



CHALLENGES

OPPORTUNITIES

2006—07 Annual Report
Upper Great Plains Transportation Institute



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The Upper Great Plains Transportation Institute is an independent research and education center at NDSU. Administratively, it is directly responsible to the university provost. The Institute conducts research related to the immediate and long-term transportation needs of the region and disseminates information through conferences, workshops and seminars.



The research program is guided, in part, by an advisory council composed of representatives of various organizations, industries and agencies affecting or affected by transportation. The program areas focus on specific transportation issues, but, united within the UGPTI, they share expertise, staff and other resources to form an overall program with the flexibility to address emerging challenges and opportunities.



ADVISORY COUNCIL



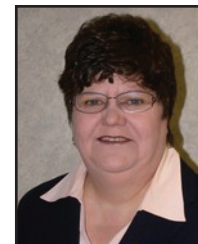
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DIRECTOR'S MESSAGE

Fuel prices and the state of the nation's transportation infrastructure have thrust transportation into the spotlight this year. The Upper Great Plains region has not escaped the glare.

Costs for transportation and to maintain our complex network of transportation systems continue to escalate. At the same time mobility for people and freight is as important as ever in this global age. Being connected is essential and our system of highways, railways, waterways and transit systems all play an important role.

Nationally, transportation experts have identified several challenges that face transportation in the 21st century. Those challenges must be addressed in our region as well. They include the need to:

- Improve global competitiveness
- Develop domestic markets
- Enhance personal mobility
- Improve emergency services
- Support national defense and homeland security
- Improve safety
- Reverse environmental trends
- Conserve energy

The dedicated and talented staff of the UGPTI is already addressing many of these issues. The Institute has grown steadily and significantly over the past 20 years. This growth has resulted in the development of human capital and knowledge that facilitates commerce, improves transportation infrastructure and increases mobility of the region's citizens. That expertise is focused on the unique needs of rural and small-urban areas, particularly those in the Upper Great Plains region, but has implications nationally and internationally. Some highlights from this report include:

Continued academic growth. During the 2006-2007 academic year, 21 students were enrolled in the NDSU interdisciplinary doctoral program in Transportation & Logistics. The growth in the program indicates increasing interest by students in transportation and logistics as an academic field. The Master's of Military Logistics program graduated its first class and a second group of 13 professionals is working their way through the program.

Putting experience to work. Thirteen civil and construction engineering students have worked at our Department of Transportation Support Center in the past year. Of those, four have graduated and one accepted early hire with the NDDOT. All are active in the engineering field in the region.

North Dakota Local Technical Assistance Program. The UGPTI assumed management of the center in January 2007. The center headquarters moved to Bismarck at that time as well. This program complements our existing efforts by providing outreach to counties and communities across the state.

National Summit on Agricultural and Food Truck Transport. More than 200 attendees and 40 speakers participated in the first-ever event in Washington, D.C. The focus was finding ways to strengthen commercial agricultural trucking to ensure safe, secure, and efficient agricultural and food transportation.

Indian Reservation Road Planning. This effort will give road planners for the nation's Indian reservations tools for assessing and planning their road systems.

Traffic operations field test. We partnered with the City of Fargo to develop a traffic signal control field test bed to research, evaluate, and develop methods to improve traffic signal operations.

These are just a few of the highlights that you will find in this report. The work reported on here is the result of significant investment by the State of North Dakota and by our other partners. We appreciate their confidence in us.

We are proud of our accomplishments, but we recognize that the changing transportation environment of the 21st century will continue to pose both challenges and opportunities that must be address for the continued success of our state and region.

Thank you for your interest in our work and in the nation's transportation system.



A stylized, handwritten signature in black ink, appearing to read "James Griff".

PROGRAM AREAS

Academic programs offered include an interdisciplinary Ph.D. program in transportation and logistics and a transportation option in the master's degree programs in civil engineering and agribusiness and applied economics. Graduates are prepared for careers in wholesale and retail business, construction, consulting, and government. A master's in military logistics is also offered. UGPTI academic programs are largely funded by the Mountain-Plains Consortium and the Department of Defense.

The **Advanced Traffic Analysis Center (ATAC)** enhances transportation systems in small to medium-size cities by using advanced traffic analysis and intelligent transportation systems to improve safety and mobility. The center's primary role is to support decision makers responsible for planning, operating and funding transportation systems at the local, regional and state level. Primary efforts focus on intelligent transportation systems, traffic operations and travel demand modeling.

The **Agricultural and Industrial Freight Center** promotes the efficient use of resources and enhances the competitiveness of agricultural products in the region. Staff members evaluate transportation industry trends, policy, and rates – all factors that are critical to maintaining product quality and helping businesses and producers reach key markets. They also examine supply chain management and transportation-related economic development initiatives to enhance the competitiveness of agribusinesses in the region.

The **Department of Transportation Support Center (DOTSC)** provides intellectual capital to the NDDOT to solve complex problems. The center also addresses regional issues within North Dakota and the surrounding states. The center includes a student roadway design section supervised by on-site DOT design staff to employ, train and utilize undergraduate students in DOT design projects. The center's information technology center integrates NDSU computer science and management information systems students with real-world information technology issues and projects related to the DOT.

The **Mountain-Plains Consortium (MPC)** conducts research, education and training on transportation infrastructure and the movement of passengers and freight. It is a competitively selected university program sponsored by the U.S. Department of Transportation, attracting the nation's best talent to study transportation and develop new transportation strategies and concepts. The consortium includes North Dakota State University, Colorado State University, South Dakota State University, the University of Utah, and the University of Wyoming.

The **North Dakota Local Technical Assistance Program (NDLTAP)** fosters safe, efficient, environmentally sound, and cost-effective highway, road, and street systems by exchanging transportation technology with North Dakota's local units of government and the transportation community. NDLTAP accomplishes this effort through training, technical assistance, and information services as part of the Federal Highway Administration's nationwide LTAP network.

The **Small Urban & Rural Transit Center (SURTC)** provides transit stakeholders, users, suppliers and agencies information and training on technology and improved management and operations to increase the mobility of small urban and rural residents through improved public transportation. Research focuses on transit coordination, ITS applications and mobility planning.

The **Biennial Strategic Freight Analysis Center** addresses key issues in North Dakota transportation. Each biennium, the program focuses on an economic sector important to the state with the goal of improving the competitiveness of firms through transportation enhancement in North Dakota. The current effort focuses on freight planning.

The **Transportation Learning Network (TLN)** is an interactive conferencing network linking the transportation departments in Montana, North Dakota, and Wyoming and the Mountain-Plains Consortium universities. TLN supports quality transportation through a network of people and technology that serves TLN members by enhancing communication, education, professional development, technology transfer and research.

The **Transportation Safety Systems Center (TSSC)** develops and maintains software used by state and federal safety specialists nationwide at weigh stations and ports-of-entry for inspecting commercial vehicles. Additional software is used by safety specialists during on-site reviews of commercial carriers. In addition, the center is also extensively involved in safety-related research and analysis to improve targeting of enforcement efforts and enhance software programs.

