TECHNOLOGY EXCHANGE
A Newsletter of the Minnesota Local Technical Assistance Program (LTAP)

University of Minnesota
Center for Transportation Studies

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LTAP Inside

Back to school with LTAP and Goldy

Minnesota LTAP is housed on the University of Minnesota's Minneapolis campus, just a touchdown pass or two away from the new TCF Bank Stadium. But our connection to the University is much deeper than just location. We share an important goal: to provide opportunities for continuing education and lifelong learning.

Like the University, Minnesota LTAP provides education programs across the state to help students advance their careers and contribute to society. Since its foundation in 1851, the University has sent forth more than 400,000 graduates who apply their knowledge to make a better world. Minnesota LTAP has some catching up to do, but since our creation in 1993, thousands of workers have taken our classes, and more than 2,000 students are now enrolled in our Roads Scholar program.

The new stadium is an example of the benefits of education. University alumni were

Goldy *continued on page 2*

The TCF Stadium site includes innovative streetscaping and lighting, signage, and storm water best management practices.

Intelligent transportation systems: helping local agencies improve safety

Low-cost intelligent transportation systems (ITS) solutions are now more readily available and can help local transportation agencies reach their safety goals. However, relatively few agencies are using ITS technologies.

In 2008, the Minnesota ITS Pilot Safety Program was established to help local transportation agencies implement ITS technologies by funding ITS consulting assistance for these agencies. The pilot program was a joint venture sponsored by the Minnesota Department of Transportation (Mn/DOT) State Aid for Local Transportation, the Mn/DOT Office of Traffic Safety and Operation, the Minnesota Local Road Research Board (LRRB), and ITS Minnesota. In the initial round of funding, three projects were funded, and two of the projects are now complete.

Background

Many Minnesota cities and counties have established ambitious goals to significantly increase safety on their local transportation systems. However, improving highway safety using standard solutions is more difficult than it once was. Many of these standard safety solutions have already been implemented. In other cases, drivers have simply learned to disregard static traffic warning signs or have become increasingly distracted and fail to notice them.

ITS *continued on page 4*

New resource pages on Web site

Minnesota LTAP has added more resources to its Web site and reorganized it to improve usability.

The Technical Topics page lists topics ranging from bike paths to work zones. Two new topics were recently added: pavements and vegetation management. Clicking on one of the topics takes you to a listing of selected resources about that subject. Resources may include publications and Web sites, videos, and training, plus links to pre-defined searches in TRIS Online and TLCat.

The left column of the home page shows recent entries in the LTAP blog. The blog (short for "Web log") lets you see what's new from LTAP or your peers, ask a question, or share a tip.

The Design Tools page includes selected design tools from the Mn/DOT State Aid for Local Transportation Division, the Minnesota Local Road Research Board, and Minnesota LTAP.

The search page lets you search LTAP & TTAP Centers, University transportation centers, state DOTs, and transit agencies.

Please take a look and let us know if you have any comments about the site or ideas for how we can make it even stronger to meet your needs. *LTAP*

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COMMUNICATIONS

Speakers share tips for communicating with the public

Public participation was the topic of one of the sessions at the Center for Transportation Studies (CTS) 20th Annual Transportation Research Conference. The event was held in Bloomington in May. Highlights from the session are below. To read coverage of other sessions, please see www.cts.umn.edu/Events/ResearchConf.

Hear Every Voice—public participation at Mn/DOT

Scott Bradley, landscape architecture chief in Mn/DOT's Office of Technical Support, described Mn/DOT's "Hear Every Voice" initiative (www.dot.state.mn.us/planning/publicinvolvement), which helps employees learn about and implement effective stakeholder and public participation.

The initiative, which is an expansion of previous Mn/DOT efforts, consists of several components:

- Documentation of public involvement and stakeholder consultation practices with Mn/DOT
- Tools & Resources: online access to participation best practices including foundations of effective participation, planning tools, implementation techniques, evaluation tools, and resource links to other organizations' publications and Web sites
- Training and Skill Development: a comprehensive curriculum of courses and skill practices to support employees in planning, implementation, evaluation, and/or management of public and stakeholder participation. Minnesota LTAP has coordinated this training for Mn/DOT.

There is commitment for Hear Every Voice across Mn/DOT functional areas, Bradley said, and Commissioner Tom Sorel is a "great advocate." In the next biennium, the program may expand to include online training and sessions for local agency personnel.

Although public participation may seem challenging, getting the public's input and approval can result in a better project completed more quickly. The goal of public participation is "to build solutions—not to sell solutions," Bradley explained. "Customers need to be the center of every decision we make and every service we provide."

Bradley then shared some tips of the trade. "Don't expect the public to come to you," he said. "Find out where they congregate and go to them." Use various techniques: go to the mall and to neighborhoods, ride the bus and talk to riders, or go on air. "These are just a snippet of the things we should be thinking of," he said.

Don't waste their time, Bradley continued. Be goal-driven, purposeful, and productive. Know what you need or want, and decide techniques to get there. Clarify who should be involved and discover their interests. Then design, implement, and evaluate your plan.

"Trust is everything," Bradley concluded. "It is critical."

Otter Tail County corridor study

County engineer Rick West described the public participation elements of a road project in Otter Tail County. The 1.7-mile road on the western edge of Pelican Lake runs along highly valued real estate. Traffic on the road is two to three times heavier in the summer because of recreational users. Some years back, he said, the lake association raised concerns about safety and called for a realignment to provide pedestrian and bicycle facilities and reduce speeding.

The corridor has a mix of local and regional traffic, numerous access points, school bus stops, steep ditches, and minimal structural setbacks from the road. The project became a battle of "lakers" versus farmers, and township versus county, West said. To move beyond the impasse, the county retained outside help.

Brian Shorten of SRF Consulting described the process. SRF started with a new approach and set up a steering committee with representatives of all factions. The firm did a traffic analysis and found that some of the preconceived notions weren't true. A speed and vehicle classification study showed that speeding was a significant problem, for example, while heavy trucks were not. The origin-destination study indicated that approximately 80 percent of the future traffic had origins or destinations within the corridor study area. Results of the traffic analysis also showed that in the year 2030, fewer than 500 vehicles would divert to a new western CSAH 9 alignment, but such an alignment could cost approximately $9.2 million. "This changed the whole dynamic of the study," he said.

