



Slide 1 - Slide 1

Noise Training



The Corporation of the City of Windsor

Noise Training



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Slide notes

Welcome to the corporation of the City of Windsor's noise training.

Noise is a common health hazard in the workplace. This course focuses on hearing loss prevention, and the ways to eliminate, or reduce noise exposure.

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Noise Training




Main Menu

Click each lesson to complete this training

Understanding Noise

Effects and Control of Noise Exposure

Hearing Protection




Slide notes

You must complete all modules of this course. At the end of each module, you'll be asked to complete a review to test your knowledge of that material. These reviews will help prepare you for the final test. After completing all modules, you'll be given the final test. You must score at least 75% to pass the course. Okay, let the learning begin.


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Noise Training



Main Menu


Click each lesson to complete this training

 Understanding Noise

 Effects and Control of Noise Exposure

 Hearing Protection


Final Test



Slide notes

Slide 4 - Understanding Noise


Noise Training



Understanding Noise

What is Sound?

- Sound is vibration
- A perceived loudness
- Expressed in decibels (dB)




Next

Slide notes

Sound, is a vibration. When something makes a noise, it's actually vibrating, and this causes air molecules around it, to vibrate too. These vibrations are transmitted through the air, to our ears, where we perceive them as sound. Sound, which is a perceived loudness, is expressed in decibels, written as D B. Think of sounds as pressure waves that travel in air or water. If you could see these waves, they would look similar to surface waves made when you throw a stone, into a calm pool of water.

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Noise Training



Understanding Noise

What is Sound?

- Quietest sound = 0 dB
- Loudest sound (without pain) = 120 db
 - 1 million times more energy than the quietest sound we hear
- Most sounds: 30 - 100 dB




Try Again

Slide notes

The quietest sound we can actually hear is about zero decibels. The loudest sound we hear, without pain, is about 120 decibels. The loudest sounds known to occur, are 192 decibels, and they come from volcanic eruptions. The loudest sounds we can hear, without causing us pain, have about one million times more energy than the quietest sounds we can hear. Most sounds we hear, are in the range of 30, to 100 decibels.

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Noise Training



Understanding Noise

What is Noise?

Unwanted or unpleasant sound levels



Our eardrums respond to sound by vibrating similarly to the waves

Try Again


Slide notes

Noise, is defined as unwanted, or unpleasant sound levels. As you just learned, sound is composed of variations, or vibrations. More specifically, these are vibrations of air pressure, above and below, local ambient pressure in waves of various amplitudes and frequencies. Those are a lot of big terms!

What's important for you to know, is that our ear drums respond to sound by vibrating similarly to the waves. We identify the ear drum vibrations as sound. As sound waves increase in amplitude or pressure, we perceive the sound as getting louder.

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Noise Training



Understanding Noise

Sound Pressure Levels

- Transmitted through
 - gases (air, plasma)
 - liquids (water)
- Transmitted as longitudinal / compression waves
- Compared to ripple effect of throwing a stone in a lake
- Expressed in
 - decibels -dB
 - A-weighted decibels - db(A)
- Perceived loudness




Next

Slide notes

Sound is transmitted through gases such as air or plasma, and through liquids such as water as longitudinal waves, also called compression waves. Think about these invisible waves like the effects of throwing a stone into a lake. The stone creates ripples in the water. Sound creates the same type of ripple, we just can't see the waves. Sound is expressed in either decibels, or d B, or A weighted decibels, known as "d B A". Remember, sound is the perceived loudness.

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Noise Training



Understanding Noise

Measuring Sound

- Measured using a logarithmic scale
- Small dB increases represents large increases in sound energy
- 3 dB increases is a doubling of sound energy
- 10 dB increases represents a 10-fold increase
- 20 dB increases represents a 100-fold increase



Integrated Sound Level Meters (ISLM)

- Measures noise
- Built-in calculation software


Try Again

Slide notes

Sound pressure levels in decibels, or A-weighted decibels, are based on a logarithmic scale. Small decibel increases, represent large increases in sound energy, and they can't be added or subtracted in a way we usually use mathematics. For example, if one machine emits a sound level of 90 decibels, and a second identical machine is placed beside the first, the combined sound level is 93 decibels, not 180 decibels. So, a 3 decibel increase is actually doubling sound energy. A 10 decibel increase represents a 10 fold increase. And a 20 decibel increase, represents a 100 fold increase. Generally, sound levels will decrease by 6 "d B A" for each doubling of distance from the source of the sound. These calculations can be very complex, even for industrial hygienists. That's why "I S L M's", Integrated Sound Level Meters, are used to measure noise. These meters have built in software, that performs the calculations.

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Noise Training



Understanding Noise

Measuring Sound

Adding two sounds of equal value always results in a 3 dB increase!

Difference between 2 noise levels of 10 dBA or more = zero increase

$$80 \text{ dB} + 80 \text{ dB} = 83 \text{ dB}$$
$$100 \text{ dB} + 100 \text{ dB} = 103 \text{ dB}$$
$$40 \text{ dB} + 40 \text{ dB} = 43 \text{ dB}$$
$$95 \text{ dBA} + 80 \text{ dBA} = 95 \text{ dBA}$$


Try Again

Slide notes

But to put this in easier terms, it helps to know that adding two sound pressure levels of equal value, will always result in a three decibel increase. So, if a piece of equipment that emits 80 decibels is turned on at the same time as another tool emitting 80 decibels, the result is, 83 decibels. If two pieces of equipment both emit 100 decibels at the same time, the result, is 103 decibels. And the same hold true for two machines running at 40 decibels, which will result in sound, at 43 decibels. But, when the difference between two noise levels is 10 “A” weighted decibels or more, the amount to be added to the higher noise level, is zero. For example, if your workplace noise level is 95 “A” weighted decibels, and you add another machine that produces 80 A-weighted decibels of noise, the workplace noise level will still be 95 “A” weighted decibels.

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Noise Training



Understanding Noise

Daily Allowable Exposure Times to Noise

Ontario Ministry of Labour (MOL) Legislative and Corporate Standards

Ontario Noise Regulation 381/15 states "every employer shall ensure that no worker is exposed to a sound level greater than an equivalent sound exposure level of 85 dBA Lex8." (8 hour day, often expressed as Lex8)

In Federal workplaces governed by Canada Labour Code Part II (Transit Windsor, Windsor Airport, Detroit Windsor Tunnel) the 8 hour exposure value is 87 A-weighted decibels.

MOL Noise Guidelines indicates, "It should be noted, however, that nothing in the regulations precludes use of HPDs for noise exposures below 85 dBA and such use is considered advisable for exposures to sound levels above 80 dBA."

"At levels as low as 80 dB, 3% of workers will experience significant hearing loss during their work career."

(National Institute for Occupational Safety and Health - NIOSH)

Try Again

Slide notes

Ontario noise regulation 381/15 states that, every employer shall ensure, that no worker is exposed to a sound level, greater than an equivalent sound exposure level of 85 A-weighted decibels, lex 8.


Federal workplaces governed by Canada Labour Code Part II, Transit Windsor, Windsor Airport, Detroit Windsor Tunnel, the 8 hour exposure value is 87 A-weighted decibels.

Ontario Ministry of Labour Guidelines, indicates that, It should be noted, however, that nothing in the regulations, precludes use of "HPDs" for noise exposures below 85 A-weighted decibels, and such use is considered advisable, for exposures to sound levels above 80 A-weighted decibels.

According to the National Institute for Occupational Safety and Health, 3% of workers will experience significant hearing loss during their work career, at levels as low as 80 decibels. Between 2006 and 2015, almost 30,000 people in Ontario had an allowed loud noise induced hearing loss claim, according to the provinces workplace safety and insurance board. This accounted for about 23 percent of all allowed occupational disease claims.

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Noise Training



Understanding Noise

Daily Allowable Exposure Times to Noise: Area Sampling

- Conducted to determine significant sources of noise
- Sources prioritized to determine
 - potential noise exposure
 - workers requiring hearing protection, education and training
 - where signage should be posted
 - areas where noise is of concern
- Duration of exposure difficult to measure, predict or control



City of Windsor Corporate ceiling limit: 80 dB

Next

Slide notes

The Corporation conducted area sampling, to determine significant sources of noise in the workplace.


These sources were then prioritized for noise control measures to: determine the potential noise exposure of workers. Identify workers who require hearing protection, education, and training. Determine workplace areas where signage should be posted. And, identify areas where noise is of concern

Given the nature of the tasks performed by workers in the area sample, duration of exposure is not a readily identifiable, or measurable constant, and is therefore an unknown variable, and difficult to measure, predict, or control.

An accurate exposure profile, even using personal dosimetry, would be difficult to establish in these circumstances, given both the variability of noise exposure duration, and the tasks themselves. That's why the City of Windsor corporate ceiling limit is actually 80 decibels, at any time.

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Noise Training




Understanding Noise

Measuring Noise Levels

Sound level meters
Measures noise levels at any one instant

Noise dosimeters
Measures average noise levels over time

- Decibel scale
 - gives all frequencies equal weight
- Hearing sensitivity varies with frequency
 - most sensitive between 400 - 4000 Hz
 - less sensitive to low or high frequencies
- A-weighted decibel (dBA) scale developed for sound level measurements
- dBA allows different frequency balances to be fairly compared for relative loudness



Next

Slide notes


Noise is measured either using sound level meters, or noise dosimeters. The difference in these instruments, is that sound level meters can measure noise levels at any instant, whereas, noise dosimeters, measure average noise levels over time.

The decibel scale, gives sound of all frequencies equal weight, while human hearing does not. Our hearing sensitivity varies with frequency. It's most sensitive in the middle range, between 400, and 4000 Hertz. But is much less sensitive in the low, and high frequencies.

To compensate for the non-linear frequency response of human hearing, the A-weighted scale was developed for sound level measurements. They are expressed as "D B A", instead of "D B", and allow sounds of different frequency balances to be fairly compared for relative loudness. This is completed by using sound level meters, or noise dosimeters, which measures noise levels at any one instant, or average noise levels over time.

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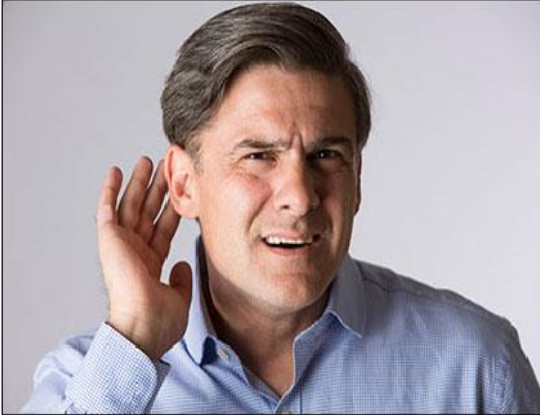
Noise Training



Understanding Noise

Measuring Noise Levels

- Loudness / intensity measured in decibels using dosimeters - frequently expressed in Hz and duration (length of exposure)
- Human hearing normally limited to 12 - 20,000 Hz frequencies
- Upper limit generally decreases with age (human)



Next

Slide notes


Loudness, or intensity is measured in decibels, using noise meters, or dosimeters, and are frequencies expressed in hertz or “H Z”, and duration, or the length of exposure. Human hearing is normally limited to frequencies between about 12, and 20,000 hertz, or kilohertz, although these limits are not exact.

