

Responses to Questions and Complaints Regarding Hearing and Hearing Protection (Part I)

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The most recent installments of the EARLog series #6 and #7¹, focused on concepts and techniques that have been successfully used to motivate management and employees alike, to actively support and participate in hearing conservation programs. We stressed that the program administrators must sincerely and accurately deal with questions and complaints regarding the utilization of hearing protection devices (HPDs) and the purpose of the hearing conservation program. What follows is a summary of the more common areas of concern that are expressed by supervisors and employees, and information that can provide the basis for appropriate responses.

Complaint:

Hearing protectors are uncomfortable.

Response:

HPDs are often uncomfortable initially, but hearing loss due to noise exposure is "uncomfortable" permanently. Like a new pair of shoes or glasses, hearing protectors do require a reasonable period of adjustment. Since not all hearing protectors adapt equally well to all head shapes and ear canals, it is important to give the employee the final choice in what he or she will wear. If after a couple of weeks of daily use the employee is still experiencing difficulties or discomfort, the protector should be resized and/or refitted, or another hearing protector should be issued.

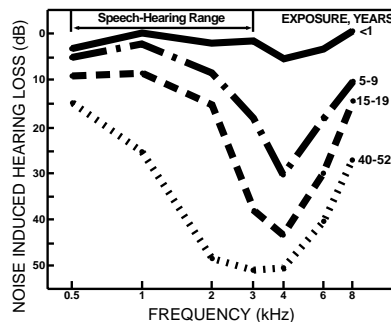
Excuse:

I don't need hearing protection; I am used to the noise.

Response:

Ears do not get used to noise - they "get deaf" (and unfortunately a deafened ear may often *seem* to get used to the noise). Repeated exposure to noise does not

ILLUSTRATION OF THE DEVELOPMENT OF NOISE INDUCED HEARING LOSS*



*All exposure levels were approximately 100 dB SPL (After Taylor, et al.²)

Figure 1

toughen ears nor does having an existing noise induced hearing loss prevent you from losing the hearing you have left. Although individual susceptibility to hearing loss from noise exposure varies widely, there are currently no standardized tests that can detect the more noise sensitive members of the population.

Question:

I've already lost some or most of my hearing; why should I have to wear hearing protection?

Response:

The existence of a noise induced hearing loss does not protect one from losing further hearing due to noise exposure. In Figure 1, we have illustrated the typical progressive nature of noise induced hearing loss. Initially we see that hearing is damaged in the higher frequencies and as the unprotected exposures continue, this damage spreads to the lower frequencies, eventually affecting those essential to the understanding of speech (500 Hz to approximately 3000 Hz). Although HPDs cannot restore a

noise induced hearing loss, which by its nature is permanent and irreversible, they should prevent additional losses from being incurred. Furthermore, proper use of HPDs will prevent employees from developing a temporary hearing loss, and allow existing temporary losses to recover before they become permanent.

Complaint:

I can't hear my fellow workers if I wear hearing protectors.

Response³:

When the ear is bombarded with high level sound, it overloads and distorts, reducing its ability to accurately discriminate different sounds. Wearing HPDs reduces the overall sound levels so that the ear can operate more efficiently. The effect is similar to the improved vision that sunglasses provide in very bright, high-glare conditions.

For those with normal hearing, HPDs will usually provide improved communications when sound levels are greater than approximately 85 dBA. For moderate to severely hearing impaired individuals, the situation is more complicated; for them, hearing protectors may not provide a communications benefit and actually be a liability. But, if these individuals do not protect their hearing, they may suffer additional impairment and then will have even greater difficulty communicating regardless of noise level.

Complaint:

My machine sounds different to me when I wear hearing protectors.

