

Safety Talk

Hearing Conservation for General Industry

Before you begin:

Obtain the most recent noise exposure assessment data that has been conducted and made available to all affected employees. Ensure that current historical noise data is representative of current working conditions.

Review five elements of your Hearing Conservation Program (HCP) to determine company goals.

Post 29 CFR 1910.95, Occupational Safety and Health Administration's – Occupational Noise Exposure Standard, if applicable.



Introduction

Introduce the topic of hearing conservation by explaining that noise-induced hearing loss (NIHL), also called sensorineural hearing loss, is a permanent type of injury. It can affect you not only at work but in all aspects of your life. Hearing loss is a gradual process and is permanent. It is less noticeable than other types of workplace injuries.

The main goal of hearing conservation is to preserve our hearing by the elimination or reduction of noise. This talk will review hearing conservation requirements based on the Occupational Safety and Health Administration's (OSHA) Occupational Noise Exposure Standard, 29 CFR 1910.95.

Definitions

Occupational Noise is defined as acoustic energy received by an employee's auditory system while they are working, which may result in permanent hearing loss.

OSHA's Permissible Exposure Limit (PEL) is 90 decibels (dBA) averaged over 8-hours. OSHA requires the use of hearing protection when employee exposures exceed those listed in Table G-16.

Table G-16 – Permissible Noise Exposures
(from [OSHA 29 CFR 1910.95 \(b\)\(2\)](#))

Duration/day/hours:	Sound level dBA slow:
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
1/2	110
1/4 or less	115

OSHA's Action Level (AL) for hearing conservation is 85 dBA averaged over 8-hours. When exposures reach or exceed the AL, a hearing conservation program (HCP) must be implemented.

8-Hour Time Weighted Average (TWA) measurement of an individual's personal exposure to noise over an 8-hour workday. Please note, this does not represent exposures for an extended work shift.

Noise Reduction Rating (NRR) is the unit of measurement indicating the effectiveness of hearing protection devices to reduce sound exposure within a given work environment. The higher the NRR, the more effective the hearing protection.

Noise Induced Hearing Loss (NIHL) results from exposure to excessive noise or sound in our environment.

Sensorineural Hearing Loss results from excessive noise exposure that damages the inner ear where the cochlea receives sensory sound and transfers it to the auditory nerve.

Conductive Hearing Loss results from any condition that prevents a continuous path between the noise source and the cochlea.

Ototoxins Chemicals have the potential to cause hearing impairment alone or in conjunction with noise, even below 85 dBA.

Discussion

Explain the physiology of hearing and how noise affects hearing

1. Sound waves are collected in the outer ear and funneled to the eardrum.
2. When sound waves hit the eardrum, it vibrates and sends sound to the middle ear.
3. The middle ear amplifies the vibrations and sends them to the inner ear.
4. The vibrations stimulate hair cells in the inner ear and creates an electrical impulse.
5. This impulse travels to the brain along the auditory nerve, causing the sensation of sound.

Discuss the types of hearing loss.

1. Several medical conditions may also cause conductive hearing loss:
 - Middle ear infections.
 - Perforation of the eardrum.
 - Fixation of the ossicular chain (the bones in the middle ear freeze or quit working).
 - Otosclerosis (a growth of spongy bone in the inner ear).These conditions can often be treated medically or surgically.
2. Sensorineural / NIHL
 - Affects the inner ear, specifically the cochlea. Receptors within the cochlea are damaged and cannot receive the sensory information and pass it on to the auditory nerve.
 - Occurs over time.
 - Permanent, cannot be reversed.

Explain that hearing loss can be associated with chemical exposures.

Working with certain chemicals, known to be an ototoxin, can potentially affect hearing. Common ototoxins found in the industrial workplace include carbon monoxide and solvents such as toluene. There is an increased risk of hearing loss for workers exposed to these chemicals. When working with chemicals known to be ototoxic, it is important to minimize exposures as much as possible. This can include wearing chemical resistant gloves, use of increased ventilation, or other interventions. Additionally, in these environments, exposed workers may need hearing tests at more frequent intervals than annually.

Based on OSHA's standard, hearing conservation program (HCP) elements are:

1. **Noise monitoring** - determine personal noise exposures as an 8-hour (TWA). Identify employees for inclusion in HCP and mandatory hearing protection.
2. **Audiometric testing** – provide for employees who meet or exceed OSHA AL of 85 dBA.
3. **Hearing protection** - employer must provide adequate hearing protective devices to an employee exposed at or above the OSHA AL and mandate their use when exposures reach or exceed the OSHA PEL.
4. **Training** - employees in an HCP must receive training on the effects of noise and proper donning and wearing of hearing protection.
5. **Recordkeeping and employee notification** - Monitoring records – 2 years. Audiometric test results – duration of employment.

Inform employees of the types of hearing protection available and the NRR they provide and the types available to them.

- o Ear plugs (molded, disposable, reusable).
- o Earmuffs.
- o Ear canal caps.

Conclusion

It is important to be aware of high levels of noise in your environment. High noise environments contain noise levels in excess of 85 dBA. Proper hearing protection and not spending unnecessary time in areas that have high noise levels can reduce potential exposure. Ensure that the hearing protection chosen is suitable for the task. Noise exposure comes from many sources on and off the job. The good news is that many types of hearing loss are preventable.

Group Activity

List the steps to properly insert foam ear plugs for high noise tasks encountered throughout the work shift or for known high noise tasks:

Steps include:

- Roll and squeeze foam ear plugs.
- Pull ear up and back.
- Insert rolled plug.
- Hold plug in ear until it expands.

Download a sound level meter smart phone application and use it to measure the noise of equipment that you suspect may be generating excess noise.

Ask participants to list activities outside of work where they may experience excessive noise. Do they wear hearing protection? If not, encourage them to do so. Explain that regardless if the noise or sounds are pleasant or unpleasant to us, it is still excessive noise and can damage our hearing.

Resources

[NIOSH: How to wear soft foam earplugs](#)

[OSHA: Safety and Health Topics – Occupational Noise Exposure](#)

[NIOSH: Workplace Safety and Health Topics – Noise and Hearing Loss Prevention](#)

[Hearing Health Foundation: Workplace Hearing Loss](#)

[MedlinePlus: Occupational Hearing Loss](#)

[Preventing Hearing Loss Caused by Chemical \(Ototoxicity\) and Noise Exposure](#)