Human hearing is normally limited to frequencies between about 12, and 20,000 hertz, or kilohertz, although these limits are not exact.

The upper limit generally decreases with age. Other species have a different range of hearing.

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Noise Training




Understanding Noise

Sound Waves


- Require some kind of material to travel through
- Speed varies from substance to substance
 - most slowly in gases
 - faster in liquids
 - fastest in solids



Air - 343.21 meters/sec



Water - 1,484 m/s



Iron - 5,120 m/s

Next

Slide notes


Sound waves require some kind of material to travel through.

The speed of sound, varies from substance, to substance. Sound travels most slowly in gases. It travels faster in liquids. And faster still in solids.

Sound travels at 343.21 meters per second in air. 1,484 meters per second in water, 4.3 times as fast as in air. And 5,120 meters per second in iron.

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Noise Training



Understanding Noise

How Sound Travels

- Travels through matter as a waveform
- Consists of longitudinal or compression waves in matter
- Travels through materials
 - air
 - water
 - steel
- Insulating materials can absorb sound waves



Next

Slide notes

Sound is a regular mechanical vibration that travels through matter as a wave form.


It consists of longitudinal, or compression waves in matter. You can visualize sound travel by comparing it to spectators doing the wave at a sports event.

Although it most commonly travels through air. Sound readily travels through any materials, such as water, and steel.

Some insulating materials absorb much of the sound waves, preventing the waves from penetrating the material.

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Noise Training



Understanding Noise

How Sound Travels

- Vibrations through air
 - loudspeaker cone
 - guitar string
 - drum head
 - vocal chords
 - blowing across a bottle top
 - wind blowing through trees
- Vibrations through liquid or solids
 - train rolling on a steel railroad track creates sound waves that vibrate and create sound in the air




Try Again

Slide notes

Whenever an object in air vibrates, the longitudinal, or compression waves, move away from the object as sound. There are many forms of the vibration, some not so obvious. The back and forth movement of a loudspeaker cone, guitar string, or drum head, result in compression waves of sound. When you speak, your vocal cords also vibrate, creating sound. If you blow across a bottle top, the air inside the bottle goes in a circular motion, resulting in sound waves being formed, or even wind blowing through trees can create sound indirectly. Sound can also be created by vibrating an object in a liquid, such as water, or in a solid, such as iron. A train rolling on a steel railroad track will create a sound wave that travels through the tracks, they will then vibrate, creating sound in air that you can hear, while the train may be a great distance away.

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Noise Training




Understanding Noise

Echoes

Conditions required to have an echo:

- Sound must travel at least 75 metres (although you can hear echoes from shorter distances under the right conditions)
- Sound must be able to bounce back
- Sound must hit a flat, smooth surface
- To be able to hear the small amount of returning sound, all other sounds must be absorbed




Next

Slide notes

An echo, is an eerie phenomenon that can occur under certain circumstances, and is caused by several conditions, which must be just right. In order to have an echo, the sound must travel at least 75 meters, although you can hear echoes from shorter distances under the right conditions. The sound must be able to bounce back. It must hit a flat, smooth surface somewhere. To be able to hear the small amount of returning sound, all other sounds must be absorbed.

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Noise Training



Check Your Understanding

Let's stop for a moment and check your understanding of this information


Next

Slide notes

Before we continue, lets stop and make sure you understand this information. Click next when you are ready to begin the quiz.

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Noise Training



"Noise" is defined as "unwanted" or "unpleasant" sound.

☒ A) True

☐ B) False

You must answer the question before continuing.


Submit

Slide notes

"Noise" is defined as "unwanted" or "unpleasant" sound. Is this statement true. Or false.

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Noise Training



Most sounds we hear are in the range of...

☐ A) 10 to 40 dB

☐ B) 20 to 80 dB

☒ C) 30 to 100 dB

☐ D) 80 to 180 dB

You must answer the question before continuing.

Submit

Slide notes

Most sounds we hear are in the range of...

10 to 40 dB


20 to 80 dB

30 to 100 dB

80 to 180 dB

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Noise Training



Small decibel increases represent small increases in sound energy.

☐ A) True

☒ B) False

You must answer the question before continuing.


Submit

Slide notes

True. Or false. Small decibel increases represent small increases in sound energy.

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Noise Training



Two pieces of equipment, located in the same room, are running at the same time. They both emit sound levels of 100 dB. That means the total amount of sound being emitted is...

☐ A) 100 dB

☒ B) 103 dB

☐ C) 140 dB

☐ D) 200 dB

☐ E) 300 dB

You must answer the question before continuing.

Submit


Slide notes

Two pieces of equipment, located in the same room, are running at the same time. They both emit sound levels of 100 dB. That means the total amount of sound being emitted is...

100 dB. 103 dB. 140 dB. 200 dB. 300 dB.

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Noise Training



Two pieces of equipment, located in the same room, are running at the same time. One machine emits 100 dB. The other machine emits 85 dB. That means the total amount of sound being emitted is

☒ A) 100 dB

☐ B) 103 dB

☐ C) 185 dB

☐ D) 200 dB

☐ E) 285 dB

You must answer the question before continuing.

Submit


Slide notes

Two pieces of equipment, located in the same room, are running at the same time. One machine emits 100 dB. The other machine emits 85 dB. That means the total amount of sound being emitted is...

100 dB. 103 dB. 185 dB. 200 dB. 285 dB.

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Noise Training



The Ontario noise regulation ensures that no worker is exposed to a sound level greater than the equivalent sound exposure level of 85 A-weighted decibels, Lex8. The Corporation of the City of Windsor's "ceiling" limit is...

- ☐ A) 75 dB at any time
- ☒ B) 80 dB at any time
- ☐ C) 85 dB at any time
- ☐ D) The Corporation of the City of Windsor does not have a sound exposure "ceiling" limit

You must answer the question before continuing.

Submit


Slide notes

The Ontario noise regulation ensures that no worker is exposed to a sound level greater than the equivalent sound exposure level of 85 A-weighted decibels, Lex 8. The Corporation of the City of Windsor's "ceiling" limit is...

75 dB at any time. 80 dB at any time. 85 dB at any time. The Corporation of the City of Windsor does not have a sound exposure "ceiling" limit.

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Noise Training



Sound can be created when an object vibrates in air, liquid or even in a solid.

☒ A) True

☐ B) False

You must answer the question before continuing.


Submit

Slide notes

Sound can be created when an object vibrates in air, liquid, or even in a solid. Is this statement true. Or false.

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Noise Training



Congratulations!

You have now completed this lesson

Next


Slide notes

Congratulations!

You have now completed this lesson. Click next to continue.

Slide 27 - Effects and Control of Noise Exposure


Noise Training



Effects and Control of Noise Exposure

Effects of Noise

- Communication difficulties
- Irritability
- Poor work performance
- Feelings of isolation
- Stress
- Muscle tension
- Increased blood pressure
- Difficulty concentrating
- Absenteeism
- Accidents




Try Again

Slide notes

The effects of noise are vast, and include communication difficulties, irritability, poor work performance, feelings of isolation, stress, muscle tension, increased blood pressure, difficulty concentrating, absenteeism, and even accidents.

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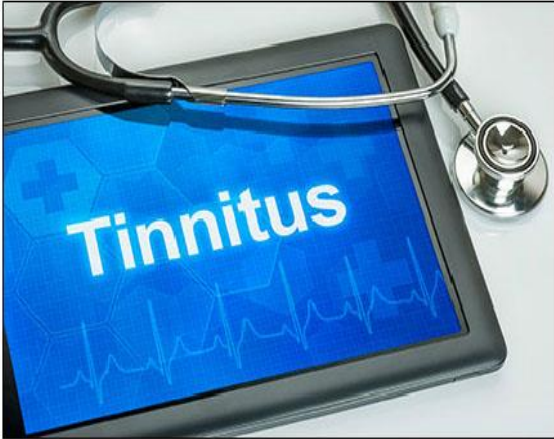
Noise Training



Effects and Control of Noise Exposure

Excessive Noise Exposure

- Causes hearing loss over time, depending on loudness and length of exposure
- Damages or destroys nerves in the inner ear
- Can cause "tinnitus" - permanent ringing in the ears
- Hearing loss and tinnitus can occur from
 - a single, extremely loud event
 - long-term exposure to less intensive but loud noise



Try Again

Slide notes

Exposure to loud noise will inevitably cause hearing loss over time, depending on the loudness, and length of exposure.


Loud noise exposure damages, or destroys, the nerves in the inner ear, which results in a loss of the ability to hear.

Excessive noise exposure can also result in "tinnitus". This is a permanent ringing in the ears.

Both hearing loss, and tinnitus, can occur from a single, extremely loud event, like an explosion, or gunshot, but can also happen from long-term exposure to less intense, but still loud noise.

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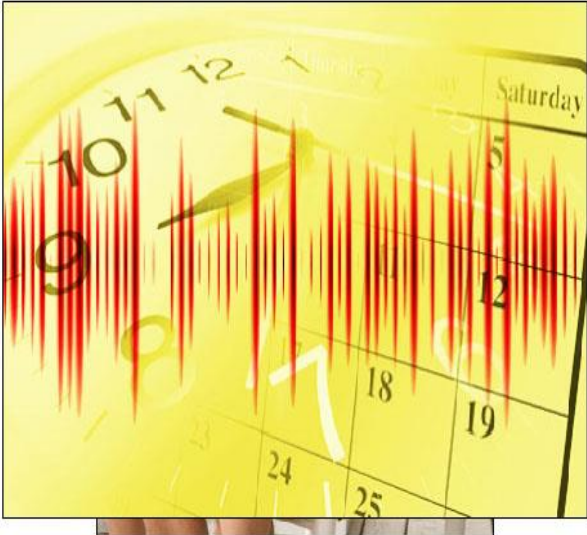
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Effects and Control of Noise Exposure

Long Term Exposure to Noise

The longer and louder the noise exposure, the greater chance permanent damage will occur



Next

Slide notes

When we're young, we can hear a wide range of pitches over an enormous range of loudness - from low rumbles, to high-pitched squeals.


Our ears can recover from short exposure to loud noise, but over time, nerve damage will occur.

The longer, and louder the noise exposure, the greater chance permanent damage will occur.

There really is no such thing as "tough ears", or "getting used to it". People who say they are "used to the noise", probably have some hearing loss!

