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Policy & Planning

Seminar offers insights on best practices for regional sustainability planning

Across the nation, sustainability planning is gaining momentum due to increased interest at all levels of government and new sources of federal funding. "There is a great deal of activity around sustainability right now, and we saw the need for research to respond to that interest," said **Carissa Schively Slotterback** in an October 6 CTS research seminar.

Slotterback, an associate professor and head of the Master of Urban and Regional Planning program at the Humphrey School of Public Affairs, led the creation of a model for regional sustainability planning and implementation to help fill this need. "We were interested in creating something that organizations and stakeholders can adapt to their own contexts all around the country," she said. The project was sponsored by CTS.

The research is based on a case study analysis of a diverse set of regional sustainability plans. After selecting the case studies, Slotterback and her research team reviewed planning documents, interviewed key participants, and collaborated with a diverse research advisory committee. Once they completed this process, the researchers identified emerging best practices in three key areas: plan content, planning process, and implementation and monitoring.

The first set of best practices revolves around the development of plan content. They include taking time to define sustainability relative to regional context, using issues and themes as organizing elements, considering issues of local jurisdiction, documenting participation efforts in the plan, and creating short and long versions of the plan. "Often these regional planning documents can be technical and cumbersome, so creating a shorter version of the plan makes it more digestible to a broader audience," Slotterback said.

Best practices for the planning process include engaging multiple stakeholders from the private and public sectors, offering online participation to build knowledge and promote engagement, creating issue-specific workgroups to help make connections and provide resources, engaging decision makers from local jurisdictions, and displaying plan and background information online. One example of engaging stakeholders is the Denver region's "Sustainability Cafes" that were held at the outset of the regional planning process, Slotterback said. These events encouraged participants to discuss what a sustainable Denver region would look like.

Finally, the researchers identified five emerging best practices for regional plan implementation: include clear implementation content in the plan; leverage and enhance regional authority to facilitate implementation; think beyond agency implementation by offering support grants, toolkits, and technical assistance; start small with visible outcomes and successes; and track regional indicators that relate to the plan and report progress online. Chicago's [MetroPulse website](#) is an example of a successful online progress reporting tool. The website makes it easy to view progress in key planning areas including crime, transportation, health, environment, land use, and more.

Researchers are working with the project's advisory committee to develop a final planning framework that can be used to inform decisions in a

wide variety of regional environments across the nation.

[Watch the video or download the podcast](#)

Intelligent Transportation Systems

Techplan research uses smartphones to improve safety

Connecting theory and practice is essential to solving complex transportation problems. With that sentiment, **Greg Lindsey**, professor and associate dean of the Humphrey School of Public Affairs, welcomed attendees to an August 19 forum focused on current research by the TechPlan program.

TechPlan, directed by **Frank Douma**, associate director of the State and Local Policy Program (SLPP) at the Humphrey School, is a collaboration between the ITS Institute and SLPP. TechPlan researchers are conducting a set of federally sponsored studies on how transportation systems can be planned to accommodate an increasingly complex technological environment.

The intersection of public health and transportation serves as a starting point for the current work of Humphrey School assistant professor **Yingling Fan**, whose research group designed a smartphone application to gather data on travel behavior and help users better understand and shape their own travel behavior.

As part of a research project dubbed "UbiActive," Fan worked with Douma, senior systems engineer **Chen-Fu Liao** of the Minnesota Traffic Observatory, and Assistant Professor **Julian Marshall** of the civil engineering department to create a smartphone app for the Android mobile platform. The app will semi-automatically collect data about the user's travel and activity patterns using the mobile device's onboard GPS unit as well as the accelerometer, which is normally used to detect the orientation of the device. It also includes a self-reporting function, prompting users to provide information about their travel and secondary activities.

The UbiActive app will do more than gather data—it will also give users feedback about the health implications of their travel behavior. During an upcoming field study, Fan said, the researchers will try to determine if users will respond to feedback from their smartphones by altering their travel behavior. UbiActive is the first study to use smartphones to collect public health data in the context of travel behavior, Fan noted.

