

Readiness through Hearing Loss Prevention

Technical Guide 250



 **USAPHC**
U.S. ARMY PUBLIC HEALTH COMMAND

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NOISE AND HEARING LOSS

What is noise?

- ✓ Any disturbing, harmful, or unwanted sound.
- ✓ The most common hazard in the workplace or during training.
- ✓ The primary cause of hearing loss in the Army.

What are the different types of noise?

- ✓ Noise can be continuous, or steady.
Examples include power tools, vehicles and aircraft.
- ✓ Noise can also be impulsive.
Examples include explosions, weapons fire and certain metal-forming machinery.



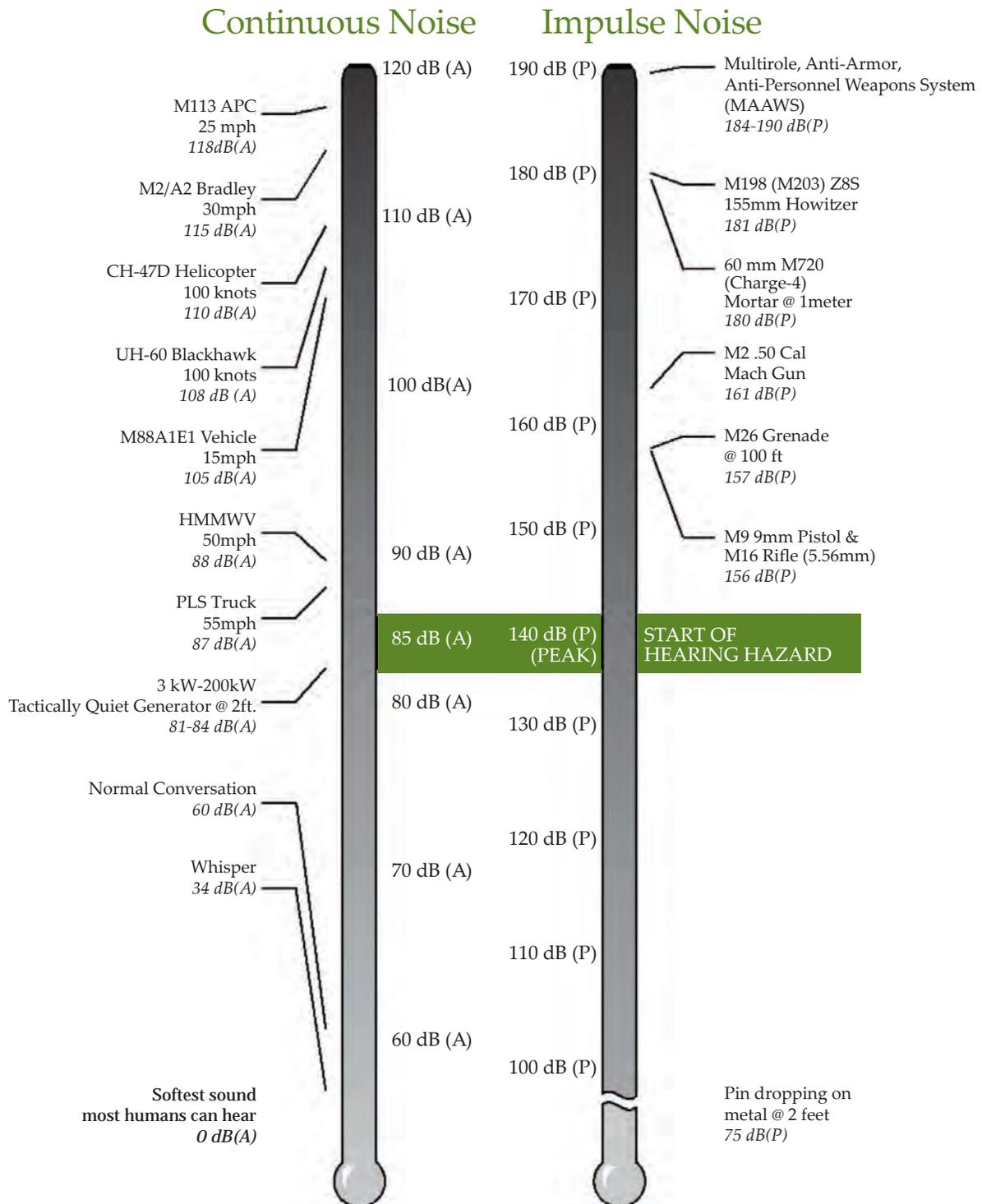
Will noise toughen your ears?