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Noise Training




Effects and Control of Noise Exposure

Hearing Loss from Noise Exposure

Typical hearing loss by excessive exposure

- Gradual
- Begins with loss of ability to hear higher pitches
- First noticeable effects is difficulty hearing speech
- Includes frequent exposure to:
 - equipment and machinery
 - gas powered equipment
 - lawn mowers
 - chain saws
 - wood chippers
 - snow blowers
 - weed whackers
 - vacuum trucks
 - pneumatic tools
 - table saws
 - aircraft
- Commonly caused by use of personal music devices and being at loud concerts



Try Again

Slide notes

Hearing loss caused by excessive noise exposure is usually not noticed at first because it's gradual.

Typically, a person first loses the ability to hear higher pitches. Often, the first noticeable effect is difficulty in hearing speech.


Examples of this type of exposure includes frequently being around:

- equipment and machinery
- gas powered equipment
- lawn mowers
- chain saws
- wood chippers
- snow blowers
- weed whackers
- vacuum trucks
- pneumatic tools
- table saws
- and aircraft

More common examples include using personal music devices and being at loud concerts.




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Noise Training



Effects and Control of Noise Exposure

What is "Too Much Noise Exposure"?

-  The risk of hearing loss increases dramatically as noise levels increase
- At levels as low as 80 dBs, 3% of workers without HPDs will experience significant hearing loss during their work career.
- reported by NIOSH
-  Impact or banging noise levels above 140 decibels will cause immediate damage to nerves in the ear
-  Exposure to noise levels above 115 decibels for even five minutes is very risky



Personal Music Devices are banned in the Corporation during work hours and while "on the job"

Try Again

Slide notes

As you may have guessed, the risk of hearing loss dramatically increases as noise levels increase.

Nyosh reports exposure levels as low as 80 decibels, in workers unprotected by HPDs (hearing protective devices), can result in up to 3% of those exposed, suffering permanent hearing loss!

Impact or banging noise levels, like those reached from hitting an anvil with a ball peen hammer, can reach 140 decibels. Most noise meters will shut off at this level to protect the instrument from noise overload damage.

Personal Music Devices, are banned in the Corporation during work hours, and while "on the job".


Loud rock music contributed to hearing loss among baby boomers, but personal music devices are expected to make the problem much worse for the next generation. These devices, which can reach 115 decibels, pump music through headphones directly into the ear canal, and let the user overcome the rumble of the subway, or the drone of an airplane engine, without drawing angry shouts of "turn it down!"

As a result, they easily desensitize the user to dangerously high sound levels. Personal Music Devices pose an additional danger, because they hold thousands of songs, and can play for hours without recharging, users tend to listen continuously for hours at a time. They don't even need to stop and change a CD.

Since hearing damage caused by high volume is determined by its duration, continuous listening to personal music device, even at a seemingly reasonable level, can damage the delicate hair cells in the inner ear, that transmit sound impulses to the brain. A recent study in Pediatrics, reported that of the nearly 10,000 people who responded to a survey posted on the MTV web site; only 8 percent considered hearing loss "a very big problem."

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Noise Training



Effects and Control of Noise Exposure

Safety Effects from Noise Induced Hearing Loss (NIHL)

- Workers may not hear audible warnings and safety signals
- Hearing impairment jeopardizes affected employees and co-workers
- May interfere with daily life, especially social activities in noisy settings
- High incidence of fatalities
 - being struck by objects
 - transportation incidents
 - fatal accidents from moving machines (especially pedestrians)
- Break downs in communication



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Workers with Noise Induced Hearing Loss, referred to as NIHL, may not hear audible warnings and safety signals. Hearing impairment jeopardizes not only affected employees, but others who work with them.

NIHL may interfere with daily life, especially during social activities in noisy settings.

Hearing loss also contributes to a high incidence of accidental fatalities, from being struck by objects, transportation incidents, and fatal accidents from moving machines, especially pedestrians.

Of course hearing loss also results in the basic breakdown in communication, both at work, *and* at home!

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Noise Training




Effects and Control of Noise Exposure

Noise Induced Hearing Loss (NIHL)

Estimated risk of incurring material hearing impairment as a function average daily noise exposure over a 40-year working lifetime (source NIOSH)


- Average Exposure 90 dBA 29%
- Average Exposure 85 dBA 15%
- Average Exposure 85 dBA 3%

 15 minutes of unprotected exposure at 110 decibels risks hearing damage

Statistics based on **unprotected workers**

Remember: Corporate Ceiling Limit: 80 dB

[Try Again](#)



Slide notes

The National Institute for Occupational Safety and Health, estimates the risk of incurring hearing impairment as a function average of daily noise exposure over a 40 year working lifetime.


For workers whose average exposure is 90 A weighted decibels, the risk is 29%. With an average exposure of 85 A weighted decibels, the risk drops 15%. And for those workers whose average noise exposure is 80 decibels, 3% of them are expected to incur a hearing loss.

It takes only 15 minutes of unprotected exposure at 110 decibels to risk hearing damage.

It's important to remember that these statistics are based on **unprotected** workers. So you can see why the Corporate 80dB ceiling limit, is so important!

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Effects and Control of Noise Exposure

Noise Induced Tinnitus

- Permanent ringing in ears
- Difficult to treat
- Constant roaring, squealing or buzzing in one or both ears
- Can disrupt sleep, reduce concentration and cause irritability and depression



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Slide notes


Tinnitus, which is a permanent ringing in the ears, can be the result of exposure to high noise levels. It's very difficult to treat.

Tinnitus sufferers usually complain of hearing constant roaring, squealing or buzzing in one or both ears.

Severe tinnitus may disrupt sleep, reduce concentration and cause great irritability and depression.

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Noise Training



Effects and Control of Noise Exposure

Cost of Hearing Loss Claims

Claims for noise-induced hearing loss in manufacturing workplaces exceeded


\$30,000,000

between 1995 and 2004

- *Workplace Safety and Insurance Board (WSIB)*

Average cost of hearing aids/batteries:
\$11,000 every 4 years (2006) payable until death

Equipment costs for a 55-year-old worker who lives until the age of 83 could reach \$100,000!



Next


Slide notes

According to the Workplace Safety and Insurance Board, or “WSIB”, claims for noise-induced hearing loss in manufacturing workplaces exceeded 30 million dollars between 1995 and 2004!

In 2006, the WSIB estimated that the average cost of a set of hearing aids and batteries for workers with noise-induced hearing loss can reach \$11,000 every four years, payable from the time the claim is approved until the death of a worker. So for a 55-year-old worker who lives until the age of 83, the equipment costs could reach \$100,000!

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Noise Training



Effects and Control of Noise Exposure

Controlling Employee Noise Exposure


Principles of Control

- Source
- Path
- Worker
 - limit time exposed to loud noise
 - purchase/use quiet equipment

Noise reducing challenges

- Make machines harder to clean
- Materials are hard to clean
- Expensive!

But so worthwhile!



Try Again

Slide notes

To avoid the effects of excessive workplace noise exposure we use the principles of control, which include controlling at the source, along path and at the worker.


This can be done in several ways. The most desirable methods are to either limit the employee's time exposed to loud noise, or to purchase and use quiet equipment

Let's use the example of "sound dampening", which you can actually try at home using a wine glass. Tap against the glass and you'll hear a loud ring. Now put a finger from the other hand on the glass, which dampens or eliminates the sound of the ring!

Reducing noise exposure can be challenging since guarding and sound-proofing materials make machines harder to clean, or are hard to clean themselves! Noise reduction is expensive, but in the long run, so worthwhile!

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Noise Training



Effects and Control of Noise Exposure

Controlling Employee Noise Exposure

- Stationary noisy machines can be enclosed or isolated from workers
- Commercial sound-absorbing materials absorb up to 70% or more
- Retrofit vehicles, heavy equipment or hand powered tools with noise-reducing add-ons
- Hearing protection (ear muffs or ear plugs)



Next

Slide notes

Other ways to control noise exposure?

Sometimes stationary noisy machinery can be enclosed or isolated from workers.

Sound is absorbed when it strikes a porous material. Commercial sound-absorbing materials usually absorb 70 percent or more of the sound that strikes them.


Some vehicles, heavy equipment, or hand power tools can be retrofitted with noise-reducing add-ons.

When these methods are not feasible or not effective, then hearing protection (ear muffs or ear-plugs) is the last resort.

Please Note that: cotton, cigarette butts or other similar material provides little or no protection.

Slide 38 - Slide 38


Noise Training



Effects and Control of Noise Exposure

Controlling Noise Exposure: Engineering Controls

- Eliminate unneeded equipment
- Buy quiet equipment
- Retrofit existing equipment to minimize noise
 - add-on noise control dampers
 - mufflers
 - enclosures



Next


Slide notes

Controlling noise at its source is preferable to requiring workers to wear hearing protection. This can be accomplished by eliminating unnecessary equipment, purchasing “quieter” equipment or retrofitting existing equipment to minimize noise output with add-on noise control dampers, mufflers or even enclosures.

In fact, many manufacturers are aware of noise concerns and are striving to build and offer “quieter” equipment. So if you’re looking at new power equipment, get the noise rating and do some comparison shopping.

Slide 39 - Slide 39

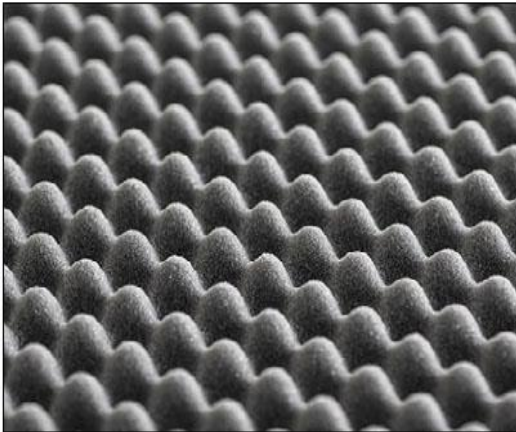
Noise Training



Effects and Control of Noise Exposure

Controlling Noise Exposure: Engineering Controls

- Enclosure/barriers
 - openings/holes allow noise leakage
- Relocate fixed noisy equipment
- Isolate the machine operator in a booth or room
- Use remote control
- Sound-absorbing materials
 - usually absorbs 70% or more



Try Again

Slide notes

You may be able to use an enclosure or barrier to reduce noise. The number of decibels of sound reduction can be measured by comparing the noise level before, and after installing an enclosure or barrier over a noise source.


But you need to be careful. Any openings or holes in the enclosure or barricade, allow noise leakage and greatly reduce the effectiveness of noise control.

Another option, when feasible, is to relocate noisy equipment to an area that reduces workers' noise exposure. If that's not possible, you may be able to isolate the machine operator from the noisy fixed equipment, by moving the operator to a booth, or separate room. And with automation of machines and processes, remote control from a separate room may become desirable.

Sound is absorbed when it strikes a porous material. Commercial sound-absorbing materials usually absorb 70 percent or more of the sound that strikes them.

