



SPECIAL RESEARCH CONFERENCE ISSUE

This issue of the *CTS Report* features extended coverage of the 22nd Annual CTS Transportation Research Conference, held May 24 and 25 in St. Paul. Coverage includes:

- An opening session about public-private partnerships with a keynote presentation by **Adrian Moore** (below) and panel discussion with **Scott Dibble**, **Brad Larsen**, **Jay**

Lindgren, and **Lee Munnich** (page 3).

- A Luncheon presentation about sprawl and urban mobility measures by **Joe Cortright** (below).
- A MnDOT update from **Tom Sorel** (below).
- A sampling of concurrent sessions (pages 5–8). **CTS**

Opening keynote: Momentum shifting toward public-private partnerships

Public-private partnerships, or P3s, offer promise to help fill the gap between transportation needs and resources, but they are just a tool—not a “magical solution” to all our woes, said **Adrian Moore**, vice president of research with the Reason Foundation, in the opening plenary of the research conference.



Adrian Moore

P3s should be brought out of the

toolbox when they best fit the task. They are often proposed, however, “when the usual way of doing business can’t accomplish the project...often when there are tight financial constraints,” he said.

P3s tend to be suited to large projects, Moore said, and they offer some key advantages. One is the transfer of risk from a DOT or local agency to the private sector. This is “a big deal,” he said, particularly if an idea turns out to be a poor one—such as the case of a toll road in the

San Diego suburbs that opened one year before the housing bust. The firm funding the project promptly went bankrupt, and investors lost their money. “That’s their job,” Moore said. “That’s what investors do...But the road is still there, and people still use it.”

Another important advantage of P3s is that they bring increased investment through financing mechanisms. They also create incentives to minimize a facility’s life-cycle cost, assure proper maintenance,

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Luncheon speaker: Accessibility measures needed to guide transportation policy

“The secret to reducing the time Americans spend in peak-hour traffic has more to do with how we build our cities than how we build our roads,” said **Joe Cortright**, president and principal economist with Impresa and senior adviser with CEOs for Cities. He made his remarks at the research conference luncheon on May 24.



Joe Cortright

Cortright summarized findings from *Driven Apart: How Sprawl is Lengthening Our Commutes and Why Misleading Mobility Measures Are Making Things Worse*, a recent report prepared for CEOs for Cities and funded by the Rockefeller Foundation.

The critical finding from the report, Cortright said, is that in large U.S. metropolitan areas (those with populations of 1 million or more), distance matters. In the nation’s largest cities, the typical traveler spends 200 hours per year in peak-period travel. But in the best-performing cities, travelers spend fewer hours in peak traffic. “We take that as a mark of the efficiency of the transportation system,” he said, but the reason isn’t transportation—it’s because people in those areas travel shorter distances.

Cortright compared *Driven Apart* with the *Urban Mobility Report* (UMR), which the Texas Transportation Institute has produced annually since 1982. The UMR provides estimates and rankings of

Cortright continued on page 4

Commissioner outlines enterprise risk management at MnDOT

Tom Sorel, commissioner of the Minnesota Department of Transportation (MnDOT), outlined the department’s new enterprise risk management (ERM) approach during remarks preceding the conference luncheon presentation.



Tom Sorel

MnDOT is facing challenges, Sorel said, including the possibility of less federal funding. “It’s very important that we prepare for these challenging times, so when the legislature comes to us and asks how we can be more efficient, we can report that we are already doing a lot

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and spur innovation. Because users pay the costs of a facility, P3s offer greater fairness. And they use a business-case analysis rather than a political process, which may mean better-targeted investment, Moore said.

P3s have a growing U.S. as well as global track record, he said. P3-enabling legislation has been passed in a number of states, and it's under discussion in several others (see related articles about Minnesota activities on pages 3 and 5).

Still, Moore continued, "these are interesting times for P3s." Several projects were nearly initiated but fell through because of the credit crunch and financing problems. The amount of money in international infrastructure investment pools has increased in the last three years, but firms don't give much attention to the U.S. "because it's so frustrating trying to invest here compared to anywhere else in the world...other than perhaps Cuba and China," he said.

