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A comparison of earmuff protection measured in real-world and laboratory conditions

Emil Kozlowski[a] and Ewa Kotarbinska[b]
[a]Centr. Inst. for Labour Prot. - Natl. Res. Inst., Czerniakowska 16, 00-701 Warsaw, Poland
[b]Warsaw Univ. of Technology Inst. of Radioelectronics, Nowowiejska 15/19, 00-665 Warsaw, Poland

It has been well known and that noise protection provided by earmuffs in real-world conditions is lower than measured by a laboratory standardized REAT test. In this study, earmuff protection was tested by simultaneous measurement of the L_{Aeq} under and outside the earmuffs in 91 industrial workplaces and in the laboratory. In all cases, the L_{Aeq} measured under the earmuffs was compared with the level predicted according to the EN 458 standard, by an octave-band method for calculating the A-weighted SPL under the hearing protector. The L_{Aeq} levels measured under the earmuffs in real-world conditions were by more than 3 dB(A) and 15 dB(A) higher than predicted by the octave-band method, respectively in 65% and 17% of cases. The main causes of worse protection at workplaces were worn-out earmuffs due to prolonged usage (33%), improper way of wearing earmuffs (15%), or the use of eye-glasses (8%). The data show that attenuation values measured by the REAT method overestimate by 1-5 dB the earmuff protection obtained in real-world conditions. [Work supported by the Polish Ministry of Labour and Social Policy, grants 4.S.03 and 3.S.02].