

Hearing Conservation

DMME

Division of Mineral Mining

AR Training

Updated 2012

MSHA Part 62

- Took effect in September, 2000. The major requirements:
 - Mine operators must use all feasible engineering and administrative controls to reduce miner's noise exposure to the “permissible exposure level” (PEL).
 - Hearing protection (PPE) may not be used instead of these controls.
 - Establishes an “action level” at which miners must be included in a hearing conservation program (HCP).
 - The HCP provisions discuss noise exposure, hearing testing, hearing protection, training and recordkeeping.
 - Mine operators must ensure that no miner is exposed, at any time, to sound levels exceeding 115 dB (A).

Virginia Safety and Health Regulations

4VAC25-40-770

- Except for surface mines inspected by MSHA, employee exposure to noise shall not exceed the federal limit adopted for mineral mines. If exposure exceeds the federal limit, the director may require the mine operator to employ feasible engineering and administrative control measures. Operators shall provide hearing protection upon request.



How Is Sound Measured?

What Is A dB, dB (A)?

- We measure sound in decibels, a unit of measure usually shown abbreviated as dB. There are several scales of dB; A, B, C and D. It is the A scale we see most often since it is intended to measure noise that parallels human hearing. This is shown as dB (A) or dBA. In fact, in recent times it has become accepted that when dB is shown, we are actually referring to dB (A). Decibel levels in MSHA Part 62 are shown as dBA.

How Does The Scale Work?

The decibel scale is measured logarithmically. That means that as decibel intensity increases by units of 10, each increase is 10 times the lower figure. Thus, 20 decibels is 10 times the intensity of 10 decibels, and 30 decibels is 100 times as intense as 10 decibels.



dB	Intensity
0	1
10	10
20	100
30	1000
40	10000
50	100000
60	1000000
70	10000000
80	100000000
90	1000000000
100	10000000000
110	100000000000
120	1000000000000
130	10000000000000

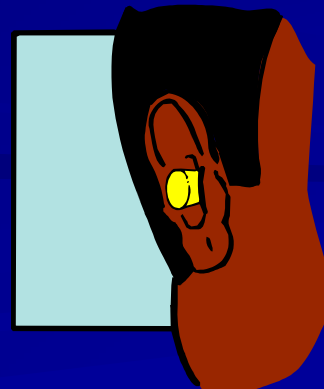
Sound Level Examples

Decibel Level

- 0 ■ Faintest sound heard by human ear.
- 30 ■ Whisper, quiet library.
- 60 ■ Normal conversation, sewing machine, typewriter.
- 90 ■ Lawnmower, shop tools, truck traffic.
- 100 ■ Chainsaw, pneumatic drill, jet ski.
- 115 ■ Sandblasting, loud rock concert, auto horn.
- 140 ■ Gun muzzle blast, jet engine; noise causes pain and even brief exposure injures unprotected ears.

So What Are The Limits/Levels?

- Except for the upper limit of 115 dBA, all the levels are based on an eight hour time-weighted average (TWA8) reading on the dBA scale.
 - The “action level” is 85 dBA.
 - The “permissible exposure limit” (PEL) is 90 dBA.
 - The “dual hearing protection level” is 105 dBA.



What Do All These Numbers Mean?

The “Action Level”

- The 8 hour time-weighted average (TWA8) of 85dBA is the action level.
 - If over an 8 hour period your average noise exposure is 85 dBA or more, then you must take part in a hearing conservation program (HCP).
 - Among other things, your hearing must be tested annually to see if you are being adversely affected as time goes by.
 - Noise at this 85 dBA level is considered to be 50% of the intensity of the 90 dBA limit.
 - Each increase of 6 dB results in a doubling of the noise intensity.
 - Studies indicate extended exposure to noise at or above this level may cause hearing loss, thus, the requirement for ongoing testing.

