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Paul D. Dybala, Ph.D., Editor-in-Chief

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8/28/2006

Hearing Protection from General Purpose Materials?

Elliott Berger, M.S.

Q: Do you really need to use specially designed earplugs for hearing protection? Can you use other, more inexpensive materials such as cotton balls, or other similar household items, or can you just stick your fingers in your ears?

A: Earplugs are made of acoustically impermeate materials and of a specific size so that when properly worn they can provide appropriate hearing protection. That said, you must make sure that your earplugs are inserted correctly into the ear. I have provided an example of proper and improper earplug insertion from the brochure "Tips & Tools for fitting and using E•A•R foam earplugs." www.e-a-r.com/pdf/hearingcons/tipstools.pdf

Other useful fitting tips can be found in EARLog 19 Tips for fitting hearing protectors at www.e-a-r.com/pdf/hearingcons/earlog19.pdf

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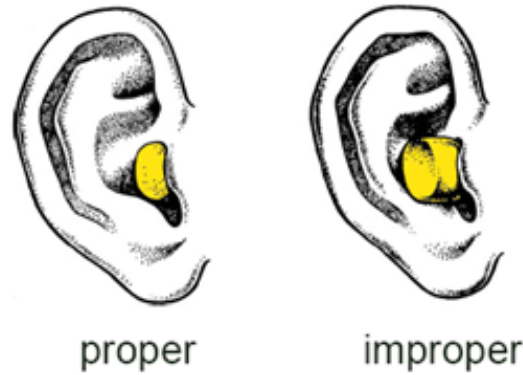


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I would advise that you NOT use other general-purpose materials as hearing protection! They will probably offer little, if any, protection from noise.

As an example, I was recently asked if cigarette filters were effective hearing protectors when used as an earplug. Simply stated, cigarettes are bad for your health and bad for your hearing protection. You have to be able to draw air thru the filter to smoke the cigarette - that means filters are porous, not sealed, and not a good sound block.

Using some Marlboro Ultralight filters we conducted a quick experiment to see just how effective they might be. The results: they afford no protection below 500 Hz and about 6 dB @ 500, 12 dB @ 1000, and 22 dB @ 2000, just like what you would expect from a leaky earplug (getting back to my point above about the proper insertion of earplugs). It is also important to note that the numbers above are only for filters sized exactly right and sealed tightly around the perimeter of the ear canal. Since the diameter of a cigarette filter is only about 8 mm, they are on the small size for most of the population.

I have also examined cotton balls, motorcycle helmets and simply putting your fingers in your ears. You can find all the data in my hearing protection chapter in The Noise Manual, 5th Edition, by E. H. Berger, L. H. Royster, J. D. Royster, D. P. Driscoll, and M. Layne, Am. Ind. Hyg. Assoc. (2000). In short, cotton provides only 5 – 10 dB except at the highest frequencies; surprisingly motorcycle helmets, which are quite acoustically leaky, are not much better, but fingers in your ears (though not terribly functional for general activities) nets you 25 – 30 dB; quite sufficient for a brief noise emergency.

After receiving his M.S. in Acoustical Engineering from North Carolina State University, Elliott Berger joined Aearo Technologies in 1976. As E•A•R/Aearo's Senior Scientist, Auditory Research, he conducts hearing protector research and development. He has written over 60 articles on hearing protection/conservation, and was the principal editor for the 4th and 5th editions of the AIHA Noise & Hearing Conservation Manual. Elliott chairs ANSI working group S12/WG11 on hearing protectors, served on a National Academy of Science committee evaluating hearing loss in the military, and is also involved with numerous other standards committees. In 1993 he was the recipient of the National Hearing Conservation Association's Outstanding Hearing Conservationist Award. Elliott is Past President of the National Hearing Conservation Association (NHCA), Past-Chair of the American Industrial Hygiene Association's (AIHA) Committee on Noise and a Fellow of the Association, a Board Member of the of the Council for Accreditation in Occupational Hearing Conservation (CAOHC), a Fellow of the Acoustical Society of America (ASA), and a member of the American Speech-Language-Hearing Association (ASHA).

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