

KUNHEE (KC) CHOI, PHD, M.ASCE

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Dr. Kunhee Choi has a broad background of research experience in the areas related to this MnDOT 554 project: a) extensive knowledge and experience of developing decision-support tools and methods that evaluate contract times on urban highway projects to determine the most economical monetary values of incentive/disincentive (I/D) dollar amount; b) recent research projects with regards to I/D rates (USDOT SWUTC 16-01), contract time (NCHRP 08-114), project scoping (NCHRP 08-88), right sizing (NCHRP 19-14); and c) specific experience in analyzing the most economical and realistic I/D dollar amounts for a given project—an optimal value that allows the agency to stay within budget while at the same time effectively motivating contractors to use their ingenuity to complete the projects earlier. Dr. Choi was on the research team that developed and implemented the FHWA's award winning software program Construction Analysis for Pavement Rehabilitation Projects (CA4PRS), which enables DOT engineers to perform a schedule/cost/traffic integrated tradeoff analysis using what-if construction scenarios. It was developed through a FHWA pooled-fund with a multistate consortium (California, Minnesota, Texas, and Washington). For this MnDOT 554 I/D project, the TTI team will leverage CA4PRS to develop a series of comprehensive lookup tables of contract times that reflect the schedule effect of a wide variety of key factors under accelerated I/D schedules.

Education

PhD, Civil and Environmental Engineering, University of California at Berkeley, 2008
MS, Construction Management, Texas A&M University, 2002
BS, Architectural Engineering, Korea University, 1999

Experience

Cost-Benefit Analysis and Incentives/Disincentives (California Department of Transportation)

To ensure that a favorable benefit–cost ratio was actually achieved by implementing a comprehensive outreach program, Dr. Choi performed a cost–benefit analysis as an aid to Caltrans for future accelerated reconstruction projects with a similar public outreach scheme. The root problem this study addresses is how to determine when and what type of capacity-added projects to use in order to realize the maximum benefits with regards to project type, size, and complexity.

Accelerated Contracting Methods and Incentives/Disincentives (US DOT; California Department of Transportation)

In the past five years, his research has centered around on evaluating schedule and cost performance of different types, sizes and complexities of projects built under alternative contracting methods. More specifically, Dr. Choi investigates the marginal impact of various alternative contracting methods and project delivery systems on key performance measures while controlling for different project and market characteristics.

Schedule-Cost-Traffic Integration Analysis on What-if Scenarios Using CA4PRS (FHWA pooled Fund Project)

In his FHWA pooled-fund project, Dr. Choi played an instrumental role in the development and enhancement of an integrated planning tool that determines the most feasible transportation plans by balancing construction time, project cost, and traffic impact. The tool (so-called CA4PRS) has been widely used by some pioneering states (e.g., CA, WA, MN, TX) and endorsed by FHWA for its practicality and reliability. Dr. Choi has developed a new graduate course titled “Advanced Infrastructure Planning and Management” at Texas A&M University, and CA4PRS has been used as the main analytical tool for the course.

Innovative Tools and Methods of Project Programming and Right-Sizing (NCHRP 19-14: Right-Sizing Transportation Investments; NCHRP 08-88: Effective Project Scoping Practices)

Dr. Choi has developed a wide variety of decision-support methods and tools for project programming and right-sizing investment decisions. In the NCHRP 08-88 project, he developed a guidebook that provides effective project scoping process while also addressing scalability issues that reflect the different levels of project complexity. In the NCHRP 19-14 project, Dr.

Choi has gathered a massive amount of data to perform schedule-cost-change-risk interdependent assessments that account for the effects of different alternative contracting methods.

Selected Reports/Projects

- . Anderson, S., Quiroga, C., Overman, J., **Choi, K.**, Sahu, J., Kermanshachi, S., Goodrum, P., Taylor, T., and Li, Y. (2015). Effective Project Scoping Practices to Improve On-Time and On- Budget Delivery of Highway Projects: Project Scoping Process Guidelines. Final Technical Report, National Cooperative Highway Research Program, Transportation Research Board, Washington, D.C.
- . **Choi, K.**, Park, E.S., Bae, J. (2013). Decision-Support Framework for Quantifying the Most Economical Incentive/Disincentive Dollar Amounts for Critical Highway Pavement Rehabilitation Projects. Final Technical Report, Southwest Region University Transportation Center, Texas A&M Transportation Institute, College Station, TX.
- . Lee, E.B., and Harvey, J.T. (2008). Extended Applications of Rehabilitation Construction Productivity Analysis Products (CA4PRS). Federal Highway Administration. (Note that **Choi** was the lead graduate student researcher on this project).
- . **Choi, K.** (2008). Innovative Contracting Methods Implementation Studies. Research Report, Division of Research and Innovation, California Department of Transportation, Sacramento, CA.
- . Lee, E.B., Harvey, J.T., and **Choi, K.** (2006). Innovative Fast-Track Approach to Minimizing Public Inconvenience in Heavily Trafficked Urban Highway Rehabilitation. Technical Report, California Department of Transportation, Sacramento, CA.
- . Lee, E.B., **Choi, K.**, and Harvey, J.T. (2005). Pre- and Postconstruction Analysis of the Interstate 15 (Devore) Concrete Rehabilitation Project. Research Report (UCPRC-RR-2005-14), Office of Roadway Research, Division of Research and Innovation, California Department of Transportation, Sacramento, CA.

Selected Publications

- . **Choi, K.**, Lee, H.W., Bae, J., and Bilbo, D. (2016). Time-Cost Performance Effect of Change Orders from Accelerated Contract Provisions. *Journal of Construction Engineering and Management*, ASCE, 142 (3), 04015085.
- . **Choi, K.**, and Kwak, Y.H. (2012). Decision-Support Model for Incentives/Disincentives Time-Cost Tradeoff. *Automation in Construction*, Elsevier, 21 (2012), 219-228.
- . **Choi, K.**, Kwak, Y.H., Pyeon, J., and Son, K. (2012). Schedule Effectiveness of Alternative Contracting Strategies for Transportation Infrastructure Improvement Projects. *Journal of Construction Engineering and Management*, ASCE, 138 (3), 323-330.
- . **Choi, K.**, Lee, E.B., Kwak, Y.H., and Pyeon, J.H. (2011). "Optimal Incentive/Disincentive Predictive Model for Transportation Projects." The 2nd International Conference on Transportation Construction Management, Federal Highway Administration, Orlando, FL, February 7-10.
- . **Choi, K.**, Kwak, Y.H., and Yu, B. (2010). "Quantitative Model for Determining Incentive/Disincentive Amounts through Schedule Simulations." 2010 Winter Simulation Conference, Institute of Electrical and Electronics Engineers (IEEE), Baltimore, MD, December 5-8.
- . **Choi, K.**, Lee, E., Ibbs, C.W., and Kim, Y. (2009). "Multifaceted Public Outreach and Cost-Benefit Analysis for Its Effectiveness Validation." *Journal of Construction Management and Economics*, Taylor & Francis, 27 (8), 771-782.
- . Lee, E.B., **Choi, K.**, and Lim, D.S. (2008). Streamlined Strategies for Faster, Less Traffic-Disruptive Highway Rehabilitation in Urban Networks. *Transportation Research Record: Journal of the Transportation Research Board*, No. 2081, TRB, National Research Council, Washington, D.C., 38-45.