“Permissible Exposure Limit” (PEL)

- The 8 hour time-weighted average of 90 dBA is the federal PEL. If this is exceeded:
 - All feasible engineering and administrative controls must be used to reduce the miner’s noise exposure to or below 90 dBA.
 - The evidence clearly indicates that extended exposure to noise above 90 dBA will result in some degree of hearing loss.
 - The miner must take part in a HCP.
 - If the exposure can not be reduced to 90 dBA with engineering and administrative controls, then hearing protection must be provided and the mine operator must ensure it is worn.

Permissible Exposure Levels

8-hour TWA integrating all sound levels from
90 dBA to at least 140 dBA

Duration per day (Hours of exposure)	Sound level (dBA, slow response)
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
1/2	110
1/4 or less	115

“Dual Hearing Protection Level”

- If an 8 hour time weighted average of 105 dBA is exceeded, all actions shown for exceeding the PEL will apply, plus, the miner must be supplied with both ear plug and ear muff type hearing protection. The mine operator must ensure that both types are worn concurrently.
 - A reading of 106 dBA would be 6 dB beyond the PEL of 90 dBA, thus, the noise intensity is doubled.





No miners, *including those with dual hearing protection*, are permitted to be exposed to sound levels exceeding 115 dBA.



What Is An Engineering Control?

- Engineering controls would include:
 - Building a wall or partition between a noisy piece of equipment and an area where miners must work.
 - Adding noise reducing materials (insulation) to a control room or equipment cab to reduce operator exposure.
 - Improved mufflers and sealing exhaust leaks on engines.
 - Changing materials, components, etc. to those producing less noise.



What Is An Administrative Control?

- Administrative controls might consist of:
 - Making an area off limits during operations producing high noise levels. This rule must be posted and all miners aware of the danger.
 - Rotating personnel on a piece of equipment so no one is over-exposed for the shift.
 - Developing written procedures for a task or equipment operation that will result in lowering noise to acceptable levels.
 - Again, rules and procedures must be in writing and given to affected miners and/or posted in the affected areas.



Remember....

- All *feasible* engineering and administrative efforts must be utilized to reduce miner's exposure to the PEL (90 dBA) *prior* to depending on PPE. If all else fails, then ear plugs and/or muffs must be used.
- Virginia regulation 4VAC25-40-770 require hearing protection be available to miners upon request, regardless of the noise level they may be experiencing.
- * What is feasible will be decided on a case by case basis. Factors considered include; nature and extent of exposure, level of noise reduction (target is 3dBA or more) and cost in relation to benefit.

Why Is This So Important?

- A recent NIOSH (National Institute for Occupational Safety and Health) publication referenced studies indicating that 70% to 90% of all miners have a noise induced hearing loss severe enough to be classified as a hearing disability by the time they reach retirement age.



What Did You Say?

