

SAFETY & HEALTH BULLETIN

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Hearing Loss Due To Solvent Exposures

We are all aware of the relationship between excessive noise exposures and hearing loss, but did you know there are a number of “Ototoxic¹” chemicals that can also cause hearing loss? These substances can be drugs or metals and solvents commonly found in the work environment. As with noise induced hearing loss, chemical induced hearing loss is permanent and cannot be reversed.

Synergistic effect with noise:

Exposure to ototoxic chemicals alone can induce mild hearing loss or produce greater hearing loss when combined with exposure to noise. In one 20-year study² of over 300 workers, researchers found that 23 percent of the workers exposed to organic solvents (a mixture including toluene and xylene) showed significant high frequency hearing loss. Only eight percent of the non-chemically exposed workers in this study showed hearing loss. Evidence of a synergistic effect comes from the fact that the chemically exposed group had average noise levels of 80-90 dB, while the non-chemically exposed groups’ noise levels were between 95-100dB.

Identified and Suspected Ototoxic Chemicals:

- | | |
|--------------------|---------------------|
| • Butyl Nitrate | • Mercury |
| • Carbon Disulfide | • Styrene |
| • Carbon Monoxide | • Toluene |
| • Hexane | • Tin |
| • Lead | • Trichloroethylene |
| • Manganese | • Xylene |

What Can be Done?

Below are some steps that you may wish to consider to address this situation:

- Review your written safety and health program to ensure this issue is addressed.
- Reduce solvent exposures.
- Reassess your hearing conservation program to consider:
 - Offering audiometric testing to workers exposed to both noise and solvents; and
 - Using hearing protection for workers exposed to solvents and noise even when noise levels are below the allowable limit for noise.

Contact

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This Safety & Health Bulletin is one in a series of publications issued by EH to share occupational safety and health information throughout the DOE complex. For additional information regarding the publications, call Mary Cunningham at (303) 903-2072.

¹ Ototoxic – (‘oto-’ relating to the ear) toxic to the ear, in this context causes hearing loss.

² Morata, T.C. et al, Effects of Occupational Exposure to Organic Solvents and Noise on Hearing, Scand J Work Environ Health, 1993; 19:245-54.