Slide 40 - Slide 40


Noise Training



Effects and Control of Noise Exposure

Controlling Noise Exposure: Engineering Controls

- Soundproofing in trucks, tractors and other heavy vehicle cabs
 - less effective when windows are open
 - air conditioning reduces noise exposure



Next


Slide notes

Trucks, tractors and other heavy vehicle cabs, usually have soundproofing, but it is much less effective if windows are open in warm weather.

Air-conditioning not only provides comfort, but reduces noise exposure because employees are more likely to keep cab windows closed.

Slide 41 - Slide 41


Noise Training



Effects and Control of Noise Exposure

Controlling Noise Exposure: Engineering Controls

- Proper equipment maintenance avoids
 - noise from loose parts
 - parts scraping against each other
 - grinding noise from inadequate lubrication
 - vibration
- Reflected sound in workplaces with hard materials on ceilings, walls and floors
 - coat ceilings and walls with sound-absorbing materials



Try Again

Slide notes

Sound is produced by changes in force, pressure, or speed. Great changes produce louder noises and small changes quieter ones. More noise is produced if a task is carried out with great force for a short time than with less force for a longer time.

In some cases, a noise hazard will be created or made worse by a lack of maintenance. Parts may become loose, creating more noise because of improper operation or scraping against other parts. Grinding noises may also occur as the result of inadequate lubrication.

It is especially important to provide proper maintenance of noise control devices which are added or built into machinery. If a muffler becomes loose or worn out, for example, it should be fixed or replaced as soon as possible.


Vibration in machines often results from slippage or loosened bolts. In such cases, the disturbance can be reduced by repair or replacement.

Vibration isolation of a machine is effective if installed correctly.

In a workplace with hard materials on the ceiling, walls, and floor, almost all of the sound which strikes the surfaces is reflected. The sound level goes down at first as you move away from the machine, but after a certain point it remains practically unchanged. A better sound environment can be obtained by coating the ceilings and walls with effective sound-absorbing material.

Slide 42 - Slide 42


Noise Training



Effects and Control of Noise Exposure

Annual Audiometric Testing

- Assesses audible range for tones and speech
- Monitors possible hearing loss
- Often performed as part of pre-work placement
- Used for suspected hearing loss
- Trained technician (audiologist) uses an Audiometer
- Alerts employers and employees to the possibility of excessive noise exposure



Next

Slide notes

Annual audiometric employee testing, assesses their audible range for tones, and speech, and is a way to monitor possible hearing loss.


This health screening method is relatively painless, and is often performed as part of a pre-work placement test. The audiometric test, is also used when a person is suspected of having a hearing loss.

Typically, a trained technician, audiologist, oversees the subjective testing process, by using an electric device called an audio meter.

This test can alert both employers and employees to the possibility of excessive noise exposure at work, as well as outside of work.

Slide 43 - Slide 43

Noise Training



Check Your Understanding

Let's stop for a moment and check your understanding of this information


Next

Slide notes

Before we continue, lets stop and make sure you understand this information. Click next when you are ready to begin the quiz.

Slide 44 - Slide 44

Noise Training



Effects of noise can include all of the following EXCEPT...

☐ A) irritability

☐ B) muscle tension

☐ C) high blood pressure

☐ D) absenteeism

☒ E) All of these can be caused by exposure to noise

You must answer the question before continuing.

Submit

Slide notes

Effects of noise can include all of the following EXCEPT...

Enter slide note

irritability

muscle tension


high blood pressure

absenteeism

All of these can be caused by exposure to noise

Slide 45 - Slide 45

Noise Training



Tinnitus (permanent ringing in the ears) can happen from long-term exposure to excessive noise or a single, extremely loud occurrence; while permanent hearing loss only happens from long-term exposure.

☐ A) True

☒ B) False

You must answer the question before continuing.


Submit

Slide notes

Choose either true or false. Tinnitus, (permanent ringing in the ears), can happen from long-term exposure to excessive noise or a single, extremely loud occurrence; while permanent hearing loss only happens from long-term exposure.

Slide 46 - Slide 46

Noise Training



Typically a person first loses the ability to hear...

- ☒ A) high-pitched sounds
- ☐ B) low-pitched sounds
- ☐ C) both high and low-pitched sounds
- ☐ D) Typically a person loses the ability to hear all sounds at the same time

You must answer the question before continuing.

Submit

Slide notes

Typically a person first loses the ability to hear...

high-pitched sounds


low-pitched sounds

both high and low-pitched sounds

Typically a person loses the ability to hear all sounds at the same time

Slide 47 - Slide 47

Noise Training



Without hearing protection devices, approximately 3% of workers who are exposed to noise levels at 80 decibels will suffer permanent hearing loss.

☒ A) True

☐ B) False


You must answer the question before continuing.

Submit

Slide notes

Without hearing protection devices, approximately 3% of workers who are exposed to noise levels at 80 decibels will suffer permanent hearing loss.
Choose either true or false.

Slide 48 - Slide 48

Noise Training

How long would it take to risk hearing damage if you are exposed to noise at 110 decibels without wearing hearing protection?

- ☐ A) 5 minutes
- ☐ B) 10 minutes
- ☒ C) 15 minutes
- ☐ D) 30 minutes
- ☐ E) 60 minutes

You must answer the question before continuing.

Submit

Slide notes

How long would it take to risk hearing damage if you are exposed to noise at 110 decibels without wearing hearing protection?

5 minutes

10 minutes


15 minutes

30 minutes

60 minutes

Slide 49 - Slide 49

Noise Training



The most preferred method of controlling excessive noise exposure is to...

☐ A) wear hearing protection at all times

☒ B) purchase and use quiet equipment

☐ C) remove anyone with hearing loss from areas with excessive noise

☐ D) Any of the above

You must answer the question before continuing.

Submit

Slide notes

The most preferred method of controlling excessive noise exposure is to...

wear hearing protection at all times


purchase and use quiet equipment

remove anyone with hearing loss from areas with excessive noise

Any of the above

Slide 50 - Slide 50

Noise Training



Which of the following is an example of an engineering control used to reduce noise?

- ☐ A) Installing an enclosure around the machine
- ☐ B) Relocating noisy equipment
- ☐ C) Move the machine operator to a separate booth or room
- ☐ D) Add sound-absorbing material to the area
- ☒ E) These are all good example of engineering controls

You must answer the question before continuing.

Submit

Slide notes

Which of the following is an example of an engineering control used to reduce noise?

Installing an enclosure around the machine

Relocating noisy equipment


Move the machine operator to a separate booth or room

Add sound-absorbing material to the area

These are all good example of engineering controls

Slide 51 - Slide 51

Noise Training



Noise hazards can be created or made worse by a lack of maintenance.

☒ A) True

☐ B) False

You must answer the question before continuing.


Submit

Slide notes

Noise hazards can be created or made worse by a lack of maintenance. Is this true... or false?

Slide 52 - Slide 52

Noise Training



Congratulations!

You have now completed this lesson

Next

Slide notes

Congratulations!

You have now completed this lesson. Click next to continue.

Slide 53 - Hearing Protection

Noise Training



Hearing Protection

Types of Hearing Protectors



Ear Plugs

Ear Caps

Try Again

Slide notes

Hearing Protection Devices, or “HPDs”, come in 3 basic types.

Ear muffs.

Ear plugs.

And, ear caps.

Ear muffs, and ear plugs, offer about equal protection, whereas ear caps, somewhat less.

All hearing protectors are designed to reduce the intensity of noise to the sensitive nerves in our inner ear.

They do that far better than cotton, or bits of cloth stuffed in the ear.

All three of these types of hearing protection have advantages and disadvantages, and people vary on their preference for use.

Once again, we remind you that personal headsets for your music devices, are NOT allowed in the workplace.

Slide 54 - Slide 54

Noise Training



Hearing Protection

Ear Plugs

- Made of foam, rubber or plastic
- Can be either one-size-fits-all or sized S, M or L
- Can connect by cord or plastic
- Some are single use/disposable
- Inexpensive
- Lightweight
- Maintenance-free



Next

Slide notes

Ear plugs are made of foam, rubber, or plastic, and can be either one-size-fits-all, or in sizes small, medium, and large.

Some are connected by a cord, or plastic, to prevent dropping, or losing them. Some are single use, and disposable.


They are inexpensive, lightweight, and require no maintenance.

By trying different types, brands, and sizes, most people can find a comfortable fit through trial and error.

Although some people find ear plugs uncomfortable to wear for long periods, they rarely cause infection, or prolonged irritation of the ear canal.


Slide 55 - Slide 55

Noise Training




Hearing Protection

Types of Ear Plugs



Foam

- Must be inserted properly to provide rated noise reduction (NRR)



Pre-moulded

- Customized for exact fit
- Can have handles for use in dirty environments

Next

Slide notes

There are 2 basic types of ear plugs: the expandable foam, which provides the greatest protection, and pre-moulded plastic ones, which are more comfortable for some people, since they are customized to the exact fit of a person's ear canal. Some pre-moulded ear plugs have little "handles" for use in dirty environments.

Foam ear plugs must be inserted properly to provide their rated noise reduction, or NRR.

Slide 56 - Slide 56

Noise Training



Hearing Protection

Properly Inserting Ear Plugs






1. Roll into thin, crease-free cylinder

- squeeze lightly while rolling between forefinger and thumb
- gradually apply pressure
- can also use palms to roll

2. Reach one hand around the back of your head and pull up and back on your other ear to straighten the ear canal

3. Hold in the ear 10 - 20 seconds to allow earplugs to expand

4. Release and push again for 5 seconds

[Try Again](#)

Slide notes

Before inserting foam earplugs, they should be rolled into a very thin, *crease-free* cylinder. In order to get the diameter of the cylinder as small as possible and crease free, you should begin by squeezing the earplug lightly as you roll it between your forefinger and thumb. Then gradually apply progressively greater pressure as the plug becomes more tightly compressed.

The earplug may also be rolled in a person's palms to achieve the thin, *crease-free* cylinder.

A mistake that some people make is to unintentionally roll the foam earplug into a ball or cone, instead of a cylinder. This results in a configuration that cannot be inserted very far into the ear canal and therefore will not provide effective hearing protection.

To properly insert the rolled and squeezed cylinder into your ear, reach one hand around the back of your head and pull up and back on your outer ear to straighten the ear canal. If the ear canal is not straightened out, the earplug cannot slide in far enough because of the natural curve inside your ear. You should be able to feel when the earplug is in far enough to provide a good seal.

Foam earplugs must then be held in your ear with your finger for 10-20 seconds to allow them to expand. Then, to ensure the best fit possible, you should release and push again for another 5 seconds. At this point, the earplug will be positioned entirely within your ear canal.

Slide 57 - Slide 57

Noise Training



Hearing Protection

Ear Plugs

Advantages

- Simple to use
- Less expensive than muffs
- More comfortable in hot or damp work areas

Disadvantages

- Provide less protection than ear muffs
- Should not be used in areas with noise levels over 150 dB
- Not as visible as ear muffs
- Must be properly inserted to provide adequate protection



Try Again

Slide notes

Ear plugs are simple to use, less expensive than muffs, and more comfortable in hot, or damp work areas. On the negative side, they provide less protection than some muffs, and should not be used in areas having noise levels over 105 dB. They are not as visible as muffs, and a supervisor cannot readily check to see if workers are wearing them. They must be properly inserted to provide adequate protection.