The consultants presented the data at an open house. They worked with the public to determine their main objectives—reduce speed, improve safety—and asked if those needs could be addressed in a different way, since a new alignment was too costly. The steering committee reviewed the input and deliberated.

A corridor study helped stakeholders discuss safety improvements for this Otter Tail County roadway.

The result? Dual solutions. In the short term, the solution is to construct an innovative rural traffic-calming program around the lake, with sidewalks. In the long term, the county will plan for a new alignment and construct it in 15 to 20 years.

Shorten shared several lessons from the project: stakeholders know their needs, but they can benefit from a technical analysis to define the most appropriate transportation solution. Staffers need to keep an open mind and make public participation a two-way sharing and learning experience. "The final outcome may not be the originally anticipated one by either citizens or technical staff," he said.

West added that citizens didn't contest the engineering analysis. It was the first corridor study done in Otter Tail County, and they would do another "in a heartbeat," he said. "Did it cost more money to do requested studies? Yes. Is it worth it? Yes." ***LTAP***

—Pamela Snopl, LTAP editor

Goldy *from page 1*

involved in many aspects of the stadium design and construction, as well as the plans for game-day traffic control and parking. And you can bet that some of the people who will plow the city streets and maintain the traffic signals around the stadium sharpened their skills at LTAP workshops.

Over the coming months, we plan to reinforce Minnesota LTAP's connection to the University by incorporating maroon and gold in our print and electronic materials. Goldy Gopher will also adorn some pages.

So when you're cheering the Gophers to victory, take a moment to remember your link to the University and the importance of education and—and then register for an upcoming LTAP workshop! ***LTAP***

—Pamela Snopl, LTAP editor

McGinnis named CTS acting director

Laurie McGinnis, a member of the LTAP Steering Committee, has been appointed acting director of CTS. She succeeds Robert Johns, who was appointed director of the Volpe National Transportation Systems Center in Boston. ***LTAP***

Technology Exchange

The **Minnesota Local Technical Assistance Program** is part of the Federal Highway Administration's Local Technical Assistance Program (LTAP). LTAP is a nationwide effort designed to foster and improve information exchange among local practitioners and state and national transportation agencies. Minnesota LTAP is administered by the Center for Transportation Studies at the University of Minnesota, and cosponsored by the Minnesota Local Road Research Board and the Minnesota Department of Transportation.

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LRRB UPDATE

OPERA spotlight:

New technology helps police enforce red-light running

Police officers in Burnsville are getting some help as they work to catch drivers who run red lights, thanks to a tool called an Enforcement Light. Installed as part of a Local Operational Research Assistance Program (OPERA) project that involved the City of Burnsville, Mn/DOT, and the University of Minnesota, the year-old traffic lights have been extremely helpful to police officers enforcing red-light compliance along Trunk Highway 13 in the southern metro. Below is an overview of the project.

Problem

The City of Burnsville and Mn/DOT began investigating red-light violations in October 2007. Between the years of 2002 and 2006, Burnsville averaged 950 crashes a year, with about 360 of those crashes occurring at intersections. Of the intersection crashes, about 70 were right-angle crashes at signalized intersections, indicating that they were most likely the result of red-light running.

Solution and implementation

Researchers and engineers had help from the Florida Department of Transportation (FDOT) as they explored the installation of Enforcement Lights, which aid police officers in catching red-light violators. The Enforcement Light turns blue as the traffic light turns red, allowing nearby police officers to observe violators and issue citations more effectively after the offender has passed through the intersection.

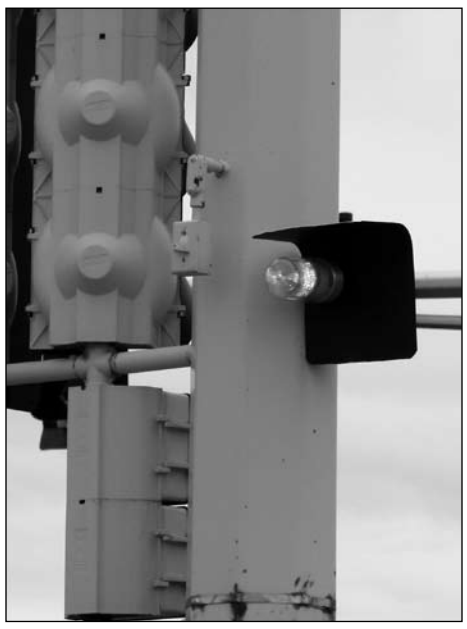
After reviewing crash data at a number of intersections along Trunk Highway 13, in February 2008 officials installed Enforcement Lights where the highway meets County Roads 5 and 11.

Results

With the help of Craig Shankwitz, director of the Intelligent Vehicles Lab at the University of Minnesota, the City of Burnsville conducted a study designed to examine the effectiveness of the Enforcement Lights on Trunk Highway 13. The study indicated that the Enforcement Lights had a positive impact on red-light running. The daily violation rate per 10,000 vehicles was reduced by 41 percent for westbound Highway 13 at County Road 5 and by 84 percent for eastbound Highway 13 at County Road 11. Research also showed that rates of red-light violations were greater with higher volumes of traffic, and that violations occur most often during peak traffic hours (6:00 to 9:00 a.m. and 3:00 to 6:00 p.m.). During the typical peak hour periods (6:00 to 9:00 a.m. and 3:00 to 6:00 p.m.), there were a combined 46 violations, accounting for 63 percent of the four-day total of 73.

Cost

The City of Burnsville received an $8,000 grant from the OPERA program, which officials used to study the impact of the new technology. Each Enforcement Light cost $250 per approach.



Implementation

The two Enforcement Light intersections on Trunk Highway 13 are still being enforced by police officers. The City of Burnsville is also planning to use the technology at other locations throughout the city. ***LTAP***

—Sarah Van Nevel, LTAP intern

The Exchange *regularly highlights projects completed under the LRRB's Local Operational Research Assistance Program (Local OPERA). A sample from the 2009 OPERA annual report is reprinted above. The report will be available later this year at* www.mnltap.umn.edu/opera.

Local OPERA helps to develop innovations in the construction and maintenance operations of local government transportation organizations. Learn more about the program and apply for OPERA funding online at www.mnltap.umn.edu/opera, *or contact Jim Grothaus, Minnesota LTAP director, 612-626-1077,* mnltap@umn.edu.

