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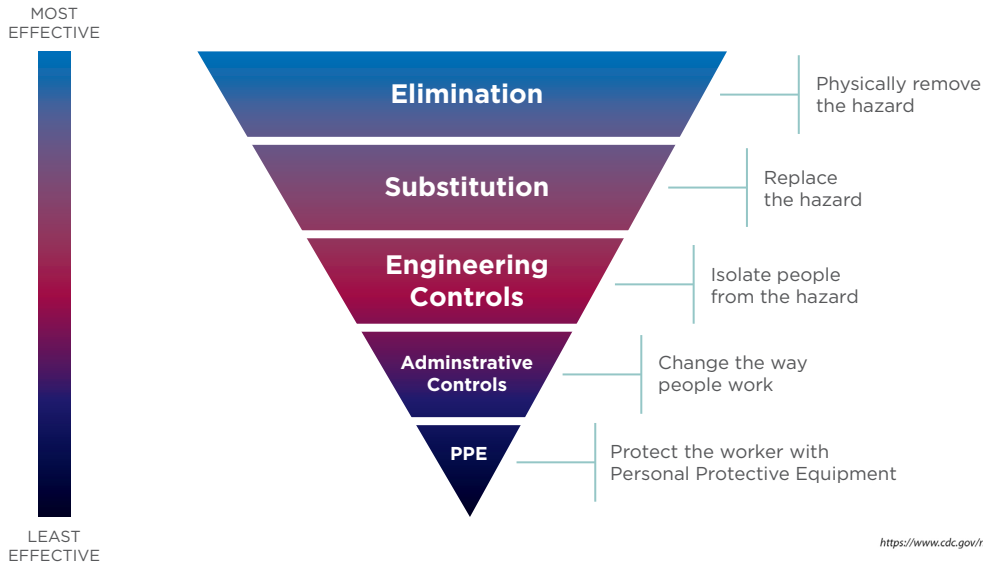
Preventing Hearing Loss in the Workplace

By William McCaffrey

More than 48 million people are affected by hearing loss in the United States. One of the most common causes of hearing loss is exposure to loud noise, referred to as *noise-induced hearing loss*. The Centers for Disease Control and Prevention have called noise-induced hearing loss the most common work-related injury. Workers in the mining, construction, and manufacturing industries are most likely to be exposed to dangerous levels of noise. Many times, hearing loss is accompanied by tinnitus, a ringing in the ears that can affect concentration and disrupt sleep. Exposure to loud noise also can cause stress, anxiety, high blood pressure, heart disease, depression, and other health issues.

Controlling noise exposure is a key element of any workplace safety and health program. The Hierarchy of Controls is a method of selecting the most appropriate control measure when a workplace hazard has been identified. It is often depicted graphically as an upside-down pyramid with five layers: elimination, substitution, engineering, administrative, and personal protective equipment (PPE). The most effective control measure is at the top of the pyramid, and the least effective control is at the bottom. Oftentimes, more than one control measure is needed, but one should always consider control measures higher on the hierarchy first.

HIERARCHY OF CONTROLS FOR NOISE EXPOSURE




Elimination	Elimination of a noise source is the ideal control measure. Getting rid of an excessively loud piece of equipment or repair or maintenance to stop excessive noise are examples of eliminating the hazard. Unfortunately, this is not always possible.
Substitution	Substitution is similar to elimination, wherein a piece of equipment or process is replaced with a quieter alternative. Noise levels should always be considered when redesigning a work process or purchasing new equipment. An initiative called Buy Quiet, launched by the National Institute for Occupational Safety and Health (NIOSH), encourages companies to purchase quieter equipment when replacing or adding new equipment.
Engineering	Insulation is one of the most practical control measures for exposure to loud noise. Insulated control rooms, equipment enclosures, floor and ceiling insulation, acoustic pipe and duct wrap, acoustic barriers, and baffles are just some of the engineering controls that can significantly reduce worker exposure to dangerous noise levels.
Administrative	Administrative controls include measures such as warning signs and restricting access to very noisy areas, scheduling and job rotation to minimize exposure to noisy areas, moving workers farther away from noise sources, and training workers to recognize and avoid harmful noise levels.
Personal Protective Equipment (PPE)	PPE for noise exposure can be ear plugs, ear muffs, or both used together. PPE should always be the last line of defense. Not using PPE, or incorrectly using PPE, even for brief periods of time, can greatly increase a worker's exposure to harmful noise.

Engineering and administrative controls are not just a recommended best practice, they are required by federal regulation when noise levels are too high. OSHA's standard on occupational noise exposure states that feasible administrative or engineering controls must be utilized first, and only then can PPE be used to further lower employee noise exposure. Hearing protection in the form of ear plugs or ear muffs should be a last resort after engineering and administrative controls have been used.

Like most OSHA health standards, the standard on occupational noise exposure starts with an exposure assessment. There are two trigger levels in the noise standard: a permissible exposure limit of 90 decibels, measured on the A scale (90 dBA); and an action level of 85 dBA. Both are measured using an 8-hour, time-weighted average (TWA). Noise exposure can be determined with a sound level meter for area sampling, or with a personal noise dosimeter worn by employees for a full shift that determines their "dose" of noise exposure (100% dose is equal to the permissible exposure limit of 90 dBA TWA). NIOSH has a free app that turns your phone into a sound level meter (currently only available for iOS devices). A good rule of thumb is that you may have a noise problem if workers have to shout to communicate with each other.

When noise exposure equals or exceeds the action level of 85 dBA, employees must be enrolled in a Hearing Conservation Program to protect their hearing. Elements of a Hearing Conservation Program include audiometric testing, training, and hearing protection. Audiometric testing establishes a worker's

baseline hearing level, which is compared to annual rechecks to catch potential hearing loss as early as possible. Training must also be conducted annually, with an emphasis on the effects of noise exposure on hearing and the importance of hearing protectors. The cost of annual audiograms, annual training, and hearing protective devices should always be considered when determining the economic feasibility of engineering controls. Noise control engineering will often be cheaper in the long run than a Hearing Conservation Program.

Exposure to loud noise does not just damage your hearing; it can have a detrimental effect on overall quality of life. Noise-induced hearing loss can lead to social isolation and depression. Stress from noise exposure can raise blood pressure and the risk of heart attack and stroke. Acoustic and noise insulation can improve your workers' overall well-being. In addition to making your workplace safer and more productive, controlling noise exposure can make your employees healthier and happier. Noise insulation is a win-win for employers and employees. 



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