P3s might emerge as options for two current U.S. investment needs: improved goods movement and urban congestion relief. The freight system nationwide has unmet needs for additional capacity, particularly out of port cities. Urban congestion-relief projects could include high-occupancy toll lanes, express toll lanes, and new suburban toll roads in high-growth areas.

Why not just continue with public toll roads? "Both are tools in the toolbox," Moore said, "and you need to decide which is the right one. The primary

disadvantage of the public approach is that it doesn't bring new capital—it's just a revenue bond, and there's no risk transfer." Long-term concession funding allows more complex financial structures (such as sponsor or shareholder equity or bank debt) and access to new pools of capital (pension funds, insurance companies, general public), and it can raise larger sums. "Very few toll projects built in the U.S. have actually had the revenue that was projected," he said. "In my book, those kinds of mistake are much better made by private-sector investors than by groups that then have to tap the taxpayers to backfill those losses."

There is still debate over P3s, but momentum is shifting. Tolling itself is the more controversial aspect of P3s, even though survey data show majorities prefer tolls to tax increases for funding new roadways. "But left-wing and right-wing populists can still stir up significant anti-toll opposition," Moore said. The key is to communicate that P3s address needs and add choice.

A chief concern with P3s is the need to protect the public interest from the semi-monopoly aspects of a facility, Moore said, noting that some form of regulation or the concession agreement terms themselves could address such concerns.

Another issue is that much of the industry is based where P3s are more common—in Asia or Europe. "You have to be comfortable with global trade and dealing with foreign companies," Moore said.

Other concerns are the length of the



concession term and whether huge upfront payments are wasted. "Upfront payments are attractive to states or local governments trying to balance budgets, but that's essentially a form of borrowing, and I'm a firm believer that any time the government is borrowing, [it] should be a highly scrutinized transaction," he said. Other issues include the possibility of excessive toll rates, land seizure by private companies, and termination/buyout provisions—all of which can be addressed in the contracts, he said.

P3 process reforms are also needed. Some countries—Australia and Canada, for example—have separate entities to oversee P3s. The decision to use a P3 "never should be an ideological choice—it should be driven by the characteristics of the project and meet the needs of that project," he stressed.

In closing, Moore said the outlook for toll road concessions is very strong due to continuing revenue constraints and unmet system needs. "P3s are a tool that should be systematically part of how we assess doing projects," he said. **CTS**

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of these things," he said. "We believe this approach can be sustainable and help us respond to anything that comes our way."

In recent years MnDOT has initiated many activities in the area of risk management, Sorel said, building the foundation for what it's calling enterprise risk management. He defined ERM as integrated risk management—a continuous, systematic process to understand, manage, and communicate risk from an organizational-wide perspective. "It's about making

strategic decisions that contribute to an organization's overall corporate objectives," he said.

ERM supports MnDOT's vision to be a global leader in transportation, Sorel continued. It improves internal communication, maximizes capital and operational investments, and provides for nimble responsiveness.

"Risks change," Sorel said, "and a nimble organization changes in response to them appropriately. We're changing

our organization—becoming a sustainable organization, and finding sustainable solutions."

Minnesota is one of the few states in the country doing this. "We've got a lot of the building blocks in place. Now it's a matter of folding them into this framework we're calling ERM," he said.

In closing, he added that research is the spark to innovation: "It is so vital to helping us have a world-class transportation system in our state." **CTS**

Opening panel discusses future of P3s in Minnesota

Laurie McGinnis, director of CTS, moderated a follow-up discussion of **Adrian Moore's** presentation with four leaders involved in the future of P3s in Minnesota: **Brad Larsen**, new MnPASS policy and planning manager and former director of the Minnesota Department of Transportation (MnDOT) Office of Traditional and Innovative Finance; **Scott Dibble**, state senator; **Lee Munnich**, director of the State and Local Policy Program (SLPP) at the Hubert H. Humphrey School of Public Affairs; and **Jay Lindgren**, partner with Dorsey & Whitney LLP and a legal expert in innovative finance.

