



## Risk Levels of Occupational Noise Exposure

Risk of noise-induced hearing loss, along with numerous secondary effects associated with unprotected occupational noise exposure are real; however, risk of noise-induced impairment is also dependent upon daily noise exposure levels.

Risk estimates are often based upon impairment formulas and differ depending upon the impairment formula and how that formula defines impairment. If one is to estimate risk based upon the 1959 AMA impairment formula (which is still in use today in many State jurisdictions), the risk of impairment in typical occupational noise environments is low. Contrastingly, risk of impairment based upon the American Speech-Language-Hearing Association's (ASHA) formula suggests that a significantly greater percentage of Americans are at risk. This discrepancy is rooted in that fact that the 1959 AMA impairment formula incorporates 500, 1000, and 2000 Hz, as opposed to the ASHA formula that includes 1000, 2000, 3000, and 4000 Hz; the latter generates a higher risk estimate since it is those frequencies believed to contribute most to everyday speech perception.

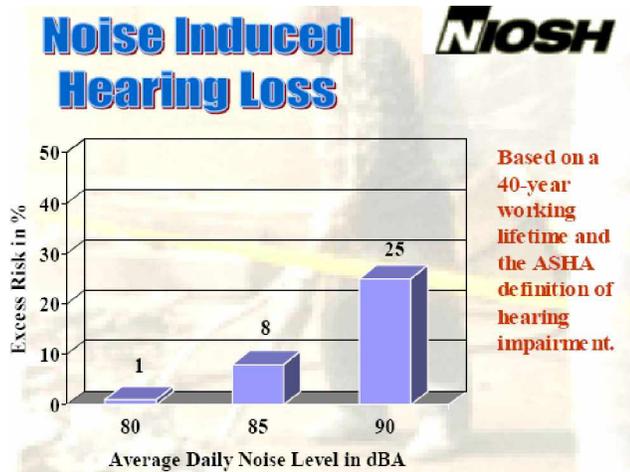
The National Institute for Occupational Safety and Health (NIOSH) referenced the ASHA formula in a publication entitled "Criteria for a Recommended Standard: Occupational Noise Exposure". This study incorporated retrospective data to arrive at excess risk estimates for occupational noise; an excess risk estimate is derived by subtracting hearing loss due to the normal ageing process from general risk estimates. An unprotected 85 dB time weighted average exposure poses an 8% excess of material impairment due to noise over a 40 year career. An unprotected 90 dB exposure over a 40 year career poses a 25% excess risk. On the other hand, an 80 dB career long exposure poses but a 1% excess risk of noise induced impairment. *Put another way, 92% of workers exposed to unprotected noise levels of 85 dB would not sustain occupationally induced hearing loss over the duration of a 40 year career.*

Dr, William W. Clark reminds us, however, to not make the mistake of believing that lower level noise environments pose zero risk of initiating the path to noise-induced hearing loss. Lower level noise exposures may in fact pose higher risk of noise induced hearing loss in the long run since behavioral responses to low level noise differ from that in response to higher level noise. Noise levels below 95 dB, while annoying, rarely elicit pain or discomfort, unlike noise levels exceeding 100 dB. As a result, one may be less likely to don hearing protection in lower (yet still damaging) noise levels. (Five Myths in Assessing the Effects of Noise on Hearing *William W. Clark, Ph.D., Central Institute for the Deaf*)

The NIOSH excess risk estimates serve to underscore the often overlooked contributions to noise-induced hearing loss from non-occupationally related sources. Sociocusis (noise induced hearing loss stemming from non-work related exposures) remains a significant problem in today's society.



While annual hearing loss prevention training should of course address work related noise risks, a comprehensive training program should also include proper domestic (off the job) protective practices. The NIOSH risk estimates also highlight the importance of thorough review of a worker's work related exposure levels and off the job noise exposure practices in the Work Relatedness Determination process.



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