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Highway Planners, Engineers Now Have a Model to Help with Incentive/Disincentive Calculations

Mineta Transportation Institute's free report offers a model for optimizing contract provisions

San Jose, Calif., June 12, 2012 – The Mineta Transportation Institute (transweb.sjsu.edu) has released a peer-reviewed research report, [*Systematic Procedures to Determine Incentive/Disincentive Dollar Amounts for Highway Transportation Construction Projects*](#). The report offers systematic procedures and models to assist project planners and engineers in determining an appropriate incentive/disincentive (I/D) dollar amount for highway projects. These are essential to optimize the use of I/D contracting provisions for early project completion, as encouraged by the Federal Highway Administration. Principal investigators were Jae-Ho Pyeon, PhD and E.B. Lee, PhD, PE. The free 64-page report is available for download at transweb.sjsu.edu/project/2908.html

“Using Construction Analysis for Pavement Rehabilitation Strategies (CA4PRS) software, we analyzed Caltrans I/D projects to introduce three different levels of CA4PRS implementations for the I/D dollar amounts calculation,” said Dr. Pyeon. “Based on the results of these case studies, the systematic procedures to determine appropriate I/D dollar amounts were developed using the CA4PRS schedule-traffic-cost integration process for the new I-5 rehabilitation project in LA.”

For the research project, 48 I/D projects awarded between 2003 and 2010 were collected from Caltrans. Of these, 43 I/D projects completed in 11 Districts were used for data analysis. A majority of projects were 3R (resurfacing, rehabilitation, and reconstruction) and widening projects. Approximately 54 percent of the projects had high traffic volumes measured in excess of 100,000 average daily traffic (ADT).

As a result of their analyses, the researchers developed systematic procedures to determine I/D dollar amounts using CA4PRS analysis, briefly summarized in eight steps. Among them are: setting up a schedule baseline based on CA4PRS schedule analysis; evaluating the impact of the work zone on the traveling public; estimating contractors' various costs and savings for I/D acceleration; estimating the agency's savings from project compression; and other key steps. The proposed procedures were applied to a typical highway pavement rehabilitation project using hot mix asphalt (HMA) materials.

“More study is needed to apply the concept to other types of highway projects, with adjustment for the type of project,” said Dr. Pyeon. “For example, the proposed I/D calculation process can be used for a roadway widening project with relevant schedule baselines and resource inputs for acceleration. The CA4PRS new version (V3.0) released this year has a new module for roadway widening schedule analysis that can produce the schedule baseline for the I/D calculation.”

Once the logic and input/output configurations of the systematic I/D calculation process are confirmed, the current prototype, which is running on an Excel spreadsheet, must be converted into a more professional program for practical implementation. Meanwhile, more collaboration between the contractor and the transportation agency is needed to test and implement the new I/D system.

Implementing I/D contracting has played an important role to improve project time performance, with substantial project time savings reported for numerous projects in many states. However, the report states that I/D provisions, which generally increase project costs to the contracting agency, should be used only for those critical closures where traffic inconvenience and delays are to be minimized.

The report includes 38 tables and figures for further illustration. Free PDF copies can be downloaded from transweb.sjsu.edu/project/2908.html

ABOUT THE PRINCIPAL INVESTIGATORS

Jae-Ho Pyeon, PhD, is an assistant professor in the Department of Civil and Environmental Engineering at San José State University. Dr. Pyeon received his master's and doctoral degrees in civil and coastal engineering from the University of Florida. He is a university representative on the Transportation Research Board and a member of the Construction Research Council, American Society of Civil Engineers. Dr. Pyeon 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 more than 20 years of experience in various disciplines of heavy construction. Currently an associate researcher and co-principal investigator in the Institute of Transportation Studies at the University of California, Berkeley, Dr. Lee has focused on researching and implementing innovative methods for rehabilitating transportation infrastructure. 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 degree in civil engineering at Seoul National University. Dr. Lee spent 12 years with Hyundai Engineering and Construction, Inc.

ABOUT THE MINETA TRANSPORTATION INSTITUTE

The [Mineta Transportation Institute](http://transweb.sjsu.edu/mineta) (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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