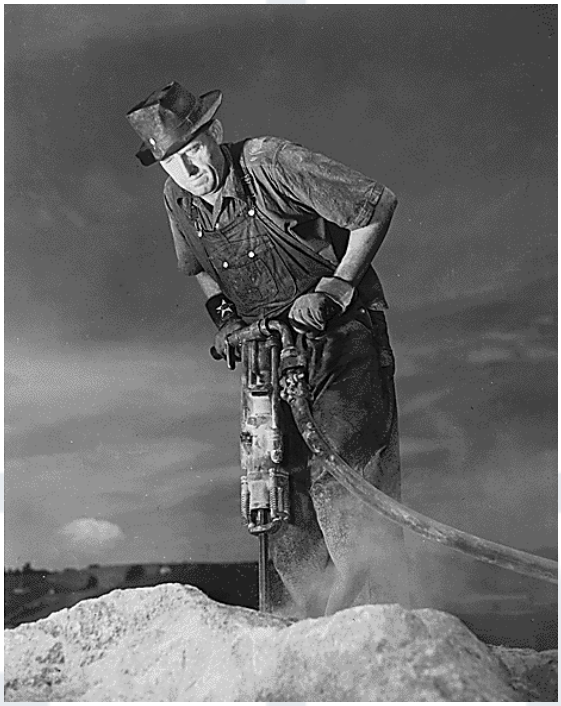
NOISE-INDUCED DEAFNESS

Exposure to excessively loud noise levels will produce loss of hearing, due to damage to the sensory hair cells of the inner ear. Losses may be due to chronic exposure, single loud incidents, or as a result of a blast effect. Each tends to present in a different pattern.



Noise Trauma: Needs ear muffs.

Chronic noise damage (Inner Ear Conditions) is due to concussive effects of either repeated loud sounds (e.g. factory work, or chronic continuous loud noise). This damages the ear at levels above 85 db, when continued for more than 3-4 minutes. The damage worsens with continued exposure, but stabilises if the noise is discontinued. Apart from reducing the noise itself, ear muffs are the optimal mode of damage prevention, as even specialised noise suppression earplugs provide less protection.

Single loud incidents may cause marked loss, evidently if exposure occurs with a head-down posture. “Acoustic accidents” of this nature are frequently difficult to prevent, being often one-off events.

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Blast injuries may be complex. The force of the incident may compress and rupture the drum, perhaps impacting fragments of drum skin into the middle ear. Conductive (mechanical) losses may result from persistent drum perforation, middle ear scarring, chain dislocation, or from skin fragments forming cholesteatomas (cysts of skin) that may expand and compress or erode the middle ear structures. Blasts may also cause a perilymph fistula, when rupture of the inner ear orifices produces leakage, with nerve deafness and perhaps severe dizziness.

Audiological findings tend to reflect the cause of the noise trauma. Chronic damaging environmental sound produces a symmetrical high frequency nerve deafness pattern, maximal at 4000 cps, forming a characteristic hearing dip at this frequency. This is because the cells that activate in response to this frequency are closest to the entry of sound into the inner ear.

In some cases (temporary threshold shift) the initial losses may recover in part or full.

Conversely, single severe episodes tend to cause unilateral losses, or noise patterns that are worse in one ear, reflecting the side of exposure. “Rifleman’s Ear”, for instance, shows a worse pattern in the left side (for a right-handed shooter), as that ear is closer to the muzzle blast of the weapon.

Blast injuries (Trauma) may show a severe unilateral, perhaps total, nerve loss, or bilateral losses, worse on the blast side. A mixed nerve and conductive loss may occur in the event of significant middle ear damage. A perilymph fistula may demonstrate a fluctuating low frequency loss, leading to further or total nerve deafness.

The essential management of noise trauma is ear protection, now fortunately common in industrial sites, partly from worker awareness or union intervention, partly government workplace legislation and inspection, and partly managerial, whether altruistic or insurance-driven.

More information

- Noise trauma

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