The **Rural Transportation Safety and Security Center (RTSSC)** promotes and enhances the region's transportation safety and security through research, education, and outreach in partnership with stakeholders. It is a collaborative effort between the Upper Great Plains Transportation Institute and the NDDOT, with funding from the Federal Highway Administration.

EDUCATION

UGPTI education programs are designed to prepare tomorrow's transportation professionals. Students learn from staff involved in research and outreach programs so they are able to apply theory and case studies to real-world situations. Students apply

their classroom lessons through their intimate involvement in the Institute's research and outreach programs. The Institute's programs benefit from the students' enthusiasm, skills and creativity.



Military logistics. The UGPTI coordinates the Masters of Military Logistics program offered by NDSU. This intensive 12-month program is offered to officers and military civilians. It provides them with the latest transportation and logistics research, technology and applications needed to improve the efficiency, effectiveness and responsiveness of logistical and transportation systems within the military. The first class of 17 students graduated in August 2007. Twelve students are enrolled in the program for the 2007-2008 academic year.

Continued growth. During the 2006-2007 academic year, 21 students were enrolled in the NDSU interdisciplinary doctoral program in Transportation & Logistics, up from six when the program was launched in 2002. The growth in the program indicates increasing interest by students in transportation and logistics as an academic field. National studies indicate that demand for graduates trained in transportation will continue to grow. The UGPTI also offers a transportation option to master's level students in agriculture and applied economics and civil engineering. There were 12 students enrolled in those transportation degree options.

Scholarships awarded. Four \$1,500 scholarships are funded each year at NDSU by the MPC. Twenty-two scholarships have been awarded since they were established in 2002. The University Transportation Engineering Scholarship recognizes academic performance and interest in transportation. The scholarships were presented to Amy Hardy of Ellendale, ND, and Jason Mayfield of Fargo. Hardy is a junior and Mayfield is a senior, both majoring in civil engineering. The Paul E.R. Abrahamson Transportation Scholarship recognizes academic achievement and interest in agricultural transportation and logistics. Kimberly Spear of Fargo and Chris Duchsherer of Drake, ND, received the award this year. They are both seniors in agribusiness and applied economics.

Real-world design. The Engineering Center at DOTSC has been working on multiple highway improvement projects over the past year including asphalt pavement overlay, concrete pavement repair, and complete reconstruction projects. DOTSC is currently finishing its work on a \$6 million reconstruction project on ND Hwy 23 through Watford City, ND. The project consists of two segments: concrete pavement for Main Street and asphalt pavement for the remainder of the project. The improvement also includes new curb and gutter, sidewalk, decorative crosswalks, decorative lighting, trees, storm sewer, and a multi-use trail. DOTSC has spent the better part of two years working on this project from the preliminary engineering, through the public involvement process, and developing design. The project is scheduled to be built during the 2008 construction season.

Putting experience to work. Thirteen different civil and construction engineering students have worked at the DOTSC engineering center in the past year. Of those, four have graduated from their respective program and one has accepted early hire with the NDDOT. The four graduates from the DOTSC program are all active in the engineering field; three in North Dakota and one in Moorhead, MN.

Weigh-in motion database. The DOTSC information technology students created a program to work on an existing NDDOT weigh-in-motion (WIM) database. The WIM database contains information such as weight and class, for every vehicle to pass over each of the state's

12 data collection points. The program works to clean up anomalies in the database so that it can be examined in detail. The original work was initiated to generate the data input files for the new mechanistic design guide for research purposes. This data can be mined in many ways. Reports should be able to be generated for any class type and any weight range.

Software updates. The DOTSC information technology department also worked to convert and/or update existing programs to run with updated software programs. These programs can help store data in a way that is easily accessible and maintainable.

OUTREACH

UGPTI staff members have close working relationships with professionals in government agencies and industry. Many UGPTI staff members have work experience as consultants and transportation professionals. Those relationships and that experience are channeled into training programs and applied

research. In addition, staff members are resources for colleagues to consult on emerging issues and technology. Results from the Institute's research programs are key components of outreach efforts.



LTAP visits. LTAP staff made about 109 site visits with local government clients. They also coordinated and participated in numerous other visits with local government employees and officials at training sessions and conferences to provide technical assistance on road maintenance and construction issues.

Helping NDDOT meet training requirements. Each state DOT receiving federal funds was required to develop a Work Zone Safety and Mobility Plan by October 2007. NDDOT's plan requires training for all maintenance employees, construction inspectors, project engineers and project planning and design engineers. LTAP and TLN worked together to identify necessary training and will be making those courses available to DOT employees. The first course will be a traffic control technician course followed by an OSHA work zone safety course, an NHI advanced work zone management course and a traffic control supervisor course.

Pavement preservation course. TLN and LTAP also continued to provide assistance to the NDDOT by hosting a series of four pavement preservation courses. The courses were conducted by FHWA and touched on the four major areas of pavement preservation: Introduction to Pavement Preservation, Pavement Management Systems, Preservation of Rigid Pavements, and Preservation of Flexible Pavements. More than 115 people registered for the Introduction to Pavement Preservation course at 20 sites in North Dakota, Montana, Wyoming and South Dakota.

Software for motor carrier safety. Staff at UGPTI's TSSC continue to develop and maintain high-quality software for use by federal and state commercial vehicle safety specialists nationwide. The work is funded by the Federal Motor Carrier Safety Administration. The software applications are used by specialists in many functions, including helping to conduct inspections, checking on driver's license status, reviewing information from past inspections, reviewing carriers' safety and violation history, and developing case files for enforcement activities. This FMCSA work is the primary activity of the Transportation Safety Systems Center.

Border help. TSSC is working with the Federal Motor Carrier Safety Administration and U.S. Customs and Border Protection to improve truck and bus safety and security at U.S. borders. The center is helping to bridge FMCSA and CBP computer systems and databases to facilitate the clearance of commercial carriers, vehicles and drivers. The goal is to identify and contain unsafe vehicles while speeding the flow of safe vehicles and goods crossing the border.

Concrete information. The TLN launched a series of technical seminars on concrete to improve the skills of workers with the NDDOT, contractors, counties and cities across North Dakota. The hour-long seminars covered topics such as the basic concrete and hydration, engineering properties of concrete, placing concrete in hot and cold weather, concrete curing technology, and concrete admixture technology. The topics were selected to address common problems encountered when using concrete in transportation infrastructure projects. The seminars were conducted by experts from the N.D. Ready-Mix and Concrete Products Association.

TLN offers employee development courses. The TLN launched a popular personal finance course this year to supplement its leadership and other personal and professional development offerings. “We offer these courses on behalf of the DOT’s we serve so they can offer them as an added benefit to help retain and recruit qualified staff,” notes TLN director Julie Rodriguez. “Employee surveys indicate that attaining a proper work-life balance is a key to employee satisfaction.”

Transit management training offered. SURTC developed a three-day Introduction to Transit Management training session designed for new transit managers and others in the industry who are ready to expand their knowledge base. The training provides a broad-based knowledge of basic concepts related to transit operations, funding, record keeping, compliance issues, etc. The goal is to develop a certificate program as part of completing the session. The training will be offered at locations across Minnesota, Montana, North Dakota, South Dakota, Wyoming, and Utah.

