

CONTENTS

Internal Shuttle System	2
Transportation Analysis Study	4
Advisory Council Chair	7
Jacobson Earns Degrees	7
GIS Associate	8
NDSU Solar Race Team	9
WASHTO-X	12

Mid-Continent Knowledge Network studies international transportation

Congestion. Crashes. Chaos. Words no transportation planner ever wants to hear.

Transportation professionals in education, research, planning and implementation met via the TEL8 network on how to make the continent's central trade corridor a safe place.

The timing for their second meeting was propitious. Just days before the Sept. 11 attack, almost 50 people met via videoconference to discuss issues dealing with traffic from Canada to Mexico through the middle of North America.



Safe vehicles and safety standards that cross borders are of particular concern to the six-member consortium. Those in the group are the Mountain-Plains Consortium, the Upper Great Plains Transportation Institute Transportation Safety Systems Center at Lakewood, Colo., the Colorado Division of Federal Highway Administration, the National Center for Intermodal Transportation at the University of Denver, Southwest University Transportation Center at Texas A&M University and the University of Manitoba Transportation Institute. A Mexican school is expected to be part of the consortium.

Information from the six presentations showed a consistent concern for safety and international trade.

Transportation issues at the Mexico-U.S. border are particularly affected by the North American Free Trade Agreement. Rob Harrison at the University of Texas and Southwest University Transportation Center brought his expertise in this

Internal shuttle system called ‘Saving Grace’

When North Dakota State University opened its doors this fall, a new on-campus shuttle service and Metro Area Transit Bison Gold Route were available to students.

Campus Police Chief and Security Officer Tim Lee said the campus shuttle was a “saving grace” the first days of school when one parking lot wasn’t open. Students responded well, he said, to free transport on campus. One day, the ridership was 287.

Jill Hough, associate research fellow with the Upper Great Plains Transportation Institute, worked with students, NDSU staff members and Metropolitan Area Transit personnel to help design Route 13 and the on-campus circulator shuttle.

Michael Simonson, Fargo Transit planner with whom Hough worked, calls the initial usage quite impressive. Monitoring the numbers the first two weeks of school showed ridership of 5,300 students in the circulator. He said expanding the route looks likely. He also said the route is the most extensively used in the entire transit system. While ridership on Gold Route 20 is light during the day, evening use indicates there might be an expansion of the schedule to encourage and to accommodate students.



The campus circulator, according to Hough, stops every 10 minutes so students have quick and easy access across the campus. The circulator runs from 7:20 a.m. to 4:20 p.m. school days helping the students who traverse the land-grant institution. The main body of the campus is from 12th Street to 18th Street and 12th Avenue to 19th Avenue.

Gold Route 20 is NDSU’s connection to work, shopping, food and entertainment and runs from 6:15-10 p.m. weekdays and from 7:30 a.m. to 9:30 p.m. Saturdays. For students who need the bus for employment, the bus is a real benefit. NDSU pays the city for the service. Students are issued an identification card to ride all MAT routes.

The new transportation system is a hit with students, according to Student Government President Jonas Peterson. The system was a student government campaign issue and an idea students liked. “Once the snow flies, students will really grab the buses,” he said, adding, “I’m pleased with the service. It’s part of what makes us a great institution.”



area. Labor issues, competition, shipping costs and supply chains and the magnitude of Mexican truck access all affect both image and fact in cross-border transport. Railroads used safety to freeze congressional legislation on large combination vehicles in the 1990s.

Trucking legislation through NAFTA said in January 2000 that there would be full cross-border access for international shipments. Now it's autumn 2001 and careful re-evaluation of all international shipping and travel becomes essential.

Yet facts remain from the Mid-continent conference. Safety arguments about Mexican trucks are not supported by data even though the public perception is that Mexican trucks aren't as safe as American or Canadian trucks. Fatality and injury rates for all vehicles are indeed higher in Mexico than the U.S. or Canada, but they have lower fatality and injury rates per truck.

