ENHANCEMENTS TO ESTIMATE AND FORECAST INDIANA STATEWIDE TRAVEL DEMAND

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ABSTRACT

Transportation planning models provide useful information to decision-makers for understanding the traffic problems, identifying possible alternatives, finding the best alternatives, and developing implementation procedures. Two basic questions: "what are the traffic conditions on roadways now?" and "which traffic improvements are the best to choose?" should be answered during the planning process. This study develops a new integrated statewide transportation and land use model system to help evaluate the effect of policy strategies and traffic network improvements. The research also proposes new methods to improve estimation of traffic volumes through the traffic monitoring system.

Research has shown that transportation and land use have a close relationship. The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 required that metropolitan and statewide transportation plans be integrated with land-use plans. Therefore the integrated transportation and land use models are needed to assess the performance of urban policy strategies. In this study, the Land Use in Central Indiana 2 (LUCI2) statewide urban simulation model is integrated with the statewide travel demand model (ISTDM) to form an integrated model system and predict Indiana statewide travel demand over time. Different transportation and land use policy scenarios can be tested and compared using the integrated ISTDM-LUCI2 model system. The univariate sensitivity of VMT outputs on the model parameters and input data are carried out and analyzed.

To improve estimation of current traffic volumes, estimation of Annual Average Daily Traffic (AADT), an essential element of statewide traffic monitoring program, is studied. Several new methods -- Analysis of Variance (ANOVA), Artificial Neural Network (ANN), Fuzzy Basis Function Network (FBFN) and Smooth Splines -- are

compared with the traditional method by using continuous traffic volume data from automatic traffic recorder (ATR) sites in Indiana. Novel unsupervised and supervised K-nearest neighbor algorithms using geographic information system (GIS) technology are developed and tested for the factor group process. Suggestions are provided for improving the traffic monitoring system process.