and perform poorer at work, which could cause them to lose their jobs. It can also cause social and family tension and relationship breakdowns.



SAFETY RISKS

Noise at work can interfere with communications and make warning signals or alarms hard to hear. It can also reduce people's awareness of their surroundings.

These issues can lead to safety risks – putting people at risk of injury or death.

CONTROLLING NOISE

There are many ways in which we could reduce noise and noise exposure. First think about how to remove the source of noise altogether – for example, putting a noisy machine where it cannot be heard by workers. If that is not possible, try the following:



- Using quieter equipment or a different process
- Engineering/technical changes to reduce the noise at the source/machine
- Proper maintenance of equipment
- Using screens, barriers, enclosures or sound-absorbent materials
- Identifying and demarcating noise zones
- Improved ways of working to reduce noise levels
- Limiting the time employees spend in noisy areas
- Proper use and care of hearing protection devices

Controlling noise usually involves implementing a combination of the above.

NOISE ZONES

Workplaces where noise has been identified as a risk are demarcated as noise zones, and symbolic signs are posted at their entrances. Obey the sign and only enter if you are wearing suitable hearing protection devices correctly.

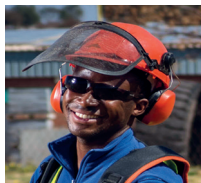


HEARING PROTECTION DEVICES

Hearing protection, such as earmuffs and earplugs, is your last line of defence against hearing damage. Your employer should provide you with the correct hearing protection devices, train you on how to correctly use it and how, where and when to get replacements.

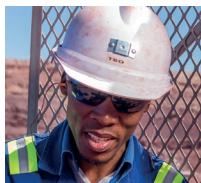


FITTING HEARING PROTECTION



Earmuffs (special circumstances):

- The earmuff cups must fully enclose your ears and have a tight seal
- Adjust the headband
- Remove any trapped hair



Foam earplugs

- Roll and compress the foam earplugs into a thin and crease-free cylinder
- Pull the ear outward and upward
- Insert the foam earplug into the ear canal and wait for it to expand, before letting go of the foam earplug



Customised/reusable earplugs:

- Pull the ear outward and upward
- Insert the customised/reusable earplug until you feel it sealing
- When removing the customised/reusable earplug, carefully twist the customised/reusable earplug for a slow, safe removal
- Care and maintenance

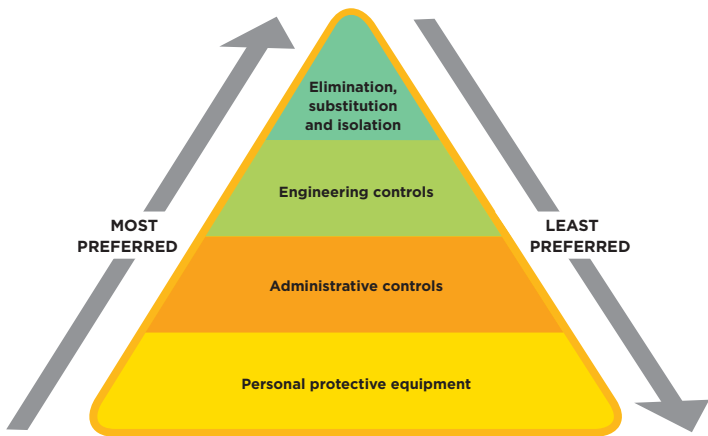
ROLES AND RESPONSIBILITIES

Employer's duty

Section 11 requires the employer to assess and respond to risk.

- 1) Every employer must:
 - a) identify the hazards to health or safety to which employees may be exposed while they are at work
 - b) assess the risks to health or safety to which employees may be exposed while they are at work
 - c) record the significant hazards identified and risks assessed
 - d) make those records available for inspection by employees
- 2) Every employer, after consulting the Health and Safety Committee at the mine, must determine all measures, including changing the organisation of work and the design of safe systems of work, necessary to:
 - a) eliminate any recorded risk
 - b) control the risk at source
 - c) minimise the risk, and
 - d) in so far as the risk remains:
 - i) provide for personal protective equipment
 - ii) institute a programme to monitor the risk to which employees may be exposed

The employer must assess the health and safety risks to employees and take all reasonable practicable steps towards eliminating or controlling the risks. Noise control at source can be achieved in many ways and where possible the following methods must be implemented:



- **Elimination, substitution and isolation**

Where possible, equipment producing noise must be phased out. Original equipment manufacturers (OEM) have a responsibility towards this.