MnDOT believes there is potential for large-scale procurement P3s, Larsen said. "They should be considered where good in-depth analysis demonstrates a strong potential for a better return on investment from using P3 approaches than using traditional approaches." There are few large projects in the pipeline now, he noted, but there is good potential for other types of P3s, such as smaller-scale strategic partnering projects or those involving value capture. "There are a whole myriad of other opportunities," he said.

Lindgren agreed with Moore that P3s are a tool, "not a cure-all," and that the key is finding projects that are the right fit. The process has to be open to international companies so that the free market can work. "We have to think about that in our corner of the world: Do we want a Spanish company running our new HOT lane?" Such public perception issues are "job 1," he said. "We need to get over those political questions first, then [the approach] just becomes another tool in the toolkit," he said.

Lindgren also said that a "value for money" analysis—a step in the procurement process that compares what a project would cost funded publicly vs. privately—would be especially important in Minnesota given the state's tradition of transparency.

Munnich said P3s are primarily financing tools that offer ways of leveraging funding and sharing risk, but funding streams are still needed. He and other University researchers are studying potential revenue streams that could supplement or one day replace the motor fuel tax. All the possibilities, however, are "very limited, but we may be able to get more out of them. P3s may offer an alternative to do that." Munnich also noted that a state P3 task force, led by **Adeel Lari**, director of innovative financing at SLPP, had just held its first meeting. The Humphrey School is leading the task force at MnDOT's request.

Dibble said current statutory authority to enter into P3s is "fairly broad...and it doesn't capture a lot of what's important for us to think and talk about and develop in coming years." He raised a number of questions: "How do we properly place these facilities in our transportation program? How do we make sure this program is in the public interest, and that we provide for ongoing public accountability and oversight?" Other issues include how to deal with unforeseen challenges (such as a firm's bankruptcy) and defining who takes responsibility for environmental studies and land acquisition. "We need to think of these things and be very specific," he said.

More broadly, Dibble asked, "Is it a good idea? What are the implications for travel patterns and land use, and what are the opportunities for economic development?" He called for a solid foundation of public policy and a common framework with which to operate. He encouraged the audience to participate in the task force's work to shape future legislation.

Larsen added that Minnesota's current P3 statute was enacted in 1993, making



Adrian Moore, Scott Dibble, Brad Larsen, Jay Lindgren, Lee Munnich

Minnesota one of first states in the country to adopt legislation for toll facilities. However, in the only attempt to use it—a 1990s highway project—one municipality vetoed the toll late in the process, causing the private-sector partner to lose millions. MnDOT believes new legislative authority is needed and hopes the task force will take the next step to draft the language, he said.

Moore interjected two thoughts about the discussion. First, decisions about big infrastructure projects should be driven by analysis. "If a project will benefit millions substantially but one vocal opponent can torpedo it, the process is too sensitive," he said. Second, definitions are needed for which issues must be resolved at the legislative level, which at MnDOT, and which at local agencies.

In the question-and-answer period, an audience member asked how MnDOT would react if a private company proposed an unsolicited project—would it add it to the plan?

Dibble replied that this question points out the importance of clear P3 policies. "We can demand due diligence...and value for money analysis. Jumping the queue would get swift attention from legislators," he said. "Transportation investments aren't just about mobility...they are about something much larger: the form and shape of our communities, future economic development potential, and our environment." **CTS**

**Mark your calendars: 23rd Annual CTS Transportation Research Conference
May 23–24, 2012, RiverCentre, St. Paul, Minnesota**

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congestion, he said, and it makes a number of claims: congestion is a big problem, it wastes a lot of energy, it's getting worse, and it costs a lot of money. The UMR is used in specific ways across the country, he said, and "many people quote it as a reason to increase capacity." It also receives considerable media coverage.

