VALIDATION OF ODOT SUFFICIENCY RATING SYSTEM

Problem

The condition assessment of a highway system is a process of objectively measuring the physical condition of its components. The condition measurements are used in conjunction with certain performance indicators to define the overall condition of the highway at any given time. In the past, the Ohio Department of Transportation (ODOT) has used many performance indicators such as traffic volume, pavement conditions, accident rates and bridge conditions to track performance of highway sections. However, ODOT did not have a uniform composite measure to track changing conditions over time.

Recognizing the potential benefits that could result from the use of a composite performance indicator, in 2001, the ODOT began serious investigation of the highway sufficiency rating system. In order to investigate the viability of the sufficiency rating system to ODOT, a ‘Sufficiency Rating Team’ was formed. As a result, in early 2002, a sufficiency rating system was established at the ODOT. Since then, the ODOT has used this system to describe the overall highway measure and to reflect the changing conditions of highway facilities over time in Ohio.

While ODOT’s efforts have resulted in the development of a sufficiency rating system, further work is deemed necessary to examine
Objectives

The primary objective of this study is to critically review and validate the sufficiency rating system that was developed by ODOT in the most recent years. The researchers at the University of Cincinnati conducted a comprehensive review of similar efforts through a survey of all state departments of transportation and literature searches, comparing the ODOT sufficiency rating system to those existing in other states, and developed a new system for ODOT. This sufficiency system was developed using the inventory data available with ODOT, and includes a set of mathematical models, which can be used to define the sufficiency of a highway segment based on Condition, Congestion and Safety.

Description

This study presents an overview of ODOT's current sufficiency rating (SR) system followed by a comparative study of SR systems in other states. The information about other SR systems was obtained through a survey of all state departments of transportation and literature search. The system developed by ODOT, like most other states, was based on the opinions of an expert panel who, based on their previous knowledge and experience, selected the type and number of parameters including the weights assigned to each parameter. A 0 to 100 points scale represented the sufficiency rating of a highway segment. This approach for developing a sufficiency rating was subjective and would likely introduce a bias in the system when implemented. Hence, the researchers recommended an objective approach for developing the SR system, which consisted of three major variables namely, Condition, Congestion, and Crashes. Condition was represented by PCR, Congestion was represented by Volume/Capacity Ratio and Crashes was represented by Crash Density. A statistical technique called Principal Component Analysis was used for developing mathematical models to calculate the sufficiency ratings for 10 functional classifications of highways in the State of Ohio. The models developed are non-linear and the correlation significance of these models ranges from 54 to 89. The lower correlation significance for some of the classifications may be due to the incoherent and insufficient data for the model development process.

Conclusions and Recommendations

The mathematical models developed in this study can be used for calculating sufficiency ratings for the ODOT highway network. The models are expected to adequately and objectively describe the overall condition of the highway section with the variables appropriately identified and weighed to reflect their significance. The SR system can be used as an excellent tool by the central and district offices of ODOT.

It is recommended that the statewide sufficiency rating models for 10 functional classifications of highways be implemented by the Ohio Department of Transportation.

Implementation Potential

The sufficiency rating models developed in this study can be implemented by ODOT as soon as possible.