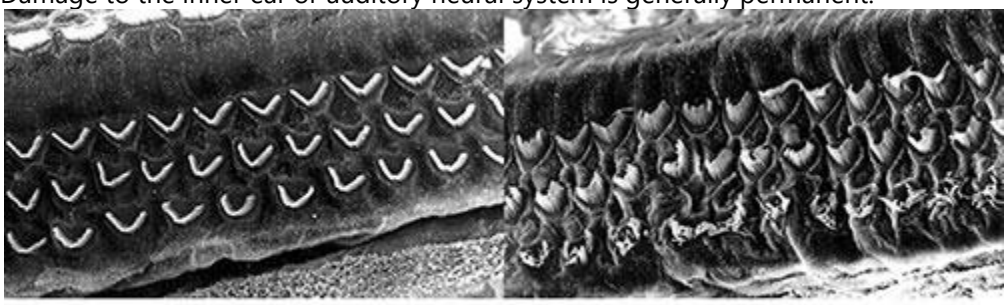
https://www.cdc.gov/nceh/hearing_loss/how_does_loud_noise_cause_hearing_loss.html

How Does Loud Noise Cause Hearing Loss?

Hearing Loss Can Be Temporary or Permanent

Hearing loss is a decrease in your ability to hear or understand speech and sounds around you. Hearing loss can happen when any part of the ear or the nerves that carry information on sounds to your brain do not work in the usual way. In some cases, hearing loss can be temporary. However, it can become permanent when vital parts of the ear have been damaged beyond repair. Damage to any part of the ear can lead to hearing loss.

Loud noise is particularly harmful to the inner ear (cochlea). A one-time exposure to extreme loud sound or listening to loud sounds for a long time can cause hearing loss. Loud noise can damage cells and membranes in the cochlea. Listening to loud noise for a long time can overwork hair cells in the ear, which can cause these cells to die. The hearing loss progresses as long as the exposure continues. Harmful effects might continue even after noise exposure has stopped. Damage to the inner ear or auditory neural system is generally permanent.



Normal Hair Cells Damaged Hair Cells

After leaving a very loud event, such as a concert or football game, you may notice that you don't hear as well as before. You might not hear whispers, sound might seem muffled, or you may hear ringing in your ears. Normal hearing usually returns within a few hours to a few days. This is because the hair cells, similar to blades of grass, will bend more if the sound is louder. But they will become straight again after a recovery period.

However, if loud noise damaged too many of the hair cells, some of them will die. Repeated exposures to loud noises will eventually destroy many hair cells. This can gradually reduce your ability to understand speech in noisy environments. Eventually, if hearing loss continues, it can become hard to understand speech even in quieter places.

Noise Can Also Damage Nerves in Your Ears

In addition to damaging hair cells, noise can also damage the auditory nerve that carries information about sounds to your brain. Early damage may not show up on your hearing test, but can create a 'hidden hearing loss' that may make it difficult for you to understand speech in noisy environments. The cumulative effect of noise affects how well you might hear later in life and how quickly you might develop hearing problems, even after exposure has stopped.

How Do We Hear?

We hear sound because of vibrations (sound waves) that reach our ears. We recognize those vibrations as speech, music, or other sounds.

Outer Ear

The outer ear—the part of the ear you see—funnels sound waves into the ear canal. The sound waves travel through the ear canal to reach the eardrum.

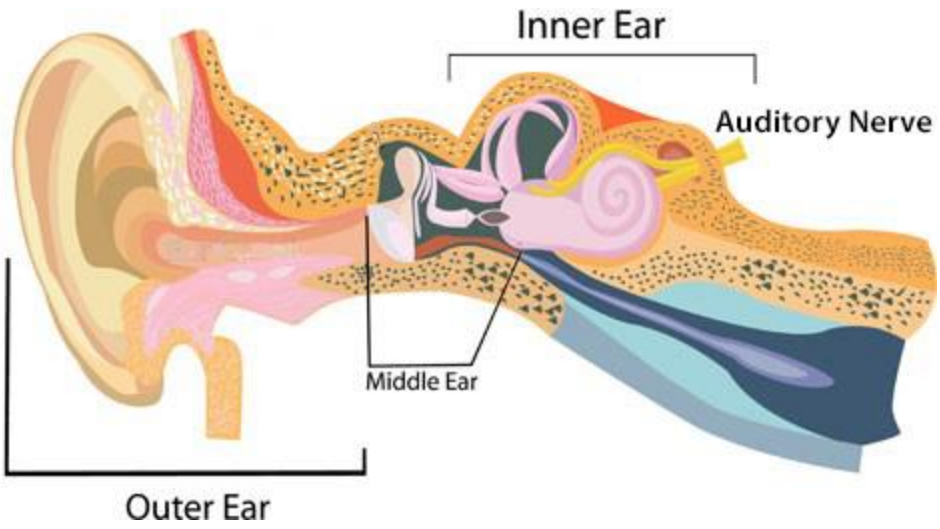
Middle Ear

The eardrum vibrates from the incoming sound waves and sends these vibrations to three tiny bones in the middle ear. These bones amplify, or increase, the sound vibrations and send them to the inner ear.

Inner Ear

The inner ear contains a snail-shaped structure filled with fluid called the cochlea. Sound vibrations create waves in the cochlear fluids. As the waves peak, they cause tiny hair cells (types of receptors that can detect sound) to bend, which converts the vibrations into electrical signals.

Auditory Nerve
The auditory nerve carries the electrical signals from the inner ear to the brain, which interprets the signals as sound that you recognize and understand.



WHO: Exposure Limits
The World Health Organization (WHO) recommends that noise exposure levels should not exceed 70 dB over a 24-hour period, and 85 dB over a 1-hour period to avoid hearing impairment. For more information on WHO noise publications, visit WHO's list of noise-related publicationsExternal.

ACCEPTED STANDARDS FOR RECOMMENDED PERMISSIBLE EXPOSURE TIME FOR CONTINUOUS TIME WEIGHTED AVERAGE NOISE ACCORDING TO NIOSH AND CDC.

Continuous dB	Permissible Exposure Time
85 dB	8 hours
88 dB	4 hours
91 dB	2 hours
94 dB	1 hour
97 dB	30 minutes
100 dB	15 minutes
103 minutes	7.5 minutes
106 minutes	3.75 minutes (<4 minutes)
109 dB	1.875 minutes
112 dB	.9375 min (~1 min)
115 dB	.46875 min (~30 sec)

During the period 28th November to 15th December, the St. Thomas Church operates illegal loudspeakers placed along the roads and at the busy junction at over 120 dBA. The hapless policemen who are posted on duty during this time to protect the church and permanent residents within 200 metres of these loudspeakers are the ones who are most affected.