

Uncertainty evaluation of road traffic noise models in two Ibero-American cities

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Abstract

In this study, the differences between calculated and measured noise values were evaluated in situ through more than 550 measurements in two Ibero-American cities. These categorisation method-based noise measurements were performed at 216 sampling points located on five different types of urban roads. Two different calculation methods were used for noise modelling—XPS 31–133 and CNOSSOS-EU. In addition to the magnitude and average of the uncertainties, their biases were evaluated independently in the calculation. These uncertainties were analysed overall for each city and considering the type of urban road. The relationship between road traffic characteristics (flow and percentage for each vehicle class) and the type of uncertainty was also studied. A high percentage of the uncertainties of both methods are lower than 3 dB in both cities. However, the calculation methods are different from each other in terms of the distribution of errors for the various types of urban roads and the bias of the estimates. The XPS 31–133 method provides the worst estimates for sound measurements performed on residential streets, whereas the CNOSSOS method presents the largest estimation errors on main streets. In terms of the bias, the XPS 31–133 method overestimates the noise values, primarily in residential streets; this overestimation is explained by the increase in the flow and percentage of medium heavy vehicles. On the other hand, the CNOSSOS-EU method underestimates the noise values in a high percentage of measurements performed on the various types of urban roads. This underestimation is significantly related to the increase in light vehicles flow.

Author keywords

Noise mapping
Road traffic
Uncertainty