But the models used for the UMR have several flaws, Cortright asserted. First, the UMR ignores the role of distance in the performance of the transportation system, so it rates areas as "less congested" even if residents have to travel farther. To determine its ratings, the UMR calculates a travel time index: how much additional time it takes to travel a given distance at peak vs. off-peak hours. For example, if a trip takes 20 minutes off peak (free flow) but takes 25 minutes at peak, there is five minutes of delay, for an index of 1.25 (25/20).

The index, however, is a misleading guide, he said. Chicago has a higher index (1.43) than Charlotte, North Carolina (1.25), for example, but Chicagoans spend less total time traveling because their trips are shorter. "The model penalizes cities with short, compact form," he said, and focuses debate on new capacity rather than on other possibilities.

Another concern is that the UMR sets the baseline as zero congestion—"an unattainable ideal," he said. "It assumes you could eliminate all congestion at peak hours, and we don't do that with any other systems because it would be too expensive."

The UMR also uses a poor model for

estimating travel time and speeds, and it bases fuel consumption estimates on an outdated study, Cortright said. The study, from 1981, used data on 1973–76 GM cars averaging 13.6 mpg at speeds up to 35 mph.

In addition, UMR findings "do not square with other data," he said. For example, a National Household Travel Survey suggests travel time, adjusted for distance, actually declined from 1982 to 2001.

So, Cortright said, better measures are needed to understand how urban transportation systems work and how to optimize them. For *Driven Apart*, the researchers developed new measures that emphasize accessibility. Their approach explicitly includes travel distances and quantifies time, energy, and the economic costs of sprawl-lengthened commute travel.

Using a baseline based on the best performers (the 90th percentile) of 50 large metro areas, *Driven Apart* asked what the effect would be if all 50 metro areas could perform as well as those in the 90th percentile. The results predict that residents would drive about 40 billion fewer miles per year, use two billion fewer gallons of fuel, and save \$31 billion annually, Cortright said.

Driven Apart also found that some cities have made progress. While UMR's travel index says congestion has gotten

worse in every city, the *Driven Apart* approach shows trips and travel time got shorter: in 1982, the average trip was 19.6 miles and took 53 minutes; in 2007, 16 miles and 43 minutes.

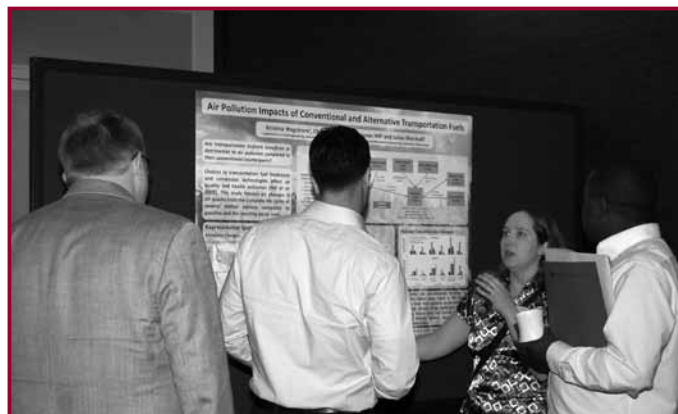
Going forward, Cortright called for an alternative set of measures that emphasize accessibility—"ultimately our goal"—and he cited the CTS-led Access to Destinations Study as an example (www.cts.umn.edu/access-study). Measures should reflect land use and trip distance and incorporate better data, such as GPS and real-time data that have become available since the UMR began.

Driven Apart, Cortright concluded, found that designing communities for shorter trips saves time, energy, and money. "It's extremely possible to have cities do this," he said. "New measures that emphasize accessibility should guide our transportation policy." **CTS**



Conference video and presentation slides available

The conference featured more than 75 presentations over two days by leading scholars, public officials, and professionals in the fields of transportation funding, technology, infrastructure, and land-use planning. Presentation abstracts, PowerPoints (in PDF format), video of the plenary sessions, and expanded coverage are at www.cts.umn.edu/Events/ResearchConf/2011. The CTS Twitter site—<http://twitter.com/#!/UMNCTS>—also has highlights from staff, attendees, and presenters who tweeted during the sessions. **CTS**



Researchers discussed their work during the conference poster session.