Brenda Lantz from the Upper Great Plains Transportation Institute Transportation Safety Systems Center continues her work with ensuring the safety of North American motor carrier operations. Communication links for computer programming and databanks to alert regulatory authorities and trucking companies of problems or potential problems shows great promise for safety enhancement.



Others who presented were Paul Dempsey from the National Center for Intermodal Transportation at the University of Denver on *Free Trade But Not Free Transport: The Mexican Standoff*; Barry Prentice from the University of Manitoba Transportation Institute on *Economics of Congestion at a Border Gateway: The Case of Laredo*; Bill Stockton from Southwest University Transportation Center at Texas A&M University on *Criteria & Design of a Model Border Crossing* and Denver Tolliver from UGPTI on *Canadian-U.S. Rail Freight Flows Since NAFTA*.

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(Photos courtesy of Robert Harrison, Center for Transportation Research, The University of Texas at Austin)

Strategic transportation analysis study shows results

The North Dakota Biennial Strategic Transportation Analysis program is critical to managing the logistical challenges of North Dakota's industrial sectors according to Gene Griffin, director of the Upper Great Plains Transportation Institute. Several important issues were analyzed in the first-stage of the program affecting grain and oilseeds.

Phase one included evaluation of shuttle trains, heavier covered hopper cars, intermodal facilities and the influence of logistics on transporting North Dakota products. Initial information in each of the four areas indicates challenges and opportunities for North Dakotans.

Shuttle Trains

Grain flow patterns for some 162 million bushels of North Dakota HRS wheat, durum, barley and corn may well be strongly affected by the investment in shuttle facilities. Both the facility itself and its ability to utilize more competitive rates in attracting grain have the potential to strongly influence future local grain flow patterns.

As grain flow patterns adjust to new market signals, demands on the local grain gathering system must be addressed. In looking at shuttle trains as a component of the study, several factors became apparent for shipments of North Dakota grains.

Each shuttle venture has unique requirements in infrastructure, economic incentives, investment requirements and financing packages. Based on an earlier UGPTI study, a \$6 million green field facility required approximately 10 million bushels handled for profitable returns. Grain companies and railroads suggest a target of 12 to 15 million bushels for a shuttle facility.

This bushel requirement compares to the current average annual handle of 1.2 million bushels for North Dakota's elevators and an average annual handle of 5.6 million bushels for the state's largest elevators. Because of this, redistribution of bushels in the local elevator industry seems imminent.

Using wheat as the base case, the boundary of grain draw areas estimated for 10 shuttle facilities in the state encompassed 45 percent of the total land area. In production, approximately 88.6 million bushels of HRS wheat and 32.9 million bushels of durum were in the estimated shuttle draw areas.

These 10 draw areas encompassed about 38 percent of the state's HRS wheat production and 39 percent, of the state's durum production. For barley and corn, the shuttle facilities have the potential to accumulate 26.5 million bushels (24 percent of average state production) and 14.2 million bushels (19 percent of average state production), respectively, based on the estimated boundaries of the draw areas.

In relative terms, 2 percent of the elevators may originate up to 32 percent of the average annual production of wheat, barley and corn. This market share of North Dakota production translates to an average 16.5 million bushels per facility.

This potential concentration of bushels has implications for local roads, short line railroads, bridge infrastructure, local processors, local communities and the North Dakota elevator industry.

Impact of Heavier Cars on Light Density Rail Lines

Railroads are for-profit businesses. When they make decisions on whether to upgrade lines with light rail to handle larger cars, they rank investment alternatives on internal rates of return. Because North Dakota grain producers rely on an efficient rail system to move their products to domestic and export markets, decisions on rail lines and grain hopper car size are critical.

In the 1999-2000 crop year, approximately 69 percent of all North Dakota grains and oilseeds transported to domestic and export markets went by rail. The recent shift to larger grain hopper cars may threaten the viability of the state's light-density branch line network. Instead of 263,000-pound cars hauling 100 tons of grain, the new industry standard is becoming 286,000-pound cars capable of hauling 111 tons of grain.

Many light-density branch lines cannot handle these larger cars. Although it is possible to load the larger rail cars at lighter weights or operate at lower speeds on such lines, railroads operating on such lines eventually face a decision between upgrading and abandoning lines that cannot handle the 286,000 pound cars at full weight.

