

Hearing Protection

How Hearing Works

Are you one of the 20 million people who are exposed to hazardous noise on the job? If so, you'll want to protect yourself from hearing loss by learning how hearing works, how your own hearing is measured, and how high levels of noise can cause hearing loss over time.

How the Ear Hears

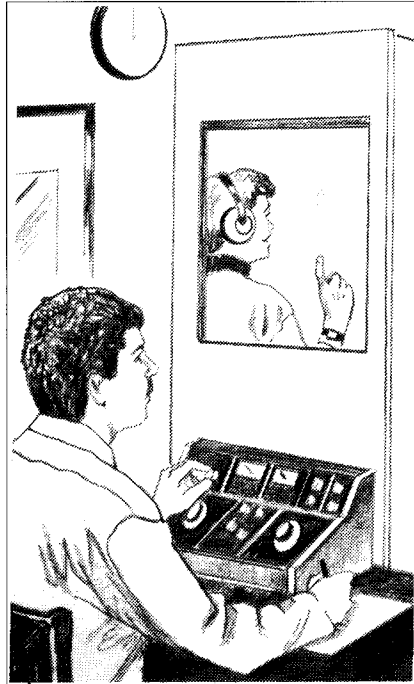
Sound waves travel through the ear canal to the eardrum. This membrane vibrates when the sound waves hit it, much the same way a drum vibrates when you hit it. The vibrations are transferred through tiny, sensitive bones in the middle ear to the cochlea, a coiled, hollow structure in the inner ear that is filled with fluid and lined inside with thousands of tiny hairlike structures called hair cells. When the sound vibrations transfer to the cochlea, they cause waves in the fluid to move the hair cells, which convert the vibrations into nerve impulses. The auditory nerve carries these impulses to the brain, where you interpret them as sound.

How Damage Occurs

The hair cells lining the cochlea of your ear are extremely fragile. They can be damaged by such things as infections, head injuries, and certain drugs. But the most common source of damage to hair cells is noise. Loud noise over a period of time causes these nerve cells to die off, usually so gradually that you are not aware that it's happening until your hearing is permanently damaged.

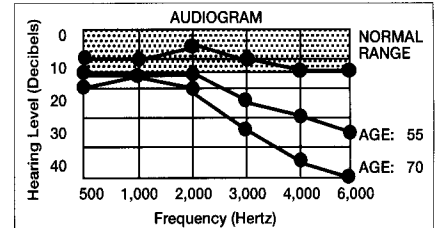
Audiometric Tests

Fortunately, we can measure hearing loss with a sensitive test that will keep track of your hearing ability and alert you and your company to hearing loss, long before it becomes severe



enough to affect you. In this test, which measures your ability to hear sounds of different frequencies (itches), you will be asked to listen to sounds and indicate when you hear them. The results are shown on an audiogram, a graph that shows your hearing threshold (the quietest sound you can hear) at each frequency. The frequency of sound is shown on the horizontal line of the graph and is measured in units called *hertz*; the higher the number, the higher the pitch. The vertical line on the left shows the loudness of sound at your hearing threshold; it is measured in units called *decibels* (sometimes abbreviated *dbA*). The jagged line in the audiogram connects your hearing thresholds at different frequencies; the higher the line, the better your hearing.

This audiogram shows how hearing changes as we age: At lower pitches there isn't much difference, but as we get older we experience greater difficulty in hearing high



itches. The same changes take place when there is hearing loss from excessive noise. If you compare audiograms taken at one-year intervals and find that the line has dipped significantly, you are experiencing hearing loss, even though you may not yet notice it.

What Does "Too Loud" Mean?

Decibels, used for measuring hearing thresholds, are also used for measuring the loudness of noise. You are exposed to about 20 decibels in a quiet bedroom, 110 decibels when you are using a power saw. OSHA regulations require hearing protection to be made available if you are exposed to noise levels above 85 decibels for eight hours at a time. Always wear hearing protection when the noise level is over 90 decibels. You can tell you need hearing protection if you have trouble hearing someone talking two feet away, if you hear ringing or other sounds in your ears after you leave work, or if you have trouble hearing for a while after you leave work.

In spite of what you may have been told, you don't "get used to" noise. You may learn to ignore it, but your ears can't tune it out. You can help protect your precious hearing by wearing proper hearing protection, having your hearing tested yearly and compared to previous tests, and giving your ears a rest by getting away from noise whenever you can.