- **Engineering or source control**

Where possible, noise at the source is controlled through muffling and silencing of equipment used on the mine.

ROLES AND RESPONSIBILITIES CONTINUED

- **Administrative controls**

Measures have been put in place to prevent employees identified with noise induced hearing loss from being further exposed to unacceptable noise levels above 85 dB(A)

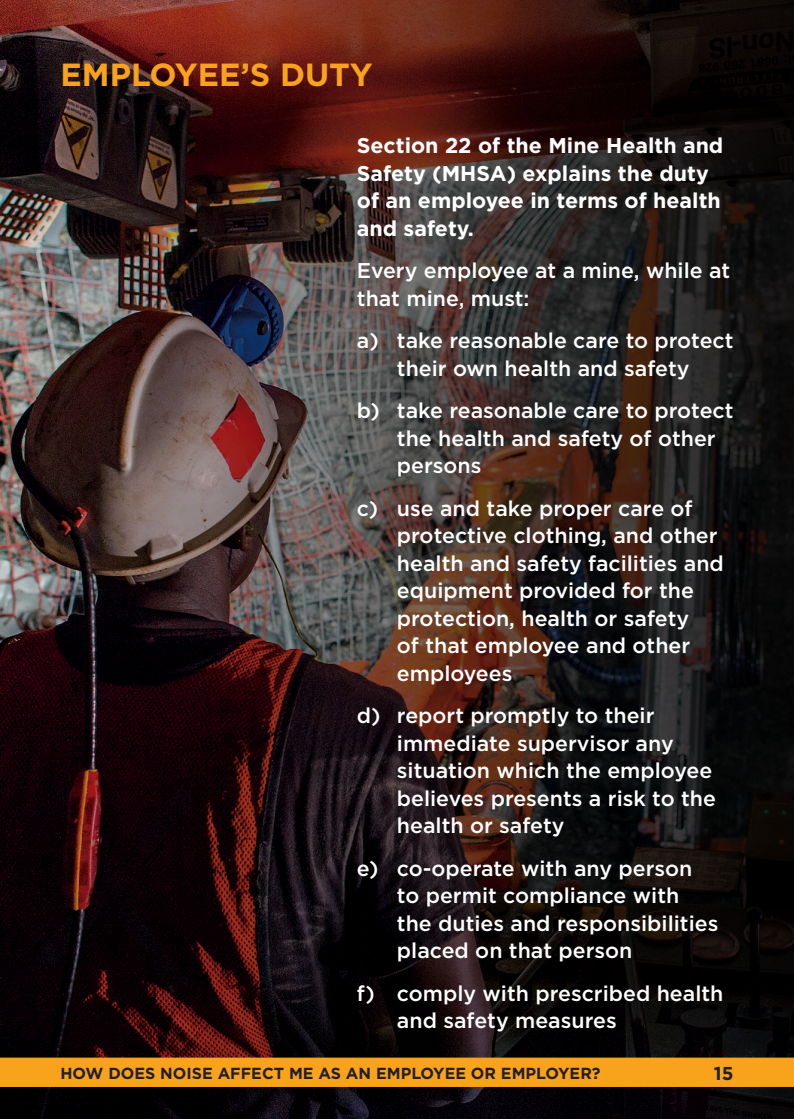
- **Personal protective equipment**

This is the last resort after it has been identified that noise control engineering and administrative controls cannot provide sufficient protection.

A system of occupational hygiene measurements must also be established, maintained and the records must also be linked as far as practicable to each employee's record of medical surveillance.