Talking the transit talk. Transit managers, academics, consultants and government agencies may all be speaking English, but they may not be talking the same language when it comes to transit. That's why SURTC compiled a free and easily accessible Transportation Glossary and Resource Manual. The glossary is a compendium of transit funding resources, performance measures, and accounting principles that will serve as a guide and resource for transit professionals. In addition to terminology and bench marks used in transit management, the glossary includes information on a wide variety of federal and state transit programs and initiatives.

Tribal transit coordination workshop held. The MPC and SURTC planned a Transit Coordination Workshop specifically geared to Native American transit programs throughout North Dakota. Under provisions of the current federal highway bill, many tribes are required to develop a plan for the coordination of their transportation services. Before the workshop, staff members visited tribal transit operations in North Dakota to better understand each of the tribal areas and concerns that were unique to each project. The two-day workshop detailed coordination mandates, the benefits of coordination, the development of potential transportation coordination partners within their service area, how to initiate coordination, and the continuation of ongoing coordination efforts.

Conducting DOT training on state and federal requirements. SURTC is conducting training for transit managers across the state on behalf of the NDDOT. The training is designed to help transit agencies comply with new requirements to receive state and federal transit aid. Its goal is to help managers learn what's required, how to collect the necessary statistics, and how to report them.

Expanding PASS training. Since SURTC began the PASS Driver Certification program in North Dakota, South Dakota, and Utah, more than 200 drivers have been certified and 16 people are now certified to teach the training. The training teaches drivers to deal with people with varying disabilities, including how to load them onto wheelchair lifts and to ensure they have a safe and secure ride. Not only do drivers learn how to transport passengers safely and securely, they also learn how to be sensitive to the special needs of the passengers.

Helping plan transit sessions at tribal transportation conference. The Ninth Annual National Tribal Transportation Conference featured transit planning sessions for the first time thanks to help from SURTC. Previous conferences have been focused largely on roads and bridges, but now expanded sessions in transit planning were included because of transit funding available through the new federal Transportation Bill. SURTC organized three sessions for the conference. The first focused on transit basics such as types of transit services, funding sources, benefits of transit services and basic concepts of transit planning. Two half-day sessions provided more in-depth content on developing business plans for transit agencies and creating a transit development plan.

Human resource management training offered. SURTC staff members presented a seminar in human resource management at the Utah Urban/Rural Specialized Transportation Association Annual Conference in Salt Lake City. It provides tools to assist new and experienced transit supervisors, managers, and directors select and manage employees. It is designed to walk employers through the hiring process and the development of an effective employee handbook. At the conclusion, participants each received an employee handbook template they can customize for their own agencies.

Training on fundraising and local match. Raising money for transit operations is always a challenge. SURTC offered a seminar focusing on numerous ways of generating operating capital. The rules and regulations vary from state to state in terms of financial assistance available to transit systems. This seminar focused on investigating an organization's situation and brainstorming funding options based on the skills, abilities and knowledge of the staff.

School transportation efficiency training. In cooperation with the North Dakota Department of Public Instruction, SURTC researchers conducted a School Transportation Efficiency training program across the state in 2005 and 2006. In total, the training consisted of nine modules. Topics included coordinated maintenance, routing, technology, finance, safety, and security. Many rural districts are facing declining tax bases and declining enrollments. This forces them to look for ways to be more economical and efficient in transporting students.

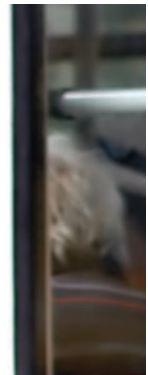
LTAP Clearinghouse. The UGPTI is working with the American Road and Transportation Builders Association in Washington, D.C. to manage the National Local Technical Assistance Program/Tribal Technical Assistance Program Clearinghouse. The program serves as an exchange for highway transportation-related technology and information for local units of government and state LTAP centers. The UGPTI is providing technical assistance in redesigning and upgrading the LTAP website and will be exploring new technology applications and other methods of technology transfer that could be applied by centers across the country. The TLN and the ND LTAP center are integral parts of this effort.

North Dakota Traffic Operations Roundtable sponsors legislative amendment. The vision of the roundtable is to solidify ATAC's support to traffic engineers across North Dakota and the region. The roundtable allows peers to share ideas, identify critical issues, provide experiences, and guide ATAC's traffic operations activities. Last year ATAC facilitated a legislative amendment to the ND Century Code to require drivers to treat dark signals as 4-way stop signs, thus reducing confusion and hazardous driving behavior after major power outages. The bill was sponsored by Senator Stanley Lyson of Williston, ND, and signed by Governor John Hoeven on March 2.

RESEARCH

UGPTI research programs have roots that are more than 40 years deep. Originally focused on North Dakota commodity transportation, the Institute's research portfolio is now national

in scope. The focus of that portfolio is on the mobility of people and freight in rural areas and communities and small cities.



intelligent transportation systems

Regional ITS architecture update. ATAC researchers are working on updating regional ITS architectures originally developed in 2005. The update includes the statewide ITS architecture, as well as architectures in the Bismarck-Mandan, Fargo-Moorhead, and Grand Forks-East Grand Forks metropolitan areas. A regional ITS architecture provides a comprehensive framework for supporting ITS deployment by defining services, developing system requirements, identifying information flows, coordinating agency roles, and integrating functions across jurisdictional lines. North Dakota is witnessing growing ITS deployment as transportation agencies turn to technologies for enhancing traffic safety, system operations, and customer service. ATAC has been an integral resource for these agencies and as a result has been designated with the role of maintaining ITS architectures and using them to support project development.

Evaluation of Red River Bridge sprayer system. The NDDOT completed installation of its second fixed automated sprayer technology (FAST) system at the Red River Bridge on I-94 along the North Dakota-Minnesota state border in January 2006. Anti-icing systems represent

promising technology for enhancing the safety and mobility of travelers with several more systems planned for installation throughout North Dakota. ATAC researchers evaluated the system at the Red River Bridge. The evaluation follows federal ITS project evaluation guidelines and focuses on capturing lessons learned, documenting system costs and benefits, and identifying any technical or institutional issues. The aim of this evaluation study is to provide reference and guidance to the NDDOT and other states to support future installations of FAST systems.

NDDOT dynamic message sign guidelines. The NDDOT is increasingly using dynamic message signs (DMS) to provide travelers with pertinent road, weather, and construction information. Previously, ATAC researchers helped the NDDOT develop the DMS Composer software to assist NDDOT staff in developing DMS messages. In this project, ATAC helped the NDDOT develop Statewide DMS guidelines to ensure DMS installation and operations meet national and state standards. The guidelines address DMS design, installation, and operations and identify authorized uses. The guidelines also ensure consistency in DMS operations in all eight NDDOT districts.

traffic operations

Bismarck intersection analysis. The intersection of Washington St. and Ash Coulee Dr./43rd Ave is located in the northern part of Bismarck, an area experiencing significant development. In recent years, several requests have been made to the City Commission to install a traffic signal at this location in an effort to alleviate traffic congestion and safety issues. The concerns are primarily related to traffic conditions during Horizon Middle School start and dismissal times. Horizon Middle School has about 600 students and is located about half a mile west of Washington St. on the north side of Ash Coulee Dr. The City of Bismarck requested assistance from ATAC to assess traffic conditions and evaluate potential improvements. ATAC conducted a site review and completed several analyses of traffic operations and safety in the area. The study concluded that traffic delay at the intersection was minimal and that a traffic signal was not justified now or for the foreseeable future (based on traffic projections). ATAC researchers were commended on their thoroughness and professionalism by city staff.