Turning to a different kind of health impact, **Tom Horan** and **Ben Schooley**, researchers with the ITS Institute and the Center for Excellence in Rural Safety, described their ongoing work aimed at improving emergency response and treatment by helping EMS providers share information quickly and easily with emergency room doctors. Their CrashHelp system, now being tested as a prototype by 20 ambulance crews and six hospitals in Idaho, consists of a smartphone application for emergency responders and a web interface for emergency medical center workers. Using CrashHelp, paramedics can send videos, digital photos, and other information directly to physicians at the hospital.

Data security is a key issue in the development of the system, they said. Federal law provides strong regulations for protecting medical information, including any data gathered by emergency workers. For CrashHelp to be useful, however, the data protection measures—such as digital encryption and decryption of video—must be implemented in such a way that paramedics can use their smartphones quickly and easily.

Douma also discussed the importance of data security in a presentation on ITS data needs. Noting that the privacy issues raised by ITS technologies are both important and varied, Douma said that both the nature of the data collected and the privacy expectations of the people affected have to be taken into account.

The study looked at several case studies to understand how privacy issues affect public acceptance of new transportation-related technologies. Douma's findings indicate that the public's perception of privacy issues is just as important as the legal reality. Agencies need to communicate how data is going to be used and how it will benefit travelers in order to build public acceptance of new technologies, he said.

The final presentation of the day focused on consumer travel behavior and retail geography. Graduate student **Arthur Huang** worked with Associate Professor **David Levinson** of the civil engineering department to study how clusters of retail businesses develop in response to consumer demand and transportation system dynamics. The project, which is ongoing, is attempting to answer questions including whether retail clustering increases or decreases travel demand, and whether trip chaining—combining multiple tasks and destinations into a single journey—contributes to the development of retail clusters.

[More about TechPlan](#)

Reprinted from the October 2011 issue of the *CTS Report*.

Portable weigh station for rural roads debuts at MnROAD



Professor Taek Kwon at a demo of the portable WIM device.

In August, the Minnesota Department of Transportation (MnDOT) hosted a demonstration of a portable weigh-in-motion (WIM) system at the MnROAD pavement research facility near Albertville, Minnesota. The system, designed by University of Minnesota Duluth electrical and computer engineering professor **Taek Kwon**, promises to make it easier and less expensive to monitor truck traffic, especially in rural areas.

In recent years, state, county, city, and township transportation authorities have grown more concerned about damage to local roads and bridges due to the increased traffic of larger, heavier trucks. The need for better data about vehicle loads became critical when a new state law in 2009 considered all paved roads to have a 10-ton design unless posted otherwise.

Minnesota has 16 WIM stations, with another scheduled to open near Moorhead this fall. All but one are located on a principal arterial route. "There's a lot of area that we're not really covering, and a portable weigh-in-motion system would be useful," said **Ben Timerson**, weight data and engineering coordinator at MnDOT. "Truckers fairly rapidly figure out where the permanent sites are and learn how to avoid them."

Timerson, who hosted the MnROAD demo, said a portable WIM system would aid the Minnesota State Patrol in weight enforcement, and the additional freight data would be useful for managing the county road system, designing appropriate pavements, and setting bridge load restrictions.

The research to develop the portable WIM system was sponsored by MnDOT. In addition, MnDOT State Aid and the Minnesota County Engineers

Association have supported the research, with several county engineers serving on the technical advisory panel for the project. Eventually, the plan is to contract with a manufacturer to produce a commercial version of the system.

For more about the development of the WIM system, please see the [winter 2009–10 issue of the ITS Institute's newsletter, the *Sensor*](#).

Reprinted from the October 2011 issue of the *CTS Report*.

Safety & Security

Roundabout research examines issues for pedestrians and cyclists



The roundabout at 66th Street and Portland Avenue in Richfield, Minnesota, was one of two sites selected for the study. (Photo by David Gonzales, MnDOT)

Responding to reports that pedestrians and cyclists were finding it difficult to cross roundabout intersections, the Minnesota Department of Transportation asked researchers at the [Minnesota Traffic Observatory \(MTO\)](#) to take a close look at interactions between motor vehicles, pedestrians, and cyclists. MTO director [John Hourdos](#) highlighted some interesting findings from the project at an ITS Institute research seminar on September 29.

