

Reducing the Risk of Hearing Loss While Ensuring Compliance

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Custom hearing protection might help you meet the hearing loss prevention trifecta: Fit, comfort and communication while wearing hearing protection.



At least 4 million workers go to work each day in damaging noise and 10 million people in the United States have a noise-related hearing loss. As many as 22 million workers are exposed to potentially damaging noise each year, according to the Centers for Disease Control and Prevention (CDC).

Occupational hearing loss is the most commonly recorded occupational illness in manufacturing accounting for one in nine recordable illnesses, according to NIOSH. Although a traumatic noise exposure may cause an immediate hearing loss in some cases, most occupational hearing losses occur so gradually that workers are unaware they are losing their hearing, adds the document. With continued exposure, the hearing loss spreads into those frequencies most needed to understand speech.

In many workplaces, disposable foam earplugs traditionally are used to block noise. However, their effectiveness depends not only on proper fit and the matching of the protector to their particular ear, but also on compliance. Do workers wear them consistently and correctly place them in their ears?

Most people wear disposable foam earplugs incorrectly, which limits their effectiveness. Each foam earplug is supposed to be rolled tightly, put deep in the ear canal then held in place with the index finger until it fully expands and the user can just see the outer edge. Instead, most people leave them hanging out of their ears.

Another challenge occurs when workers must talk in person or via two-way radio in high-noise work environments. To hear and communicate, they remove their earplugs, which exposes them to damaging noise for the duration of the conversation. Such cumulative exposure to harmful workplace noise is a leading cause of hearing loss.

People commonly remove earplugs to carry on a conversation. But if they remove them 20 percent of the time, they have reduced their effectiveness by half.

Essentially what is required to optimally protect workers is a hearing loss prevention trifecta: a device that delivers the proper fit, maximum comfort and the ability to communicate verbally or over radios without having to remove it.

To tackle the severe occupational hearing loss problem, it is helpful to consider the ideal solution, which requires allowing for all three factors.

The Hearing Protection Trifecta

First, an ideal hearing protection device would be customized to meet the needs of every employee or worker on the floor. That means fitting all ears regardless of differences in size, shape or depth. Like snowflakes, no two ears are the same – and they continue to grow throughout a person's lifetime – so there is no such thing as one-size-fits-all when it comes to hearing protection. With better fit and comfort, workers probably would wear the devices correctly and compliantly.

Second, the hearing loss prevention device would prevent high-noise sounds from entering the ear at levels that could cause instant damage or damage over time. NIOSH recommends reducing worker noise exposure to 85 dB for eight hours, but this still can leave 12-15 percent with hearing loss over their work lives.

Third, the device would prevent high-noise exposure without limiting communication, and could be worn all day. In this way, the worker could wear it the entire workday, which would eliminate the hearing damage that occurs when typical earplugs are removed in high-decibel work settings to communicate.

Fortunately, a new generation of occupational hearing protection has been designed with the trifecta of custom fit, comfort and ability to communicate while wearing.

Custom Fit Might Be the Way to Go

If you make custom hearing protection available for everyone and ensure people know how to use it, studies have shown it can reduce occupational hearing loss to near zero in industry. Unlike one-size-fits-most disposable earplugs, some cost-effective hearing protectors are fitted to the individual worker so every worker receives the same high level of hearing protection.

Such custom hearing protection can be rendered quickly and cost-efficiently in an industrial setting. Companies that make personalized industrial hearing protectors custom mold hearing protection to each worker's ear. The companies go to the plant to take impressions of each worker's ear canal and outer ear in a process that usually takes about 10 minutes per worker.

The custom impression is sent to the lab for processing where the device, which is an exact replica of the wearer's ear canal and outer ear, is manufactured. This ensures the device seals the



ear both in the canal and around the ear, preventing damaging noise from entering while eliminating ear pressure. Some companies are scanning the ear impression and moving into 3D printing of the casting for even closer fit. Company representatives then return to the plant to train workers on how to ensure proper fit and fix any that do not fit perfectly.

A custom hearing protector fit can be a key part of preventing occupational hearing loss because everyone's outer ear and ear canal is unique. The closer the fit, the better the function and the less people take them out to relieve ear pressure or modify them as is common with disposable foam earplugs.

Comfort and Compliance

Since these unique custom hearing protection devices are made of a medical grade silicone, they are designed to be soft and flexible. The advantage of the softer devices is better comfort and function. They change shape slightly as the wearer's ear canal changes shape when talking or chewing, thereby continuing to seal during those activities.

Greater comfort addresses a significant problem facing health and safety managers who oversee hearing loss prevention programs: getting people to wear hearing protection products and policing their use.

Communication While Wearing Hearing Protection

Since factory workers often need to communicate in person during their work shift, they typically remove disposable earplugs to talk. Some custom hearing protection includes a filter and vent to make speech more understandable by reducing attenuation at higher speech frequencies.

Talking by two-way radio is also common in manufacturing settings. But because a radio must be louder than factory noise for a worker to hear it, it usually is the loudest sound source in the work setting and must be protected against to avoid hearing loss.

To deal with this problem, manufacturers of certain custom hearing protection devices can connect incoming radio audio to the outside of the hearing protector so the device's filter reduces dB volume and the worker does not have to remove the hearing protector to talk on a two-way radio. Because filters "squeeze" high and low frequencies to block potentially harmful sound waves, communication comes through but harmful noise does not.