Analysis of Sound Loss from the Highway Traffic through Lightweight Insulating Concrete Walls and Artificial Neural Network Modeling of Sound Transmission

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Abstract : In this study, analysis on whether the lightweight concrete walled structures used in four climatic regions of Turkey are also capable of insulating sound was conducted. As a new approach, first the wall's thermal insulation sufficiency's were calculated and then, artificial neural network (ANN) modeling was used on their cross sections to check if they are sound transmitters too. The ANN was trained and tested by using MATLAB toolbox on a personal computer. ANN input parameters that used were thickness of lightweight concrete wall, frequency and density of lightweight concrete wall, while the transmitted sound was the output parameter. When the results of the TS analysis and those of ANN modeling are evaluated together, it is found from this study, that sound transmit loss increases at higher frequencies, higher wall densities and with larger wall cross sections.