New LRRB publications at www.lrrb.org

Storm water maintenance BMP resource guide

The use of storm water treatment strategies, often referred to as best management practices (BMPs), has increased significantly due to new storm water regulations. The LRRB Research Implementation Committee has created a resource guide to help local government agencies with their BMP inspection and maintenance activities. City staff and policymakers can use the guide to evaluate various BMPs based on anticipated long-term maintenance requirements.

The Stormwater Maintenance BMP Resource Guide (2009RIC12) focuses primarily on BMPs that have been heavily used in Minnesota and concludes with a brief section covering BMPs that are newer to Minnesota and have been less commonly used to date. www.lrrb.org/pdf/2009RIC12.pdf (7MB)

Subsurface drainage manual for pavements

A new manual created by University of Minnesota researchers will help maintenance agencies select the right subsurface drainage treatments for their particular needs. The research was sponsored by the LRRB and the Minnesota Department of Transportation.

The manual—*Subsurface Drainage Manual for Pavements in Minnesota* (Mn/DOT 2009-17)—collects and synthesizes information from many sources. It includes an overview of subsurface drainage structures as well as guidelines for selecting, designing, constructing, and maintaining drainage structures. Additional appendices provide recommended procedures, design plans, charts and tables, and additional examples. The information is intended to address pavement types and situations commonly found in Minnesota. www.lrrb.org/pdf/200917.pdf (5MB)

Innovative contracting methods

The LRRB has developed a new resource—*Innovative Contracting Methods* (2009RIC02)—to help local government agencies learn how to use contracting processes more cost-effectively. It provides guidance on topics including Mn/DOT's Innovative Contracting Web site, Minnesota local government experience, contracting 101, best value procurement for contractors, bidder qualification, and alternate bidding. www.lrrb.org/pdf/2009RIC02.pdf (0.5MB)

Preventive maintenance for recreational trails

This report (2009-25) discusses existing preventive maintenance treatments for recreational trails and the effectiveness of those treatments, and also promotes new treatment methods and regular scheduled maintenance to preserve the trails. Test sections of the various treatment methods were evaluated for ease of construction, how successfully they sealed the surface, and trail users' opinions of the surface. www.lrrb.org/pdf/200925.pdf (0.6MB) ***LTAP***

Value capture for transportation finance

The Center for Transportation Studies at the University of Minnesota has released research findings on the use of "value capture" for financing transportation projects. Value capture is a type of infrastructure financing in which increases in private land values generated by public investment are in part "captured" through a variety of approaches to help pay for infrastructure projects.

The study, commissioned by the state legislature, identified eight policies that can be classified as value-capture strategies: land value tax, tax increment financing, special assessments, transportation utility fees, development impact fees, negotiated exactions, joint development, and air rights. Some value-capture strategies target property owners, while others target developers. The strategies differ in how, when and where they may be applied. Statutory changes would be needed to use some of them in Minnesota.

Research publications on the project, including a policy summary, report to the Minnesota Legislature, and final technical report, are available at the study site: www.cts.umn.edu/www.cts.umn.edu/Research/ValueCapture. ***LTAP***

SAFETY

The Traffic Corner: Traffic safety near schools

According to the Centers for Disease Control, "motor vehicle injuries are the leading cause of death among children in the U.S." Now that school is in full swing and the snow isn't too far away, what are you doing to make the traffic near your schools as safe as possible? Based on my experience with several grade schools and high schools, here are some simple things you can do:

Minimizing vehicle/student interaction
Minimizing the amount of time students mix with vehicles is the low-hanging fruit of school traffic safety. These measures typically don't cost anything, but they are usually specific to each school. You are trying to control where students come into the school and leave the school so they don't mix with a lot of vehicles. If at all possible, you don't want kids crossing the street to get into buses or their parents' cars.

An example would be having parents drop off their kids at a school entrance instead of letting them out on the street. Another example is loading students into buses or vehicles in a tightly controlled manner: (1) no vehicles are allowed to move in the loading area while students are being loaded, (2) an adult is in charge who signals the vehicles or buses when all the students are loaded, (3) the vehicles leave in a single-file line, and (4) the next platoon of vehicles or buses is loaded.

Increasing student visibility
Trees, shrubs, fences, buses, and parked vehicles should be limited in crossing areas so drivers can see kids in time to stop for them. Obstructions should be removed within the school grounds and along the school walking routes. This is most important at elementary schools because the children are smaller. A 3-foot-high shrub would be a problem at an elementary school but not at a high school.

When possible, students should cross traffic in groups so they will be more visible. If there are concentrations of students who walk or bicycle along the same route, a "walking school bus" or "bicycle train" system can be developed. The students go to their corner at a certain time and get "picked up" by the group in the same fashion a school bus operates. These work best if an adult volunteer goes with the group, starting at the first "stop."

Slowing down traffic
The speed of a vehicle in a crash greatly determines the severity of injuries. Slowing down vehicles within the school grounds and on the streets adjacent to the school is a significant way to improve safety. Go to www.TrafficCalming.org to learn effective ways of slowing down traffic. ***LTAP***

(Mike Spack, P.E., is the president of Spack Consulting. Before starting his firm, Spack worked for the City of Maple Grove as traffic engineer. He is a regular contributor to the newsletter, writing brief articles on traffic engineering topics.)

Enhanced version of SafeRoadMaps.org

The Center for Excellence in Rural Safety (CERS) at the University of Minnesota has launched an enhanced version of SafeRoadMaps.org to help drivers identify the most dangerous portions of upcoming trips.

The online service flags the nation's Top 100 "Hot Zones," the rural areas that have experienced the most fatalities over the past five years. The hot zones are presented in a Google Maps-based format, where viewers can zoom from a national map showing all 100 zones down to a photo of each individual section of the road.

SafeRoadMaps.org, unveiled in July 2008, is a powerful and visually innovative crash-mapping tool that maps out every roadway fatality in the nation to the local level. Site visitors need only enter a zip code, municipality name, or street address to immediately see a map or satellite image of all the road fatalities that have occurred in the chosen area over the past five years. Details about each crash are also available, such as whether the driver was wearing a seat belt, drinking, or speeding. In addition, the tool notes which life-saving public policies, such as strong seat belt laws, are being employed in the chosen area. ***LTAP***

ITS *from page 1*

In recent years, the advancement of ITS technologies has greatly increased traffic safety on interstates and other state highways. But despite the increasing availability of "off-the-shelf" ITS solutions that can be easily implemented at the local level, relatively few local public agencies utilize ITS technologies.

