



Project Summary

Texas Department of Transportation

0-5541: Developing Sustainable Transportation Performance Measures for TxDOT's Strategic Plan

Background

Sustainability is a term that is widely discussed with regard to human activity in today's world. Since transportation is such an important part of our everyday life, the sustainability of our transportation system is of great importance for future generations. The concept of sustainable transportation is broadly defined in this research project as the provision of safe, effective, and efficient access and mobility into the future while considering economic, social, and environmental needs. Researchers at the Texas Transportation Institute (TTI), with the help of West Texas A&M University (WTAMU), were asked to develop a methodology that the Texas Department of Transportation (TxDOT) could use to assess sustainability in their transportation planning activities.

What the Researchers Did

The researchers used a performance measurement based approach to evaluating sustainability. Performance measures translate data, statistics, or attributes into a form that the public and decision makers can easily understand. Developing a common set of performance measures allows for the evaluation and comparison of different projects and transportation corridors for both current and future conditions.

Sustainability is a very broad concept and can be interpreted in many ways. This makes it a difficult and often contentious activity to actually define a set of comprehensive performance measures for sustainable transportation. The researchers handled this issue by defining the performance measures for sustainability within the scope of TxDOT's strategic plan. Relating the performance measures to TxDOT's strategic plan goals provided a good framework for TxDOT to address sustainability issues. The performance measures were developed for highway corridors and are applicable at the planning level.

This project produced 13 sustainable transportation performance measures. Researchers developed methodologies for evaluating these measures based on readily available data inputs, and also defined a process by which the measures could be benchmarked and combined into sustainability index values. The sustainability index values are a set of numbers expressed on a scale from zero to one, which allows different corridors or scenarios to be compared based on the performance measures. Researchers developed a user-friendly calculator in Microsoft Excel® with an accompanying user manual. The calculator can be used to generate the performance measure values and sustainability index values for a given corridor. Based on the user inputs, the calculations can evaluate a base case scenario and multiple alternate future scenarios.

Research Performed by:

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Project Completed: 8-31-08

What They Found

The calculator was used to conduct pilot applications that demonstrated its applicability to rural, urban, and suburban conditions. Case studies were conducted for US Highway 281 in San Antonio, US Highway 290 in Houston, and Interstate Highway 27 in Amarillo. The case studies demonstrated the flexibility and usefulness of the performance measures and the calculator. Using the analysis outputs (see examples in Figure 1 and Figure 2), progress toward sustainability could be evaluated in terms of specific goals in TxDOT's strategic plan, or evaluated for different links on a given study corridor. Such results are useful in identifying and optimizing strategies for enhancing sustainability while planning highway projects or corridors.

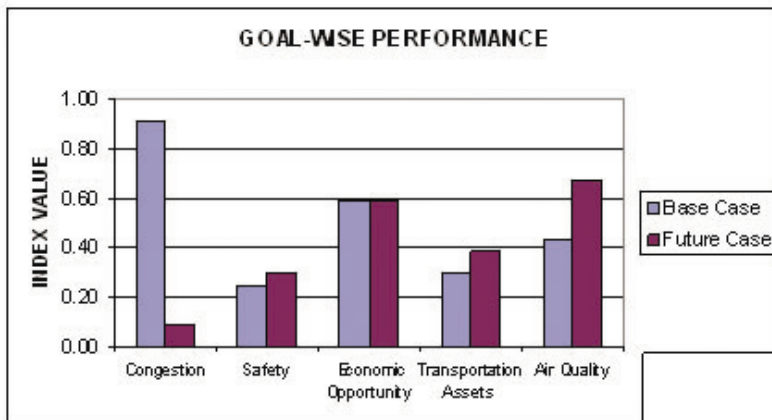


Figure 1. Calculator Outputs for Goal-Wise Index Values—US 281 Case Study.

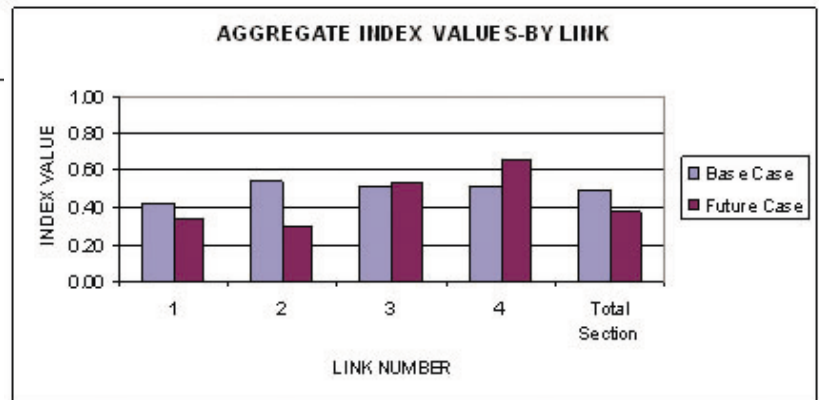


Figure 2. Calculator Outputs for Link-Wise Index Values—US 281 Case Study

What This Means

Transportation agencies often struggle to assess sustainability in a way that is relevant to their everyday functions. By linking sustainable transportation performance measures to an agency's goals, the agency can tailor the methodology to its specific needs. Thus, this research provides TxDOT with a valuable tool that can help incorporate sustainability concerns into regular highway corridor planning activities. The performance measurement framework will also be applicable to other transportation agencies seeking to develop their own sustainable transportation evaluation methodologies.

For More Information:

0-5541- Developing Sustainable Transportation Performance Measures for TxDOT's Strategic Plan: Technical Report

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