Selection of microphone location, measurement uncertainty and calculated noise maps

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The ISO 1996 standard is considered as a reference in the elaboration of strategic noise maps under the guidelines of the European Noise Directive 2002/49/EC because it describes aspects related to noise indicators and the calculation and measurement procedure of the sound pressure level outdoors. In part 2, it includes a section which explains how to calculate the uncertainty of measurement, based on standard uncertainty due to factors such as instrumentation, operating conditions, residual sound and weather and ground conditions. However, the standard itself suggests that additional contributions to uncertainty should be added, such as that associated with the selection of microphone location. Considering these aspects and that the ISO 1996 standard is currently under revision, a simulation study of the effect of acoustic shielding due to the parking lines in urban streets was carried out in order to determine their influence on the propagation of the sound field from the sound source to the microphone. For this purpose, the Boundary Element Method (BEM) was used. Different heights of the sound source have also been considered in simulations, following some indications found in the literature. The results obtained with and without parked vehicles show a modification of the sound field in the area between the façades of the buildings and the parking lines. This effect is dependent on the urban configuration of the considered street and significantly affects the results at the reference heights considered in the standard for the calculation and measurement of sound levels on the façade. Consequently: a) this can be a cause of uncertainty in the results of the measurements because it depends on the urban configuration at the

measuring point and b) this effect can have effects, not considered until now, in the process of obtaining noise maps by calculations.

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