Both “Off the shelf”, and “custom” ear plugs, provide about the same level of protection.

Slide 58 - Slide 58

Noise Training



Hearing Protection

Ear Muffs

Advantages

- Better at reducing low frequency noise
- Last longer
- Cover the entire ear
- Include replaceable pads/cushions
- Some high-tech styles filter out specific noise frequencies
- Easier to fit
- Generally more durable than plugs

Disadvantages

- More expensive
- Less comfortable (especially in hot weather)
- Less able to seal cushions around the ear if worn over heavy beards, long hair or sideburns or eyeglass sidepieces



Try Again

Slide notes

Ear muffs have some advantages over ear plugs. Ear muffs can usually provide greater protection than plugs, although this isn't *always* true. They're slightly better than plugs at reducing low frequency noise, like a dull roar. They are initially more expensive, but last much longer than most plugs.

Ear muffs cover the whole ear, and are preferred by some people. They have replaceable pads or cushions, and some high-tech styles filter out specific noise frequencies. They're easier to fit, and generally more durable than ear plugs.

But ear muffs have some disadvantages too. They're more expensive, and often less comfortable than plugs; especially in hot work areas. The ability of ear muff cushions to seal around the ear, is reduced if they are worn over heavy beards, long hair or sideburns, and the sidepieces of eyeglasses. In these cases, the seal is likely to be altered, which will result in loss of hearing protection.

Slide 59 - Slide 59

Noise Training



Hearing Protection

Ear Muffs

Tips

- Ensure eyeglass sidepieces fit close to the head
- Can get muffs designed to be worn with hard hats or goggles
- Can get hard hats with attached ear muffs
- Muffs and plugs can be worn together to give better protection



Next

Slide notes


To help in maintaining a good seal, it's important that eyeglass sidepieces fit close to the worker's head, and be as thin as possible.

Some ear muffs designed to be worn with hard hats or goggles, or hard hats with attached ear muffs can be purchased.

Here's a tip that can help, in areas where noise levels are very high, muffs and plugs can be worn together to give better protection.

Slide 60 - Slide 60

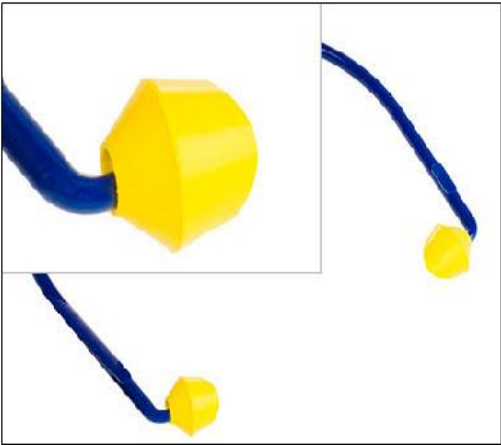
Noise Training




Hearing Protection


Ear Caps

- Similar to ear plugs
- Blocks the ear canal
- Good for intermittent use
- Good for people who find ear plugs uncomfortable



 **Caution:**

- Limited use
- Only reduce noise by approx. 10 dB
- Not adequate protection in noise areas above 95 dB

 Corporation does not consider ear caps suitable in areas above 89 dB

Next

Slide notes

Ear caps are like ear plugs, except they don't insert into the ear canal. They only block it. They're good for intermittent use, or for people who find ear plugs uncomfortable.

You need to be careful though. Ear caps have a limited use, and only reduce noise to the ear by about 10 decibels, so they would not give adequate protection in noise areas above 95 decibels.

At the corporation of the City of Windsor, ear caps are not considered suitable in areas measured above 89 decibels.

Slide 61 - Slide 61

Noise Training



Hearing Protection

Double Protection (ear plugs and ear muffs)

- Required at 105 dB or more
- 2nd form of HPD provides approx 3 - 5 dB of added attenuation (amount of noise being decreased)
- Avoid overprotection
 - makes worker feel isolated

Determine effective NRR of plugs

- subtract 7
- subtract additional 5 dBA
- should result in 80 dBA or less



Try Again

Slide notes

“Double protection”, (wearing both ear plugs and ear muffs), is required in areas at 105 dB or higher. The second form of hearing protection device, provides approximately 3 to 5 dB of additional attenuation, which means the amount of noise being decreased. It does not double the protection capability.

At the other extreme, it's important to avoid overprotection. Using more protection than necessary can make workers feel isolated from their work environment. Take care to select protectors with sufficient, but not excessive attenuation, to keep noise at 80, dBA.

In a case where the hearing protector does not offer enough protection, earmuffs, and plugs, can be worn together. Determine the effective noise reduction rating of the plugs by subtracting 7, and then subtracting an additional 5 A weighted decibels, for a total reduction of 12 decibels. This number should result in an exposure of 80 A weighted decibels, or less.

Slide 62 - Slide 62

Noise Training



Hearing Protection

Hearing Protection Devices

Amount of attenuation based on factors:

- HPD characteristics
- How HPD is worn

Must be capable of keeping noise exposure below 80 dBA Corporate ceiling level

 Hearing protectors required in areas above 80 dB



Next


Slide notes

The amount of attenuation a hearing protection device provides, depends on its characteristics and how the worker wears it. The selected hearing protector, must be capable of keeping the noise exposure at the ear, below the 80 A weighted decibel Corporate ceiling level.

Because a worker may not know how long a given noise exposure will last, or what additional noise exposure he, or she, may incur later in the day, it's a Corporate requirement to wear hearing protectors, whenever working in areas above 80 dB. Workers, and supervisors, should ensure that the hearing protectors are worn correctly, are fitted properly, and are appropriate for the noise in which they are worn.

Slide 63 - Slide 63

Noise Training



Hearing Protection

Noise Reduction Rating (NRR)


Laboratory testing to determine the ability to reduce noise levels to the ear

- Measured in decibels (dB)
- Printed on earmuff or earplug package
- The higher the number, the greater the protection

Noise Reduction Rating

31 DECIBELS

WHEN USED AS DIRECTED




Next

Slide notes

Studies of hearing protector users, have shown repeatedly that average protection values in the real world, are much lower than the labeled Noise Reduction Ratings, (NRR), determined in laboratories with trained, and motivated subjects.

Slide 64 - Slide 64

Noise Training



Hearing Protection

Noise Reduction Rating (NRR)

Noise area: 100 dB


Reduction to 78 dB

Since lab conditions are not the same as workplace conditions, the actual noise reduction is 7 decibels less than the printed NRR

100 dB

- 22 dB

78 dB



Noise Reduction Rating

29 DECIBELS

WHEN USED AS DIRECTED

EPA

Try Again

Slide notes

Let's look at some specific examples. In a noise area of 100 decibels, this earplug will reduce the noise down to 78 decibels, which is still protective.

That's because the lab rated NRR is 22 dB. In this case, we subtract 22 dB, from the actual noise level

29 dB minus Lab-rated NRR


29 minus 7 = 22 dB (actual NRR)

Since lab conditions are not the same as workplace conditions, the actual noise reduction is 7 decibels less than the printed NRR. So, we'll use the noise reduction rating of 22 instead of 29.

So an earplug with an NRR rating of 29 decibels, actually reduces noise by 22 decibels, which is still protective.

Slide 65 - Slide 65

Noise Training



Hearing Protection


Resistance to Wear Hearing Protection

Why

- Discomfort
- *Lack of understanding the hazards of excessive noise*
- Belief of inability to hear machinery or co-workers

Factors that determine acceptance and use of hearing protection

- Convenient and available
- Belief the device can be worn correctly
- Belief the device will prevent hearing loss
- Belief the device will not impair ability to hear
- Comfort
- Knowing the device will adequately reduce noise
- Ease of fit
- Compatibility with other PPE



Try Again

Slide notes

Remember that the best hearing protection for any worker is the removal of hazardous noise from the workplace. Until, and unless that happens, the next best hearing protector for a worker is the one he or she will wear willingly and consistently.

Employees resist hearing protection because they find them uncomfortable, don't understand the hazards of exposure to excessive noise, or believe they will not be able to hear machinery, or co-workers as well.

There are some extremely important factors that determine a worker's acceptance of hearing protectors, *and*, the likelihood that they'll wear them consistently. The hearing protectors must be convenient, and available. There must be a belief that the device can be worn correctly, *AND*, that it will prevent hearing loss. The worker must also believe that the device will not impair their ability to hear important sounds.

Other factors that ensure workers consistently wear hearing protectors are comfort, knowing the device will adequately reduce noise, ease of fit, and compatibility with other personal protective equipment.

Slide 66 - Slide 66

Noise Training



Hearing Protection

Addressing Worker Resistance

- Using HPD in noisy areas makes it easier to hear each other because background noise is muted
- Employees quickly adjust to change in sound quality

Solutions:

- Provide several choices of hearing protectors
- Training on hazards of excessive noise exposure



Try Again

Slide notes

The fact is, using hearing protection in noisy areas, actually makes it easier for co-workers to hear each other, because loud background noise is muted!

There is some change in sound quality when plugs, or muffs are used, but employees can be expected to quickly adjust to this change. It is similar to the way dark glasses reduce the sun's glare, making it easier to see.

Employee resistance is usually solved by providing several choices of hearing protectors.

Training employees on the hazards of excessive noise exposure, which provides them with the awareness, and knowledge of this hazard.

Slide 67 - Slide 67

Noise Training




Hearing Protection

Addressing Worker Resistance

Wearing HPDs

- Does NOT make it more difficult to hear
- Hearing improved when noise ranges 85 - 105 dB
 - level of speech and noise are reduced
 - hearing mechanism is not overloaded
 - relatively free from distortion cause by high levels of sound



Next

Slide notes

Extensive studies show, that individuals with normal hearing, will hear warning signals slightly better, when using a hearing protector. In noisy industrial environments, hearing protection programs don't always address the special needs of hearing-impaired workers. As recent research has uncovered, most audiology testing does not take into account how hearing-impaired individuals may function in noisy settings. Individuals with existing hearing damage will not hear as well in noisy environments while using standard off the shelf hearing protection.

HPDs do not make it more difficult to carry on a conversation and hear warnings when noise is above 80 decibels. In fact, when noise ranges from 85 to 105 decibels, hearing is actually improved when plugs or muffs are used. This improvement happens because the levels of both the speech and noise are reduced, to where the hearing mechanism is not overloaded, and it's relatively free from distortion, caused by high levels of sound.

