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Contributions Concerning Solving Some Buildings Acoustics Problems by Computer Simulation

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Summary

Protection against noise is one of the six essential requirements, which have been stated in the European Construction Product Directive. The construction works must be designed and built, in such a way, that the noise perceived by the occupants or people nearby is kept down to a level that will not threaten their health and will allow them to sleep, rest and work in satisfactory conditions. The purpose of this thesis was to study some buildings acoustics problems by computer simulation.

Starting from the recommendation of the Romanian Code concerning the calculation of road traffic noise levels and sound attenuation by acoustic noise screens, in thesis, some proposal have been applied. The aim has been to provide a basic platform for calculating road traffic noise levels in complex situations and acoustic modeling of road noise barriers. An index, rating uniquely the insertion

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loss of a noise barrier, has been determinate, which allows any noise barrier to be uniquely described.

Acoustic absorbent panel consist of perforated supporting plates that act like support of absorbent materials. Thesis studies the absorption spectra changes of these devices based on the acoustic characteristics of the absorbers used and on the perforation coefficients of the supporting panels.

Micro-perforated panels require small space to achieve high sound absorption when compared with typical foam or porous materials. The effect of micro-perforated plate and airspaces layers towards the sound absorption of the multi-layer construction was also investigated in this thesis. Acoustic absorption coefficient is the main parameter to be estimated.

Computer simulation using author's program was done to calculate the acoustic absorption coefficients. A study concerning acoustic behavior multiple layers walls were performed by computer simulation. The software was written by author.

Keywords: traffic noise, acoustics barriers, simulation, absorbers, buildings isolation, acoustic absorption, double wall, multi-perforated plate, resonance, modeling

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