Speakers discuss P3 activities, research in Minnesota

In a concurrent session, **Brad Larsen**, MnPASS policy and planning manager with MnDOT, picked up where he left off in the morning's plenary.

A wide variety of projects can be referred to as P3s, Larsen said, but projects most commonly referred to as P3s in the U.S. today involve a new procurement method in which a private entity designs, builds, finances, operates, and sometimes maintains a transportation facility for a long period of time.

MnDOT has been exploring large-scale procurement P3s for about the past two years as part of its innovative finance program, he said. Two key recent activities were a St. Croix River Crossing innovative finance study (mandated by the legislature) and a P3 project screening study.

The latter study, completed in December 2010, screened 39 projects statewide to identify the best candidate projects for P3 procurement approaches. Criteria included project size and complexity and whether a project is needed immediately but lacks funding. The result is a list of the best shorter-term project candidates, he said, including:

- St. Croix bridge
- I-35W (Minneapolis to Blaine) and I-94 (Minneapolis to St. Paul) MnPASS lane combined project
- I-94/I-494 (I-394 to Monticello) MnPASS lane and TH 610 final phase combined project
- a pavement preservation program
- a rest-area project

Longer term, the study identified the Lowry Hill tunnel in Minneapolis and a state bridge program as candidates.

Current activities include the launch of a P3 task force that will meet through December. Its purpose is to help build stakeholder understanding and support for P3 approaches, Larsen said, and "gain some consensus on legislation and legislative strategies moving forward." Another project is analyzing P3 business models to help address truck parking and rest-area needs. Future activities include stakeholder and public outreach as well as institutional and organizational development.

For large-scale procurement P3s, Larsen concluded, there is potential for some projects. For smaller-scale projects, "there is tremendous potential for partnering opportunities with private entities interested in contributing money or other resources to projects, providing debt financing options for projects, and sharing risks and rewards in new ways."

Also in the session, **Emily Saunoi-Sandgren** described another recent MnDOT-funded effort, the "Advancing Public Interest in the Launch of P3s" research project led by Professor **Zhirong (Jerry) Zhao** of the University's Humphrey School of Public Affairs.

Although interest is growing in P3s, she said, there is "quite a bit of confusion and controversy" about them. Much of this stems from media coverage of asset monetization cases such as a tollway in Indiana.

In its study, the research team defined the spectrum of project delivery, from traditional methods to full privatization. For each P3 option, the study analyzed public benefits, associated risks, and possible approaches to mitigate these risks. The research also examined related public concerns and potential strategies to address these concerns at different stages of P3 decisions.

The public's concerns over P3s, Saunoi-Sandgren noted, revolve around the fear of losing public control over what has historically been a public good. There is concern about possible lack of transparency and the risk of increased costs to the public—"they fear the speculative benefit won't come true," she said.

In their final report, the researchers present a number of solutions to address these concerns, such as more public engagement and education, increased legislative and institutional support, P3 oversight entities, and the strengthening of contract design and project management. (The state P3 task force intends to use the report as a framework for its discussions.)

Their conclusion, Saunoi-Sandgren said, is that P3s "are a worthy consideration."

The study was also the topic of a February 22 CTS research seminar by Zhao. A webcast recording of the seminar is available at www.cts.umn.edu/Events, and the report is available for download at www.cts.umn.edu/Research. **CTS**

Cyclopath and Cycloplan: collaborative bicycle planning and routing

Loren Terveen, associate professor of computer science and engineering, and **James Andrew** of the Metropolitan Council discussed how an online routing tool for bicyclists has been enhanced for transportation planners and engineers.



Loren Terveen

team of University of Minnesota researchers, is an open content routing and social media tool for bicyclists. Users can search for bicycle routes, share notes about roads and trails, enter tags about special locations, and edit route maps by filling in missing or unofficial trails.

