The THRESHOLD©

A T K GROUP PUBLICATION DEVOTED TO OCCUPATIONAL HEARING LOSS PREVENTION AND PROGRAM MANAGEMENT

On The Inside

Communication Headsets For Hearing Impaired Employees

Safety professionals are often confronted with a conundrum: How do I protect the hearing of a known hearing impaired worker while at the same time ensuring his/her safety as well as the safety of others working with them?.

Profoundly impaired persons have (albeit audiometrically immeasurable) some level of *residual* hearing. Residual hearing refers to the present level of hearing function. For a person with acquired hearing loss, residual hearing is the amount of hearing function present after the acquired loss. For the congenitally deaf person, residual hearing is the level of hearing function at birth and any that now remains. Residual hearing to a deaf person is analogous to detectable light to a blind person. The faintest detection of environmental noise cues and vibration to a deaf person is invaluable.

Deaf workers may be fitted with hearing protectors. A mildly attenuating hearing protector is best for the profoundly deaf worker to protect residual hearing. Caution is advised, however, not to over-attenuate so as not to create a safety hazard in situations where environmental cues (such as vibration and mechanical alarms) are missed.

For moderate to severely hearing impaired workers, protecting residual hearing is vital. This category of worker is very prominent in industry, one who has yet to master those "subtle" skills of adjustment and compensation demonstrated by their profoundly deaf counterparts.

Most manufacturers offer communication headsets, which implement *passive* or *active* attenuation. Passive hearing protectors create a known acoustical response to noise without the assistance of built-in electronic circuitry. Commonly used earplugs and canal caps are passive hearing protection devices.

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Some passive earmuffs are engineered to attenuate certain high frequency noise while allowing low frequency energy where most speech energy is contained. Passive devices are most effective in low to moderate noise environments.

Active hearing protectors use built-in electronic circuitry to attenuate noise, block undesirable frequencies detrimental to communication, and amplify "preferred" noise to a safe level to facilitate better communication. Usually in earmuff form, active protectors are most effective for those with severe hearing impairment and for those in particularly safety sensitive jobs in moderate noise not exceeding 92 dBA (TWA). When noise levels exceed 92 dBA, amplification is "clipped" and units become passive devices. Users of active devices also benefit from "stereo" reception, providing noise localization and directionality. Output on most active protectors is limited to 82 dB, assuring safe levels of amplification and adequate noise level attenuation.

"Special need" fittings should be administered by qualified safety professionals (audiologists, industrial hygienists, or technical support representatives of the manufacturer).

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Extended Work Shifts Increase TWA's

Employees not normally included in the Hearing Loss Prevention Program (HLPP) may move them into the actionable category requiring HLPP inclusion when work shifts are extended. Knowledge of increased work duration requires a solid reassessment of noise doses not only to determine actionable status, but (more importantly) to reduce risk of noise induced hearing loss and/or associated physiological ill effects of noise (i.e. lesser attention span, high blood pressure, fatigue, mental distress, etc.).

The OSHA noise standard stipulates a permissible exposure level (PEL) of 90 dB(A) for an eight hour workday with a 5 dB exchange rate. For every 5 dB increase in noise, the permissible exposure duration is reduced by half. Thus a 95 dB(A) exposure is permissible for 4 hours; l00 dB(A), 2 hours; 105 dB (A) 1 hour, etc.

If an employee regularly works an eight hour work day and his/her noise exposure is 90 dB(A), their dose is 100%. A double work shift results in a noise dose of 200%. Do not make the mistake in thinking that as long the employee is working in noise at or below 90 dB(A) that, his/her noise dose will not exceed 100%. For the employee who was not previously OSHA actionable, increasing his/her workday just two hours may change his/her OSHA status to actionable. A two-hour work extension of an 8-hour workday increases noise dose by 25%. Consider the example of the employee that normally puts in an eight-hour workday measuring an 8-hour time weighted average of 84.2 dB. Referencing Table A-1 in the OSHA noise standard, a time weighted 84.2 dB exposure equals a noise dose of 45% situating this employee *just under OSHA's ACTION LEVEL of a 50% dose (85 dB TWA).* However, by increasing this employee's daily exposure at 84.2 dB an extra two hours per day, a noise dose of 56.2% results; this makes this employee actionable. How did we arrive at 56.2% you ask? It is improper to add 25 percentage points to the employee's 45% dose to arrive at an increased noise dose of 70%. Rather, we simply calculate the value that is 25% of the employee's customary 8-hour noise exposure and add that value to the employee's normal percentage dose. In this case, 25% of 45 gives us 11.2 percentage points. Adding 11.2 percentage points to the normally incurred 45% noise dose results in an increased dose equal to 56.2%.