Slide 68 - Slide 68

Noise Training



Hearing Protection

Hearing Conversation for the Hearing Impaired

- Specialized HPD for occupationally-exposed hearing impaired
 - passive - no electronics or amplification
 - active - power supply and electronics
 - communication headset - ear muffs and microphone
- Determine appropriate HPD for each hearing impaired employee
- Provide individualized audiometric tests
- Raise awareness of the need to protect residual hearing



Next

Slide notes

Specialized hearing protectors are available that may benefit occupationally-exposed hearing-impaired workers, in a variety of noisy workplaces. Specialized hearing protectors include, passive, (no electronics or amplification), active, (a power supply and electronics), or communication headsets, (ear muffs and microphone), usually used with an intercom system.

Employers should work with hearing-impaired workers, and the person in charge of the hearing conservation program, to determine the appropriate hearing protection for the hearing-impaired employee, and to determine on a case-by-case basis, whether the worker's hearing aid, can be appropriately worn in a noisy workplace, under an earmuff.

Individualized audiometric testing protocols may be necessary to obtain valid audiograms.

And, it's important to raise awareness regarding the need to protect the residual hearing of workers, with hearing loss.

Slide 69 - Slide 69

Noise Training



Hearing Protection

Proper Use of Hearing Protectors

- Actual effectiveness cannot be determined with 100% certainty
- Improper use of earplugs
 - not inserted far enough
 - become loose due to head and body movements
- Improper use of earmuffs
 - ineffective seal around the ear
- Removing HPD for “just a minute” could result in overexposure
- Wear hearing protection both on and off the job



 It won't protect you if you don't wear it!

Next

Slide notes

Hearing protection only provides adequate protection when they're used, and used properly.

The actual effectiveness of any individual hearing protector, can't be determined with 100% certainty under workplace conditions.

Workers may be exposed to excessive levels of noise, without realizing it, because they think they're wearing their hearing protection properly.

Improper use of both earplugs and earmuffs is often observed in workplaces. In some cases, foam earplugs are not inserted far enough; in others, they work their way loose because of head and body movement during work activities. Regardless of the reason, ear plugs are of little value if they don't fit snug and well within the person's ear.

The improper use of earmuffs typically results in an ineffective seal around the ear and reduced hearing protection.

Sometimes users will remove earmuffs or earplugs “just for a minute” in a noisy area. In very high noise areas, this could easily result in noise overexposure. Remember - *It won't protect you if you don't wear it!!*

Hearing loss can be prevented by protecting your hearing in every way possible. This includes wearing hearing protection *both on and off* the job.

Slide 70 - Slide 70

Noise Training



Hearing Protection

Selecting the Right Hearing Protection

- Choose the right HPD
 - noise level
 - comfort
 - suitability for worker and environment
 - amount of noise reduction
- Earmuffs are best for intermittent noise exposure
 - easier to take on/off as needed
- Check Manufacturer's NRR



Try Again

Slide notes

The choice of hearing protectors is a very personal one, and depends on a number of factors, including, level of noise, comfort, and the suitability of the hearing protector, for both the worker, and his environment. Most importantly, the hearing protector should provide the desired noise reduction. It is best, where protectors must be used, to provide a choice of a number of different types to choose from.

If the noise exposure is intermittent, ear muffs are more desirable, since it may be inconvenient to remove and reinsert earplugs.

Remember - manufacturers provide information about the noise reducing capability of a hearing protector, so check the NRR rating of each Hearing Protection device to choose the one that's best for you.

Slide 71 - Slide 71

Noise Training



Hearing Protection

Determining the Right Hearing Protection

- Determine noise areas
- Determine noise levels
- Determine who needs hearing protection
- Calculation needed dB reduction
- Determine which hearing protector provides the needed dB reduction
- Select at least 2 choices



Next

Slide notes

In order to get the full benefits of hearing protection devices, they must be worn at all times during noisy work. Removing hearing protectors, for even a short time, substantially reduces the actual hearing protection.

Your employer will determine noise areas, noise levels, and who needs hearing protection. The required decibel reduction of hearing protection can then be calculated; and a determination as to which hearing protection will be required, can be made. Employees should have at least two types of hearing protection to choose from.

Slide 72 - Slide 72

Noise Training



Hearing Protection

Hearing Protector Care and Maintenance

- Follow manufacturer's instructions
- Check for wear and tear
- Replace ear cushions or plugs when no longer pliable
- Replace unit when head bands are stretched and do not keep ear cushions snug against the head

Cleaning ear muffs

- disassemble
- wash in warm water
- rinse in clean warm water
- ensure sound-attenuating material does not get wet
- use soft brush to remove skin oil/dirt from ear cushions
- squeeze excess moisture and place on clean surface to air dry

Cleaning ear plugs

- first check manufacturer's recommendations
- squeeze excess moisture and place on clean surface to air dry



Next

Slide notes

You need to follow proper care, and maintenance, of all hearing protection devices. To do that, follow the manufacturer's instructions.

Check hearing protection regularly for wear and tear.

Replace ear cushions, or plugs, that are no longer pliable.

Replace a unit, when head bands are so stretched, that they don't keep ear cushions snugly against the head.


Disassemble ear muffs to clean them. Wash them with a mild liquid detergent in warm water, and then rinse them in clean, warm water. And, make sure the sound-attenuating material inside the ear cushion, does not get wet.

Use a soft brush to remove skin oil, and dirt, that can harden the ear cushions. Squeeze excess moisture from the cushions, and then place them on a clean surface to air dry.

When caring for ear plugs, remember to always check the manufacturer's recommendations first, to find out if they are washable. If they are, be sure to squeeze excess moisture from the plugs, and then place them on a clean surface to air dry.

Slide 73 - Slide 73

Noise Training



Check Your Understanding

Let's stop for a moment and check your understanding of this information


Next

Slide notes

Before we continue, lets stop and make sure you understand this information. Click next when you are ready to begin the quiz.

Slide 74 - Slide 74

Noise Training



Do hearing protection devices make it harder or easier to hear in a noisy environment?

☐ A) Harder because they muffle sound

☐ B) Harder but only if the noise is really loud

☒ C) Easier because they reduce background noise

☐ D) Hearing protection devices make no difference in how you hear

You must answer the question before continuing.

Submit

Slide notes

Do hearing protection devices make it harder, or easier, to hear in a noisy environment?

Harder because they muffle sound


Harder but only if the noise is really loud

Easier because they reduce background noise

Hearing protection devices make no difference in how you hear

Slide 75 - Slide 75

Noise Training



When selected and worn properly, both ear plugs and ear muffs perform equally well.

☒ A) True
☐ B) False

You must answer the question before continuing.


Submit

Slide notes

When selected and worn properly, both ear plugs, and ear muffs, perform equally well. Is this statement true or false?

Slide 76 - Slide 76

Noise Training



Custom made earplugs work better than any other earplugs.

☐ A) True

☒ B) False

You must answer the question before continuing.


Submit

Slide notes

Choose either true, or false. Custom made earplugs work better than any other earplugs.

Slide 77 - Slide 77

Noise Training



Before inserting foam earplugs into the ears they should be...

- ☐ A) rolled into a ball or cone
- ☒ B) rolled into a thick, crease-free cylinder
- ☐ C) rolled into either a ball or cylinder
- ☐ D) Foam earplugs should first be inserted into the ears; then shaped

You must answer the question before continuing.

Submit

Slide notes

Before inserting foam earplugs into the ears they should be...

rolled into a ball or cone.


rolled into a thick, crease-free cylinder.

rolled into either a ball or cylinder.

Foam earplugs should first be inserted into the ears; then shaped.

Slide 78 - Slide 78

Noise Training



Ear plugs should not be used in areas having noise levels above 95 decibels.

☐ A) True

☒ B) False

You must answer the question before continuing.


Submit

Slide notes

Is this true or false? Ear plugs should not be used in areas having noise levels above 95 decibels.

Slide 79 - Slide 79

Noise Training



All of the following are advantages of ear muffs when compared to ear plugs except...

☐ A) ear muffs can usually provide greater protection than ear plugs

☐ B) ear muffs last longer than ear plugs

☒ C) ear muffs are usually more comfortable than ear plugs, especially in hot work environments

☐ D) ear muff parts can be replaced without replacing the entire unit

☐ E) These are all advantages of ear muffs

You must answer the question before continuing.

Submit

Slide notes

All of the following are advantages of ear muffs, when compared to ear plugs, *except*...

Ear muffs can usually provide greater protection than ear plugs.

Ear muffs last longer than ear plugs.


Ear muffs are usually more comfortable than ear plugs, especially in hot work environments.

Ear muff parts can be replaced without replacing the entire unit.

These are all advantages of ear muffs.

Slide 80 - Slide 80

Noise Training



Wearing both ear plugs and ear muffs is required in areas at 105 dB or higher.

☒ A) True

☐ B) False

You must answer the question before continuing.


Submit

Slide notes

Wearing both ear plugs, and ear muffs, is required in areas at 105 dB or higher. Is this statement true... or false

Slide 81 - Slide 81

Noise Training



Which of these are factors that determine a worker's acceptance and actual use of hearing protectors?

- ☐ A) A belief that the device will prevent hearing loss
- ☐ B) A belief that the protectors will not prevent them from hearing important sounds
- ☐ C) Knowing the device is comfortable and convenient
- ☐ D) Knowing the device is compatible with other PPE
- ☒ E) All of the above

You must answer the question before continuing.

Submit

Slide notes

Which of these are factors that determine a worker's acceptance, and actual use of hearing protectors?

A belief that the device will prevent hearing loss.

A belief that the protectors will not prevent them from hearing important sounds.


Knowing the device is comfortable and convenient.

Knowing the device is compatible with other PPE.

All of the above.

Slide 82 - Slide 82

Noise Training



You are working in a noise area of 100 decibels. Because the noise level is less than 105 dBA double hearing protection is not required. The ear plugs you are wearing have an NRR of 30 decibels. Once you make the necessary calculations, the noise reduction rating of the ear plugs makes it safe to use in areas where noise is at or under...

- ☐ A) 80 decibels
- ☒ B) 77 decibels
- ☐ C) 100 decibels
- ☐ D) 130 decibels

You must answer the question before continuing.

Submit

Slide notes

You are working in a noise area of 100 decibels. Because the noise level is less than 105 dBA, double hearing protection is not required. The ear plugs you are wearing, have a Noise Reduction Rating of 30 decibels. Once you make the necessary calculations, the noise reduction rating of the ear plugs, makes it safe to use in areas where noise is at, or under...


80 decibels.

77 decibels.

100 decibels.

130 decibels.

Slide 83 - Slide 83

Noise Training

If noise exposure is intermittent, ear plugs are more desirable, since the worker will not need as much constant protection.

☐ A) True
☒ B) False

You must answer the question before continuing.


Submit

Slide notes

If noise exposure is intermittent, ear plugs are more desirable, since the worker will not need as much constant protection. Select either true, or false.

Slide 84 - Slide 84

Noise Training



Congratulations!

You have now completed this lesson

Next


Slide notes

Congratulations!

You have now completed this lesson. Click next to continue.

