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Testing of railway noise annoyance models based on noise sensitivity and different noise indices

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ABSTRACT

With the aim to enhance noise annoyance models solely based on energy-averaged index, different works from the literature have shown the interest of different psychoacoustic and noise indices to account for different annoying auditory sensations evoked by environmental noises. From laboratory data, the relevance of these indices has led to multilevel regression models using them and noise sensitivity as variables. Since most of these indices have to be calculated from audio recordings, their use is time-consuming for large-scale environmental noise studies. For railway noise annoyance models based on noise sensitivity and different noise indices, this work proposes to build relationships that allow an estimation of these indices from the sole knowledge of L_{den} index given by noise maps for railway noise. This study presents 1) the construction of these relationships, 2) their testing using a new data set, 3) the testing of annoyance models based on noise sensitivity and on these indices using L_{den} and data from a socio-acoustic survey. The testing of the proposed relationships indicated their relevance for a future use in environmental noise assessments. Thanks to the proposed relationships, the testing of noise annoyance models using survey data was possible. It revealed that the railway noise annoyance models based on noise sensitivity and different noise indices estimated from railway noise L_{den} performed better than L_{den}-based annoyance model.

Keywords (3-6): Noise annoyance, noise sensitivity, railway noise, psychoacoustic indices