Summary of Final Report, BC353-20
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DATA INTEGRATION PROCEDURES IN SUPPORT OF STATEWIDE TRANSPORTATION MODELING AND PLANNING PROCESSES

PROBLEM STATEMENT

Metropolitan Planning Organizations (MPOs), transit agencies, and other local and regional transportation planning entities conduct transportation planning studies to identify needs and prioritize transportation improvement projects for funding. Billions of dollars in transportation funding are allocated based on the results of transportation planning studies, corridor analyses, and other special modal studies conducted by agencies every year. Virtually all of these studies involve the use of computer models and procedures to forecast future demand for transportation facilities and to identify transportation improvement projects that would help to alleviate congestion, improve safety, reduce delay and travel time, and enhance mobility and accessibility both for people and the goods and services they consume.

Transportation planning and computer modeling processes in the state of Florida rely on a wide variety of data and information. Without comprehensive data of high quality, computer models cannot provide reliable results that can be used to guide billions of dollars in annual transportation investments. Hence, it is very important to have comprehensive and high quality data about the transportation system and the population and employment that depends on the transportation system for mobility and accessibility. For example, various Florida Standard Urban Transportation Model Structure (FSUTMS) models in the state and the Florida Intrastate Highway System (FIHS) Work Program Development process utilize an array of input variables that describe the socio-economic, demographic, transportation network, intermodal facility, pavement condition, accident, traffic volume, environmental, and land use characteristics of a region to predict future traffic volumes on every link of a multimodal transportation network. All of these data items are derived from a wide variety of different sources and then pulled together to perform the desired analysis or run the appropriate computer model. Due to the disparity in the format and nature of the various databases from which desired input variables can be derived, the task of developing an integrated database for modeling and planning purposes is extremely time-consuming and arduous. Keeping a modeling or planning database constantly up-to-date is another major challenge as the data sources (from which the input variables are derived) are often updated in different years by various entities. In addition, as different agencies employ different data extraction and integration procedures, there are inconsistencies across databases utilized for planning in the state.

Since the amount of data and the size and complexity of multimodal transportation networks required to support planning and modeling studies in the state continue to rise and the number of data sources from which input variables are derived continues to increase, the Florida Statewide Model Task Force has expressed the need for a set of consistent, easy-to-use, and flexible data integration procedures that can support the modeling and planning processes in the state.

OBJECTIVES

The objectives of this project include the following:

1. Identify data items and data sources that are commonly used in the State of Florida for transportation planning and modeling.

2. Develop data integration procedures that allow the extraction and integration of variables from a variety of sources, formats, and levels of aggregation.

3. Provide a mechanism by which planning and modeling databases can be easily updated as key data sources (e.g., census data) get updated.

FINDINGS AND CONCLUSIONS

The research project has provided several key deliverables that will be of great benefit to agencies around the state conducting transportation planning and modeling studies. The following summarizes the key deliverables and findings of the research project:

- The development of an integrated statewide transportation network suitable for both passenger and freight transportation planning and modeling is extremely complex. There are many different highway network systems and databases from which one can derive an accurate intermodal network for planning studies. Based on the research conducted in this project, the Dynamap systems from Geographic Data Technology, Inc. were found to be extremely accurate and topologically consistent representations of road networks for the state. In collaboration with Geographic Data Technology, Inc., a Dynamap Transportation network has been built for the entire state. The Dynamap system can serve as an excellent reference network or intermediate platform for local agencies to develop their own accurate and comprehensive transportation network system. A sample integrated network has been developed as part of this project and included in the deliverables. Tools that would facilitate network development and database integration have also been developed and are included with the final report.

- The analysis, integration, and reduction of census data and tabulations is a very time consuming and arduous task. There are hundreds of data tabulations that are released with the Census SF1 and SF3 data every ten years. Most transportation planning studies rely heavily on census data for socio-economic projections of population and employment. These projections are used in turn to develop projections of future traffic demand and volumes on roadway links to identify locations of congestion that merit improvement. The project has resulted in the compilation of user-friendly GIS-based Census 2000 SF1 and SF3 databases for the entire state of Florida. These databases are compatible with the TransCAD transportation modeling GIS software, which is the new modeling platform being adopted in the state. In addition, procedures for extracting, integrating, and reducing large census files with TransCAD software have been developed and incorporated into the project deliverables.

- Transportation planning procedures in Florida will soon be transitioning to the TransCAD transportation modeling GIS software, because the Florida Statewide Model Task Force has voted to adopt TransCAD as the primary engine for modeling processes in the state. As part of this project, the research team worked with Caliper Corporation to develop a sample Broward County model in the TransCAD software environment. This sample model illustrates how databases and modeling procedures of various formats can be imported and integrated into a relational database system in TransCAD. This sample model, provided on a CD with the project final report, serves as a first-level prototype that will greatly aid agencies in efficiently, accurately, and effectively migrating their model systems into the TransCAD environment.

BENEFITS

The results of this research will greatly benefit transportation planning agencies and travelers in the State of Florida. Growth in population, employment, and tourism is placing ever-increasing demand on the state's transportation infrastructure. As transportation funding levels are unable to keep up with the needed transportation system improvements, it is vitally important that planning agencies in the state use the best information, databases, and modeling procedures for planning transportation investments. This project has resulted in the development of a comprehensive set of integrated transportation planning databases and user-friendly data integration tools and procedures that are compatible with the latest transportation modeling software.

Using the developed databases and tools, transportation planning agencies in the state will be able to develop reliable transportation demand model systems in an efficient and cost-effective manner. Thus, the benefits of this project are two-fold. First, transportation planning agencies will be able to save time and money in the development, updating, and validation of their transportation modeling procedures and databases. The findings and deliverables of this research project will potentially result in a 20% savings in time and cost (e.g., a 24-month $500,000 transportation plan update or major investment study may be accomplished in 20 months for $400,000). Second, the traveling public will see the benefit of improved planning processes and databases. Transportation planning agencies will be better able to guide scarce dollars to projects of greatest need and impact, and, in so doing, reduce delay and increase safety for the traveling public.

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