Work zone mobility and safety. ATAC researchers are working to enhance safety and traffic operations in highway work zones by:

- 1) Developing effective management and control strategies;
- 2) Evaluating applications of advanced technologies (ITS);
- 3) Accumulating work zone performance data to support decision making; and
- 4) Using successful public awareness and outreach efforts.

As part of the project, ATAC has been collecting traffic data along the I-29 work zone in the Fargo area since 2006. The data are collected using non-intrusive microwave radar sensors strategically located along the work zone area. The sensors provide detailed traffic counts, speeds, and vehicle classification. This is one of the first applications of these sensors in North Dakota. ATAC students designed and constructed special platforms and masts for deploying the sensors along the road. Data from the sensors are downloaded and batteries are recharged on a three-day cycle. Data collected from the work zone have been utilized in calculating traffic diversions, identifying periods of low performance, and pinpointing locations which experienced excessive speeding.

Traffic operations field test. ATAC partnered with the City of Fargo on developing a traffic signal control field test bed to research, evaluate, and develop methods to improve traffic signal operations. Several video traffic detection and surveillance cameras were installed at the 12th Ave. N and 18th St. intersection near the NDSU campus. Data from the intersection are carried via dedicated fiber to the NDSU network. ATAC researchers have implemented a software system which allows the NDDOT and Fargo traffic engineering staff to view and control the surveillance cameras. The system provides ATAC with traffic data on a 24 hour basis in order to support ongoing research projects.

More ATACid's are used by researchers across the U.S. ATAC's controller interface device (CID), developed over several years of research, has seen a surge in interest and sales. Several new units have been sold recently to research centers at the University of Nevada at Las Vegas and the University of Tennessee. Other ATACid users include the University of Virginia, Texas Tech University, and Siemens ITS. The ATACid enables researchers to model complex traffic control problems using hardware-in-the-loop-simulation, which allows an actual traffic signal control system to be used within a traffic simulation model (e.g., VISSIM). ATACid was recently being used in research presented at the TRB's Traffic Signal Committee meeting in San Jose, CA.

metropolitan transportation planning

ATAC houses regional travel models of the three metropolitan planning organizations in North Dakota. As such, ATAC provides, maintains, runs and updates these models to support transportation planning activities. The multi-year partnership is supported by the NDDOT, the Grand Forks-East Grand Forks Metropolitan Planning Organization, the Fargo-Moorhead Metropolitan Council of Governments, and the Bismarck-Mandan Metropolitan Planning Organization. During the 2006-2007 fiscal year, ATAC performed the following projects:

- Completed a major update of GF-EGF MPO's Regional Travel Model to account for transportation and socio-economic changes since the previous model update. The update also included an upgrade of the model software to a more powerful modeling software. ATAC also converted all of the model network and other data into a GIS platform allowing a more flexible interface for making changes. The updated model was calibrated to current conditions and has since been used to support long-range transportation plans in the GF-EGF region.
- Used GF-EGF MPO's Regional Travel Model to generate travel projections to the year 2035. The projections are used for road and traffic management planning.
- Worked on a major update of F-M Metro COG's Regional Travel Model. The update includes updated network and traffic data and revisions to the model structure to account for residential and commercial growth and changes in the road network and travel patterns.
- Completed an analysis to assist in designing a new interchange of 52nd Ave. S. with Interstate 29 in Fargo. ATAC also provided analysis of various options for expanding 52nd Ave. S. to accommodate increased traffic in the area.
- Evaluated various options for a new Red River Bridge in south Fargo to assess the impact on current and future traffic flows and patterns.
- Conducted pedestrian counts on 19th Ave. N. in Fargo to assess the pedestrian and traffic interaction and determine the needs for traffic control and pedestrian safety measures such as crosswalks and signals.
- Evaluated various options for increasing the traffic-carrying capacity of U.S. Highway 75 in Moorhead. The analysis evaluated impacts on traffic flows and patterns as well as impacts on pedestrians.
- Worked on a major update of Bismarck-Mandan MPO's regional travel model. As part of the project, researchers are collecting data on traffic volumes and flows in various parts of the city

transit and personal mobility

Building a better small bus. SURTC has been working with the Federal Transit Administration (FTA) to bring together bus manufacturers, bus equipment manufacturers, transit agencies, paratransit agencies and others to design a better small bus. The effort grew out of a study of the bus manufacturing industry conducted by SURTC and supported by the FTA. The study was aimed at identifying incentives to adopt new technologies and the impact that standardization of bus specifications would have on production efficiency and cost. The FTA also has asked SURTC to gather input on a prototype design for a bus intended specifically for small transit agencies, which will be presented to the industry as a whole.

Defining the terms “rural” and “urban” for transit. Researchers used USDA, U.S. Census Bureau and FTA data regarding definitions of “urban” and “rural” to develop a transit-specific set of classifications. The two-part classification will help distinguish rural areas within counties that may otherwise be classified as urban because they contain an urban center. Researchers are now looking at what transit services exist within the different classifications across the country.

Getting to school on time and on budget. With fewer children spread over a wider area, many rural school districts face a significant challenge in getting them to school efficiently. Researchers developed a software system for planning small rural school bus routes that could also be used by small transit systems. The software can be used to test routes or to evaluate the addition or removal of buses of various sizes from the fleet. The system was piloted in the Enderlin School District. Tools like this software will help assure that future collaborations to use school buses for other community transportation are as efficient and effective as possible.

Exploring transportation and apartment choice. SURTC researchers explored how the availability of various forms of transportation influences the residential choices of apartment dwellers. This study examined how residents of small urban areas (relatively close to workplace and local services) respond to transportation attributes of residential environments. Given that many home renters are low-income people, transit access and the level of service may have important impacts on their residential and travel choices. Results of this project may offer guidance for transportation planners, urban planners and community developers, and property managers.

Connecting people to transportation. SURTC is helping the NDDOT develop a state-wide online transportation service directory. The NDinfo.org website will enable individuals to access information about available transit services across the state. Users will be able to view basic information about transit agencies such as contact information, service area, hours of operation, reservation policies, ADA accessibility, schedules, fees and services provided. Development of the website was supported by funding from the U.S. Department of Transportation through the Federal Transit Administration.

Working to improve transit on the Turtle Mountain Reservation. SURTC researchers completed a transit development plan for the Turtle Mountain Indian Reservation and Rolette County in north central North Dakota. The plan addresses significant challenges including a high unemployment rate and a lack of transportation alternatives that are available to many local residents. Tribal officials adopted a wide array of recommendations and implementation strategies that are designed to improve the personal mobility of people living on the reservation and elsewhere in Rolette County. Researchers and tribal officials believe that implementing the plan's recommendation will significantly increase transit ridership on the reservation and elsewhere in Rolette County and greatly enhance the personal mobility of area residents.