- ✓ No! Noise destroys your ability to hear and to understand speech.
- ✓ Military veterans are four times more likely to have hearing loss than non-veterans.
- ✓ Hearing loss and tinnitus (ringing in the ears) are the top two service connected disabilities for military veterans.

When and where can noise impair your hearing?

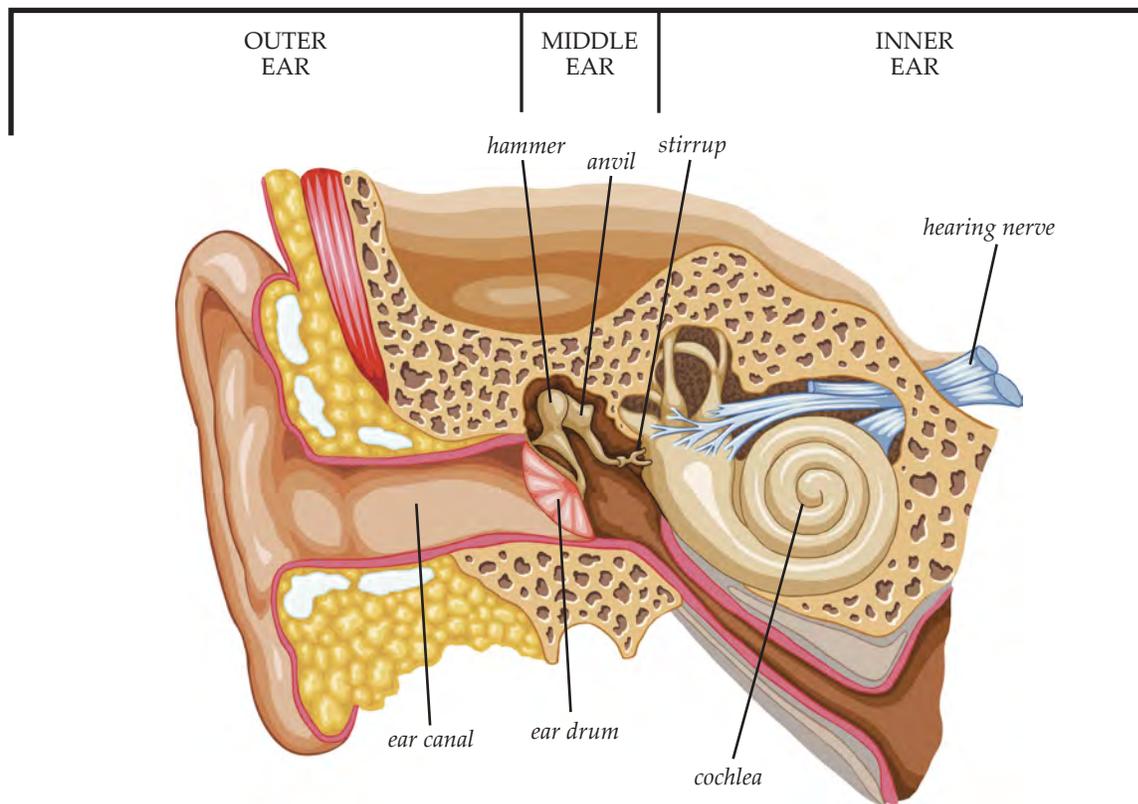
- ✓ During any weapon firing.
- ✓ Noise can damage your hearing at work, at home and during recreational activities.
- ✓ If you have to raise your voice to be heard, the noise is considered hazardous.
- ✓ Noise in combination with some chemical exposures can increase hearing damage, for example, toluene, lead, carbon monoxide, etc.

DECIBEL THERMOMETERS



HOW THE EAR WORKS

Your ear is divided into three parts.