In partnership with the Metropolitan Council, MnDOT, and other local partners, the University team is developing

Cycloplan, a new version of Cyclopath with added functionalities for planners. Cycloplan, which will require login credentials, will give planners access to private and controlled data. It will also facilitate data sharing among agencies, allowing counties and cities to collaborate across their borders, Terveen said.

Another new Cycloplan feature will allow planners to explore future

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Alternative vehicles, energy sources to shape transportation

Eager to cut gas expenses and reduce greenhouse gas (GHG) emissions, many consumers are considering alternative vehicles. And more choices are out there, such as the Nissan Leaf electric and GM Volt extended-range electric vehicle. But what does it cost to run these different vehicles, and how do they compare?

Douglas Tiffany, assistant extension professor, built a web-based decision tool to help consumers sort through the issues. The tool allows users to determine the costs of ownership and operation as well as compare GHG emissions.

Users can enter their assumptions for vehicle cost, income tax credits, and miles per gallon or miles per kilowatt-hour (kWh) for conventional, hybrid, electric, or extended-range electric vehicles, as well as assumptions about the miles per year to be driven and the number of miles driven using battery power.

The tool generates graphs that show the accumulated discounted costs of ownership and operation of the four types of cars, as well as tables that compare monthly costs for ownership and operation. Greenhouse gases are calculated for each type of vehicle. By altering the

assumptions, Tiffany said, consumers can see the differences from factors such as vehicle cost, miles per gallon, gasoline price, miles driven per year, and tax rebates.

Tiffany also noted that sources at Ford Motor Company predict that one in four cars in the United States will be “electrified” by 2020.

The free tool is online at www.extension.umn.edu/distribution/naturalresources/M1269.html.

Is the U.S. electric power infrastructure adequate for more of these vehicles? Many researchers and government agencies believe it is, said Professor **Bruce Wollenberg** of the Department of Electrical and Computer Engineering. In fact, electric cars and plug-in hybrid vehicles can actually *benefit* the power system in the future, he said. With vehicle-to-grid bidirectional power flow, vehicles can become “distributed energy resources” storing electricity for uses such as peak-load reduction, household backup, and smoothing of renewable generation output. Car batteries would become an “uninterruptible power source for your house,” he said.



Douglas Tiffany Bruce Wollenberg Jerry Fruin

A utility company could buy the energy stored by cars, perhaps as part of a dynamic pricing plan. “Eventually, the electric car becomes a friend, not adversary, to the charging system,” Wollenberg said.

Associate Professor **Jerry Fruin** of the Department of Applied Economics has also studied whether the current network for transporting energy is adequate or if new investment is needed, particularly for biomass. Much of the country’s oil and coal is transported in well-established pipeline or rail networks, respectively, but biomass sources are located in rural areas with less-developed road networks. Fruin said it will be necessary to develop new methods and systems to routinely and reliably store, transport, and handle large quantities of bulky materials of varying characteristics. **CTS**

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scenarios and predict what might happen when nonmotorized transportation facilities change. All route requests ever processed by Cyclopath have been saved, and Cycloplan will use these data to estimate how routes might change with the addition or elimination of a facility in a given area.

After the user enters a facility change, Cycloplan produces a map showing what bicycle routes in the area looked like before the change as well as hypothetical post-change routes. The tool also produces a statistical breakdown showing the associated changes in route lengths. This comparison can help planners estimate the effects of a facility change on nearby routes and bicycle traffic patterns.

“We’ll be able to use this information to evaluate how well connected parts of the region are, determine what types of

investments might have the greatest impact, and prioritize the areas where we have the biggest problems,” Andrew said.

The tool will also provide an opportunity for ongoing public collaboration, with planners able to see where public users are making changes to route maps. In addition, the tool is expected to serve as a forum for public feedback on new projects or facility designs.

“The people that are experts in bicycling are the bicyclists. This is one way to get targeted feedback from them on what kinds of improvements they’d like or what problems they see in the network,” Andrew said.



