

Flaws in the Cnossos Calculation Method and Proposed Solutions

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ABSTRACT

January 1 2019 all member states were required to have transposed the Cnossos-EU (1) calculation method (EU directive 2015/996) in their legislation. In preparation, a study was conducted in 2017 to evaluate the new calculation method. Part of this evaluation was to see if the method could be used as a replacement for the Dutch national method. In this study we found errors within the method that, if implemented, would lead to implausible results. The results of this study were presented to the EU commission and the Noise Regulatory Committee. As a result, an EU working group, chaired by the Netherlands, was established to study and propose amendments to the method. This EU working group has found numerous issues. Some issues are about unclear text, which could lead to different interpretations of the method. For example when to use a modified height in favourable condition. Another more fundamental example is that the Rayleigh criterion is not defined. Other issues are clear errors of the method. One example is a problem that occurs with multiple diffractions in favourable conditions. In its current form it is possible that in situations when multiple diffraction occurs the attenuation due to diffraction is much lower (even 0) compared to a single diffraction.

We also found that there are large differences in ground attenuation between Cnossos-EU and more common methods like ISO 9613. For many countries, this will lead to a substantially larger area exposed when Cnossos-EU will be used in 2022 compared to the noise maps produced in 2017. A second issue is that NMPB on which Cnossos-EU is based was never meant to be used for industrial noise. The ground attenuation formulas in particular are fundamentally incorrect for a high source and low receiver. A report (2) is published with the findings of the working group. Most of the issues addressed in this report have a clear and concise solution. For the Rayleigh criterion we propose two possibilities and, within the short time allotted, we have not found a solution for the ground attenuation. For this last issue further research will be necessary.

Keywords: Environmental Noise, Calculations, Propagation, Cnossos

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