The UGPTI study simulated the impact of handling larger rail cars on many types of rail lines, modeled the decision process used by railroads in deciding whether to upgrade such lines or abandon them, estimated the costs of upgrading rail lines that are unlikely to be upgraded, and estimated generalized highway impact that could result from the abandonment of non-upgraded lines.

Conclusions drawn show railroads make decisions on their own profit model. Railroads are likely to use a maximum of an eight-year time frame for evaluating the benefits to upgrading lines. Competition is also an

important factor. Railroads look at competitors' actions in terms of upgrading their rail lines, the ability of trucks to serve destination markets directly, the location of new shuttle train facilities, operational cost savings resulting from the upgrade, service improvements from the upgrade and the cost of the upgrade.

Traffic level for railroads generally show short lines are less likely than Class I railroads to upgrade. A larger revenue share for short lines or a loan guarantee program that extends the length of loan terms available to short lines could increase the likelihood of upgrading lines with light rail on short line systems.

Highways would also be affected if rail lines were eliminated. The study shows the generalized highway impact resulting from eliminating rail lines is small in comparison to the rail upgrading costs. Using various scenarios, total highway impact may exceed \$73 million but the cost of upgrading these lines would exceed \$257 million. (This does not include the cost of upgrading bridges.)

Thus, a state-funded subsidy to upgrade all such potentially abandoned lines does not appear to be warranted. However, some subsidy may be justified on specific lines.

Intermodal

One of the greatest challenges facing rural communities is limited transportation options. Many small companies do not produce quantities sufficient to ship in unit trains or even full truckloads. Intermodal shipping should provide companies and identity-preserved producers with truck trailer and container convenience while taking advantage of lower costs provided by rail shipping.

Presently, North Dakota does not have an intermodal facility. Short line railroads may enhance their own traffic base and customer service by adding an intermodal option.

A North Dakota business survey of outbound and inbound transportation showed that the southeast portion of North Dakota represented some 63 percent of all traffic. This is due to a combination of business density and willing respondents.

A Commodity Flow Survey (CFS) was used to estimate potential container truck/rail intermodal traffic generated in North Dakota. The increased shipments identified in the CFS and previous study estimates of potential intermodal traffic indicate the railroad view of intermodal may depend on other variables.

In this snapshot of truck/rail container intermodal shipping into and out of North Dakota, the study revealed benefits of intermodal transportation:

- Lower overall transportation costs
- Increased economic productivity and efficiency
- Reduced congestion and burden on over-stressed highway infrastructure
- Higher returns from public and private infrastructure investments
- Reduced energy consumption and reduced emissions
- Increased safety

North Dakota's truck/rail container intermodal shipping problem in North Dakota is circular in nature. Problems exist in the form of rates and service. Rates are high and service levels low because there is no volume.

Logistics

Company investment decisions are based on profit-maximizing goals. As North Dakota competes for these investment dollars, logistical advantages such as land values and labor costs may be nullified by logistical disadvantages such as freight rates and intermodal access.

It is imperative to identify and to understand these factors to help improve North Dakota's competitive position.

When considering a business venture, other than a clear product and market definition, the next most important consideration is to define the network for the product. This includes the total size of the market, as well as the number and size of competitors. The network design should take into account the number, size and location of suppliers, producers, distributors, wholesalers and retailers.

The specific factors to examine when considering the location of one particular component of the network, for example, a value-added processing facility, include the following:

- Labor climate
- Transportation availability
- Proximity to markets/customers
- Quality of life
- Taxes/Industrial development incentives
- Supplier networks
- Land costs/Utilities
- Company preference

(Full reports are available from the Upper Great Plains Transportation Institute at North Dakota State University)

Dale O. Anderson heads advisory council

Dale O. Anderson became chair of the Advisory Council for the Upper Great Plains Transportation Institute at its June 20 meeting in Bismarck, N.D. He is charged with providing leadership for the Council in its role of providing policy guidance to UGPTI.

