Earplug Attenuation Validation As Part of a Hearing Conservation Program

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Occupational Noise Exposure Regulations

MSHA regulates noise exposure in 30 CFR Part 62 & OSHA does in 29 CFR 1910.95

- Both MSHA and OSHA have 8-hr time-weighted average (TWA) PEL of 90 dBA and AL of 85 dBA
- Both regs say if employee noise exposures > the Action Level they must have annual audiograms and training, etc.
- Both regs say if employee noise exposures >the PEL they must wear hearing protection
- MSHA requires dual hearing protection if 8 hr TWA > 105 dBA
OSHA vs. MSHA

- OSHA allows employers to apply feasibility test to determine if admin or engineering controls can be used to reduce employee exposures to below the PEL – “When employees are subjected to sound levels exceeding those listed in Table G-16, feasible administrative or engineering controls shall be utilized”

- OSHA -Feasibility test is economic or technological

- MSHA does not allow feasibility test. A citation will be issued if the miner has a noise exposure > PEL despite the use of PPE and a fully-compliant hearing conservation program with audiograms, training, etc.

- MSHA requires the use of engineering and/or admin controls
Hearing Protection Equipment

• The most common types of hearing protection equipment are ear plugs and ear muffs.

• The protection they provide varies based on the type, model and how well they fit in an individual’s ear canal.
Noise Reduction Ratings

• Hearing Protection Equipment typically comes with a Noise Reduction Rating (NRR) that is on the box or individual container.

• The NRR is calculated by the manufacturer in a lab setting by measuring the noise that goes through the hearing protection device that is worn by a mannequin.
Noise Reduction Ratings

- NRRs don’t account for the difference in ear canal shapes and sizes and how well the hearing protection device is worn.
- Hearing protection devices should be selected so that when they are properly worn the actual noise exposure (in the inner ear) is less than 90 dBA.
- For example – outside noise level is 100 dBA, NRR is 18 so 100 – 18 = 82 dBA (in inner ear)
Applying the NRR

- MSHA doesn’t give much guidance on how to use the NRR in the selection of hearing protection equipment.

- OSHA (in 29 CFR 1910.95) has 2 methods to apply the NRR in selecting hearing protection equipment
  - Method #1 (mandatory) – subtract 7 from the NRR; i.e. TWA – (NRR-7) = exposure level;
  - Method #2 (recommended) – subtract 7 from NRR and divide by two: i.e. TWA –((NRR-7) /2) = exposure level
- These NRR adjustments are to account for noise frequency variations and improper fitting of hearing protection equipment
The 3M Earfit Evaluation System measures how much noise attenuation an individual receives when wearing a 3M earplug.

The system generates noise from a speaker and uses microphones located directly outside the wearer’s ear and inside the ear plug to measure how much noise gets through the earplug.

The computer program runs the test at several noise frequencies and calculates a personal attenuation value - this tells us how much noise protection a wearer is actually getting.
The personal attenuation rating allows us to determine if the employee has adequate noise protection from the work environment.

The ear fit system also helps train employees on how to properly wear earplugs and demonstrates the value of wearing them.

The test only takes a few minutes and the data can be stored in the program or a printout can be put in the employee’s file for documentation.
3M Earfit Evaluation System
Benefits of Attenuation Evaluation

- Verification that PPE is providing sufficient protection.
- Demonstrates to employees the benefits of wearing hearing protection and shows them how to wear it properly.
- Part of the employee-retraining and refitting that is required after a confirmed STS.
Luminant is going to first test employees with high noise exposures to measure their attenuation to ensure they are getting adequate noise protection.

Eventually all employees included in the HCP will be tested.

Possibly presenting attenuation data to MSHA to have them recognize PPE as a control measure against noise exposure.