Barriers exist to implementing ITS solutions at the local level. In some cases, local transportation organizations lack experience with or knowledge of ITS solutions. In other instances, decision makers are wary of spending the few transportation safety dollars they have on an untested ITS solution that has not yet been implemented at the local level. In many more cases, local transportation organizations have an adequate level of comfort with and understanding of ITS solutions, but simply lack funding to purchase and deploy these solutions.

Creating the ITS Pilot Safety Program
This new safety program provided $10,000 grants for local agencies to foster and generate interest in the development and deployment of ITS solutions to address traffic safety-related deficiencies on the local road system. The pilot program money could be used by cities and counties to retain a consultant for the development of an ITS solution for specific traffic safety problems. The intent of this program was to provide enough preliminary design or research to allow the agency to move forward with the deployment of the ITS solution. In addition, the project consultant would be required to create an informational white paper detailing their work. The white paper would then be shared with other local public agencies to provide additional support and guidance for ITS solutions at the local level.

A call for ITS Pilot Safety Program projects was made in February 2008, and eight project applications were received. The project review committee evaluated and scored the applications, and four projects were selected to receive funding. One of the agencies later withdrew its request, so three projects were funded. One of these projects is described on page 5, and information about the others will be on the Minnesota LTAP Web site.

Pilot program conclusions
The two counties that have currently completed work under the ITS Pilot Safety Program—Olmsted and St. Louis—report great success with the ITS consulting process. Both county engineers found the consulting process extremely beneficial and say it required a minimum time commitment on the part of their busy county engineering staffs. The greatest time commitment was at the application and kick-off stage of the project. After an initial meeting with the consultant, both engineers say the project progressed with little oversight or direction needed on their parts.

Both Olmsted and St. Louis County engineers intend to pursue the solutions outlined in their ITS consultant's reports.

The county engineers felt providing funding for local ITS solutions is the best way to bring ITS applications to the local level. They say that in most cases, local public agencies have some familiarity with ITS solutions or know where to turn for low-cost or free assistance. The greatest barrier they identified to local ITS programs was a lack of funding and reluctance on the part of engineers and local leaders to apply their very limited transportation dollars to sometimes-costly ITS solutions. Both engineers felt the ITS Local Pilot Safety Program was an extremely helpful funding source. ***LTAP***

—Megan Tsai, LTAP freelancer

SAFETY

An intelligent solution for school bus safety

It was a typical day at the St. Louis County Public Works Department. The county's acting traffic engineer, Vic Lund, was driving the county highways when Brian Boder, the resident engineer traveling with him, made an observation. He noted that while their county's highways had about 20 "School Bus Stop Ahead" warning signs, drivers rarely saw buses near the signs and probably were conditioned to disregard them. The two engineers put their heads together and came up with an idea for a dynamic warning sign—one that would alert drivers when a school bus was actually present, and as a result improve the signs' effectiveness.

Back at the office, Lund did some additional calculations. Taking into account the fact that school buses are only at each sign a few minutes a day and only on school days, he estimated a school bus is present at each sign just 0.15% of the time during the calendar year. Though there had been no recent incidents of St. Louis County children being hurt as the result of drivers disregarding bus stop warning signs, these types of crashes do happen. From 1997 to 2006, there were 1,475 crashes at or near school bus stops nationwide. Of those crashes, 204 involved a vehicle rear-ending or driving around a stopped bus. With no local funding available to pursue a dynamic warning sign solution, however, Lund set aside the idea.

A unique funding source

Not long after Lund and Boder came up with the idea for dynamic "School Bus Stop Ahead" warning signs, a unique source of funding came along. The program was called the Local Intelligent Transportation Systems (ITS) Pilot Safety Program—a joint venture funded by the Minnesota Department of Transportation (Mn/DOT) State Aid for Local Transportation, the Mn/DOT Office of Traffic Safety and Operation, the Minnesota Local Road Research Board, and ITS Minnesota. Under the program, local public agencies could apply for funding to hire an ITS consultant. The consultant would then develop ITS solutions for a specific traffic safety problem. The goal of the program was fostering interest in the development of ITS solutions for the local road system.

The Local ITS Pilot Safety Program seemed like a perfect way to explore the idea for a school bus stop dynamic warning system. "A dynamic school bus warning system really fits with our public works department's mission of providing safe transportation," says Lund. "Any engineering or maintenance activity that enhances traffic safety for motorists out on our roads is important to us, so we were eager to pursue this funding source."

The county applied for Local ITS Pilot Safety Program funding, and was one of three Minnesota local public agencies selected to receive $10,000 in funding to hire an ITS consultant and pursue their idea for an ITS safety solution.

A smooth process

For St. Louis County, selecting an ITS consultant was a fairly simple process. The county sent out three requests for proposals (RFPs), and only one consultant of the three responded. Luckily the consultant, the SRF Consulting Group, met all the RFP requirements and was selected to complete the consulting project. Lund guesses that the relatively low cost of the project led to the lower response rates to the county's RFP.

With the consultant selection complete, the project process began. "We had an initial kick-off meeting, which included a brainstorming session about where we wanted the project to go and the project deliverables," says Lund. "From there, the consultant pretty much took off."

Seeking an ITS answer

The SRF investigation into possible designs for a dynamic "School Bus Stop Ahead" warning sign identified five potential ITS solutions to this challenge, each with benefits and drawbacks.

Solution one: two-way radio (DSRC). The first approach identified for dynamic school bus warning signs was dedicated short-range communications (DSRC). This is the only solution currently in use—this type of system was deployed in 2007 in the City of Granite Falls, Minnesota. In the two-way radio approach, the bus is fitted with a continuously broadcasting radio transmitter. When the receiver at the sign picks up this signal, it activates an output controller that flashes the beacons on the sign. The sign is powered by a solar panel and does not require an electrical connection. The cost for this solution is about $3,000 for equipment on the bus and up to $20,000 per sign.