Response:

True, machines will sound different, but for the reasons outlined above, most employees will still be able to effectively monitor their operation. Once employees



REAL-EAR ATTENUATION OF TWO EARPLUGS AND TWO EARMUFFS*

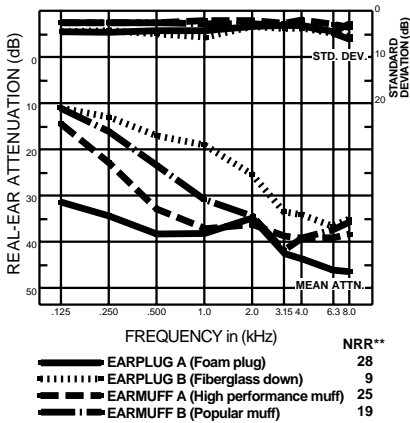


Figure 2

become accustomed to the new sound of their machine, changes in its operation will usually be as easy to detect as without the HPD. Also, since they won't be acquiring progressively increasing amounts of temporary hearing loss throughout the day, employees will be able to hear their machines as well at the end of their shift as when they started in the morning.

Question:

Do earmuffs block out noise better than earplugs?

Response:

No. The misconception that earmuffs are better than earplugs at reducing noise is partly due to the "bigger is better" school of thought. Actually, whether or not an earmuff or an earplug is better is dependent upon the device and user in question.

In Figure 2, the real-ear attenuation data for two muffs and two plugs are plotted. The data are all from one laboratory. Earplug A and earmuff A are among the best commercially available HPDs this facility has ever tested, whereas earplug B is a low attenuation insert and earmuff B is a typical "popular" model. Notice that the better earplug outperforms the better earmuff at all frequencies except 2.0 kHz, where the earmuff offers approximately a 2 dB advantage. But both earmuffs outperform earplug B at all frequencies. Thus although some earmuffs do outperform some ear plugs, it is not true to state that all earmuffs outperform

all earplugs.

It is important to remember that although the above discussion focused on attenuation, other factors such as comfort and the intended application significantly affect the choice of a muff or a plug for a particular situation.

Question:

Can earplugs cause ear infection?

Response:

Based on our experience during the past decade, and information gleaned from consultation with experts in the field of otology and audiology^{4,5} as well as data from an ongoing survey of U.S. industries⁶ it appears that the likelihood of earplugs causing outer ear infections (otitis externa) is minimal. Although it would seem that placing a dirty or gritty foreign object in the ear canal could easily lead to irritation or infection, the data from existing HCPs seem to indicate that the external ear is fairly resistant to such abuse. Nevertheless, cleanliness should be stressed and certain individuals such as diabetics or others who are prone to infection should be more carefully monitored.

When an ear infection is reported, earplugs should not necessarily be assigned the blame. Other causative agents may be⁷ excessive cleaning of the ear, recreational water sports, habitual scratching and digging at the ears with fingernails or other objects, environmental contaminants, and systemic conditions such as anemia, vitamin deficiencies, endocrine disorders, and various forms of dermatitis.

Question:

Once I put on my hearing protector, can I forget about it until I take it off for my break?

Response:

No. Hearing protectors may work loose or be jostled out of position and need readjustment. Certain pre-molded and user molded inserts are particularly prone to this problem and must be periodically reinserted or resealed^{8,9}. Properly fitted custom ear molds and user formable foam earplugs are among those devices that are best at maintaining position throughout the use period.

Question:

Will I hurt my ears if I blow my nose while wearing an earplug?

Response:

No. Since an earplug is inserted in the external ear canal, which is separated from the middle ear by a membrane (the eardrum), it will not affect the pressure changes in the middle ear which may arise due to blowing of the nose. Sometimes, if the eustachian tube, which vents the middle ear to the back of the throat, is blocked or otherwise not functioning properly air or fluids can be forced into the middle ear and cause discomfort or other problems. However, this will not be affected or aggravated by the use of earplugs.

In EARLog #9 we will continue this dialogue. Additional reference materials are listed below^{9, 10, 11}.

References and Footnotes

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