A user guide for Cycloplan is scheduled for development during the summer of 2011, with the public release of the tool slated for the fall. **CTS**

Study assesses neighborhood and social influences of transit corridors

Yingling Fan, assistant professor in the Humphrey School of Public Affairs, described her study of the social impacts and perceptions of four transit corridors in the Minneapolis–St. Paul metropolitan region. The study’s results, she said, can be used to guide current and future transportation planning.



Yingling Fan

Fan’s research project, sponsored by the Transitway Impacts Research Program (www.cts.umn.edu/Research/Featured/Transitways), focuses on four transit corridors—Hiawatha light-rail transit (LRT), Northstar commuter rail, Cedar Avenue bus rapid transit, and Central Corridor LRT, each of which is at a different stage of planning, construction, or operation.

For each corridor, Fan said, the project undertook four research components: a multidimensional quantification of neighborhood social change in areas near major transit stations, an exploration of underlying mechanisms that drive social change,

an investigation of inter-neighborhood variations in social change, and an examination of residents’ and business owners’ opinions towards social change.

The findings confirmed that residents expect changes beyond transit dimensions, and the majority of them expect these changes to be positive. Overall, urban corridors were more positively perceived than suburban ones, Fan said.

The study brought to light significant inter-corridor and inter-neighborhood variations in transit use and barriers to use, Fan added. The study also showed significant racial and cultural differences in perceptions of neighborhood change and transitway impacts as well as preferences for housing and business development. For example, in the Central Corridor Fan found less tolerance of auto-oriented development among whites, while minority residents like both auto-oriented and high-density mixed-use. These findings demonstrate that culturally appropriate, community-specific engagement and planning are needed, she said.



By examining a wide range of development stages from planning through operation, Fan concluded, this research can help policymakers determine at what point in the timelines of major transit capital projects policy responses are needed and likely to be most effective. And by analyzing community reactions to a variety of transit technologies, this research can help policymakers make decisions to prevent or mitigate socially harmful neighborhood changes associated with various types of transitways. **CTS**

Rough roads are expensive for Minnesota motorists

Rough roads cost Minnesota and its drivers a great deal of time and money each year, according to MnDOT’s **Luke Johanneck**, and these costs increase even more as roads deteriorate further. Rougher roads result in more expensive maintenance and repair projects for MnDOT and increased delays and fuel consumption for motorists.

To measure road roughness, MnDOT uses the International Roughness Index (IRI) and the Ride Quality Index (RQI). RQI scores, which are based on drivers’ perception of road roughness, range from 0 (poor) to 5 (high). MnDOT’s goal is to never have more than 2 percent of principle arterials and 3 percent of non-principle arterials in poor condition (RQI of 2 or less).

When pavements drop below the poor condition threshold, they become more expensive to repair and uncomfortable

to drive on, Johanneck said. MnDOT spends more money on pothole and joint repairs, and more extensive rehabilitation and reconstruction projects are needed to return these roads to a serviceable level. Drivers spend more time in construction-related traffic delays, and cars use more fuel because of the increased rolling resistance experienced on rougher roads. There is also an increase in vehicle repair costs related to flat tires, front-end misalignments, and truck and trailer component failures.

The annual cost of rough roads amounted to \$347 for the average Minnesota driver in 2007, according to an AASHTO report. With just under four million drivers in Minnesota, this comes to a total estimated cost of \$1.3 billion per year. And it’s only going to get worse, Johanneck said.

For MnDOT to meet its pavement

condition targets in 2020, Johanneck said it would need to spend nearly \$290 million more per year than is currently planned. Projections suggest that by 2020, one out of every eight miles of Minnesota road could be in poor condition.

To prevent this continued deterioration, MnDOT is placing increased emphasis on preventive maintenance to “keep our good pavements in good condition,” Johanneck said. MnDOT also has IRI-related incentives because study findings suggest new pavements that start out smoother stay smoother for a longer period of time. **CTS**

‘CrashHelp’ to improve emergency medical response for rural crashes

Over the past five years, researchers with the University’s Intelligent Transportation Systems (ITS) Institute and the Center for Excellence in Rural Safety (CERS)



Tom Horan

have investigated the role that information technology (IT) plays in improving emergency medical responses to victims of rural automobile crashes. The goal of this work is to reduce the adverse health impacts of automobile crash trauma, especially those in rural areas, where crashes account for a high percentage of trauma injury and death.