Solution two: vehicle pre-emption/priority. Vehicle pre-emption and priority devices are commonly used to allow emergency vehicles to turn a traffic light green and pass safely through an intersection. This approach uses the same technology to allow school buses to activate dynamic "School Bus Stop Ahead" signs. The advantage of this method is St. Louis County traffic engineers are already familiar with these systems. However, there are also many disadvantages including maintenance issues, bulky receivers, and the need for a commercial utility electrical connection. The cost for this type of system would be more than $5,500 per sign and about $700 per vehicle.

Solution three: Radio Frequency Identification (RFID). Radio Frequency Identification (RFID) is commonly used in electronic tolling applications—such as the MnPASS—but can be used in many other applications as well. This solution uses active tags both at the sign and on the bus. These tags are basically small data radios that communicate with each other. When the bus comes into range, the dynamic sign would begin flashing, and when it passes out of range the sign would stop flashing. The tags are very small and use little power, so no electrical connection would be needed. However, there are no "off-the-shelf" solutions currently available for this approach. After development costs, the system would cost about $2,000 per sign and $1,200 per vehicle unit.

Solution four: machine vision. Machine vision uses cameras for vehicle detection, and is widely used in traffic management applications. In a dynamic "School Bus Stop Ahead" sign system, the camera would be programmed to activate the sign's flashers after detecting a school bus, and would deactivate the flashers using either a timer or by detecting the absence of a bus. This approach would not require any equipment on the school bus; however, the

Bus *continued on page 7*

Tips for local transportation agencies working with ITS consultants

Many ITS technologies are now available as reasonably priced "off-the-shelf" solutions that can be easily deployed by a local transportation agency with no outside assistance. But sometimes, when you are facing a unique ITS challenge or need assistance developing a more customized solution, calling in an ITS consultant to help may be a smart choice.

The following tips on working with an ITS consultant were gathered as part of the Minnesota ITS Local Pilot Safety Program (see story on page 1). If you work for a local transportation organization, these tips will help you make the most out of your experience working with an ITS consultant:

Set a realistic budget. Consulting help comes with a price. Participants in the Local ITS Pilot Safety Program found $10,000 was enough to cover a kick-off meeting, site visits, a white paper describing the consultant's findings and recommendations, a presentation to county leaders, and additional project support (for example, being available to answer follow-up questions).

Contact a number of consultants. Lower-budget projects don't always receive an overwhelming amount of response from busy consultants. Be sure to send your request for proposals to enough consultants to ensure you receive the number of responses you desire.

Hold a kick-off meeting. The best way to get a consulting project off on the right track is to pull all the project stakeholders together in one room. This is a good time to set deliverables, lay out project expectations, and get your questions answered.

Turn over the reins. A major perk to hiring a consultant to help with your ITS project is the time and energy you save through outsourcing. Give yourself and your busy engineering staff a break, and allow the consultant to complete its work independently. Of course, if the consultant contacts you with questions, respond as promptly as possible to keep the project on schedule.

Edit carefully. Once you receive the consultant's report, read it over carefully. Don't just check for typos and grammar, but for clarity as well. If anything in the report is unclear, ask the consultant to revise that portion of the report. If you're having trouble visualizing anything, see if the consultant can add a graphic to better illustrate the idea. Remember, now is your chance to get your questions answered!

Involve local leaders. After the report's revisions are complete, look for an opportunity to present local leaders with the consultant's findings. Giving your leaders the opportunity to ask questions and learn more about the project may help you gain support for the project's funding and for exploring and implementing other ITS solutions.

Share your knowledge. Are there other local transportation agencies that could benefit from your ITS consulting project? Consider sharing the knowledge you gained through professional forums, transportation meeting presentations, and publications.

LTAP

—Megan Tsai, LTAP freelancer

MAINTENANCE

Liquids, chemicals, applications, and technology for winter maintenance

"Plowing snow is a hard job." Thomas Broadbent, consultant and local expert in anti-icing chemicals and processes, would know—he started out as a snowplow operator in downtown Minneapolis and then in Duluth. (He was also the first instructor for the Circuit Training and Assistance Program—CTAP—run by Minnesota LTAP.) Broadbent's on-the-ground experience taught him that there were no guidelines for sand and salt mixtures, so he created guidelines himself that standardize the mixture, and Mn/DOT then refined them. Since then he has been both a salesperson and consultant for anti-icing products. At the 2008 annual conference of the Minnesota chapter of the American Public Works Association, Broadbent demystified winter maintenance liquids with the goal of helping participants select appropriate anti-icing liquids or blend their own product.

Broadbent's mantra for conference participants was, "Liquid is in your future." Liquid anti-icing products are the future, he said, so he encouraged the audience to take four steps quickly. First, manage application rates by calibrating sanders, using application guidelines, and converting manual controllers to ground-oriented controllers. Second, "go out with the wet stuff." Use liquid-treated salt products and use saddle tanks to introduce liquid at the auger or conveyor. Third, buy anti-icing equipment but start small, be strategic in your use of that equipment, and "give yourself a season to get used to the equipment and product." And last, buy a 6,000-gallon storage tank because liquid storage "will be as basic to snow and ice operations as a salt shed."

Broadbent noted that there was a salt shortage in 2008 due to disrupted barge traffic and hurricanes that affected salt mine operations. The potential for shortages and steep cost increases, as well as growing concern about the environmental impacts of salt, means agencies need to increase accountability and control salt application, Broadbent said. Chemicals will become more sophisticated and effective but also more expensive, he predicted, so if operators are going out with a premium product, they need to use application guidelines so they use just the amount of product needed. "Our natural tendency is to overuse," he said.

In addition to following standardized guidelines, ground-oriented controllers used with auger spreaders that adjust to truck speed work well. Broadbent said that vendors can help calibrate the controllers, and that pre-wetting equipment should be calibrated as well. Tests have found that tailgate sanders are inaccurate even with good controllers. Another helpful tip: use just one style of controller so operators don't have to learn and use different controllers.

Liquids and granular products each have advantages and disadvantages, he said. Granular products are concentrated but they need to go into liquid solution in order to work; low-speed, low-traffic roads including turn lanes and ramps are harder to clear. Granular products are effective for low moisture events. However, granulars don't stay in place. Bounce and scatter studies show that larger chunks scatter farther, so finer granules are better.

