



Cost Estimate Modeling of Transportation Management Plans for Highway Projects

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Highway rehabilitation and reconstruction projects frequently cause road congestion and increase safety concerns while limiting access for road users. State Transportation Agencies (STAs) are challenged to find safer and more efficient ways to renew deteriorating roadways in urban areas. To better address the work zone issues, the Federal Highway Administration published updates to the Work Zone Safety and Mobility Rule. All state and local governments receiving federal aid funding were required to comply with the provisions of the rule no later than October 12, 2007.

One of the rule's major elements is to develop and implement Transportation Management Plans (TMPs). Using well-developed TMP strategies, work zone safety and mobility can be enhanced while road user costs can be minimized. The cost of a TMP for a road project is generally considered a high-cost item and, therefore, must be quantified. However, no tools or systematic modeling methods are available to assist agency engineers with TMP cost estimating.

Study Methods

This research included reviewing TMP reports for recent Caltrans projects regarding state-of-the-art TMP practices and input from the district TMP traffic engineers. The researchers collected Caltrans highway project data regarding TMP cost estimating. Then, using Construction Analysis for Pavement Rehabilitation Strategies (CA4PRS) software, the researchers performed case studies. Based on the CA4PRS outcomes of the case studies, a TMP strategy selection and cost estimate (STELCE) model for Caltrans highway projects was proposed. To validate the proposed model, the research demonstrated an application for selecting TMP strategies and estimating TMP costs.

Findings

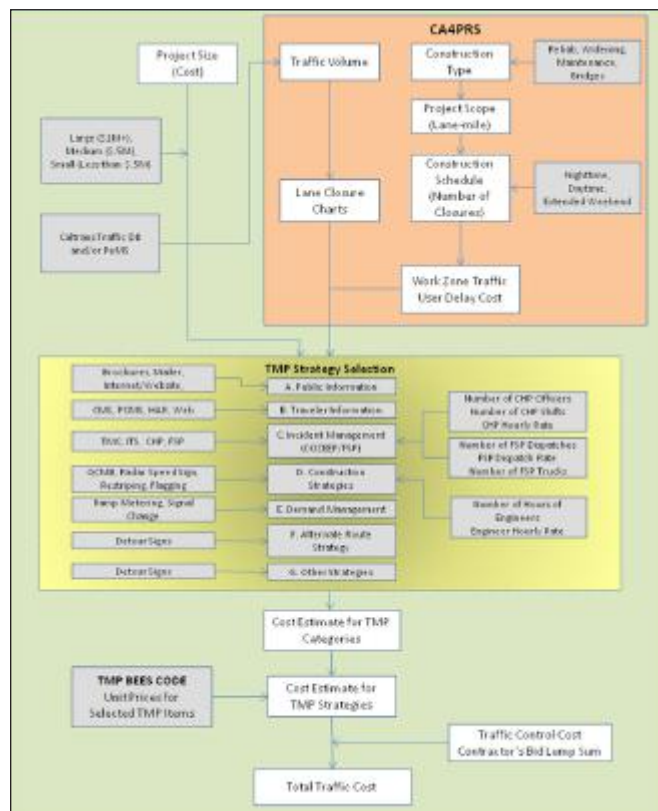
A detailed step-by-step TMP STELCE model was developed considering various situations, including diversity of traffic conditions, construction schedules, and resources. The TMP selection procedure model takes into account the CA4PRS analysis results as an input value to determine Intensity Level using the Performance Attribute Matrix method. The CA4PRS provides the major parameters to the TMP STELCE model. The resulting TMP cost estimates are then used as input into the CA4PRS so it can be included in the agency's cost estimate.

The TMP STELCE model classifies the project into one of five Intensity Levels, depending on the score earned through quantitative values for the project attributes. The costs for TMP strategies, which are selected in the category's corresponding Intensity Level, are estimated by a function of Intensity Level and the baseline TMP cost dollar amounts. The cost of each strategy is determined by using "what-if" analysis.

The TMP STELCE model was verified using the I-15 Ontario rehabilitation case study. The comparison results between the cost estimated by the model and the one estimated by the Caltrans TMP Report shows an acceptable difference (approximately 5 percent). Regarding the model's limitation, the proposed TMP STELCE model was developed based on Caltrans TMP practices and strategies. Therefore, other STAs might require adjustments and modifications, reflecting their TMP processes, before adopting this model.

Policy Recommendations

The authors recommend that a more detailed step-by-step TMP strategy selection and cost estimate process be included in the TMP guidelines to improve the accuracy of TMP cost estimates. The items composing each TMP strategy must be specified and their cost standards must be provided by the project size and scope.



TMP Strategy Selection and Cost Estimate (STELCE) Modeling Procedure

About the Authors

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