Project Summary

Texas Department of Transportation

0-6655-TI: System Operation and Preservation Optimization

Background

The 2009 2030 Committee Report prepared a number of scenarios for pavement and mobility improvements. Over the past two years, the 2030 Committee has updated and revised their report, and several additional analyses have taken place that informed the 2011 2030 Committee Report. This project investigated the mobility and economic consequences of a range of transportation investment levels in Texas' metropolitan and urban regions. The scenarios summarized in this report include a different set of conditions than the 2009 2030 Committee report—those tied more closely to what is possible, rather than what is desirable. Most of the tools were similar, but they were re-tasked to use different funding levels and focused on the next 10 years to assist TxDOT in determining the most appropriate set of investment decisions.

The report summarizes the mobility and economic consequences of current funding levels and a range of funding amounts. An associated study by the Center for Transportation Research analyzed pavement maintenance spending and condition. The results of the two studies were to be used by the 2030 Committee and others to examine different mixes of spending on mobility, pavement, and other TxDOT spending categories.

What the Researchers Did

The research consisted of developing several data items designed to identify congestion levels and the associated economic consequences between 2010 and 2020. The elements below were used to update the existing mobility and system extent estimates, design a set of improvement scenarios, identify the costs to achieve each scenario, and measure the congestion and economic effects of the scenarios.

- Funding projections.
- Updated population information.
- Recently added roadway capacity.
- Updated travel demand models from the metropolitan and urban regions.
- Implementation costs for each scenario.
- Congestion levels.
- Economic consequences of the mobility levels.

The target year of 2020 was designed to identify a closer, more easily understandable set of scenarios. A set of six scenarios are described below.

- Unacceptable Conditions (Current Trend) – The best estimate of the financially-constrained Metropolitan Transportation Plans as of 2010 were used as the benchmark scenario.

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- Continue 2010 Congestion – This scenario added enough capacity to bring travel delay per commuter values to current levels.
- Percentages of the 2006 MTP – Two percentages (75% and 60%) of the lane-miles that would be accomplished in the 2006 Metropolitan Transportation Plans were used to give a sense of the congestion trade-off between implementation cost and congestion levels.
- Minimum Competitive – The goal of this scenario was for all Texas regions to have a congestion level that is no worse than the median value of similar-sized U.S. regions.
- Worst Acceptable – This scenario was developed by adding only enough capacity to keep congestion levels in the bottom quarter of U.S. regions of similar size.

What They Found

Congestion is estimated to increase between 2010 and 2020 in almost every region and scenario. It increases more slowly in areas with slow growth or in the few regions where substantial investments are estimated to occur. The range of scenarios included in the analysis shows a familiar pattern—congestion declines with more spending.

The mobility consequences are best illustrated with a total cost measure calculated by adding the implementation cost of the projects and programs to the cost of the extra travel time and wasted fuel that is consumed as a result of the transportation system that is in place. The two costs that the public and businesses will pay are added together; the lowest cost option is easy to identify. The policy debate can proceed on the basis of which mobility goal is most appropriate or how much system improvement is desired.

One complication for the purposes of this study is that the time period of 2010 to 2020 is much shorter than the life of the projects being analyzed. For example, the projects that will be built in 2018 and 2019 will only have two years and one year of benefits, respectively, included in the calculation of total cost. In effect, the project life is being modeled as much less than the typical 20-year to 25-year period that roads are designed to achieve.

What This Means

The information developed in this research project demonstrates the trade-offs between implementation costs and the mobility and economic consequences of those investments. The data and performance measures were part of a larger investigation of the trade-offs between mobility investments and pavement quality expenditures. The report scenarios illustrate that larger investments in system improvements reduce congestion and decrease the total cost that the public pays. These differences were even more apparent when the same methodology was applied to the period from 2010 to 2035 in the March 2011 Report from the 2030 Committee.

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