Slide 85 - Slide 85

Noise Training



Final Test

75% accuracy required for course completion

Next

Slide notes

Now that you have completed all the lessons of this course, it's time to make sure you have a good understanding of this material.

Course completion will require a score of 75 percent or greater.

Click next, when you're ready to begin.

Slide 86 - Slide 86

Noise Training

THE CITY OF WINDSOR
ONTARIO, CANADA

Question 1 of 25

Two pieces of equipment, located in the same room, are running at the same time. They both emit sound levels of 100 decibels. That means the total amount of sound being emitted is...

☐ A) 100 decibels
☒ B) 103 decibels
☐ C) 140 decibels
☐ D) 200 decibels
☐ E) 300 decibels

Correct!

OK

You must answer the question before continuing.

another tool emitting 80 decibels, to result is 83 decibels.

If two pieces of equipment both emit 100 decibels at the same time the result is 103 decibels.

OK

Submit

Slide notes

Two pieces of equipment, located in the same room, are running at the same time. They both emit sound levels of 100 dB. That means the total amount of sound being emitted is...

100 dB.


103 dB.

140 dB.

200 dB.

Slide 87 - Slide 87

Noise Training


THE CITY OF
WINDSOR
ONTARIO, CANADA

Question 2 of 25

Which of these are factors that determine a worker's acceptance and actual use of hearing protectors?

☐ A) A belief that the device will prevent hearing loss

☐ B) A belief that the protectors will not prevent them from hearing important sounds

☐ C) Knowing the device is comfortable and convenient

☐ D) Knowing the device is compatible with other PPE

☒ E) All of the above

Correct!

OK

You must answer the question before continuing.

believe that the will not impair their ability to hear important sounds.

Other factors are comfort, knowing the device will adequately reduce noise, ease of fit and compatibility with other personal protective equipment.

OK

Submit

Slide notes

Which of these are factors that determine a worker's acceptance and actual use of hearing protectors?

A belief that the device will prevent hearing loss.

A belief that the protectors will not prevent them from hearing important sounds.

Knowing the device is comfortable and convenient.

Knowing the device is compatible with other PPE.

All of the above.

Slide 88 - Slide 88

Noise Training

THE CITY OF WINDSOR
ONTARIO, CANADA

Question 3 of 25

Do hearing protection devices make it harder or easier to hear in a noisy environment?

- ☐ A) Harder because they muffle sound
- ☐ B) Harder but only if the noise is really loud
- ☒ C) Easier because they reduce background noise
- ☐ D) Hearing protection devices make no difference in how you hear

Correct!

OK

You must answer the question before continuing.

Incorrect

The fact is, using hearing protection in noisy areas actually makes it easier for co-workers to hear each other because loud background noise is muted!

OK

Submit

Slide notes

Do hearing protection devices make it harder, or easier, to hear in a noisy environment?

Harder because they muffle sound.


Harder but only if the noise is really loud.

Easier because they reduce background noise.

Hearing protection devices make no difference in how you hear.

Slide 89 - Slide 89

Noise Training


THE CITY OF
WINDSOR
ONTARIO, CANADA

Question 4 of 25

Effects of noise can include all of the following EXCEPT...

☐ A) Irritability

☐ B) Muscle tension

☐ C) High blood pressure

☐ D) Absenteeism

☒ E) All of these can be caused by exposure to noise

Correct!

OK

You must answer the question before continuing.

The effects of noise are vast, and include communication difficulties, irritability, poor work performance, feelings of isolation, stress, muscle tension, increased blood pressure, difficulty concentrating, absenteeism and even accidents.

OK

Submit

Slide notes

Effects of noise can include all of the following *except*...

Irritability

Muscle tension


High blood pressure

Absenteeism

All of these can be caused by exposure to noise.

Slide 90 - Slide 90

Noise Training



Question 5 of 25

Wearing both ear plugs and ear muffs is required in areas at 105 dB or higher.

☒ A) True

☐ B) False

Correct!

OK

You must answer the question before continuing.

Incorrect

"Double protection" (wearing both ear plugs and ear muffs) is required in areas at 105 dB or higher.

OK


Submit

Slide notes

Wearing both ear plugs and ear muffs is required in areas at 105 dB or higher. Is this statement true... or false.

Slide 91 - Slide 91

Noise Training



Question 6 of 25

You are working in a noise area of 100 decibels. Because the noise level is less than 105 dBA double hearing protection is not required. The ear plugs you are wearing have a Noise Reduction Rating of 30 decibels. Once you make the necessary calculations, the noise reduction rating of the ear plugs makes it safe to use in areas where noise is at or under...

☐ A) 80 decibels

☒ B) 77 decibels

☐ C) 100 decibels

☐ D) 130 decibels

Correct!

OK

You must answer the question before continuing.

Incorrect

The correct answer is 77 decibels.

OK

Submit

Slide notes

You are working in a noise area of 100 decibels. Because the noise level is less than 105 dBA, double hearing protection is not required. The ear plugs you are wearing, have a Noise Reduction Rating of 30 decibels. Once you make the necessary calculations, the noise reduction rating of the ear plugs makes it safe to use in areas where noise is at or under...

80 decibels.


77 decibels.

100 decibels.

130 decibels.

Slide 92 - Slide 92

Noise Training



Question 7 of 25

Custom made earplugs work better than any other earplugs.

☐ A) True

☒ B) False

Correct!

OK

You must answer the question before continuing.

Incorrect

Both "Off the shelf" and "custom" ear plugs provide about the same level of protection.

OK


Submit

Slide notes

Choose either true, or false. Custom made earplugs work better than any other earplugs.

Slide 93 - Slide 93

Noise Training


THE CITY OF
WINDSOR
ONTARIO, CANADA

Question 8 of 25

All of the following are advantages of ear muffs when compared to ear plugs
EXCEPT...

☐ A) Ear muffs can usually provide greater protection than ear plugs

☐ B) Ear muffs last longer than ear plugs

☒ C) Ear muffs are usually more comfortable than ear plugs, especially in hot work environments

☐ D) Ear muff parts can be replaced without replacing the entire unit

☐ E) These are all advantages of ear muffs

Correct!

OK

You must answer the question before continuing.

- last longer than ear plugs.
- can be replaced without replacing the entire unit.

Ear muffs are often less comfortable than plugs; especially in hot work areas.

OK

Submit

Slide notes

All of the following are advantages of ear muffs when compared to ear plugs *except*...

ear muffs can usually provide greater protection than ear plugs.

ear muffs last longer than ear plugs.


ear muffs are usually more comfortable than ear plugs, especially in hot work environments.

ear muff parts can be replaced without replacing the entire unit.

These are all advantages of ear muffs.

Slide 94 - Slide 94

Noise Training



Two pieces of equipment, located in the same room, are running at the same time. One machine emits 100 decibels. The other machine emits 85 decibels. That means the total amount of sound being emitted is...

Question 9 of 25

- ☒ A) 100 decibels
- ☐ B) 103 decibels
- ☐ C) 185 decibels
- ☐ D) 200 decibels
- ☐ E) 285 decibels

Correct!

OK

You must answer the question before continuing.

Incorrect

The correct answer is 100 decibels.

OK

Submit

Slide notes

Two pieces of equipment, located in the same room, are running at the same time. One machine emits 100 decibels. The other machine emits 85 decibels. That means the total amount of sound being emitted is...

100 dB.


103 dB.

185 dB.

200 dB.

285 dB.

Slide 95 - Slide 95

Noise Training 

Question 10 of 25

Most sounds we hear are in the range of...

☐ A) 10 to 40 decibels

☐ B) 20 to 80 decibels

☒ C) 30 to 100 decibels

☐ D) 80 to 180 decibels

Correct!

OK

You must answer the question before continuing.

Incorrect

Most sounds we hear are in the range of 30 to 100 decibels.

OK

Submit

Slide notes

Most sounds we hear are in the range of...


10 to 40 dB.

20 to 80 dB.

30 to 100 dB.

80 to 180 dB.

Slide 96 - Slide 96

Noise Training 

Question 11 of 25

When selected and worn properly, both ear plugs and ear muffs perform equally well.

☒ A) True
☐ B) False

Correct!

OK

You must answer the question before continuing.

Hearing Protection Devices or "HPDs" come in 3 basic types: ear muffs, ear plugs and ear caps. Ear muffs and ear plugs offer about equal protection, whereas ear caps somewhat less.

OK


Submit

Slide notes

When selected and worn properly, both ear plugs and ear muffs perform equally well. Is this statement true, or false.

Slide 97 - Slide 97

Noise Training



Question 12 of 25

The most preferred method of controlling excessive noise exposure is to...

- ☐ A) wear hearing protection at all times
- ☒ B) purchase and use quiet equipment
- ☐ C) remove anyone with hearing loss from areas with excessive noise
- ☐ D) Any of the above

Correct!

OK

You must answer the question before continuing.

control, which include controlling the source, path and the worker.

This can be done in several ways. The most desirable methods are to either limit the employee's time exposed to loud noise, or to purchase and use quiet equipment.

OK

Submit

Slide notes

The most preferred method of controlling excessive noise exposure is to...


wear hearing protection at all times.

purchase and use quiet equipment.

remove anyone with hearing loss from areas with excessive noise.

Any of the above.

Slide 98 - Slide 98

Noise Training 

Question 13 of 25

Tinnitus (permanent ringing in the ears) can happen from long-term exposure to excessive noise or a single, extremely loud occurrence; while permanent hearing loss only happens from long-term exposure.

☐ A) True
☒ B) False

Correct!

OK

You must answer the question before continuing.

Both Tinnitus and permanent hearing loss can occur from a single, extremely loud event like an explosion or gunshot, but can also happen from long-term exposure to less intense, but still loud noise.

OK

Submit

Slide notes

Choose either true, or false. Tinnitus (permanent ringing in the ears) can happen from long-term exposure to excessive noise or a single, extremely loud occurrence; while permanent hearing loss only happens from long-term exposure.

Slide 99 - Slide 99

Noise Training

THE CITY OF WINDSOR
ONTARIO, CANADA

Question 14 of 25

Without hearing protection devices, approximately 3% of workers who are exposed to noise levels at 80 decibels will suffer permanent hearing loss.

☒ A) True
☐ B) False

Correct!

OK

You must answer the question before continuing.

NIOSH reports exposure levels as low as 80 decibels in workers unprotected by HPDs (hearing protective devices) can result in up to 3% of those exposed suffering permanent hearing loss!


OK

Submit

Slide notes

Without hearing protection devices, approximately 3% of workers who are exposed to noise levels at 80 decibels will suffer permanent hearing loss.
Choose either true, or false.

Slide 100 - Slide 100

Noise Training 

Question 15 of 25

How long would it take to risk hearing damage if you are exposed to noise at 110 decibels without wearing hearing protection?

☐ A) 5 minutes

☐ B) 10 minutes

☒ C) 15 minutes

☐ D) 30 minutes

☐ E) 60 minutes

Correct!

OK

You must answer the question before continuing.

