Hearing Protection

WHAT'S AT STAKE?

Lawn mowing, fitness classes, truck and tractor pulls, airplanes, table saws, rock concerts, snowmobiles—all these environments can be too loud. The decibel is a unit used to express sound level, and "loud noise" means sounds that are more than 80 decibels. Loud noise can be very hazardous to your health and particularly to your hearing. Over time, exposure to loud sounds on a regular basis can result in permanent hearing loss. You often don't know you have the hearing problem until it is too late to do anything about it. Sudden, VERY loud noises, like explosions, can cause instant hearing loss.

The solution is to reduce noise from reaching the ears of people by having a form of hearing protection.

The effectiveness of hearing protection is often limited by personal and workplace factors, and it can reduce the audibility of warning sounds. For these reasons hearing protection must be selected and used with care and is not to be used as an alternative to reducing the noise in the workplace.

WHAT'S THE DANGER?

Hearing Risk

Excessive exposure to noise causes irreparable damage to your hearing. Often the damage gets gradually worse with each repeat exposure, but some very high level sounds, such as those from gun fire and explosions, can cause immediate damage.

Long Term Exposure Causes Damage

Long term exposure can arise from regular working in a noisy occupation or workplace. Receptors that provide the signal from the ear to the brain are damaged by excessive noise, often without the sound seeming too loud or painful. The receptors do not recover. Over time more receptors are damaged, increasing the hearing loss. The risk to any individual is normally determined by their A-weighted daily or weekly personal noise exposure (the overall amount of noise in terms of level and duration in a working day or week).

Instantaneous Damage

Very high level sounds, such as fireworks, gunfire or explosions can result in injury

that causes immediate hearing loss or other hearing damage. The risk of instantaneous damage is normally determined by the maximum instantaneous C-weighted peak sound pressure of the sound.

HOW TO PROTECT YOURSELF

Risk Assessment Identify Those At Risk

A risk assessment is necessary to identify who is exposed above the lower or above the upper action values and the work locations and tasks that significantly contribute to their exposure. Risk assessments should identify those who need hearing protection, how much protection is required, and when and where it must be used. The daily personal noise exposure of each individual can be calculated from the noise level and duration of each noisy task within their working day, or by measurement of the person’s exposure over the working day using a sound exposure meter (noise dosimeter). If a noise dosimeter is used, one that provides a logged record of how the sound level varies with time will aid identification of the significant noisy periods and tasks when hearing protection may need to be worn.

It is important in the risk assessment to consider safety factors when hearing protection is to be used. Hearing protection reduces a person’s ability to hear warning sounds. You might need, for example, to consider alarm audibility, safe working during vehicle movements or speech communication.

Adequate protection is essential, but excessive attenuation (over protection) and requiring use where protection is not required should be avoided.

Noise Exposure Hazards

Over time, exposure to noise can cause the following problems:

- Noise-induced hearing loss (NIHL)
- Tinnitus (ringing in the ears)
- High blood pressure

Noise-induced hearing loss is the most common occupational disease suffered by worker. It often happens gradually, so workers may not realize that loud noise from their job is damaging their hearing. By the time they do realize it, it’s too late—the damage is permanent and can’t be reversed.

Hearing Loss

Any reduction in the normal ability to hear is referred to as a loss of hearing. A hearing loss can be either temporary or permanent.

Other prime causes of permanent hearing loss are age, traumatic injuries (such as from explosions or gunfire), and infection. Noise, however, is the major identifiable cause of hearing loss.

Hearing Protection Devices

Hearing protection devices (HPDs) should only be provided when engineering and administrative controls to reduce noise at the source or along the path cannot be implemented or while such controls are being put in place. HPDs are barriers that reduce the amount of noise reaching the sensitive inner ear. Fit, comfort, and sound reduction or “attenuation” are important considerations in choosing HPDs. The types of HPDs used most commonly are earplugs or earmuffs. Earplugs attenuate noise by

plugging the ear canal. Earmuffs cover the external part of the ear, providing an “acoustical seal”.

Effectiveness

The effectiveness of HPDs depend on the amount of time they are worn. What is not obvious to most wearers is that the effectiveness of HPDs can be reduced by as much as 95% or more if the protectors are not worn for as little as three or four minutes in noisy environments. It is therefore important to wear HPDs during the entire period of exposure in order to achieve the maximum protection available.

Comfort

Comfort is an important consideration in selection. An HPD that isn’t comfortable will simply not be worn or will be worn improperly. With earplugs, several factors affect comfort. Since some plugs are relatively non-porous, they can often create a pressure buildup within the ear and cause discomfort. Dirty plugs may irritate the ear canal. Because of the shape of an individual’s ear canals, certain plugs may not fit properly. Earmuffs should be made of materials that do not absorb sweat and that are easy to maintain and clean. The earmuff cup should be adjustable to conform to various head sizes and shapes. Headband tension and earcup pressure should be adjusted so that they are effective without being uncomfortable. Weight may also be a factor.

Work Environment/Procedures

HPD selection is sometimes dictated by the constraints of the work area or work procedures. For example, large volume earmuffs may not be practical in confined work situations with little head room or clearance. In that case, flat-cup muffs or earplugs may be more practical. Where work is necessary near electrical hazards, it may be desirable to use non-conductive suspension type muffs. The choice of protector may also be affected by the nature of work, as in welding where certain types of earmuffs may interfere with the welder’s helmet. The attenuation of the muff-type hearing protector may be considerably reduced when worn with spectacle-type safety glasses. (The head configuration of the wearer and the type of glasses worn will determine the reduction in attenuation.)

Where safety glasses must be worn, cable-type temples should be used in order to allow the smallest possible opening between the seal of the protector and the head. Otherwise earplugs should be worn, provided they are adequate.

Consideration should be given to hearing protectors that can be attached to hard hats where exposures to noise may be high but intermittent and where hard hats must be worn at all times. Periodic adjustments may be necessary because movement of the hard hat may break the seal of the HPD.

Consideration should also be given to work involving oils, grease, and other products that may soil hands. Ear infections may occur when earplugs are inserted by dirty hands.

Overprotection

Workers wearing HPDs that provide too much attenuation may feel isolated from their surroundings. Sounds may be heard as muffled. Speech or warning sounds may be unrecognizable. Overprotection can lead workers to resist wearing HPDs. Protectors should be chosen to provide sufficient, but not excessive, attenuation.

Where communication is critical and hearing protection is required, communication headsets can be considered. These devices provide protection against harmful levels of noise, yet allow for important communication to be heard.

Fit, Care, and Use

An employer who provides a worker with an HPD must provide adequate **training and instruction** to the worker in the care and use of the device.

Summary

Control of noise in workplaces is of growing importance as a result of increasing hearing loss claims.

This is a convenient way of understanding the overall problem and a useful approach for putting control measures in place. The three components can usually be treated in isolation, although sometimes all three must be considered together in order to control unacceptable noise levels.

1. At the source, measures are aimed at reducing or eliminating the noise being generated.
2. Along the path, barriers can be introduced to reduce the amount of noise reaching the worker.
3. At the worker, measures involve personal protective equipment being properly selected, fitted, and worn. This PPE must be used in high noise environments all the time.

Failure to provide preventive or control measures will result in temporary and ultimately permanent hearing losses.

FINAL WORD

The surest methods of preventing noise-induce hearing loss (NIHL) is to eliminate the source, or to reduce noise at the source by engineering methods. However, in certain situations, these measures are not possible. In such workplaces, workers may need to wear hearing protectors to reduce the amount of noise reaching the ears.