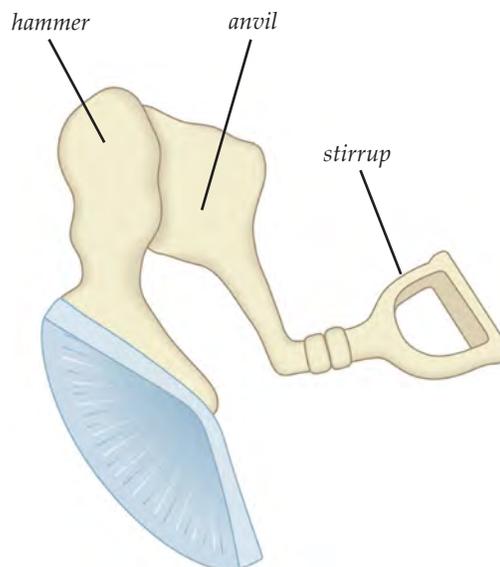


OUTER EAR

The outer ear directs sound waves into the ear canal to the eardrum. The eardrum vibrates and sets into motion part of the middle ear.

MIDDLE EAR

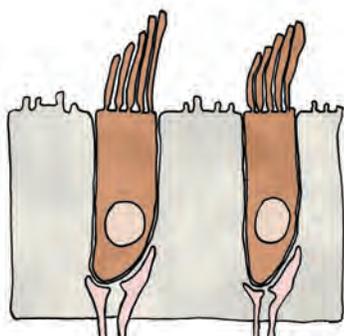
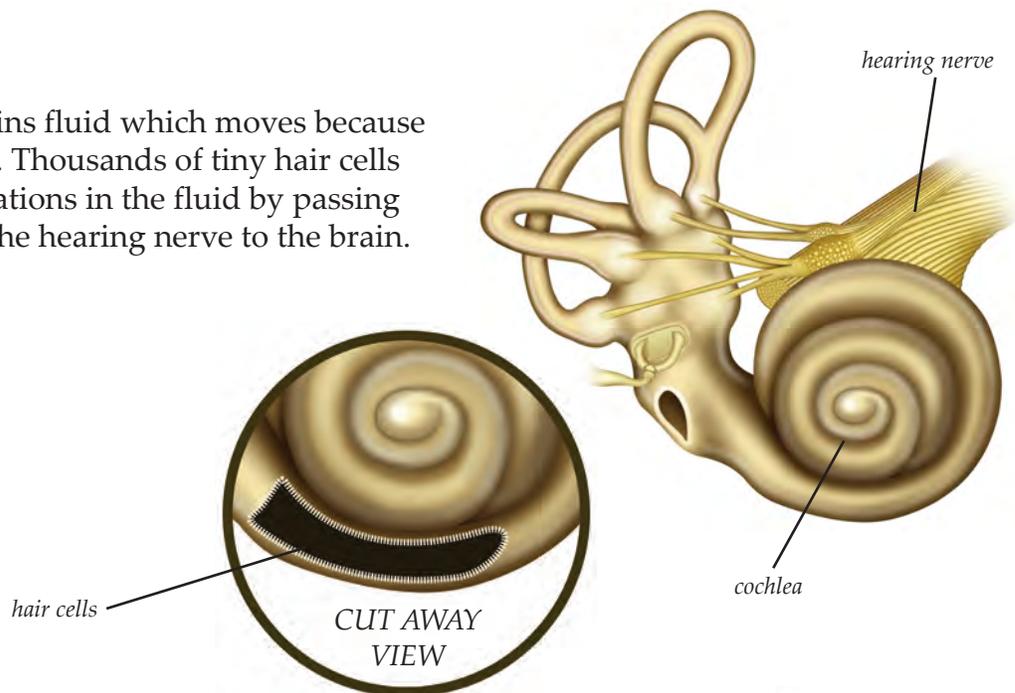
The middle ear contains the three smallest bones in your body—the hammer, anvil and stirrup. These bones vibrate and pass the sound waves into the inner ear.



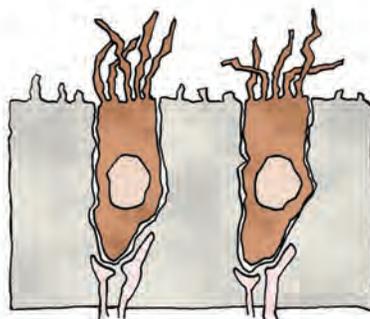
HOW THE EAR WORKS

INNER EAR

The inner ear contains fluid which moves because of the sound waves. Thousands of tiny hair cells respond to the vibrations in the fluid by passing information along the hearing nerve to the brain.



HEALTHY HAIR CELLS



DAMAGED HAIR CELLS

Damage to your hair cells caused by intense noise could be seen as hearing loss on your next audiogram when your hearing is checked.

