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## **APPLICATION OF ARTIFICIAL NEURAL NETWORK FOR PREDICTION OF TRAFFIC NOISE BASED ON THE TRAFFIC FLOW STRUCTURE**

**Abstract:** Techniques for noise prediction are mainly based on regression analysis, which generally do not good enough describe the trends of noise. In this paper the application of artificial neural networks (ANN) for the prediction of traffic noise for periods of 1 hour and 15 minutes is presented. As input variables of the neural network, the proposed structure of the traffic flow and the average speed of the traffic flow are chosen. The output variable of the network is equivalent noise level in the given time period Leq. Based on these parameters, the network is modelled, trained and tested through a comparative analysis of the calculated values and measured levels of traffic noise. It is shown that the artificial neural networks can be a useful tool for the prediction of noise with sufficient accuracy in the observed time intervals.

**Keywords:** artificial neural network, structure of traffic flow, traffic flow

### **1. INTRODUCTION**

As observed in the literature, there are many methods and models for noise assessment and among them each country tends to use its own approach. A review of this matter is critically presented in [1-2] where the main characteristics of some methods like the approaches advocated by American FHWA, the English CoTRN, the German RLS 90, the French NMPB and other are shown. There is no overall pattern of these methodologies and those countries that do not use a national model, usually apply the French NMPB-method, which is a model also suggested by the EU Directive [3]. In all these methods, calculations needed to predict environment noise in large settlements are usually simplified algorithms, and with optimization over time, a reasonable

precision in results can be achieved. Even when the same method is applied with different software packages, some discrepancies in results may occur.

Similar to the above mentioned methods, modeling with Artificial Neural Networks (ANN) is a simplified solution for the prediction of noise levels. An ANN is a system of linked equations used to model relationships between variables. ANN can be successfully used to model even the complex non-linear relationships between variables [4]. In addition, ANN models embed information about importance of independent variables. Several authors have used ANNs for noise-level prediction, noise-annoyance prediction, and noise classification [4-5]. All the mentioned papers indicate the high performance of using ANN for environmental noise prediction.