State management planning. SURTC is working with the NDDOT to complete a North Dakota State Transit Management Plan. The plan will reflect state and federal requirements for transit agencies and for the use of public funds designated for transit. The new plan will include changes introduced in the new Federal Transportation Bill. It will also act as a guide for funding application processes and timelines, minimum requirements, selection criteria, and reporting and monitoring requirements.

SURTC examines transit in Brookings, SD. In a study prompted by the Brookings City Council, researchers evaluated the city's role in providing community transportation, including the process of allocating local funds to support transportation service providers. Although no significant service gaps were identified, the study did surface some areas of possible future transportation needs including: same-day transportation for the general public, intercity bus service, essential air service, youth and school transportation, university transportation, large events, emergency planning and mitigation, signs and wayfinding.

SDSU campus transit study. The Brookings Area Transit Authority (BATA) commissioned SURTC to determine the South Dakota State University community's interest in and willingness to pay for transit service, to provide service design alternatives including operating cost estimates, to identify relevant issues, and to provide a framework for implementing service. Researchers surveyed SDSU students, faculty, and staff. They held public meetings and received guidance from an advisory board. The survey found strong support for expanded transit service to the SDSU community. It also identified a willingness among students, faculty and staff to pay for service. Based on the study, it was recommended that BATA establish fixed-route transit service to the SDSU community.

SURTC-Dakota Transit Association partnership. The Dakota Transit Association has contracted with SURTC to provide an executive director. SURTC outreach and training coordinator Gary Hegland currently fills that role. During the past year the association has established priorities to enhance training opportunities, identify strategies to increase funding for member operations, promote rural transportation nationally and increase education and advocacy efforts in the legislative process. Progress was

made in each of those areas including: seven Passenger Service and Safety (PASS) training classes were conducted with 98 drivers certified; funding for transit was increased by \$1 million for the 2007-2009 biennium in North Dakota and a sales tax exemption for fares was gained in South Dakota; and DTA has improved the quality of its conference and increased participation in national transit conferences.

Coordination plan developed. SURTC researchers helped River Cities Public Transit (RCPT) in Pierre, SD, develop a coordinated transportation plan to help the community coordinate and manage community resources to provide a higher level of transportation services to area residents. The plan was developed with information from the RCPT business plan, interviews, surveys and consultation with the agency's board of directors. RCPT provides transit services in Pierre, Fort Pierre, seven of the 21 cities in the surrounding eight-county area, as well as Fort Thompson on the Crow Creek Indian Reservation. The plan takes into account an increased emphasis on coordination that is part of new federal legislation. Several significant federal programs require a coordination plan as a prerequisite for funding.

agricultural research

Rail impacts on North Dakota wheat marketing. With support from the North Dakota Wheat Commission, UGPTI researchers are evaluating the role that transportation factors have in the local grain market and rural economy. The researchers built a computer simulation of the market which takes into account factors such as shuttle rates, crop diversity, production volumes, rail capacity constraints, domestic consumption, ocean freight rates and export sales. The model will help evaluate investment decisions and policies.

Grain shipments by mode. Specialists analyzed transportation of U.S. grains by modal share to provide information about changes in the competitiveness and relative efficiencies among the modes. The analysis estimates the tonnages of grain railed, barged, and trucked to either the domestic market or to U.S. ports for export. The UGPTI works with the USDA in collecting data and updating the time series presentations in the report.

Rail updates. The UGPTI provides the USDA with updated market and service information for the rail section of the weekly Grain Transportation Report.

North Dakota Grain Movement. The Agricultural and Industrial Freight Center summarizes grain movement reports from each elevator in North Dakota to describe distribution patterns and shipment characteristics – including destination, mode (rail or truck), origin, time, and commodity. Annual reports and monthly updates are used to encourage competition within the grain industry and to identify research needs and market trends.

Ethanol's road impact. Staff members are assessing the demands that a proposed ethanol processing plant would impose on state and county highways. Researchers are developing computer models to predict corn flows from farms to the plant, assign the flows to the highway network, estimate the annual truck trips and equivalent single axle loads, and estimate the highway improvement needs for individual routes and segments.

other research

Examining four-lane potential. The UGPTI is helping the Montana Department of Transportation examine the feasibility of expanding the U.S. Highway 2/Montana Highway 16 corridor to four lanes. UGPTI researchers were part of an expert panel assembled to guide consultants who were examining the feasibility of developing the Teddy Roosevelt Expressway corridor.

Supply chain support. UGPTI associate director Denver Tolliver along with Canan Bilen-Green and Om Yadav, faculty members in the NDSU Department of Industrial and Manufacturing Engineering, are helping Border States Electric improve its ability to serve one of its biggest customers. The researchers are developing a network optimization model to find ways to reduce costs for the Fargo-based electrical supplier while improving response time, reliability and other factors as Border States Electric works with Alliant Energy, an energy holding company with electric and gas utility operations in Iowa, Minnesota and Wisconsin. Several doctoral students are involved in the project.

Closer look at alternative fuels. Demand for alternative fuels such as ethanol and biodiesel is growing rapidly. At the same time, some states are beginning to mandate use of those fuels. Researchers are identifying key

factors influencing the use or non-use of alternative fuels by transportation service providers. They are also developing a benefit/cost analysis of switching from traditional to alternative fuels. The research results will guide policy makers and fuel users as they consider decisions related to alternative fuel use.

Accessing container markets. Intermodal shipping, particularly via container service has grown dramatically and has become the mode of choice for many international shippers. Many of the specialty crops grown in the region are shipped in containers. To maximize efficiency, containerized shipping has focused on major transportation hubs, putting the Upper Great Plains at a disadvantage. UGPTI researchers are compiling data from several recent feasibility studies focused on various sites across the region to determine if a regional strategy could be employed to enhance intermodal shipping in the Upper Great Plains. The research will identify threshold shipping volumes for establishing new intermodal facilities and maintaining existing ones. The researchers are also identifying other factors that are key to the success of intermodal facilities.

SURTC: Examining the Mobility of Rural Elderly Women



Jill Hough

SURTC director Jill Hough studied the growing proportion of elderly women living in rural areas to assess their mobility concerns and needs.

As population across rural regions of the United States consolidates around trade centers, the proportion of elderly remaining in small towns and rural areas continues to grow. The situation is bound to have an influence on their mobility and the study should help researchers and policy makers assess the situation. The number of Americans older than 65 will more than double by 2030 and nine million of them will be older than 85 years old. Hough conducted the research as part of her work toward a doctoral degree from the University of California-Davis.

She interviewed more than 1,000 women, half living in rural areas and half living in small urban areas. The research focused on women because their need for mobility is often particularly acute in rural areas. Women tend to live longer than men and many widowed women live alone. Studies also indicate that women tend to have more health-related problems that impact their driving. Hough says the research examined factors that influence the mobility of women living in rural areas such as social networks (family, friends, neighbors, etc.) and environmental factors.