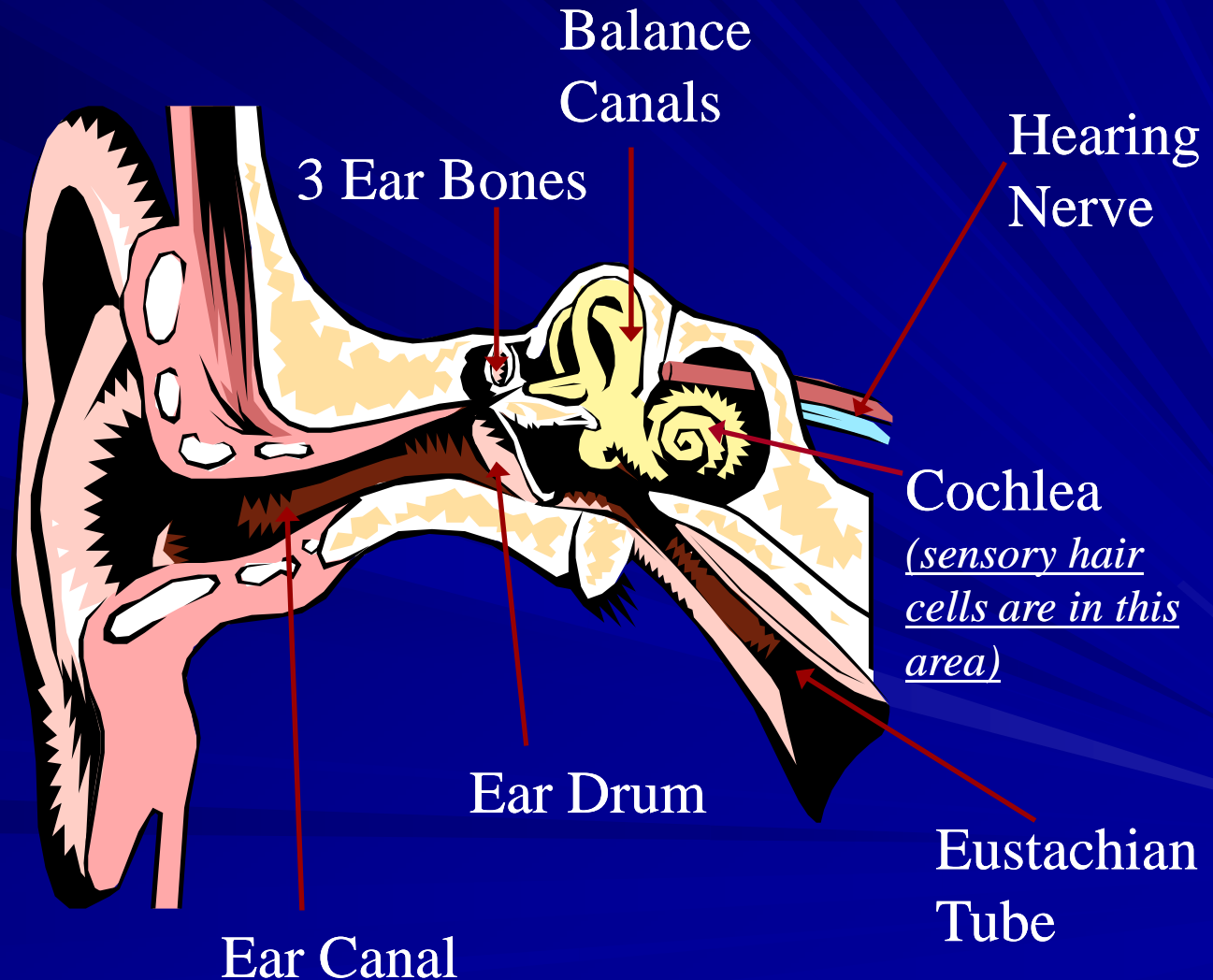
- Approximately 36 million Americans have hearing loss. Of those, 1 in 3 developed their hearing loss as a result of over-exposure to noise.*



* According to the American Academy Of Audiology

How Does It Happen?

■ Noise induced hearing loss is caused by damage to the hair cells that are found in our inner ear. Hair cells are small sensory cells that convert the sounds we hear into electrical signals that travel to the brain. If damaged, they do not grow back, causing permanent hearing loss.

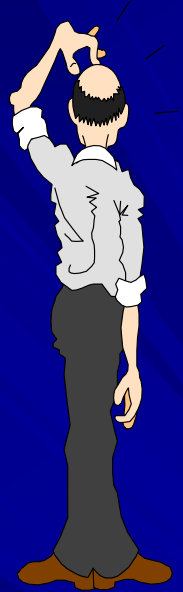


Early Signs of Hearing Loss

- Ringing in the ears after a noisy activity.
- Difficulty understanding what people say.
- Turning up the volume of the TV or radio when others hear fine.
- Not hearing background noises such as the telephone or doorbell.

Safety Hazards Due To Hearing Loss

- Can't give and receive instructions
- Can't hear warning signals
- Hard to communicate
- Can't hear sounds from machinery
- Reduced communication leads directly to accidents



MSHA Film

(19 minutes)

Access Film: <http://www.msha.gov/streaming/wvx/hearing.wvx>