Anderson will work closely with UGPTI director Gene Griffin and the North Dakota State University administration to identify research opportunities and support for the Institute with public and private sector leaders. As a former director of UGPTI, he is in an ideal position to promote the Institute's professional capacity. The two-year term Anderson serves allows him to be involved in the development and passage of the biennial budget.

As president of the Greater North Dakota Association since 1981, North Dakota's State Chamber of Commerce, Anderson has served in a number of state and national organizations. He has also been active with his North Dakota State University alma mater where he earned both his bachelor's and master's degrees. Anderson is on the NDSU Development Foundation Board of Trustees and Executive Committee and is past president of NDSU Team Makers. His professional career began as a

professor in agricultural economics at NDSU. His doctorate in agricultural economics is from Oklahoma State University.

He was the first president of the North Dakota Consensus Council and currently serves on its board of directors as well as the North Dakota Water Coalition. Nationally, he served as vice president of the Council of State Chambers of Commerce and as a member of the Chamber of Commerce Committee of the U.S. Chamber of Commerce.

Extensively involved in political activities, legislative programs and civic affairs, Anderson has also written numerous widely published articles dealing with various aspects of agricultural production and marketing, and water resource development and use.

He was district governor of Toastmasters International and was honored with Distinguished Toastmaster Award. He is an active member of the Kiwanis, Masonic Lodge and the Elks.

Anderson and his wife, Claudia, have two adult children and live in Bismarck.

Jacobson earns degrees

Dennis Jacobson, director of the Department of Transportation Support Center at North Dakota State University, was recently awarded two degrees.

While he is known as Jake at the Upper Great Plains Transportation Institute, he is an Army Colonel who graduated from the United States Army War College in July 2001 with a master's degree in strategic studies. At the same time he was completing that rigorous course, he completed a master of science in civil engineering at NDSU.

As program director, he is responsible for developing student engineering, information technology centers to support DOT engineering and research activities. In his military capacity, Jacobson is an engineer with the North Dakota Army Reserve National Guard and Deputy STARC Commander.

GIS associate adds dimension to UGPTI



Robert Arthur, a professor of geography in the Department of Geosciences at North Dakota State University, brings his expertise in transportation research to the Upper Great Plains Transportation Institute. As an advanced research associate, Arthur will

coordinate and manage Geographic Information Systems (GIS) for the Institute.

GIS will be used for managing data and for research purposes. He will promote GIS among academic and government departments to improve usage of transportation infrastructure, to explore safety issues in transportation, to catalog and maintain infrastructure, and to coordinate transportation and land-use planning.

He is particularly interested in traffic safety issues of urban and rural road networks. His research looks at geographical variables, environmental design, driver behavior and enforcement. The focus of his research is to understand the role that speed plays in collision occurrence.

Arthur will develop a GIS database to serve the Mountain-Plains Consortium transportation community that can be maintained and updated on an ongoing basis. This will entail the creation of a web-based product for efficient dissemination of information across the five-state region.

For the past seven years he worked at the Van Horne Institute, a transportation institute based at the University of Calgary. There he focused on improving the penetration of Canadian transportation into the global economy. Arthur extensively researched the role of speed in traffic.

Published in international journals and conference proceedings, he wrote a chapter concerning the use of GIS in the research of traffic safety for a soon to be released book containing articles from authors worldwide. He has also written an instructor's manual for use with a human geography textbook.

At NDSU he teaches introductory and upper level courses in GIS, human geography, transportation geography and spatial analysis. He earned his bachelor of arts, master of science and Ph.D. (A.B.D.) in geography from the University of Calgary, Canada.

Prairie Fire 'soaks in rays' and makes sunny showing in solar race

North Dakota State University's first-ever solar race car, Prairie Fire, placed fourth of the nine vehicles in the stock car class division in its debut performance, and first among rookie teams. With 25 members on the Sunsetters, the racing team's moniker, Eric Bradley, project manager and president is proud of the innovative ideas he says are unique to their project. He also credited mentor team, University of Minnesota, and some late-in-the-game aid from inner-state rival, the University of North Dakota, with valuable support.

