2016 Mid-Continent Transportation Research Symposium Where the Rubber Hits the Road: Moving from Research to Implementation

October 24 –25, 2016, Madison, Wisconsin
Madison Concourse Hotel & Governor's Club

Monday, October 24th

Session 1

1-A Mobility- Moving People and Goods – Advances in Measuring Travel Delay and Reliability

This session focused on mobility performance measures (PMs) and how they are being used by Wisconsin DOT for reporting PMs, Great Lakes Regional Transportation Operations Coalition for multi-state PMs and for studying the impact of congestion on housing prices.

Schneider, WisDOT

Liz described how Wisconsin DoT rolled out two mobility PMs: delay and reliability few years ago. Combined the NPMRDS data with state data, beginning with the interstates to compute these PMs. This data is being used to study trends in delay/reliability, impacts of events and in active management. Wisconsin DOT has been awarded a SHRP2 grant as a lead adopter of 5 Reliability products.

Peter Rafferty, UW-Madison

Peter described how there are very limited multi-state mobility PMs. Wisconsin is one of the few states that have detailed PMs for mobility and are publicly reporting them. Mobility PMs are calculated across 22,000 miles of roads in the GLRTOC megaregion. Extensive effort went into processing NPMRDS data for this. An "Anomaly Scanner" was developed to retrospectively identify abnormalities in system performance.

Jangik Jin, UW-Madison

Jangik presented his findings on how commute time/traffic congestion relate to housing property values. Till date there have been no studies on this topic primarily because of lack of data. NPMRDS data was used in this research. Significant effects of congestion on property values were found in the 5-15 mile distance from Central Business District (CBD).

1-C Preservation– Everything Old is New Again: Future Applications for Recycled Materials

This session focused on the importance of recycling, as it relates to the transportation systems. The speakers talked about ideas such as methods of recycling and the benefits of recycling from a business perspective, while also looking at some of the environmental benefits of using recycled materials. Speakers included:

Barry Paye, Bureau of Technical Services, WisDOT

Spoke on how the Wisconsin DOT recycles, and some of the major benefits of recycling. He began by describing some of materials that the DOT recycles, such asphalt, concrete, and steel. The DOT recycles because recycling is economically beneficial, environmentally responsible, and provides engineering benefits, such as improving construction efficiency. According to Paye, the DOT recycled 1.2 million tons of material in 2015, which saved them a total of $ 14.3 million.

Angela Pakes Ahlman, UW-Madison

Spoke on some environmental benefits and some of the processes involved in tracking recycled materials. A major issue in the process of recycling is tracking of the recycled materials once they've been implemented. She stated that a helpful tool on the Recycled Materials Resource Center web page can be used in order to track the usage of recycled materials and some benefit analysis of the materials that were used.

Girum Merine, WisDOT

Spoke about the use of cold in place techniques, which are used in order to recycle pavement that needs to be replaced. Using asphalt mix and additives, the existing pavement is revitalized. Some benefits of cold in place are reducing costs, construction time, CO_2 emissions, along with addressing the distress in the road itself instead of the symptoms of the distress.

1-D Service– Moving Research to Implementation from a National Perspective

This session focused on improving the application of research by trying to move research from the desk or the lab into commercialization. The researchers need to have a better idea of who their customers are and the role that they have in the field of research. Speakers included:

Stephen Maher, P.E., Associate Division Director, TRB

Spoke about the mission of the Transportation Research Board, and how they use certain programs or software to help the DOT use research. Using programs such as Research Pays Off or the Innovations Deserving Exploratory Analysis (IDEA) program, TRB can help the DOT turn their research into specifications, guides, and software products to be used.

Jason Bittner, Applied Research Associates Inc.

Spoke about implementation perspectives and sponsored research. He discussed some of the issues with implementation, such as ineffective mandates and training sessions regarding implementation. He said that proper implementation of research requires planning, follow up, and communication.

Patrick Casey, CTC and Associates

Spoke about how the Technology Transfer Committee at CTC uses research about research in order to improve the movement of research toward implementation. The ABG 30 committees hope to learn how research is implemented among different committees, and the goal is to provide guides, tools, strategies, and case studies of successful implementation of research.

Session 2

2-A Safety– Using Data to Improve Roadside Design and Safety Features
2-C Accountability- Legal Barriers to Research Implementation
2-D Service – Improving Transportation Outcomes through Implementation of Innovation and Technology Initiatives

This session focused on innovation, and the role that it plays in the Transportation industry. The speakers focused on local, national, and international levels, describing programs that help to fund and implement new transportation technologies. Speakers included:

Debra S. Elston, Director, Corporate Research, Technology & Innovation Management, FHWA
Spoke about the goals of the FHWA on a national level, and some of the major national programs they're focused on, such as smart cities or Exploratory Advanced Research (EAR). She also talked about federal funding, and the effects that a 25-26% reduction in federal research program funds has had on FHWA programs. She concluded her presentation by talking about relationships that the FHWA is currently making

with European Highway research laboratories, where the FHWA is assisting on projects such as establishing a pooled-fund highway.

