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Free Cost Estimate Model Is Offered for Transportation Management Plans

Mineta Transportation Institute seeks to help highway engineers make fast, accurate estimates.

San Jose, Calif., May 23, 2012 – The Mineta Transportation Institute (transweb.sjsu.edu) has released a peer-reviewed research report, [*Cost Estimate Modeling of Transportation Management Plans for Highway Projects*](#). The research team developed a systematic cost estimation modeling process for transportation management plans (TMP) that automatically estimates TMP costs for highway projects using pre-established TMP elements grouped by TMP strategies. This process will be especially valuable to relevant engineers at Caltrans and similar agencies. The research team included Jae-Ho Pyeon, PhD; E.B. Lee, PhD, PE; Ralph D. Ellis, PhD, PE; and Taeho Park, PhD. The free 54-page report is available for download at transweb.sjsu.edu/project/1007.html

“All state and local governments that receive federal-aid funding are required to develop and implement TMPs for all road projects,” said Dr. Pyeon. “Using well-developed TMP strategies, work zone safety and mobility can be enhanced while road user costs can be minimized. In 2001, the California Department of Transportation (Caltrans) also began requiring TMPs for all planned activities on the state’s highway system.”

The TMP is generally considered a high-cost item for a road project, so it must be quantified. The project engineer, with support from TMP engineers, is in charge of the project cost estimate as part of the Plans, Specifications, and Estimates (PS&E) package. However, no tools or systematic modeling methods are available to assist with this estimate. Therefore, the researchers reasoned that a systematic modeling process for TMP cost estimation would help the engineers produce more accurate plans.

In this research, a detailed step-by-step TMP strategy selection and cost estimate (STELCE) model was developed considering various situations, including diverse traffic conditions and construction schedules and resources. The TMP selection procedure model takes into account the Construction Analysis for Pavement Rehabilitation Strategies (CA4PRS) analysis results as an input value to determine Intensity Level using the Performance Attribute Matrix (PAM) method. The CA4PRS provides the major parameters to the TMP STELCE model. The resulting TMP cost estimates are input into the CA4PRS so they 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 TMP strategies in the TMP categories are determined by the resulting Intensity Level. 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 base cost dollar amounts. The cost of each strategy is determined by using “what-if” analysis.

“Currently, the proposed model is a prototype process model – a decision support model based on a limited number of Caltrans TMP case study projects,” said Dr. Pyeon. “The model’s accuracy and reliability can be further refined with more TMP reference projects and more case study testing. Other improvements can be made, including a more user-friendly interface, which would make the model marketable.”

Dr Pyeon noted that the developed model in its current state can be used in California and could be used in other states with a few slight modifications. “It depends on the previous TMP project data availability,” he said.

The report includes eight California case studies and a literature review. Several figures and tables include Sample TMP Costs for a Highway Project; TMP Strategies and Their Elements; TMP Cost Estimate Modeling Procedure; TMP Strategy Selection by Intensity of Attributes; and more. Free copies can be downloaded from transweb.sjsu.edu/project/1007.html

ABOUT THE AUTHORS

Jae-Ho Pyeon, PhD, is assistant professor in the Department of Civil and Environmental Engineering at San José State University. He received his master’s and doctor’s degrees in civil and coastal engineering from the University of Florida. He conducts research in transportation construction engineering and management, and teaches undergraduate and graduate courses in construction project management, construction information technology, construction scheduling and estimating, and heavy transportation construction equipment.

Eul-Bum Lee, PhD, PE, PMP, has many years of experience in heavy construction, mainly in transportation projects. As an associate researcher and co-principal investigator in the Institute of Transportation Studies at the University of California, Berkeley, he has focused on researching and implementing innovative methods for transportation infrastructure rehabilitation. He earned ME and PhD degrees in the Engineering Project Management Program of the Department of Civil and Environmental Engineering at UC Berkeley. He earned his BS in civil engineering at Seoul National University.

Ralph D. Ellis, PhD, PE, is an expert in ground transportation construction research. In particular, Dr. Ellis has significant knowledge and insights about estimating maintenance of traffic quantities and costs from his previous research project sponsored by the Florida Department of Transportation. Dr. Ellis is a registered professional engineer with many years experience as a construction projects manager. He is associate professor in the Department of Civil and Coastal Engineering at the University of Florida.

Taeho Park, PhD, is a professor in the Organization and Management Department at San José State University and a research associate at the Mineta Transportation Institute, also at San José State University. Dr. Park earned his PhD in industrial engineering from the University of Wisconsin, Madison. His research interests include supply chain management and its applications, logistics network design and improvement, enterprise risk and sustainability management, Total Quality Management applications including quality function deployment, technology management, and system design/modeling and production control problems.

ABOUT THE MINETA TRANSPORTATION INSTITUTE

The [Mineta Transportation Institute](http://www.mineta.org) (MTI) conducts research, education, and information and technology transfer, focusing on multimodal surface transportation policy and management issues, especially as they relate to transit. MTI was established by Congress in 1991 as part of the Intermodal Surface Transportation Efficiency Act (ISTEA) and was reauthorized under TEA-21 and again under SAFETEA- LU. The Institute has been funded by Congress through the US Department of Transportation’s (DOT) Research and Innovative Technology Administration, by the California Legislature through the Department of Transportation (Caltrans), and by other public and private grants and donations, including grants from the US Department of Homeland

Security. DOT selected MTI as a National Center of Excellence following competitions in 2002 and 2006. The internationally respected members of the MTI Board of Trustees represent all major surface transportation modes. MTI's focus on policy and management resulted from the Board's assessment of the transportation industry's unmet needs. That led directly to choosing the San José State University College of Business as the Institute's home. Visit transweb.sjsu.edu or Twitter @minetatrans

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