Hearing problems in the outer and middle ears are usually medically treatable. However, there is no proven cure for inner ear hearing loss caused by the noise.

Noise does not have to cause pain or bleeding to do damage.

CAUTION

HIGH INTENSITY NOISE
HEARING PROTECTION
REQUIRED

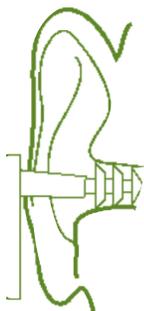
HEARING PROTECTORS

Earplugs and noise muffs are available at no charge to everyone who works in noise. Make-shift protectors, such as cigarette filters, cotton or bullet casings do not protect you and they are not hygienic.

EARPLUGS

Preformed earplugs come in various types and sizes and need to be fitted by a medically-trained person. This type of hearing protection should be issued with a carrying case, the top lid of which serves as an inserting device for several types of earplugs.

Triple-Flange earplugs are available in small, medium and large sizes.



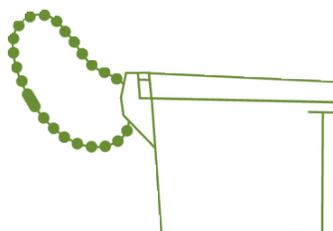
Quad-Flange earplugs are available in one size fits many; however, its stem is too wide for use with the earplug inserting device.



Combat Arms Earplugs (CAE) are in their third generation. The current generation of CAE's come in earth tone colors and three different sizes with a toggle switch. The closed position protects from continuous and impulse noise, while the open position only protects from impulse noise but allows some softer sounds to be audible.



Earplug Inserting Device (Top) and Carrying Case



Sound-Guard foam earplug (two-color)





Foam earplugs come in small, medium and large and are semi-disposable.

For a proper fit:

- ✓ Roll and compress the plug into a very thin cylinder ensuring there are no wrinkles that may allow sound to get through.
- ✓ While compressed, quickly insert the plug well into the ear canal.
- ✓ Gently hold the plug in place until it expands to fill the entire ear canal.

Remember:

- ✓ Your voice will sound muffled or low-toned or muffled, as if in a barrel, when your earplugs are properly inserted.
- ✓ Adjusting to wearing earplugs may take a little time.
- ✓ You can be refitted with a different size and type.
- ✓ If using preformed earplugs such as triple or quad flanged, keep the earplugs clean with soap and water and use them only when dry.

NOISE MUFFS

When properly fitted, noise muffs form a seal around your ears. For proper maintenance, replace hardened or torn earcup seals and degraded acoustic foam padding.