Engineering for the car became a team sport and a lesson in cooperation. The race itself is grueling by any standard. It's 2,247 miles along historic Route 66 from Chicago to Claremont, Calif. In 11 days, five drivers rotated in the third heaviest vehicle in the race. Drivers had a hot ride, inside a vehicle made to soak in the sun's rays for power. The energy of the sun was Prairie Fire's sole power. Within the team concept, 16 team members and adviser, Dr.

Wayne Reitz from North Dakota State University's mechanical engineering department, accompanied their 2-year-old baby.

They began the process in 1999. According to Reitz, the students did all the work from fund-raising through design, building, testing and finally racing. During the race they

degree F. heat. In the desert, drivers rotated every two hours. An official race observer rode along in one of NDSU's accompanying vans. Sixteen students and Reitz, with four support vehicles made the trip. It's an expensive proposition, with NDSU students having one of the least costly cars at approximately \$50,000. The faster cars can cost up to \$1 million.



North Dakota State University Solar Race Team

As an engineer, Reitz says the students learned to be creative and work with a budget. Cheap and free were favorite words. They learned to look for reasonable

were their own troubleshooters. In the first third of the race, the car was not performing as they expected and was using too much energy. Engineers make things make sense and this didn't. The students went through the car, analyzing and rejecting possibilities. The culprits turned out to be brake pads that were not retracting. With the problem solved, they had 30 percent more speed.

Race days were from 8 a.m. to 6 p.m. Drivers sat in the driver's bubble at what Reitz estimated to be about 125-

goals and had good, practical experience, he said. He's pleased there are so many sophomores and juniors interested in the project as well. The race is held every two years and they can prepare for the next adventure. Students came from electrical, mechanical and computer backgrounds with some marketing added to the mix. Brian Freeman, a junior and mechanical team leader, said Prairie Fire's sturdiness was important. The 1,100-pound car suffered no mechanical breakdowns – a victory in

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Rear view of the solar car



View from inside the car

itself. When UND's car was disabled, they donated spare tires, flashers and water to the Prairie Fire team.

They're already looking forward, using knowledge from this pioneer venture. One thing for sure, the next car will be lighter, and though it would be nice, it still won't have air conditioning.

(photos courtesy of Sunsetters)

“Sunsetters is very happy with how everything went on our Chicago to California journey. Not only were we very successful in finishing the race competitively, we also finished without any major car failures or safety compromises. This tells us that the engineering and construction techniques we used were suitable for the rigorous 2,300 miles. Finishing as the number one rookie team overall was one of our goals and to add to this we finished fourth in the stock class. The race lasted 11 days and was an enjoyable and valuable experience for the team and adviser who attended. The donation from UGPTI helped immensely in funding our expenses on the road.”

Eric Bradley, president, Sunsetters NDSU Solar Race Team

Check out the Website: www.sunsetters.org, then click on “The Race.”

Loading the car in the trailer



Driver in the car





Rolla, Missouri, checkpoint



Tulsa, Oklahoma, pitstop



Caravan pictures

The Finish Line!



After the finish in Claremont, California



Tel8, MPC partner with WASHTO-X

Fourteen states in the western United States linked in the new WASHTO-X system. WASHTO-X is a two-year project that involves taking TEL8-type events to the WASHTO-X states. WASHTO stands for the Western Association of State Highway Transportation Officials.

Much of what the new project will do mimics the TEL8 program which will provide guidance and assistance, and bridging access. The Mountain-Plains Consortium will assist in conducting research.

WASHTO-X expects to do three types of events: 15-20 information sessions, four to six university seminars and two to four videoconference focus groups.

The TEL8 board said it applauds the motives and efforts made by Doug Anderson and Doyt Bolling that underpin WASHTO-X. The project director is Bolling who works at the Utah T2 Center at Utah State University.

TEL8 provides Department of Transportation programs providing information and research to its members. TEL8 also offers graduate level courses and links its universities to other information series. TEL8 remains dedicated to transportation in Region 8.

In partnering with WASHTO-X, TEL8 extends its vision to be a leader in distance learning and communications through technology and programming that adds value to TEL8 members.