Two sites were selected for the project—one in a suburban setting with high vehicle traffic volume, and another near a public park in Minneapolis. The City of Richfield, where the suburban site is located, was a key partner in the project. The two sites differ in terms of road geometry, traffic control features, and traffic characteristics, allowing the researchers to compare and contrast different roundabout situations.

The researchers used a mobile data collection system, designed by MTO lab manager [Ted Morris](#), consisting of eight cameras mounted atop an extendable mast that continually recorded vehicles and pedestrians entering and leaving the intersections. The camera mast was attached to a trailer, which also housed a battery power source that allowed the unit to operate for nearly

a month without recharging. Back at the lab, students carried out the painstaking work of combing through the data and logging every interaction between a pedestrian or cyclist and a motor vehicle for statistical analysis.

Hourdos explained that identifying factors that affected drivers' decision to yield was one of the project's principal objectives. The researchers looked at a wide variety of possible influencing factors, including whether the driver was entering or leaving the roundabout, the presence of other vehicles behind and in front of a target vehicle, the positions of other vehicles in the roundabout, time of day, volume of traffic, and the number and location of pedestrians and cyclists waiting for an opportunity to cross.

Several factors appeared to influence the willingness of a driver to yield. Drivers who were exiting a roundabout were significantly less likely to yield. However, drivers at both sites were more likely to yield to pedestrians standing in the center of the roundabout than to those waiting outside the intersection. In addition, drivers were more likely to yield to larger groups of pedestrians and cyclists. Overall, drivers at the Richfield site—where traffic volumes are higher and there are fewer pedestrians and cyclists—were far less likely than drivers in Minneapolis to yield the right-of-way.

Analyzing the delay times experienced by pedestrians and cyclists produced some interesting results, said Hourdos. Taking into account all pedestrians—both those who had to wait to cross and those who did not encounter any vehicular traffic at the intersection—the average delay was around 2.3 seconds, and even those who had to wait for a car to stop waited an average of only 3.8 seconds. However, there was a huge variation in wait times, with some having to wait up to 30 seconds or more. Compared to a signalized intersection, where the average delay is roughly half the time it takes for the signal to complete one full cycle, roundabouts offer much better average wait times, Hourdos said. But having to stand at the crosswalk while cars speed through (despite a state law requiring drivers to yield) could make the wait seem much more onerous, Hourdos noted.

The video recordings collected at the Richfield roundabout for this project will also be used in an upcoming study funded by the Minnesota Local Road Research Board. Hourdos and Morris will partner with civil engineering professor [Gary Davis](#) to evaluate how a change in traffic control signs and striping influences drivers' ability to safely navigate the Richfield roundabout. The existing video will be used to establish conditions at the roundabout before changes in signing and striping are made, while two new deployments of the data collection system will gather information both immediately and one year after the changes. The study hopes to discover whether the new signs and striping alleviate driver confusion and improve adherence to roundabout driving rules.

[Watch the video or download the podcast](#)

Transportation Infrastructure

Moving forward with asphalt performance



Researchers from the University of Minnesota Duluth have hit the road running on a recent study exploring the suitability and use of asphalt performance tests. Although extensive research has demonstrated that laboratory performance tests can improve the longevity of asphalt pavements and reduce early deterioration, current Minnesota Department of Transportation (MnDOT) material specifications do not require them.

In a MnDOT-funded study, civil engineering assistant professor [Eshan Dave](#) and teaching assistant [Philip Koptan](#) synthesized previous research and implementation efforts for asphalt performance tests—an important first step in identifying a suitable test that can be included in future material specifications. The researchers also identified tests with the greatest potential for use in Minnesota.

Although many agencies have a performance test requirement in standard material specifications—such as for the evaluation of moisture-induced damage or rutting distress potential—study findings indicate that only a few use performance-testing-based material specifications to tackle cracking distresses. Dave

and Koptan also found that very few lab tests for predicting field performance have undergone a satisfactory validation, and even fewer are simple enough to be used on a routine basis. And although most tests deal with one or more asphalt pavement distresses, none can be used as a global performance indicator.

