

Cal Poly

Safety Bulletin- Work in High Noise Environments

This document provides an overview of the effects high levels of noise can have on hearing and introduces the Cal/OSHA Hearing Conservation Program. Guidelines listed below shall be followed to reduce, avoid, and prevent hearing loss while performing work on campus.

Most work environments contain a number of noise sources. Exposure to high levels of noise can cause permanent hearing loss. Short term exposure to loud noise may cause a temporary change in hearing or a ringing in your ears called tinnitus. These short-term problems may go away within a few minutes or hours after leaving the noisy environment. Repeated exposures to loud noise can lead to permanent tinnitus and/or hearing loss. The effects of noise induced hearing loss can limit your ability to hear high frequency sounds, understand speech, and seriously impair your ability to communicate. Loud noise can create physical and psychological stress, interfere with communication and concentration, reduce productivity, and contribute to workplace accidents and injuries by making it difficult to hear warning signals.

When sound waves enter the outer ear, the vibrations impact the ear drum and are transmitted to the middle and inner ear. In the middle ear, three small bones amplify and transmit the vibrations generated by the sound to the inner ear. The inner ear contains a snail-like structure called the cochlea filled with fluid and lined with very fine hairs. These microscopic hairs move with the vibrations and convert the sound waves into nerve impulses resulting in the sounds we hear. Exposure to high levels of noise can destroy these hair cells, causing a loss of hearing.

Noise is measured in units called decibels (dB). The higher the decibels, the louder the sound and more damaging to your hearing. The Cal/OSHA Hearing Conservation Program requires employers to monitor noise exposure levels and identify employees exposed to noise at or above 85 decibels (dB) averaged over 8 working hours, or an 8-hour time-weighted average (TWA). Signs will be posted in those areas where hearing protection is mandatory. Employees who work under these conditions will be notified, must wear ear protection, and be monitored in the Hearing Conservation Program. At Cal Poly, this only comprises a handful of employees however; hearing conservation should be a priority for employees who are routinely exposed to high decibels of noise, even for small periods of time.

At present, noise-induced hearing loss is incurable and irreversible. Steps to reduce noise levels by administrative or engineering controls must be addressed first as part of an effective hearing conservation program. Typical examples of engineering controls are reducing the noise at the source, interrupting the noise path by installation of acoustical enclosures and barriers, and reducing reverberation and structure vibration by lubrication and installation of sound-absorbing material. Reducing the amount of time a worker is exposed to a high noise level is an example of an administrative control.

Hearing protection is the final part of a hearing conservation program. If noise levels cannot be reduced by administrative, engineering, or work practice controls then ear protection should be worn to reduce exposure to excessive noise. Reducing decibel levels even a small amount makes a significant difference in protecting your hearing. When properly worn; hearing protection can greatly reduce your exposure to excessive noise. As an employee, prudent practice would advise wearing hearing protection anytime noise levels go above 85 dB. All ear protection has a Noise Reduction Rating (NRR) listed on the package of the device. The higher the NRR the greater the level of noise reduction. Depending on your level of exposure, you may choose from the following devices:

- Disposable earplugs
- Reusable earplugs
- Headband plugs
- Sealed earmuffs

Don't automatically assume the product with the highest NRR is the best choice. Over-protection can leave workers with the inability to hear any sound whatsoever and may force them to remove their hearing protection every time they want to speak to a co-worker or hear something in the surrounding environment. Removing your hearing protection in noisy environments for as little as 5 minutes a day can dramatically affect your true NRR. Remember, the best hearing protection is hearing protection that gets worn!

All ear protection should be visually inspected before using. It is important to properly don ear protection to get the NRR protection listed. For more information on ear protection, refer to the Personal Protective Equipment Guide in the EH&S website.

Campus Safety Bulletins are prepared by Cal Poly Environmental Health and Safety. Questions about this bulletin should be directed to extension 6665.