Liquids such as salt brine will melt snow and ice quickly and break open compaction so second applications are often unnecessary. Treated salt products, according to Broadbent, work faster, work in cold temperatures, and reduce bounce and scatter, so they are an efficient way to coat with salt and cut application rates by 30 to 50 percent. Upfront costs include higher product, equipment, and labor costs. "Pre-made treated salt products work differently but they all work," he said, "so pay attention to price and availability."

To control product cost, Broadbent suggested making a treated salt solution using 4 to 6 gallons per ton. He said it needs to be mixed in a storage tank and just enough can be mixed a day or two before a predicted storm. He suggested that this liquid be applied before the snow to keep the surface wet beneath the snow. "Start out small," he said. "Buy a storage tank and a pre-made product; use 35 psi bar pressure and only streamer nozzles; use a ground-oriented closed loop controller; and apply 20 to 40 gallons per lane mile."

"Better products and equipment should equal safer roads but they don't," Broadbent concluded. He made a plea for legislation to slow speeds during storms and to ask the public to slow down when the roads are bad. "Our job is to calibrate annually, manage application rates, go out with the wet stuff, buy a tank, and use liquids," he said. *LTAP*

—Jeanne Engelmann, LTAP freelancer

Maintenance Research Corner

Staff of Mn/DOT's Maintenance Operations Research (MOR), along with the members of the Mn/DOT New Technology, Research, and Equipment Committee (NTREC), publish a monthly one-page bulletin of their latest news and findings. Below are highlights from recent bulletins. If you would like to be added to the bulletin mailing list, please e-mail Farideh Amiri of Mn/DOT Maintenance Research at farideh.amiri@dot.state.mn.us.

Litter picker

The amount of litter along Minnesota's roadways is a growing and ugly problem for maintenance personnel. The Barber Litter Picker gathers, hoists, collects, and dumps debris at speeds up to 18 mph. This system has hundreds of small stainless steel tines. These tines lift the debris from pavement or grassy areas and convey them into a 4-cubic-yard hopper that can be raised 8 feet for dumping. The system was originally developed for cleaning beaches on the East Coast. Following a demo at MnROAD, Metro has decided to try this unit for a month. They will determine if this system is safer, faster, and more efficient than its current trash removal method. If the Litter Picker is successful, it could definitely simplify trash removal along Minnesota highways.

For information, call Dewy Jones, Metro District superintendent, 651-234-7944, or see www.hbarber.com.

Litter picker

Rumble strips

RoadQuake temporary portable rumble strips alert drivers to reduce speed. RoadQuake can be used in numerous highway and road construction applications including short-term work zones, temporary lane closures, or law enforcement check points. RoadQuake is a temporary device and does not require adhesives or fasteners for installation. District 3 will evaluate these rumble strips' effectiveness of alerting drivers approaching a work crew.

For information, call Randy Reznicek, District 3 St. Cloud superintendent, 320-223-6568, or see www.plasticsafety.com. *LTAP*

On-spot chains make the job easier for snowplow operators in Eagan

Each year as summer fades into fall, Minnesotans begin to brace themselves for another long, cold winter. Snowplow operators in Eagan may be dreading winter less this year, thanks to new technology that makes their job a lot easier. On-spot chains provide increased traction for snowplow trucks, allowing plow operators to do their job more quickly and efficiently.

The technology features a mechanical apparatus placed directly behind a vehicle's rear wheels designed to "spin" the circle of attached chains in a way that provides more traction during slippery conditions. The chains take the place of the conventional snow chains that are commonly used on single-axle snowplow trucks during severe winter snow and ice conditions.

Snowplow operators in Eagan have used on-spot chains almost continuously for the past three winter seasons, and according to the city's operations manager, Tom Struve, the results have been remarkable. "Eagan has 646 cul-de-sacs and dead ends, many on down slopes or hills, exacerbating traction problems," Struve said. "Since the introduction of on-spot chains, operators have required no assistance 'getting unstuck,' and turnaround times have decreased."

Skeptical maintenance workers and city planners may be looking for a catch, but according to Struve (a member of Minnesota LTAP's Steering Committee), there isn't one. "On-spot chains are simply remarkable. We have experienced no cons," he said. "They do not mar roadway surfaces and

Chains *continued on page 7*

INFORMATION SERVICES

The Shelf

Questions? Contact Arlene Mathison, Minnesota LTAP librarian, 612-624-3646, amathison@umn.edu.

Fact sheet

Seat Belt Use in 2008—Use Rates in the States and Territories *(National Highway Traffic Safety Administration's National Center for Statistics and Analysis, 2009)*

This traffic safety fact sheet explores seat belt use rates on a state-by-state basis. According to the report, jurisdictions with stronger belt enforcement laws continue to exhibit generally higher use rates than those with weaker laws. http://www-nrd.nhtsa.dot.gov/Pubs/811106.PDF (PDF)

Guide

Best Practices: Roadside Vegetation Management *(American Association of State Highway and Transportation Officials, 2009)*

This guide explores the wide range of concerns associated with roadside vegetation management, including erosion prevention, sedimentation control, spread of noxious weeds, transportation concerns, and efficient use of resources to accomplish management objectives for the right-of-way. http://environment.transportation.org/environmental_issues/construct_maint_prac/compendium/manual/9_0.aspx

Vegetation Control for Safety: A Guide for Local Highway and Street Maintenance Personnel *(Federal Highway Administration, 2009)*

The purpose of this guide is to help local road agency maintenance workers identify locations where vegetation control is needed to improve traffic and pedestrian safety, to provide guidance for maintenance crews, and to make them aware of safe ways to mow, cut brush and otherwise control roadside vegetation. http://safety.fhwa.dot.gov/local_rural/fhwasa07018/fhwasa07018.pdf (PDF)

Tribal Road Safety Audits: Case Studies *(Federal Highway Administration, 2009)*

Road Safety Audits (RSAs) are an effective tool for improving the future safety performance of a road project during the planning and design stages, and for identifying safety issues in existing transportation facilities. To demonstrate the usefulness and effectiveness of RSAs for tribal road agencies, the Federal Highway Administration (FHWA) Office of Safety and Office of Federal Lands sponsored a series of four tribal RSAs. The results of the tribal RSAs have been compiled in this case studies document. The aim of this document is to provide tribal governments with examples and advice that can assist them in implementing RSAs in their own jurisdictions. http://safety.fhwa.dot.gov/rsa/ tribal_rsa_studies/tribal_rsa_studies.pdf (PDF)

