



MECHANISTIC-EMPIRICAL EVALUATION OF AGGREGATE BASE/ GRANULAR SUBBASE QUALITY AFFECTING FLEXIBLE PAVEMENT PERFORMANCE

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Pizza and soft drinks will be provided

Abstract:

Since high-quality aggregate materials are becoming increasingly scarce and expensive, optimizing the use of locally available materials for aggregate bases and granular subbases on the basis of cost and mechanistic properties linked to pavement performance has become an economically viable alternative. This study investigated the effect of quality of unbound aggregate material on conventional flexible pavement performance in Minnesota through a mechanistic-empirical pavement design approach. A comprehensive matrix of conventional flexible pavement layer thicknesses and mechanistic design inputs was carefully designed to conduct mechanistic analyses for pavement sections in two climatic regions in Minnesota. The type and the quality classes of unbound aggregate materials, identified as high, medium, and low, were characterized with stress-dependent resilient modulus (M_R) models from a statewide laboratory-tested aggregate M_R database. Both the nonlinear finite element program and the Minnesota Department of Transportation (MnDOT) flexible pavement design program (MnPAVE) were employed in the analyses with results compared. The contributions of the unbound aggregate base and granular subbase layers to pavement support and performance were evaluated from a mechanistic-empirical pavement design perspective. Based on the findings, several guidelines for developing performance-based aggregate material specifications were recommended.

Bio:

Yuanjie Xiao is a PhD student in transportation group working with Prof. Erol Tutumluer. He received his bachelor and master degrees in Traffic and Civil Engineering from Tongji University and Southeast University in China, respectively. Since he joined UIUC in 2008, he has been working as a research assistant on several projects, including best value granular materials for road foundation, and cost-effective base type and thickness for long-life concrete pavements.