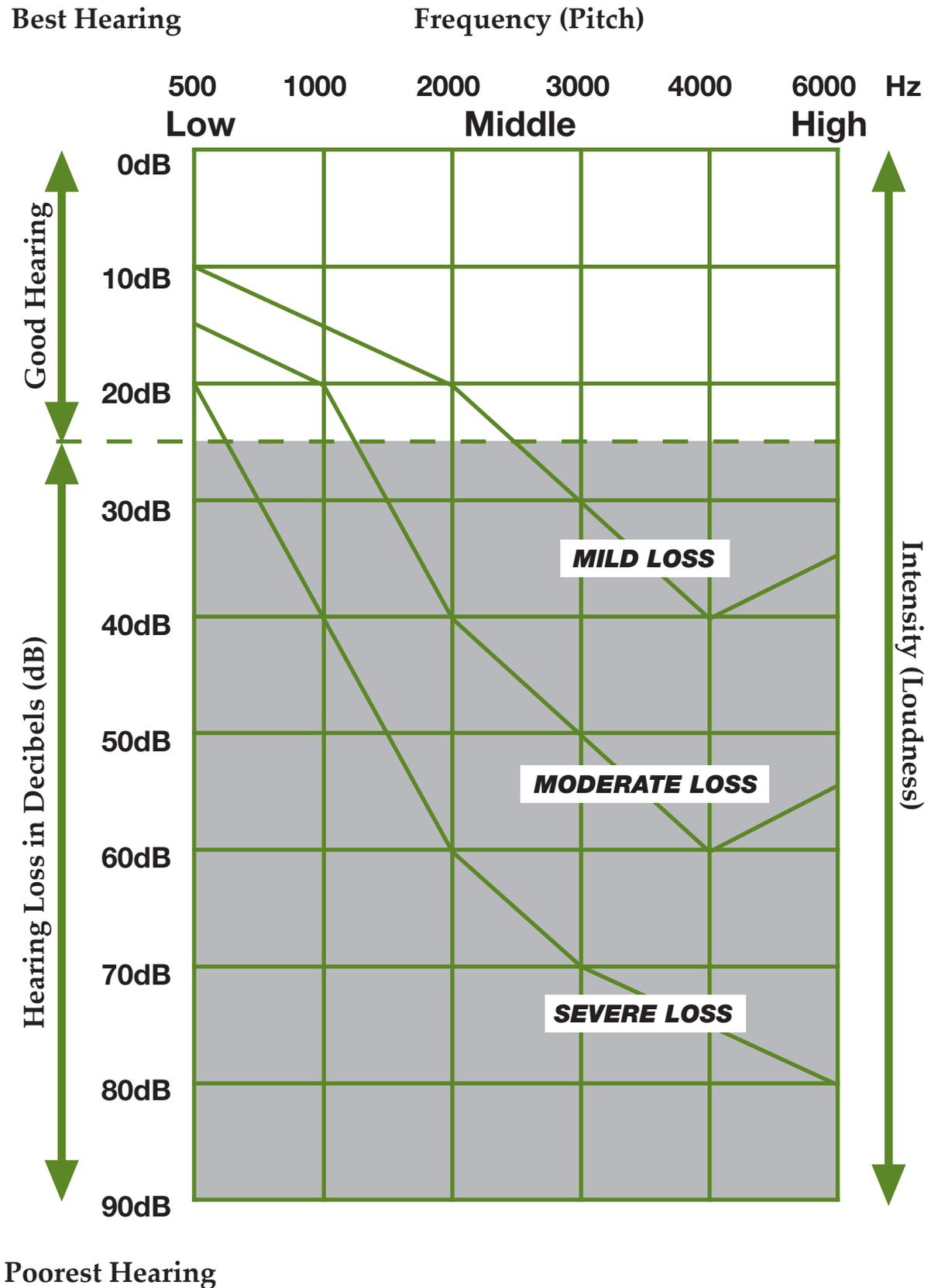
REMEMBER, THE BEST HEARING PROTECTOR IS THE ONE THAT IS WORN!

HEARING TESTING

- ✓ All personnel who work in noise-hazardous areas need an annual hearing check.
- ✓ The first test serves as the reference (baseline) from which any future change or shift in your hearing is measured.
- ✓ You will be notified when your annual hearing check is due. At that time, your hearing protective devices need to be checked and, if necessary, replaced.
- ✓ An audiogram reflects the softest tones you are able to hear at low, middle and high frequencies. (See page 9.)
- ✓ When loud noise makes your hearing worse, damage usually occurs first in the higher frequencies. Then nearby frequencies are affected.



AUDIOGRAM



READINESS AND HEARING LOSS

Why is protecting your hearing so important?

- ✓ Hearing loss caused by loud noise becomes permanent and is not medically treatable.
- ✓ Impaired hearing can cause serious or fatal mistakes at work or in training and combat situations.
- ✓ Good hearing is critical to the success of the mission, both in offensive and defensive operations.

Offensive & Defensive Operations

- ✓ Localizing snipers
- ✓ Locating patrol members
- ✓ Determining the position, number and type of friendly or enemy vehicles
- ✓ Determining types of booby traps
- ✓ Hearing the activation of perimeter alarms
- ✓ Hearing enemy movement through leaves, grass and twigs
- ✓ Determining enemy locations from the sounds of wildlife, loading of cartridges, safety locks and clipped barbed wire
- ✓ Aiding in small arms accuracy and weapons identification
- ✓ Hearing radio messages and verbal orders