Incorrect

It takes only 15 minutes of unprotected exposure at 110 decibels to risk hearing damage.

OK

Submit

Slide notes

How long would it take to risk hearing damage if you are exposed to noise at 110 decibels without wearing hearing protection?

5 minutes

10 minutes

15 minutes

30 minutes

60 minutes

Slide 101 - Slide 101

Noise Training

THE CITY OF WINDSOR
ONTARIO, CANADA

Question 16 of 25

Before inserting foam earplugs into the ears they should be...

- ☐ A) Rolled into a ball or cone
- ☒ B) Rolled into a thin, crease-free cylinder
- ☐ C) Rolled into either a ball or cylinder
- ☐ D) Foam earplugs should first be inserted into the ears; then shaped

Correct!

OK

You must answer the question before continuing.

Incorrect

Before inserting foam earplugs, they should be rolled into a very thin, crease-free cylinder.

OK

Submit

Slide notes

Before inserting foam earplugs into the ears they should be...

rolled into a ball or cone.


rolled into a thin, crease-free cylinder.

rolled into either a ball or cylinder.

Foam earplugs should first be inserted into the ears; then shaped.

Slide 102 - Slide 102

Noise Training



Question 17 of 25

Small decibel increases represent small increases in sound energy.

☐ A) True
☒ B) False

Correct!

OK

You must answer the question before continuing.

Sound pressure levels in decibels or A-weighted decibels are based on a logarithmic scale. Small decibel increases represent large increases in sound energy; and they can't be added or subtracted in the way we usually use mathematics.

OK


Submit

Slide notes

Small decibel increases represent small increases in sound energy. Is this true, or false.

Slide 103 - Slide 103

Noise Training



Question 18 of 25

The Ontario noise regulation ensures that no worker is exposed to a sound level greater than the equivalent sound exposure level of 85 A weighted decibels, Lex8. The Corporation of the City of Windsor's "ceiling" limit is...

- ☐ A) 75 decibels at any time
- ☒ B) 80 decibels at any time
- ☐ C) 85 decibels at any time
- ☐ D) The Corporation of the City of Windsor does not have a sound exposure "ceiling" limit

Correct!

OK

You must answer the question before continuing.

Incorrect

The City of Windsor corporate "ceiling" limit is actually 80 dB at any time.

OK

Submit

Slide notes

The Ontario **noise** regulation ensures that no worker is exposed to a sound level greater than the equivalent sound exposure level of 85 A weighted decibels, **Lex eight**. The Corporation of the City of Windsor's "ceiling" limit is...

75 decibels at any time.


80 decibels at any time.

85 decibels at any time.

The Corporation of the City of Windsor does not have a sound exposure "ceiling" limit.

Slide 104 - Slide 104

Noise Training



Question 19 of 25

Ear plugs should not be used in areas having noise levels above 95 decibels.

☐ A) True
☒ B) False

Correct!

OK

You must answer the question before continuing.

Incorrect

Ear plugs are simple to use, less expensive than muffs, and more comfortable in hot or damp work areas. On the negative side, they provide less protection than some muffs, and should not be used in areas having noise levels over 105 dB

OK


Submit

Slide notes

Is this true, or false. Ear plugs should not be used in areas having noise levels above 95 decibels.

Slide 105 - Slide 105

Noise Training


THE CITY OF
WINDSOR
ONTARIO, CANADA

Question 20 of 25

Noise hazards can be created or made worse by a lack of maintenance.

☒ A) True

☐ B) False

Correct!

OK

You must answer the question before continuing.

Incorrect

Noise hazards can be created or made worse by a lack of maintenance.

OK


Submit

Slide notes

Noise hazards can be created or made worse by a lack of maintenance. Is this true, or false.

Slide 106 - Slide 106

Noise Training


THE CITY OF
WINDSOR
ONTARIO, CANADA

Question 21 of 25

"Noise" is defined as "unwanted" or "unpleasant" sound.

☒ A) True
☐ B) False

Correct!

OK

You must answer the question before continuing.

Incorrect

Noise is defined as unwanted or unpleasant sound levels.

OK


Submit

Slide notes

"Noise" is defined as "unwanted" or "unpleasant" sound. Is this statement true, or false.

Slide 107 - Slide 107

Noise Training



Question 22 of 25

If noise exposure is intermittent, ear plugs are more desirable, since the worker will not need as much constant protection.

☐ A) True
☒ B) False

Correct!

OK

You must answer the question before continuing.

Incorrect

If the noise exposure is intermittent, ear muffs are more desirable, since it may be inconvenient to remove and reinsert earplugs.

OK


Submit

Slide notes

If noise exposure is intermittent, ear plugs are more desirable, since the worker will not need as much constant protection. Select either true, or false.

Slide 108 - Slide 108

Noise Training


THE CITY OF
WINDSOR
ONTARIO, CANADA

Question 23 of 25

Which of the following is an example of an engineering control used to reduce noise?

☐ A) Installing an enclosure around the machine

☐ B) Relocating noisy equipment

☐ C) Move the machine operator to a separate booth or room

☐ D) Add sound-absorbing material to the area

☒ E) These are all good example of engineering controls

Correct!

OK

You must answer the question before continuing.

- Installing an enclosure around the machine.
- Relocating noisy equipment.
- Move the machine operator to a separate booth or room.
- Add sound-absorbing material to the area.

OK

Submit

Slide notes

Which of the following is an example of an engineering control used to reduce noise?

Installing an enclosure around the machine.

Relocating noisy equipment.


Move the machine operator to a separate booth or room.

Add sound-absorbing material to the area.

These are all good example of engineering controls.

Slide 109 - Slide 109

Noise Training



Question 24 of 25

Typically a person first loses the ability to hear...

☒ A) high-pitched sounds

☐ B) low-pitched sounds

☐ C) both high and low-pitched sounds

☐ D) Typically a person loses the ability to hear all sounds at the same time

Correct!

OK

You must answer the question before continuing.

gradual.

Typically, a person first loses the ability to hear higher pitches. Often, the first noticeable effect is difficulty in hearing speech.

OK

Submit

Slide notes

Typically a person first loses the ability to hear...

high-pitched sounds.


low-pitched sounds.

both high and low-pitched sounds.

Typically a person loses the ability to hear all sounds at the same time.

Slide 110 - Slide 110

Noise Training


THE CITY OF
WINDSOR
ONTARIO, CANADA

Question 25 of 25

Sound can be created when an object vibrates in air, liquid or even in a solid.

☒ A) True

☐ B) False

Correct!

OK

You must answer the question before continuing.

Incorrect

Sound can be created when an object vibrates in air, liquid or even a solid.

OK


Submit

Slide notes

Sound can be created when an object vibrates in air, liquid or even in a solid. Is this statement true, or false.

Slide 111 - Slide 111

Noise Training



Test Results

Correct Questions: {correct-questions}

Total Questions: {total-questions}

Accuracy: {percent}

Attempts: {total-attempts}

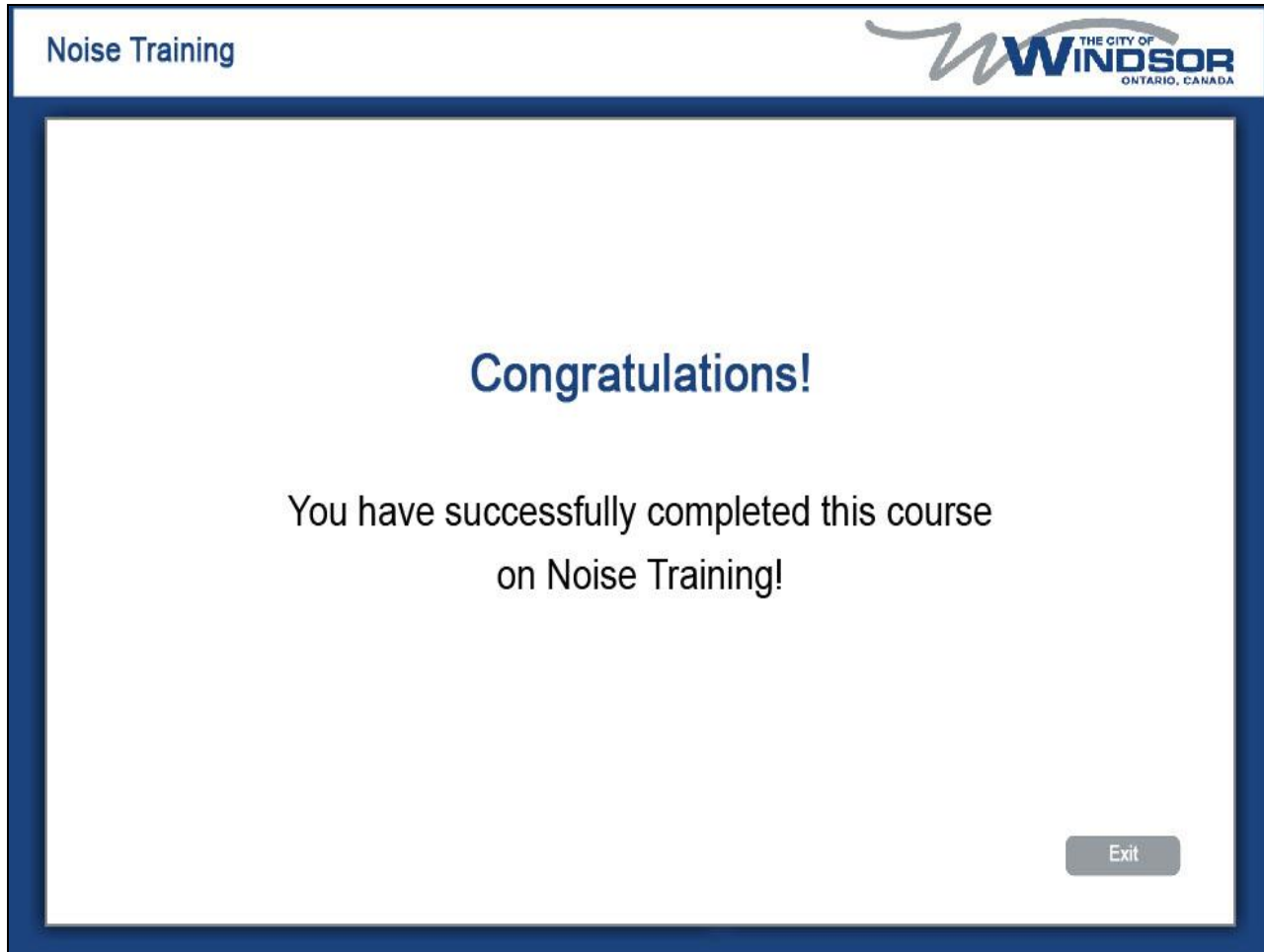
Review Area

Retake Quiz

Exit

Slide notes

Slide 112 - Slide 112

**Slide notes**

Congratulations!

You have successfully completed this course on Noise Training.

Click exit to end the course.