W-Beam Guardrail Repair: A Guide for Highway and Street Maintenance Personnel *(Federal Highway Administration, FHWA-SA-08-002)*

The purpose of this guide is to provide highway and maintenance personnel with up-to-date information on how to repair damaged W-Beam guardrail, the most frequently used barrier system. Three levels of damage are described and guidance is provided on the need and procedure for appropriate repairs. Appendices provide information on the resources (equipment, tools, crew, and time) that will be needed and forms for inspection and maintenance. http://safety.fhwa.dot.gov/local_rural/fhwasa08002

Report

Aggressive Driving: Research Update *(AAA Foundation for Traffic Safety, 2009)*

This report reviews published scientific literature on aggressive driving, explores various definitions of aggressive driving, examines several specific behaviors that are typically associated with aggressive driving, and summarizes past research on the individuals or groups that may be most likely to behave aggressively. http://www.aaafoundation.org/pdf/AgressiveDrivingResearchUpdate2009.pdf (PDF)

Impact of Shoulder Width and Median Width on Safety *(Transportation Research Board, 2009, NCHRP Report 633)*

This report explores crash prediction models and accident modification factors for shoulder width and median width on rural four-lane roads. http://www.trb.org/news/blurb_detail.asp?id=10558

Video

Roads, Rails and Urban Change *(University Metropolitan Consortium and TPT)*

Video about the history of transportation in the Twin Cities, looking at the future of transportation and land use in the metropolitan area. (DVD)

Search me

The Minnesota LTAP Web site features custom search engines to help you find information. You can search:

- LTAP & TTAP Centers
- State DOTs
- Transit agencies
- University transportation centers

Bookmark www.mnltap.umn.edu/SearchOptions.html.

Another great resource is TLCat, the Transportation Libraries Catalog. It is an online database of the leading transportation libraries with extensive transportation-related research and publications. Along with links to many other organizations, TLCat is accessible at www.mnltap.umn.edu/KnowHow/TransportationOrganizations.html. ***LTAP***

Web site

Emerald Ash Borer

This site provides information on the emerald ash borer, an exotic beetle that has destroyed tens of millions of trees in the Midwest and eastern United States. http://www.emeraldashborer.info ***LTAP***

Click, Listen & Learn

Click, Listen & Learn is the American Public Works Association (APWA) series of interactive Internet educational programs. (APWA is a partner of the National LTAP Association.) The schedule through May 2010 is online.

Upcoming topics include urban street trees, succession planning, and disaster recovery. For information, see www.apwa.net/Education/CLL. ***LTAP***

Chains *from page 6*

have required almost no maintenance or up-keep, and they do not transfer rough ride characteristics to the operator as older generation chains used to do. I would highly recommend them to any agency."

—Sarah Van Nevel, LTAP intern

On-spot chain

Bus *from page 5*

camera systems would require a commercial utility electrical connection. The cost for this system would be about $20,000 per sign unit.

Solution five: GPS geo-fencing. A geo-fencing solution would monitor the position of each school bus using GPS. When the bus enters into a specified "virtual fence" area, the nearby "School Bus Stop Ahead" sign flashers would be activated. This system would also allow for the real-time monitoring of the bus fleet. Obstacles to this solution include a high development cost and limited access to the wireless data network—which is required for the system to operate—in northern St. Louis County. After development costs, this system would cost more than $3,000 per sign unit and more than $2,000 per vehicle.

Pursuing a promising solution

SRF presented its findings to St. Louis County leaders, where the report was well received. "The report was presented to our county board members at one of their regular meetings and they were unanimously in support," says Lund. "In fact, they took a non-binding 'straw poll' vote voicing their support for pursing this project. They were very excited about using technology to improve safety."

The ITS consultant, Lund, and county leaders determined that even though "off-the-shelf" RFID technology for dynamic "School Bus Stop Ahead" signs is not currently available, RFID is the most promising and cost-effective solution.

Currently, the county is pursuing additional funding sources to pursue Phase Two, which is to develop three working prototypes and deploy them in the field for testing. Locations under consideration are along a state trunk highway and county highway in St. Louis County. The consultant has spoken with a traffic equipment manufacturer who expressed interest in eventually producing the dynamic "School Bus Stop Ahead" signs as an off-the-shelf technology solution that could be simply and inexpensively implemented by other local transportation agencies.

According to Lund, funding is the primary barrier local transportation agencies face when pursuing ITS technologies like dynamic "School Bus Stop Ahead" warning signs. Lund says the ITS Local Pilot Safety Program was instrumental in helping his county public works department explore its innovative idea. Now thanks to that help, the county is continuing to pursue this important ITS research that may eventually make getting to school safer for kids across the country. ***LTAP***

—Megan Tsai, LTAP freelancer

TRAINING AND EDUCATION

Calendar

If your professional organization meets on a regular basis, let us include the information here. Contact us at mnltap@umn.edu.
For an up-to-date list of events in Minnesota, please see the LTAP workshops and events calendar: www.mnltap.umn.edu/events.

