PREDICTION MODEL FOR SUBGRADE SOIL RESILIENT DYNAMIC MODULES UTILIZING BASIC SOIL CHARACTERISTICS FOR THE STATE OF LOUISIANA

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ABSTRACT
Resilient modules ($M_R$) is defined as the stiffness of the soil under dynamic loading. From this definition, it is clearly understood that this value is a very important input for pavement design. Unlike any other structures, pavement loading is dynamic in nature and soil stiffness values under static conditions shouldn’t be considered in the pavement design. $M_R$ values are determined by lengthy and expensive laboratory testing and this drives the need to have an equation that gives a quick reliable predicted $M_R$ value. In this paper, a model correlating the $M_R$ values to the basic soil index properties such as the percent passing sieve #4, percent passing sieve #10, percent passing sieve #40, percent passing sieve #200, present passing .002 mm, liquid limit and the plasticity index was developed. 1278 different soils types as found in the State of Louisiana were utilized to build the regression models. The $M_R$ values as well as the index values were extracted from a national database named “National Database of Subgrade Soil-Water Characteristic Curves and Selected Soil Properties for Use with the Mechanistic-Empirical Pavement Design Guide (MEPDG) created under project NCHRP 9-23A. Good correlations between $M_R$ value and the percent passing sieve #200, present passing .002 mm, liquid limit and the plasticity limit were found with a high coefficient of determination value. The generated four different regression models as well as the equations are presented within this paper.