The researchers suggest that fracture energy tests have the greatest potential for use in performance-based material specifications in Minnesota. Test results show a strong correlation with cracking in the field, particularly thermal and reflective cracking—prominent distresses on flexible and composite pavements in Minnesota. The researchers recommend exploring the simplification of fracture test procedures to make them easier to use for performance-based specifications.

A final report on the project, *Synthesis of Performance Testing of Asphalt Concrete* (MnDOT 2011-22), is available on the CTS website.

Transit, Bicycling, and Walking

Is automated rapid transit possible in the Twin Cities?

In a recently published report, **Ferrol Robinson**, research fellow at the Humphrey School of Public Affairs, examined the background of automated rapid transit (ART) systems and outlined the rationale for funding a feasibility study of an ART system for the Twin Cities.

Robinson investigated the pros and cons of implementing an ART system in Minnesota and reviewed the status of ART applications nationally and internationally. The study, funded by the Minnesota Department of Transportation, also evaluated the ability of ART to promote efficient development, livable communities, and work opportunities.

The report suggests that a detailed feasibility study would be a first step in evaluating the viability of ART in the Twin Cities. Such a study would include an assessment of alignment and right-of-way requirements, technology, reliability and readiness, and construction and operating costs. Robinson also recommends that the feasibility study contain a significant outreach and education element designed to discover what stakeholders and customers want out of the transportation system, how ART may fit in that picture, and the views of policymakers and legislators.

A final report on the project, *Rationale for Funding a Feasibility Study for an Automated Rapid Transit Application in the Twin Cities* (MnDOT 2011-17), is available on the CTS website.

TCRP research publications available online

The federal Transit Cooperative Research Program (TCRP), administered by the Transportation Research Board, provides practical transit research to address technical and operational issues. TCRP emphasizes putting research results into the hands of organizations and individuals that can use them to solve problems.

Recent TCRP publications include:

- ◆ *Communication with Vulnerable Populations: A Transportation and Emergency Management Toolkit* (TCRP Report 150)
- ◆ *Improving Safety-Related Rules Compliance in the Public Transportation Industry* (TCRP Report 149)
- ◆ *Transit Asset Condition Reporting* (TCRP Synthesis 92)

Upcoming Events

Fall luncheon: ‘Flat City: The Streetcar City and the Revival of the American Dream’

Most people think cities have high-density "pointy" centers and gradually flatter edges—edges that slope to the countryside. This presumed hierarchy has remained unchallenged despite the fact that North American cities, when they were at their most powerful, were flat—homogeneous across large urban landscapes in a form and density that was uniquely American. The form was the grid, and the means of getting around was on foot or by streetcar. In this first manifestation of the American Dream—the Streetcar City—residents produced almost no greenhouse gas from their transportation choices.

At the CTS Fall Luncheon, **Patrick Condon**, a professor and senior researcher with the Design Centre for Sustainability at the University of British Columbia, will argue why this form is again desirable for our future quality of life. The luncheon will be held December 8 in Minneapolis.

For more information or to register, please visit the [event web page](#).

Additional Upcoming Events

December 1

[Advanced Transportation Technologies Seminar: Transportation Safety Issues and Priorities in Minnesota](#), 3:30 p.m. - 4:30 p.m. CST, [1130 Mechanical Engineering](#)

December 2

[Freight and Logistics Symposium](#), 7:30 a.m. - 12 p.m., [Ramada Plaza](#), Minneapolis

December 8

[Advanced Transportation Technologies Seminar: Blindness and Pedestrians](#), 3:30 p.m. - 4:30 p.m. CST, [1130 Mechanical Engineering](#)

December 8

[CTS Fall Luncheon—Flat City: The Streetcar City and the Revival of the American Dream](#), McNamara Alumni Center, Minneapolis, MN

February 9

[TERRA Pavement Conference](#), Continuing Education and Conference Center, St. Paul, MN