	Date	Event	Location	Contact
December–February				
	Dec. 2	Minnesota Association of Asphalt Paving Technologist's Annual Asphalt Conference	Brooklyn Park, Minn.	http://mn-aapt.org/
	Dec. 3	Annual Concrete Conference	St. Paul	www.cce.umn.edu/conferences/concrete
LTAP	Jan.–Apr.	Truck-Weight Compliance Training (1 cr)	Statewide	612-624-4754, cceconf2@umn.edu
	Jan. 19–22	Minnesota County Engineers Association Annual Conference	Gull Lake, Minn.	Clair Daley, 612-624-3492, cceconf3@umn.edu
	Jan. 27–29	County Engineers Association of Minnesota Annual Conference	Brooklyn Center, Minn.	Clair Daley, 612-624-3492, cceconf3@umn.edu
	Feb. 11	14th Annual Minnesota Pavement Conference	St. Paul	www.cts.umn.edu/Events/PavementConf
LTAP	Feb. 23	Asphalt Pavement Maintenance & Preservation	Bemidji, Minn.	612-624-4754, cceconf2@umn.edu
LTAP	Feb. 25	Asphalt Pavement Maintenance & Preservation	Rochester, Minn.	612-624-4754, cceconf2@umn.edu
LTAP	Feb. 26	Asphalt Pavement Maintenance & Preservation	Medina, Minn.	612-624-4754, cceconf2@umn.edu
March–April				
	March–Apr.	League of Minnesota Cities Safety & Loss Control workshops	Various	www.lmc.org/page/1/upcoming-events.jsp
LTAP	March 2	Transportation Career Expo	Minneapolis	612-625-5608, haag0025@umn.edu
	March 3	54th Annual Asphalt Contractors' Workshop/Quality Initiative Workshop	Brooklyn Center, Minn.	www.asphaltisbest.com/calendar.asp
	March 18–19	Concrete Paving Association of Minnesota 49th Annual Concrete Paving Workshop	Breezy Point, Minn.	www.concreteisbetter.com
	March–Apr.	League of Minnesota Cities Safety & Loss Control Workshops	Various	www.lmc.org/page/1/upcoming-events.jsp
LTAP	Apr. 20–21	Spring Maintenance Training Expo	St. Cloud, Minn.	www.mnltap.umn.edu/Events/SpringMaintenanceExpo
LTAP	Apr. 27–28	CTS Transportation Research Conference	St. Paul	www.cts.umn.edu/Events/ResearchConf
LTAP	Apr. 28–29	Concrete Pavement Rehabilitation for Local Roads	Waseca, Minn.	612-624-4754, cceconf2@umn.edu

LTAP workshops

LTAP workshops, along with events cosponsored by Minnesota LTAP, are marked with an *LTAP* above. Check the Web for details: www.mnltap.umn.edu/workshops. You may also register online.

Brochures advertising upcoming LTAP workshops are mailed six weeks prior to the first scheduled workshop. Electronic notices are sent as a reminder approximately three weeks later. To be included on our electronic mailing list, contact Minnesota LTAP at mnltap@umn.edu or call 612-625-1813.

Disability accommodations are provided upon request.

CTAP workshops

If the events above aren't convenient for you, consider scheduling a Circuit Training and Assistance Program (CTAP) workshop in your neck of the woods. CTAP uses a fully equipped van to provide on-site technical assistance and training. Current CTAP training courses and special presentations are:

- Asphalt Pavement Maintenance and Preservation (0.5 cr)
- Culvert Installation and Maintenance (0.5 cr)
- Gravel Road Maintenance / Dust Control (0.5 cr)
- Roadside Vegetation Management and Erosion Control (0.5 cr)
- Snow and Ice Control Material Application (0.5 cr)
- Truck and Equipment Washing Best Practices (0.5 cr)
- Work-Zone Traffic Control and Flagger Training (0.5 cr)

CTAP workshops are informal and usually hands-on—in fact, many are held in or adjacent to maintenance facilities. Sites with easy access for the van are preferred. CTAP fees are $250.00 for 8 to 10 participants and $350.00 for 11 to 40 participants. The fees are for a two- to four-hour CTAP workshop. To schedule classes, call the CTAP instructor, Kathy Schaefer, at 651-366-3575, or e-mail Kathleen.Schaefer@dot.state.mn.us.

Roads Scholar credit

You can earn credits in Minnesota LTAP's Roads Scholar program by attending LTAP and CTAP workshops and other cosponsored events (credits are indicated above). Required workshops and electives are subject to change. To learn more or enroll in the program, visit www.mnltap.umn.edu/roadsscholar. *LTAP*

Roads Scholar credit offered at 'How to" workshop

The Northland Chapter of the American Traffic Safety Services Association (NCATSSA) will hold its 18th annual "How to" safety training workshop March 16 and 17, 2010, in Fargo, North Dakota. The conference is open to city, county, state, and federal agencies as well as consulting engineers and contractors.

The conference is intended for field-level installers, supervisors, and designers who work in the areas of work-zone traffic control, permanent signing, and pavement marking.

Participants may enroll in the work-zone training and receive half a credit toward Minnesota LTAP's Roads Scholar Program.

Tentative topics include ADA-compliant work zones, sign installation, and pavement marking materials.

New for 2010, the chapter is sponsoring a technical Striper Operator Training session on the afternoon of March 15, immediately preceding the How-to workshop. Also new, the chapter is sponsoring a "Sign Maintenance and Minimum Retroreflectivity Seminar" on March 17 and 18 immediately following the How-to workshop. Please note that these new sessions are NOT part of the How-to training.

Advance registration materials will be mailed out in November, or you can register at www.atssa.com. If you have any questions, please contact "How to" committee member Rick Shomion of Mn/DOT, 651-366-3575, rick.shomion@dot.state.mn.us. *LTAP*

Happenings from the coordinator

Happy Thanksgiving, and welcome to my first attempt at writing a column! Working at the Center for Transportation Studies for the last 12 years and with LTAP for several of those, I have had the pleasure of getting to know many fine people involved in the many different facets of the transportation world. So, I thought some of you might be interested in the things we do and participate in here that aren't strictly "LTAP." I will take up a little space in each issue of the *Exchange* to share our latest news and happenings.

Over the summer, Jim Grothaus and I helped staff the CTS booth at the state fair. The booth, which was located in the U of M building, showcased "Gridlock Buster," an interactive game designed to let kids learn about traffic management (free at www.its.umn.edu/GridlockBuster). You should try it! I played it and it's tough—the kids are much better. We also had our "Safe Roads Map" available for the adults to view (see page 4). Participants can plug in their zip codes to see how traffic crashes in their communities compare to different portions of the state or the country. And finally, the hit of the event was the on-stage version of CTS Transportation Jeopardy. Jim Foti, the *StarTribune's* "Road Guy" blogger and columnist, was the host of our game. Contestants had a great time learning about transportation-related topics and issues. Many people were very knowledgeable and answered some tough road, traffic, and technology questions. The exhibit was a great success, and everyone had a lot of fun.

In the future I will bring you updates on new research and technology, past and future trainings, Roads Scholar information and events, and…who knows what else might be out there.

Hope you have a safe and happy holiday season. *LTAP*

—Mindy Carlson, LTAP program coordinator

Mindy Carlson (right) at the State Fair

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