The system of medical surveillance of employees as required by Section 13(2)(c) must consist of an initial and other medical examinations to determine the health risk.



A photograph of a worker in a mine, seen from the back. The worker is wearing a white hard hat with a red sticker, a blue headlamp, and an orange safety vest over a dark shirt. They are looking towards industrial machinery with yellow and black warning labels. The background is filled with metal grates and pipes.

EMPLOYEE'S DUTY

Section 22 of the Mine Health and Safety (MHS) explains the duty of an employee in terms of health and safety.

Every employee at a mine, while at that mine, must:

- a) take reasonable care to protect their own health and safety**
- b) take reasonable care to protect the health and safety of other persons**
- c) use and take proper care of protective clothing, and other health and safety facilities and equipment provided for the protection, health or safety of that employee and other employees**
- d) report promptly to their immediate supervisor any situation which the employee believes presents a risk to the health or safety**
- e) co-operate with any person to permit compliance with the duties and responsibilities placed on that person**
- f) comply with prescribed health and safety measures**

EMPLOYEE'S DUTY CONTINUED

Regulation 3.14 states that no person shall:

- a) interfere with or render ineffective anything which has been provided for the protection, safety or health of persons, or alter, remove or in any way interfere with or render ineffective or disregard (this includes silencers fitted to equipment or machines to reduce noise).

Section 23 of the MSHA explains the employee's right to leave dangerous working places

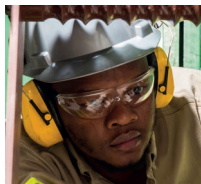
- 1) The employee has the right to leave any working place whenever:
 - a) circumstances arise at that working place which, with reasonable justification, appear to that employee to pose a serious danger to the health or safety of that employee, or
 - b) the health and safety representative responsible for that working place directs that employee leave that working place.

WHAT MORE CAN I DO?



- **Cooperate:** Help your employer to do what is needed to protect your hearing. Make sure you use any noise-control devices provided properly and follow any policies and procedures that have been put in place to reduce noise
- **Attend any training** that has been arranged to educate you on noise, the ways to reduce it and to protect yourself
- **Report any problems** with noise-control devices or your hearing protection immediately
- Let your **supervisor** and **health and safety representative** know of these problems
- **Wear hearing protection** that is given to you properly (you should be trained on how to correctly fit your hearing protection devices), and make sure you wear it all the time when you are doing noisy work, and when you are in the demarcated noise zones
- **Attend hearing checks** (audiometric testing). It is best to find out if you have any hearing damage as soon as possible, and especially before the damage to your hearing becomes disabling

TAKING CARE OF HEARING PROTECTION



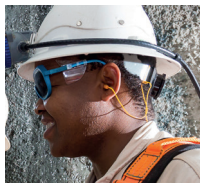
Earmuffs (special circumstances):

- Clean them regularly with soap and water
- Ensure they get replaced if damaged or earmuff cushions begin to harden or crack
- Do not stretch the headband
- Remove any trapped hair around the cushions
- Never share them with anyone else
- Store them in a safe place when not in use



Foam earplugs

- Ensuring they get replaced daily
- Never share them with anyone else
- Store them in a safe place when not in use



Customised/reusable earplugs:

- Clean your customised/reusable earplugs daily with soap and water
- Ensure they get replaced if damaged or at the end of the stipulated useful lifespan
- Never share your customised/reusable earplugs with anyone else
- Store your customised/reusable earplugs in a safe place when not in use
- Check your customised/reusable earplugs for damages daily
- Ensure that custom made hearing protection is handed in for maintenance, as specified by the manufacturer or your employer

AUDIOMETRIC TESTING



An audiometric test measures how well you can hear. The test involves you sitting in a booth, putting on headphones and then telling the person testing you when you hear different sounds by raising your hand or by pushing a button.

You should do an audiometric test within the first three months of starting work or changing jobs, and then at least once a year thereafter, so your hearing can be checked for damage. If there is damage, then we know we must find ways to reduce your exposure or reduce the noise levels in your work area.

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