Comparison of New Metrics for Assessment of Risks of Occupational Noise

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Abstracts: Noise induced hearing loss (NIHL) is one of the most common occupational related health problems worldwide. Exposure to excessive noise is the major avoidable cause of permanent hearing loss. The conventional metrics for noise evaluation cannot accurately assess the exposure risks to high-level complex noise, which commonly occurs in many industrial and military fields. Recently, we have developed two advanced models, an adaptive weighting (F-weight) and a complex velocity level (CVL) auditory fatigue model, to evaluate the risks of occupational noise. In this study, we compared performances of four noise assessment metrics, including F-weighted sound pressure level (SPL) L_{Feq}, CVL model based SPL L_{CVL}, A-weighted SPL L_{Aeq}, and C-weighted SPL $L_{Ceq,}$ using animal experimental NIHL data. The animal data includes 22 groups of Chinchillas exposed to different types of noise (e.g., Gaussian and non-Gaussian noises). Linear regression analysis is applied to evaluate the correlations between four noise metrics and the Chinchillas NIHL data. The results show that both developed F-weighting and CVL models have high corrections with animal hearing loss data compared with the conventional noise metrics, L_{Aeq} and L_{Ceq}. It indicates that both developed models could provide accurate assessment of risks of high-level occupational noise in military and industrial applications. The results also suggest that the CVL model is more accurate than the F-weighting model on assessment of occupational noise.

Key words: *Noise induced hearing loss; A-weighting; C-weighting; and fatigue model.*