

## THE ESTIMATION OF THE RESILIENT MODULUS OF SUBGRADE SOILS USING ARTIFICIAL NEURAL NETWORKS

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### *ABSTRACT*

The Resilient Modulus ( $M_r$ ) is a key input material property of subgrade soils for both the empirical and the mechanistic-empirical asphalt pavement design procedures. The resilient modulus is determined in laboratory using a standardized procedure based on the repeated load triaxial test. However, the experimental determination is costly and time consuming, and it requires sophisticated equipment and well-trained personnel. When these experimental results were not available, correlations to the widely used California Bearing Ratio and other empirical parameters could be adopted but in general, they fall short of providing reasonably accurate estimates of the parameter.

This paper presents the application of the Artificial Neural Network (ANN) technique in order to develop a robust prediction model of the resilient modulus of subgrade soils.

The measured and estimated resilient modulus results using the ANN model are compared and discussed showing that the model developed in this study is promising to estimate this property for practical applications of pavement design in small jurisdictions with limited budgets and personnel.

*KEY WORDS:* Resilient modulus, subgrade, soils, neural networks, estimation.