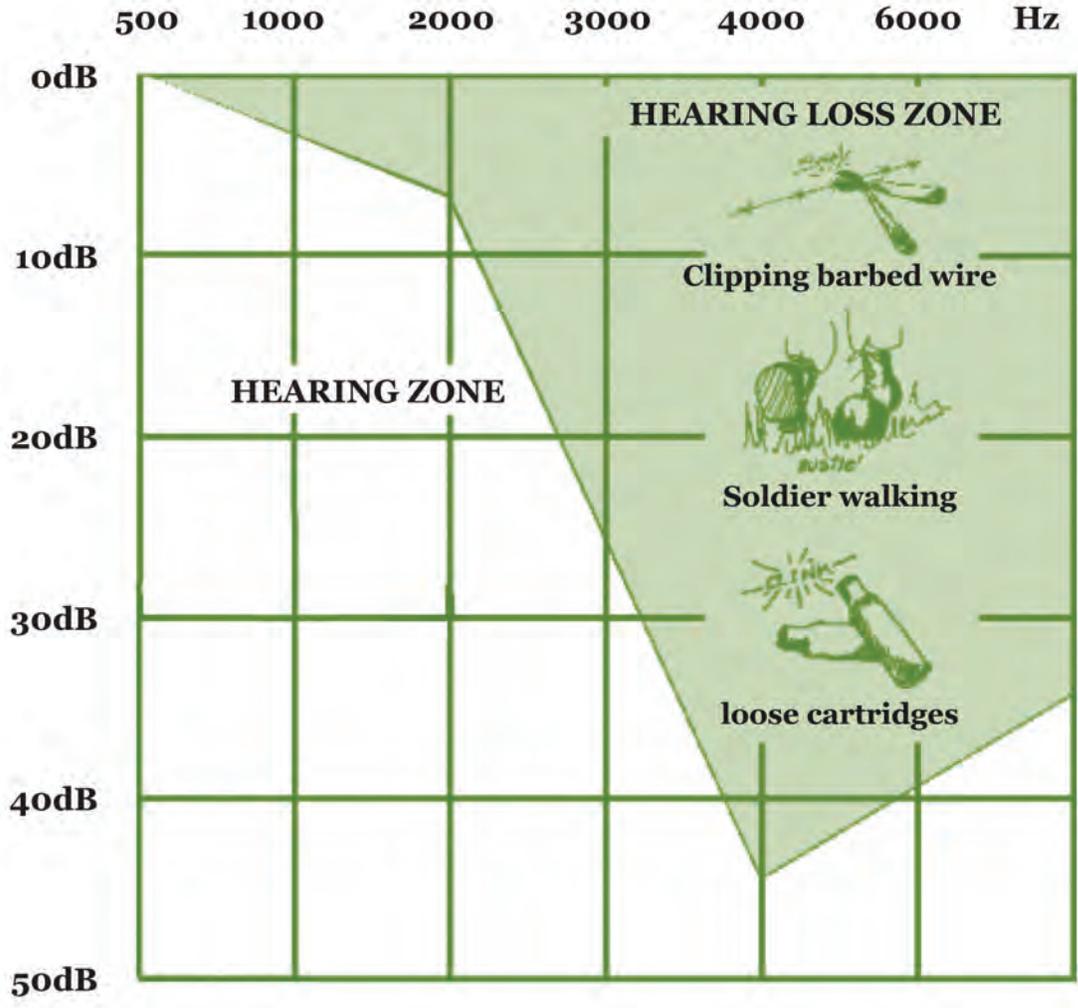
Remember:

- ✓ Early signs of hearing loss include ringing in the ears and speech sounds that are muffled.
- ✓ Speech and other sounds have to be louder to be heard or understood.

Noise Level, dBA	Permitted daily exposure time
85	8 HOURS
88	4 HOURS
91	2 HOUR
94	1 HOUR
97	30 MINUTES
100	15 MINUTES
103	7.5 MINUTES

What does a Soldier with a high frequency hearing loss miss in terms of readiness?

High-pitched combat sounds!



MOST NOISE-INDUCED HEARING LOSS OCCURS DURING TRAINING

HEALTH EDUCATION

- ✓ Each year you must receive additional training and information concerning your installation's hearing conservation program.
- ✓ You also have certain responsibilities as a participant in the hearing conservation program.
 1. Wear your hearing protection when in hazardous noise.
 2. Report for all scheduled hearing checks, including follow ups, if required.
 3. Attend an annual health education briefing.
 4. Maintain the engineering noise controls that are in place for your safety.
- ✓ Know your rights as a participant in the hearing conservation program.
 1. You have the right to copy or access your hearing records.
 2. You have the freedom to choose the type of hearing protective equipment you wish to wear, unless a medical reason limits your choice.
 3. You have the right to copy or access the noise exposure data pertinent to your work site or duties.
 4. You have the right to make suggestions that might lead to quieter equipment or less noise exposure for individuals you work with.

***The mention of any non-federal entity or its products shall not be construed or interpreted, in any manner, as federal endorsement of that non-federal entity or its products.*

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