The research showed levels of mental acuity and self-efficacy (confidence in their abilities) have a significant impact on mobility. Those with high levels of mental acuity and self-efficacy tend to have an easier time of

accomplishing desired mobility and have a lower level of desired mobility, Hough explains.

“Consequently, activities that keep women working on their mental acuity and staving off the effects of aging could have a significant impact on individuals’ ability to achieve their desired levels of mobility,” Hough says.

Likewise, efforts designed to help elderly women stay confident in their driving skills are important. Hough says women frequently decide to stop driving at a younger age than men. “If we can keep them driving safely and maintain confidence in their abilities, we may be able to help them maintain their mobility.”

In rural areas, the physical environment is often a barrier to mobility. Women may live in desolate locations with few services. Weather can make any travel difficult. Hough says community efforts to maintain services are important. Multi-purpose stores offering multiple services such as a pharmacy, grocery store and restaurant could help minimize travel needs. At the same time community transit efforts can play a key role.

“Finally, we found that women's social network is very important to mobility,” she says. “Many rely on family and friends for mobility, but we found that it was also important for many women to rely on their larger social network,” Hough said.

NDLTAP: LTAP Center Becomes Part of UGPTI



Gary Berreth

The North Dakota Local Technical Assistance (NDLTAP) program gained a new address and a new staff. The UGPTI assumed management of the center in January 2007. The center headquarters moved to Bismarck at that time as well.

The changes were driven by a desire to have the program located close to and affiliated with the NDDOT. The center was previously managed by the NDSU Civil Engineering Department. “The Transportation Institute has considerable experience in outreach and training activities as well as long-standing relationships with the NDDOT and other transportation organizations and agencies,” noted Gary Berreth, ND LTAP director. “The Institute also has collaborative programs within NDSU that will allow us to continue to tap resources there.”

ND LTAP’s mission is to foster safe, efficient, environmentally sound, and cost effective transportation systems by improving skills and increasing knowledge of the transportation workforce and decision makers within the state and region.

Efforts at the center focus on four areas.

- Safety enhancement of the transportation system through cooperation with local, tribal, state, and federal government partners as well as the private and commercial sector.
- Workforce development to maintain the viability and effectiveness of our transportation systems.

- Infrastructure management by helping local, tribal, state, and regional partners develop strategies that maximize the performance of their infrastructure while minimizing any negative effects on financial and human resources.
- Delivering value through its ability to efficiently and effectively transfer technology and information.

In 2005, the UGPTI and the American Road and Transportation Builders Association (ARTBA), based in Washington, D.C., were awarded a contract to operate the LTAP Clearinghouse. The Clearinghouse serves as a repository and source of training and technical material for the 51 LTAP centers and seven Tribal Technical Assistance (TTAP) centers across the country.

“There are some real opportunities for synergy between these programs,” Berreth notes. “Our involvement in the Clearinghouse has given us national perspective and exposed us to a broad variety of technical training and outreach programs. We’re able to put the experience to use at the local level in North Dakota.”

“Conversely, our close working relationship with the NDDOT and other local agencies, our previous involvement in applied training and outreach programs, and depth of experience in transportation research allows us to make contributions to these programs that benefits transportation professionals across the country.”

AG AND INDUSTRIAL FREIGHT: National Summit on Agricultural and Food Truck Transport Held



Kim Vachal

More than 200 attendees and 40 speakers participated in the first-ever National Summit on Agricultural and Food Truck Transport for the Future held in Washington, D.C. The event was organized by the Agricultural and Food Transporters Conference of the American Trucking Associations and the UGPTI with support from the U.S. Department of Agriculture, the U.S. Department of Transportation and the MPC.

U.S. Secretary of Agriculture Mike Johanns gave the opening keynote address stressing the importance of the Summit to the agricultural and trucking sectors of the U.S. economy and the vital role of commercial agricultural trucking in the 21st century. Other nationally recognized speakers included experts from agriculture, trucking, members of Congress and various federal agencies. The speakers addressed ways to strengthen commercial agricultural trucking to ensure safe, secure, and efficient success of agricultural and food transportation in the future.

The Summit examined the impact of farm and energy policy changes on domestic agricultural production and processing and the ability of commercial agricultural trucking to meet the demands from the

environment on trucking and agriculture. Other critical issues considered were truck driver recruitment, training, and retention; the affects of the many new security requirements in transporting agriculture and food products; and the importance of the agricultural hours-of-service exemption to the federal hours-of-service regulations.

Kimberly Vachal, UGPTI advanced research fellow and one of the conference planners, notes that the trucking industry is diverse and highly competitive. “The industry provides a broad spectrum of services to agricultural and food operations, markets, and interests. The health of the trucking industry has a direct bearing on the competitiveness of agricultural and food interests.”

“Development of legislative and policy initiatives in agricultural and food trucking for possible inclusion in the 2008 Farm Bill, the 2009 Highway Reauthorization Bill, and other appropriate federal legislation was a key focus of the summit,” noted Dave Schroyer, chairman of the Agricultural and Food Transporters Conference.

ATAC: Grand Forks-East Grand Forks Bridge Closure Study



Ayman Smadi

The cities of Grand Forks, ND, and East Grand Forks, MN, which are separated by the Red River, have experienced a history of spring flooding from the Red River and the Red Lake River. Three of the six highest Red River crests have occurred in this area since 1996. Therefore, flood control projects were appropriated for Grand Forks and East Grand Forks in 1999 to provide permanent flood protection from both the Red River and the Red Lake River. The primary components of the project include constructing levees, diversions, and flood walls to provide protection for a 250-year flood event.

Three Red River bridges provide motor vehicle access between the two cities, which include the Kennedy Bridge (Gateway Dr./US Highway 2), Sorlie Bridge (Demers Ave.), and the Point Bridge (Minnesota Ave./1st St. SE). Spring flooding can close some of these bridges for an extended period of time, creating significant delay time for motorists. The closures cause excessive traffic congestion, resulting in increased response time for emergency vehicles and additional delay time for motorists. In addition, bridge closures may occur periodically due to planned maintenance or inspection activities. Currently, no formal protocols or procedures exist for managing traffic during bridge closure events in the Grand Forks-East Grand Forks metropolitan area. Because of the significant impacts of bridge closures to the traveling public, the Grand Forks/East Grand Forks

Metropolitan Planning Organization (GF-EGF MPO) undertook this study to evaluate and improve traffic management and operations during bridge flooding and maintenance events.

This study brought key stakeholders, such as the City of Grand Forks, City of East Grand Forks, North Dakota Department of Transportation (NDDOT), Minnesota Department of Transportation (MnDOT), and the U.S. Army Corps of Engineers, together to discuss and develop protocols for coordinating the closing and reopening of bridges. The main approach in addressing the study objectives focuses on proactive planning. This is achieved by establishing coordination among the relevant stakeholders across several local, county, and state jurisdictions. This coordination is necessary to establish action levels for closing the bridges to vehicular traffic, setting up traffic detours, and implementing alternative traffic control plans.

ATAC researchers conducted extensive analyses of various bridge closure scenarios utilizing the GF-EGF regional travel model. They identified all the necessary traffic control devices for guiding traffic along alternative (detour) routes. They also developed traffic signal timing plans to accommodate the increased traffic along detour routes. As part of the study report, ATAC developed detailed traffic control plans and concepts of operations for each bridge closure scenario.

