
ANNOYANCE ANALYSIS OF POPULATION AFFECTED BY RAILWAY NOISE – EU STRATEGIC NOISE MAPPING

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Introduction: The EU member states are obliged to elaborate Strategic noise maps (SNM) till June 2007. This duty was given them by the Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise. Member States should apply the noise indicators L_{den} (overall annoyance) and L_{night} (10 p.m.–6 a.m.) for the preparation and revision of strategic noise mapping. Until the use of common assessment methods for the determination of L_{den} (L_{den} day-evening-night noise indicator – shall mean the noise indicator for overall annoyance), and L_{night} is made obligatory, existing national noise indicators and related data should be converted into the indicators mentioned above.

Material and methods: The National Reference Laboratory for using GIS in public health was delegated by the Czech Ministry of Health with the task to elaborate strategic mapping of rail transport noise. Whereas the Czech Republic did not use the national methodology for calculation of noise annoyance, the Dutch methodology was used. Geographical data (geographic, topographic and geodetic data) was obtained from the Czech Office for Surveying, Mapping and Catastre. It creates a digital topographic model of the Czech Republic territory in measuring scale 1:10,000. Data on categories of railway vehicles, track intensity and track construction was obtained from the Railway Research Institute in RML2 (Dutch computing method) standards. Input data are prepared using GIS (desktop ArcView GIS ESRI) according the recommendation of the EC Good Practice Guide for Strategic Noise Mapping and the Production of Associated Data on Noise Exposure (WG-AEN). The calculation of the noise annoyance follows the European Noise Directive using software LimA, advanced. The current limit values were stated for L_{den} 70 dB and L_{night} 65 dB.

Results: The results of annoyance analysis are performed as a sum of population (houses, school and hospitals) living/being situated in the noise level below 55 dB L_{den} and 45 dB for L_{night} (lower cut-off), over 70 dB L_{den} and 65 dB for L_{night} (limit value) and the categories between by 5 dB. In the area of interest live about 542,000 inhabitants. For indicator L_{den} 524,000 people live below lower cut-off and 300 over limit value. For indicator L_{night} live 485,000 people below lower cut-off and 200 over limit value. Out of 38,700 houses 37,000 is placed in lower cut-off and 50 over limit value for for L_{den} and 35,000 houses in lower cut-off and 27 houses over limit value for L_{night} . Most of the 495 schools is situated below lower cut-off for L_{den} (484 schools). Out of 26 hospitals the majority (24) is situated in lower cut-off for L_{den} and 15 hospitals for L_{night} . Neither school or hospital is being situated in area with over limit value both for L_{den} and L_{night} .

Conclusion: The results of annoyance analysis indicated population living and houses being situated in areas exceeding the limit noise level. In future the strategic noise maps (and its noise levels by 5 dB) may be used in public health whenever the limit noise value will be decreased.

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