ITRE Conducts FHWA Research on Double-Crossover-Diamond Interchanges

ITRE staff have been busy evaluating the operational and safety performance of Double-Crossover-Diamond (DCD) interchanges, also known as Diverging Diamond Interchanges (DDI). In collaboration with principal investigator Dr. Joe Hummer, professor of civil engineering at NCSU, ITRE staff are tasked with evaluating a total of six DCD interchanges for FHWA over a period of four years. The DCD is a relatively new interchange form in the US that offers higher capacity than a standard diamond, especially for heavy left-turning movements. The unique attribute of the DCD is the fact that through-traffic on the arterial street “criss-crosses” with the opposite-direction traffic, and travels on the left-hand side through the interchange, before crossing back to the right side. The operational benefits of the DCD are attributed to simple two-phase signals at the two cross-overs, and the fact that (heavy) left-turning movements become free-flowing, much like they would be at a cloverleaf interchange design.

But the true advantage of the DCD lies at its low construction cost, compared to more expensive interchange designs like the Single-Point-Urban-Interchange, or SPUI. Oftentimes, the DCD can be installed as a retrofit that utilizes existing bridge structures, and fits within the available right-of-way. Overall, the DCD appears to offer a lot of potential benefits in the right application and at a very competitive cost to road agencies. The job of the ITRE team is to determine just what that “right application” is, and if there are any lessons learned from existing installations that can help future designs.

To answer these questions, ITRE is working with a multi-disciplinary research team, which includes nationally renowned experts on interchange design, safety analysis, simulation studies, operational performance assessment, and human factors. An initial report by the team on the operational performance of the first four DCD interchanges is expected to be published by FHWA in early-mid 2012. Those interested can contact Dr. Bastian Schroeder (Bastian_Schroeder@ncsu.edu, 919.515.8565).

Monitoring Highway Performance: Mobility and Reliability

Three ITRE graduate students have been working on a two-year NCDOT project led by Drs. Billy Williams and Nagui Rouphail to help monitor the mobility and reliability of North Carolina Highways. Thomas Chase (photo), Sangkey Kim and Yilun Xu compared multiple data sources to assist the NCDOT in setting up a monitoring system. The NCDOT has taken a progressive approach in acquiring data on highway performance throughout the state, and in the Triangle area has three agreements to provide continuous ITS (Intelligent Transportation Systems) data. In addition to the currently used radar and GPS technology that NCDOT collects, the ITRE researchers have tested Bluetooth sensors to collect travel times on the highway. Looking towards the future, ITRE is helping to set up a system that will allow decision makers to see in real-time how well the highway system is operating while also understanding how reliably it has worked in the past.

This project has benefitted both the students involved as well as ITRE as a whole. Due to the large scope of the project, the students have developed skills in collecting, storing, processing and analyzing large amounts of data as well as working with ITS equipment.
New Version of the Triangle Regional Model Adopted

Regional stakeholders adopted a new version of the Triangle Regional Model August 16, 2011 to be called TRM v.5. The new model was jointly developed by the Triangle Regional Model Service Bureau at ITRE in a partnership with model stakeholders that include: the North Carolina Department of Transportation, the Capital Area Metropolitan Planning Organization, the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization, and Triangle Transit. This new version of the model will be used to develop updates to the transportation plans for the region with a 2040 forecast year.

The model can be used to forecast future automobile traffic and transit use for a 3,400 square mile area. The 2010 population of the model region was 1.7 million in 2010 and it grew at an annual 3.8% rate from 2005 to 2010. Primary uses for the model include: long range transportation planning, air quality analysis, project prioritizing for the Transportation Improvement Program, and forecasting travel volumes for transportation projects including highways and transit. The new model adds many improvements. New features include a bicycle and pedestrian model, an airport passenger model, and an improved parking cost and parking capacity constraint model. The new model was developed using household, transit on-board, and external travel surveys collected in 2006.

For more information about the TRM Service Bureau and TRM v.5, go to http://www.itre.ncsu.edu/HWY/trmsb/index.html where you can find contact information for staff of the TRM Service Bureau as well as links to the model stakeholder agencies.

TIMS Program Manager Retires from ITRE after 22 years

Mickey Michael may be a Wolfpack fan, but his blood runs school bus yellow. This is evidenced by the collection of miniature school buses, school bus toys, and pictures of school buses housed in his office. His collection even includes a rock shaped and painted like a school bus.

This interest in school buses began when Michael joined the Pupil Transportation Group at ITRE in 1989 as one of the project leaders implementing a state-of-the-art GIS-based school bus routing and scheduling system in North Carolina known as the Transportation Information Management System (TIMS). Michael, who retired from ITRE in mid-November, has managed the program for eleven years.

This job has been a perfect fit for Michael who has a degree in industrial engineering and a certificate in computer science from NC State University. In addition to training and supporting TIMS users, a lot of his work involves debugging software programs, writing batch programs, and setting-up network servers.

His commitment to the school bus industry goes beyond the TIMS project. Michael is involved in the management of a yearly pupil transportation conference and each year during the NC State Fair, he is heavily involved setting up a booth that uses a remote controlled school bus named “Buster” to educate children about school bus safety.

"Mickey is respected and well-liked among his peers at ITRE,” said Jeff Tsai, director of the Pupil Transportation Group. “In addition to offering help solving technology problems, he also has a wealth of experience with home repair projects. Mickey is always willing to offer advice, his tools, or even lend a hand. His role at ITRE cannot be replaced and he will be missed; however, Mickey is a friend to everyone he meets, so we hope he will visit ITRE often after he retires."

As for his plans after retirement, Michael plans to take a couple of weeks off, but after that he has a list of unfinished projects and renovations waiting for him at home. After his wife retires, they plan to travel - some trips will involve taking the grandchildren to various locations for either educational purposes or just for fun.

“I have really enjoyed my tenure at ITRE and consider this to be as much of a family to me as my real family,” said Michael. “A few of us have been with ITRE over twenty years and have watched ITRE/TIMS grow. I am also fortunate to work with the North Carolina Department of Public Instruction and UNC-Charlotte TIMS staff. When you have that many people that stay together for so long, focused on helping the school children of North Carolina get to school in the safest, most efficient manner possible, it gives you a sense of purpose and accomplishment. I am proud to have been a part of that.”