MPC: UGPTI Work Will Help Indian Reservation Road Planning



Doug Benson

An MPC-funded project at North Dakota State University will give road planners for the nation's Indian reservations tools for assessing and planning their road systems.

Indian reservations in the United States have a road network of about 50,000 miles. About half of those miles are under the jurisdiction of state, federal and local highway agencies. The remaining 25,000 miles are controlled by the U.S. Bureau of Indian Affairs and are referred to as the Indian Reservation Roads (IRR) network.

"We are taking the database of the IRR network and converting it into a format that is compatible with the analytical tools used by state and federal agencies to evaluate their roads," notes Doug Benson, the UGPTI researcher leading the effort. "Our goal is to make those analytical tools available to tribal highway planners so they can use them to evaluate and plan their highway networks."

The data used in the effort includes numerous engineering specifications including information on road and shoulder width, road surface and condition as well as strength. Additional data on safety issues and the amount of traffic are also considered. "Currently we're completing the

preliminary analysis of the IRR database and comparing it to the data requirements of HERS-ST (Highway Economic Requirements System – state version), one of the primary analytical tools used by highway planners," Benson says.

That comparison will help the researchers identify the data adequately supplied by the IRR database as well as data that are inadequate for use by HERS-ST. The next step in the project will be to develop software to address those inadequacies and convert the IRR data to a form that is usable by HERS-ST and other tools.

"The asset management capabilities provided by these tools is critical to having a road network that meets needs in a cost-effective manner and allows for growth and planning," Benson says. Road planners use analytical tools to evaluate remaining life of roads, to prioritize repair and reconstruction projects, to assess safety concerns and to develop plans for road and highway investment.

The project was launched in 2006 and a prototype of the conversion software was completed in 2007. The project is being conducted with guidance from the USDOT's Asset Management Division, Federal Lands Highway Division, and Federal Highway Administration.

RTSSC: Vision Safe Drive Conference Held



Kim Vachal

The first Vision Safe Drive Conference was held Nov. 29-30, 2007, in Bismarck, ND. Representatives from eight states and the District of Columbia were present with more than 100 attending and almost 30 speakers participating.

“The conference was a success in providing a venue for leaders and experts in traffic safety to make exchanges on emerging issues, successes, and challenges,” notes

Kim Vachal, director of the Rural Transportation Safety and Security Center, a part of the Upper Great Plains Transportation Institute at North Dakota State University. “These exchanges will be helpful in prioritizing research and outreach needs for the region as well as helping create a unified vision for traffic safety.”

Public health educators, roadway engineers, social researchers, law enforcement officials, and state and federal agency staff discussed issues they have in common, shared what they are doing, and identified future policy and legislative initiatives to improve the safety and security of transportation in rural areas. Issues emerging from the discussion included:

- primary seat belt laws
- impaired driving initiatives
- Native American tribal safety planning
- simulation training or defensive driving courses for all ages at license renewal
- increased involvement with government officials and tribal representatives
- cultural awareness training
- increasing the accuracy of data
- creating a culture of safety

- behavioral and social marketing strategies, and
- technology and the future of rural driving.

American Association of State Highway and Transportation Officials (AASHTO) director of engineering and technical services, Tony Kane gave an opening keynote address focusing on the vision for future highway safety. He stressed the importance of safe roads in creating a safe and prosperous America. Specifically, Kane encouraged states to collectively adopt a vision to reduce highway fatalities by 50 percent by the year 2030 toward an ultimate goal of zero deaths.

Other speakers included leaders from federal and state transportation agencies including the Federal Highway Administration, the Federal Motor Carrier Safety Administration, the North Dakota Safety Council, the Northern Plains Tribal Technical Assistance, the Montana Department of Public Instruction, North Dakota State University, and the departments of transportation in North Dakota, South Dakota, Montana, Wyoming, Missouri and Oregon.

In addition, panel discussions were held to consider driver-based safety initiatives, how to influence rural drivers’ behavior and how to provide safer roadways through design, operation, improvement and interagency cooperation. Many speakers emphasized the importance of coordination between the “four E’s” – education, engineering, enforcement and evaluation.

Vision Safe Drive was sponsored by the Rural Transportation Safety and Security Center and Upper Great Plains Transportation Institute at North Dakota State University with support from the MPC and in cooperation with the North Dakota Department of Transportation and the Federal Highway Administration North Dakota Division Office.

Strategic Freight Analysis Center: Planning North Dakota's Freight Movement



Mark Berwick

Today's marketplace functions on a global scale. The UGPTI's Strategic Freight Analysis Center is working to assure the region's business can compete in that marketplace.

Currently, the center's staff members are focusing on freight planning. "We looked at the origins and destinations of all freight that moves into, out of, through, and within North Dakota," says director

Mark Berwick. "The work will lay a foundation for statewide freight planning by the North Dakota Department of Transportation."

An efficient transportation system is the backbone of all economic productivity that occurs in a city, county, state and region. Without efficient transportation the economic viability of North Dakota may become stagnant or be left behind other states in the Great Plains. "Government at all levels now recognizes that transportation of freight is the essential ingredient in enhancing rural economies and bringing the global marketplace to producers, manufacturers and value added processors," Berwick says.

The Strategic Freight Plan has a three-fold purpose. First, the plan will be used to develop an understanding of North Dakota's freight system and how it integrates with the regional, national, and global freight systems. This analysis will also define the freight system's major players and their roles and responsibilities. Second, the plan will present a picture of North Dakota's current freight system, including infrastructure,

regulatory environment, and safety/security. Third the plan will identify and recommend changes and improvements to maintain a safe, secure, and efficient future freight system.

The study documents growth and trends in various commercial sectors such as agricultural processing, energy development and machinery manufacturing. That information will allow state and local transportation planners to evaluate infrastructure needs such as highway and rail maintenance and improvements.

"Without adequate transportation facilities that link to global trade, North Dakota businesses are handicapped in moving both raw materials and finished products," Berwick says.

The freight planning study is the latest in a series of major issues evaluated by the Center. Every two years, in conjunction with the NDDOT, the center selects a transportation-related issue for in-depth analysis. The goal is to provide information that will assure continued, competitive mobility for the region's freight.

Previously, the center assessed truck size and weight regulations in North Dakota and the region with an eye toward easing freight flows by providing information for jurisdictions to use in standardizing regulations. Another earlier study looked at container intermodal transportation and related trends in manufacturing. Based on the study, state legislation was developed to promote the use of local and regional port authorities.

SPOTLIGHT

TLN: TLN Expands Reach of NHI Course



Julie Rodriguez

Green army men and toy cars helped state, county and utility crews learn how to establish traffic controls in short-term maintenance and utility work areas.

The Work Zone Traffic Control for Maintenance Operations course was offered in February by the National Highway Institute via videoconference to nearly 170 participants at 14 sites across Montana, North Dakota and Wyoming. The day-long course

was taught by Frank Brewer of the University of Tennessee, a first-time network instructor.

