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San Jose State University Professors Tsao & Wei Complete a Study on Feasibility of One-Lane Two-Way BRT/Light-Rail Systems and Their Expansion to Two-Lane Systems Requiring Least Right-of-Way

Study proposes various designs to maximize ability to deploy bus and rail transit systems by minimizing space requirements.

San Jose, Calif., August 24, 2009 – The [Mineta Transportation Institute](#) has published a research report on bus rapid transit (BRT) and light-rail implemented on dedicated space. San Jose State University engineering professors Drs. H-S Jacob Tsao and Wenbin Wei, with graduate student Agus Pratama, co-authored the report, [Feasibility of One-Dedicated-Lane Bus Rapid Transit/Light-Rail Systems and Their Expansion to Two-Dedicated-Lane Systems: A Focus on Geometric Configuration and Performance Planning](#). It is especially valuable for transportation or transit planners, or for anyone planning transit-oriented developments.

The authors propose a BRT or light-rail system that effectively requires only one dedicated but reversible lane throughout the system to support two-way traffic in the median of a busy commute corridor with regular provision of left-turn lanes. Key to the design is the observation that the median space between the two left-turn lanes on two opposite ends of a roadway section is currently unused or underused for traffic purposes. But it could be used, together with one dedicated (but slanted) lane, for bus or train crossing. (In selected sections, the left-turn lanes can be sacrificed and the vacated spaces can accommodate passenger platforms, resulting in a system requiring dedication of virtually only one lane.)

Based on similar ideas, the authors next address how to implement a two-dedicated-lane BRT or light-rail system with minimum right-of-way width. In such systems, the currently unused median space can be used to accommodate a passenger platform. Then they propose ways to expand a one-dedicated-lane system to two dedicated lanes.

The report includes several conceptual design options and many geometric-configuration sketches for the bus stop and crossing space of a one-dedicated-lane system, and it discusses system performance in terms of travel speed, headway of operations, distance between two neighboring crossing spaces, and the number of crossing spaces. To ensure practicality, the authors study how to implement such a system on an existing corridor. This type of system is also useful as an intermediate step toward a two-dedicated-lane system because of its potential for facilitating transit-oriented development.

The one-dedicated-lane portion of this report was published in *Transportation Planning and Technology*. A follow-on project is funded by Caltrans through California Partners for Advanced Transit and Highways (PATH) of UC Berkeley to develop operating rules and signaling plans for optimized performance of one-dedicated-lane BRT and light-rail systems.

Download the free report at www.transweb.sjsu.edu. Click “Research,” then “Publications.” Scroll down for the document.

ABOUT THE AUTHORS:

DR. H.-S. JACOB TSAO

Dr. Tsao received his PhD in operations research from The University of California, Berkeley in 1984. Since 1999, he has been with San José State University, where he is professor of industrial and systems engineering. Prior to 1999, he worked for the Institute of Transportation Studies of UC Berkeley for seven years and for private companies, including AT&T Bell Laboratories, for eight years.

DR. WENBIN WEI

Dr. Wei is a faculty member in the Department of Aviation and Technology at San José State University. He received his MS in civil engineering with a concentration in computer aided engineering and management from Carnegie Mellon University in 1996, and his PhD in transportation engineering from UC Berkeley in 2000.

MR. AGUS PRATAMA

Mr. Pratama received his BS in industrial engineering from Parahyangan Catholic University of Indonesia in 2005 and his MS in industrial and systems engineering from San José State University in 2007. He is pursuing his MS in computer engineering with a concentration on software systems.

ABOUT THE MINETA TRANSPORTATION INSTITUTE:

The [Mineta Transportation Institute](#) (MTI) was established by Congress in 1991 as part of the Intermodal Surface Transportation Efficiency Act (ISTEA) and was reauthorized in 1998. The institute is funded by Congress through the US DOT’s Research and Innovative Technology Administration, by the California Legislature through the Department of Transportation (Caltrans), and by other public and private grants and donations. The US DOT selected MTI as a national “Center of Excellence” following a 2002 competition.

The Institute has a Board of Trustees whose internationally-respected members represent all major surface transportation modes. MTI’s focus on policy and management resulted from a board assessment of the industry’s unmet needs and led directly to choosing the San José State University College of Business as the Institute’s home. MTI conducts research, education, and information and technology transfer focusing on surface transportation policy and management topics and issues. Visit www.transweb.sjsu.edu

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