“One key aspect of reducing [these] adverse medical effects...is to decrease the amount of time it takes emergency services to respond, provide care, and take a patient to the right [trauma level] hospital,” explained **Tom Horan**, a researcher with the ITS Institute and research director of CERS.

Working with his colleague **Ben Schooley**, Horan’s research team assessed the potential value of a Web application that would facilitate a more seamless transfer of patient and incident information from EMS pre-hospital practitioners to hospital emergency

room/trauma center providers as a way to improve patient care during that “golden hour” following a traffic crash. The researchers conducted case studies of EMS systems in San Mateo County, California, and Rochester, Minnesota, to validate the model and study best practices of these rural trauma systems.

Through these efforts, the team found that information collection and handoff from ambulance providers to hospitals is fragmented, Horan said. The case studies also confirmed that new and emerging mobile- and map-based technologies could be used to address this information handoff challenge, and the group moved from concept to development of a prototype system called CrashHelp.

With CrashHelp, emergency responders use a mobile smartphone on-scene to collect multimedia data about crash victims—including digital pictures, audio recordings, and videos—as well as other basic patient and incident information, Horan said. These data are sent directly into the emergency/trauma department to a Web-based interface practitioners can view on demand. This instant messaging of sorts gives hospitals advance notification of crash severity and related information that can be used to best prepare for

a patient’s arrival. EMS agencies responsible for oversight can view aggregate information over time and conduct spatial (map-based) analyses of EMS response trends across the region and state.

Special attention was paid in the design phase to make a user-friendly, electronically secure tool. Additionally, the team has put an important emphasis on system security, Horan said.

The research team is now pilot-testing CrashHelp with EMS agencies and hospitals in the Boise, Idaho, area and is set to go live with the system mid-July. During this three-month pilot study, researchers will evaluate any improvements made in information collected by on-scene EMS personnel, communication between pre-hospital transport and hospitals, care decision making by hospital personnel (for some incidents), and resource use by hospital personnel. Preliminary results from the pilot will be available in late 2011.

Discussions are currently under way to conduct further testing as part of Minnesota’s Toward Zero Deaths (TZD) program.

For more information on this study, visit www.ruralsafety.umn.edu. **CTS**

Upcoming events *To see other events or publicize yours, visit www.cts.umn.edu/Events.*

Sept. 7–8	Conference on Performance Measures for Transportation and Livable Communities, Austin, Tex. See http://livabilityconference.tamu.edu .	Nov. 16–18	American Public Works Association–Minnesota Chapter Fall Workshop and Conference, Brooklyn Center, Minn. See www.cce.umn.edu/APWA-Minnesota-Chapter .
Oct. 4	ITS Minnesota Fall Forum, St. Paul, Minn. See www.itsmn.edu .	Dec. 2	Freight and Logistics Annual Symposium, Minneapolis, Minn. See www.cts.umn.edu/Events/FLOGSymposium .
Oct. 6–7	AirTAP Fall Forum, Breezy Point, Minn. See www.airtap.umn.edu .	Dec. 7	58th Annual Asphalt Conference, St. Louis Park, Minn. See www.asphaltisbest.com .
Oct. 12–14	Minnesota Public Transit Conference, St. Paul. See www.mpta-transit.org/events/conference .	Dec. 8	Annual Concrete Conference, St. Paul, Minn. See www.cce.umn.edu/concrete .
Oct. 18–19	Water Resources Annual Conference, St. Paul. See www.wrc.umn.edu/waterconference .		
Nov. 16–17	Minnesota Toward Zero Deaths (TZD) Annual Conference, Duluth, Minn. See www.minnesotatzd.org .		

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