At each site, participants used a scale-model road, toy cars and green army men to simulate work sites. Orange electrician's wire nuts served as traffic cones. Via TLN's two-way video environment, Brewer was able to review the simulated work sites and offer critiques and suggestions for improvement. In course reviews, participants praised the small-class atmosphere and opportunities for student and instructor interaction.

"This course pushed the envelope as far as what both instructors and participants thought could be taught via video conference," says Julie Rodriguez, director of the TLN. "There was a strong feeling that the instructor had to be there at the sites to see what was happening. The

participants and the instructor were pleasantly surprised at how clearly the concepts came through and how well everyone was able to interact."

The collaboration with the National Highway Institute was a milestone for the TLN, Rodriguez says. The TLN benefitted from the reputation of the NHI for top quality instructors and courses. At the same time, the NHI was able to reach new audiences at a very reduced cost.

"In a typical classroom setting, the instructor is only able to reach 20 to 30 students," Rodriguez explained. "Opening this session up via video conference represents a significant savings in terms of time and travel. And it's likely that some participants in the Upper Great Plains and Mountain West would never have access to this training any other way."

The course was so successful that TLN and the NHI are exploring additional collaboration for offering training. The Work Zone Traffic Control for Maintenance Operations course will be offered again via the TLN in early 2008.

DOTSC: Helping Guide Highway Investment



Kurt Johnson

Managing transportation assets like roads and bridges is a constant challenge for local, state, and federal agencies that must decide where to invest funds to maintain and improve their transportation networks.

“Making investment decisions related to transportation assets has become very difficult because of rising construction costs and limited funding,” notes Kurt Johnson, director of the UGPTI Department of

Transportation Support Center. “Those decisions become even more complex when trying to determine how various investments strategies impact the total life cycle of assets.” To address that challenge, the UGPTI is helping the NDDOT develop a 20-year forecast of performance measures and funding requirements to maintain or improve the state’s highway system.

UGPTI and NDDOT focused on the state’s pavement management program to provide realistic answers to investment strategies such as:

- What investment levels are needed to maintain the existing system or to improve it over the short and long term?
- What is the impact if the price of oil remains near \$100 per barrel or rises higher?
- What rehabilitation strategies are most cost effective relative to system performance?
- What is the impact of implementing new preservation/rehabilitation strategies?

NDDOT uses a computer pavement management system (dTIMS-CT) to develop realistic answers to these questions and more. The first of the system’s modules is a comprehensive data set of the existing pavement

network that includes location, traffic, geometric profile and a history of condition.

The second module contains performance criteria for all the preservation, rehabilitation and reconstruction strategies the NDDOT employs or new strategies it would like to evaluate. The UGPTI developed these performance models by evaluating roughness and pavement distresses on the 3,200 miles of pavement rehabilitated by various strategies during the last 10 years.

UGPTI worked closely with the NDDOT to develop the third module, cost and decision criteria, based on existing data elements which most closely mirror current project methodology. UGPTI also employed a pavement preservation strategy in developing the decision criteria.

The fourth and final module determines the most beneficial program by analyzing the incremental benefit cost of all potential strategies generated by the strategy selection module. In most cases, multiple strategies are generated for every project segment for each year in the analysis. More than a million strategies may be generated and analyzed for a 20 year analysis period.

“The result of our effort is a very realistic 20-year forecast of performance measures and funding requirements to maintain or improve the state’s highway system,” Johnson notes. “An added benefit was the ability to develop a short-term project list that closely matches the current five-year statewide transportation improvement plan and will be a useful tool for district offices to use in submitting future project requests.”

TSSC: Improving Safety through Software



Brenda Lantz

As the Federal Motor Carrier Safety Administration (FMCSA) is in the process of transforming the way they do business and aligning their information technology with their business operations, the UGPTI's Transportation Safety Systems Center is playing a key role.

The FMCSA maintains computer systems for collecting and analyzing commercial vehicle company census and safety data. With more than 3.5 million commercial vehicle inspections every year, that's a huge job. Currently commercial transport companies and enforcement personnel use up to 20 different programs to query, check, and enter data, file required reports and schedule compliance reviews and safety audits.

FMCSA's COMPASS initiative will transform the way FMCSA does business and implement an information technology solution that improves the agency's ability to save lives. The initiative will create a single source for safety data while improving data quality.

The TSSC's expertise has been primarily in developing mission critical software for laptop computers used by federal and state commercial vehicle inspectors and investigators. Those applications have not yet been integrated into the new system, but TSSC's experience with inspectors and commercial carriers is being put to use.

"In the early phases we are primarily involved with working with users and helping to define the requirements and design," notes TSSC director Brenda Lantz. "We asked users, 'What do you like with the current systems and want to keep? And what do you dislike and would want to change?'"

The FMCSA is in the second year of a long-term process of consolidating and updating its computer operations into a system that closely aligns with the agency's objectives. "Over the years, the agency had developed more than 20 different systems to address various needs. There is considerable data redundancy. Combining those systems would make them much more efficient and user friendly."

At the same time, the COMPASS system is being designed so that it will be flexible enough so that its data and capabilities can be used in new applications designed by other state and federal agencies. Currently, two of TSSC's software engineers, Dan Carroll and Gary Talpers, are building "portlets" of functionality for the main COMPASS system, the FMCSA Portal, to establish and test protocol for third-party applications that may use the system.

"It's exciting to be involved in this process from the ground up," Lantz said.

PUBLICATIONS

July 1, 2006 – June 30, 2007

Staff Papers

- SP-164 Advanced Small-Transit Vehicle Development Study
- SP-165 Designing a School Transportation Management System with Public Transportation Capabilities

Departmental Publications

- DP-176 Turtle Mountain and Rolette County Transit Development Plan
- DP-177 Examining the Impacts of Residential Self-Selection on Travel Behavior: Methodologies and Empirical Findings
- DP-178 Technical Training Status for the Department of Transportation in Montana, North Dakota, South Dakota, and Wyoming
- DP-179 North Dakota Grain and Oilseed Transportation Statistics, 2005-06
- DP-180 Annual North Dakota Elevator Marketing Report, 2005-06
- DP-181 Small Transit Vehicle Industry Study
- DP-182 Northern Plains-Pacific Freight Corridor Profile I: Idaho, Montana, North Dakota, and Washington
- DP-187 Impacts of Transportation Infrastructure on the Economy of North Dakota
- DP-188 Understanding Driver and Occupant Dynamics in Rural Traffic Safety

MPC Publications

- MPC 06-184 Support Motion Effects in a Timber Trestle Bridge: Physical and Analytical Modeling
- MPC 06-185 Trip Generation Rates for Large Elevators: A North Dakota Case Study
- MPC 06-186 The Effects of Technologies on Commercial Vehicle Company Safety and Service: A Supply Chain Perspective
- MPC 07-187A Design/Build vs. Traditional Construction User Delay Modeling: An Evaluation of the Cost Effectiveness of Innovative Construction Methods for New Construction: Part 1
- MPC 07-187B Design/Build vs. Traditional Construction User Delay Modeling: An Evaluation of the Cost Effectiveness of Innovative Construction Methods for New Construction: Part 2

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