Mike Davies, Division Administrator, FHWA Wisconsin Division

Spoke on innovation and how the relationships of FHWA promote change on American Roadways. He talked a lot about the importance of being an innovative society and the improvements that come with the types of changes that are currently being made to our roadways. He used examples such as the high friction surface treatment on the Marquette interchange in Milwaukee and the installation of GSR-IBS Bridge technology in Dodge County to give local examples of innovations that are already being done here in Wisconsin.

David Esse, DTSD Innovation Officer
Tom Ries, WisDOT

Spoke on the role that technology must have in order to get maximum benefits from innovation. They spoke about the importance that effective communication and risk management have on implementing innovation and the culture of innovation. They also talked about some specific technologies and methods used in order to efficiently innovate, along with the importance of the business process as it relates to changes that are implemented.

Session 3

3-A Accountability– Communicating the Value of Research in an Era of Increased Accountability for Results– Expert Panel Discussion

This panel discussion focused on the importance of communication for researchers as they show the value of their research to their customers. The speakers spoke about the value of transportation research, in improving road systems and safety on the roads, and how this value must be communicated to effectively market their research. Panelists included:

Tom Rhatican, Assistant Deputy Secretary, WisDOT

Patty Mayers, Communications Director, WisDOT

Steve Walters, Wisconsin Eye

3-C Preservation– Actionable Results from Recently Completed WHRP Research

This session focused on the Wisconsin Highway Research Program, that seeks to identify better ways that can be used to design, build, and reconstruct Wisconsin highways. Speakers included:

Dr. Habib Tabatabai, UW-Milwaukee

Spoke about the use of thin polymer overlays (TPO) to preserve bridge decks. TPOs are materials that can be laid on bridge decks and when combined with specially-graded aggregates can be used to preserve the bridge deck and increase friction on the surface. Research about TPOs have been done to test how different samples performed under different temperature, humidity, chemical, and traffic conditions.

Bill Oliva, Bureau of Structures, WisDOT

Spoke about how research being done shapes maintenance guidelines that are used by the Bureau of Structures. Implementation of research is key in order to create policies regarding these techniques and in order to organize types of maintenance being done to transportation systems into the qualified product list based on the performance observed.

Dr. Ramon Bonaquist, Advanced Asphalt Technologies, LLC

Spoke about the critical factors that affect asphalt concrete durability, which refers to the ability of the material to withstand the effects of aging and loads that manifest pavement distresses. He also discussed the results of some testing that was done, that looks at different binder and aggregate combinations to understand the effect of aging and volume on the flexibility index of the asphalt concrete.

Barry Paye, Bureau of Technical Services, WisDOT

Spoke about how the results from the WHRP's research can impact the type of materials that are used on the field. The research being done, combined with field-observations from around the state, has resulted in improved guidelines for the Wisconsin DOT that should improve pavement performance across the state.

3-D Mobility– The Interplay among Speed Limits, Infrastructure and Driver Behavior

This session focused on some of the current research being done to evaluate relations between driver speeds and crash incidents. Most of the research looked at the speeds of cars that may be in situations at high-risk for a crash. Speakers included:

Raha Hamzeie, Iowa State University

Spoke about research done to study relations between speed management and how drivers react to potential road conditions. Using regression models, she studied vehicle speeds in normal, crash, and near-crash situations to compare how drivers may have been reacting to these situations. She also looked at differing road conditions, due to weather or congestion for example, to study how drivers are adapting to changes.

Erin Schoon, WisDOT and Peter Rafferty, UW-Madison TOPS Lab

Spoke about research being done to study impact of the speed limit increase to 70 MPH in the State of Wisconsin. They talked about some of the misconceptions of an increased speed limit such as how an increased posted speed will result in risky driving behavior and greater speed disparity. Their research found that the average travel speed increased 1.5 mph when the posted speed was increased from 65mph to 70mph.

Lt. Chris Jushka, WisDOT

Tuesday, October 25th

Session 4

4-A Accountability– Improving Investment Decisions

This session focused on ways to improve a company's investments by utilizing proper management techniques, budget optimization and by adding value to existing data that is being collected. Speakers included:

Mara Campbell, CH2M Consulting Engineers

Spoke about proper management techniques and how they are being utilized by DOT's. She spoke about creating a proper blend of management that consists of performance management, asset management, and risk management, which are all done to improve results and performance of the company, while making sure to properly utilize the funding available.

Tricia Etzler, WisDOT

Spoke about the budget management with regards to the Wisconsin DOT. Each year, the DOT creates a new budget by the legislative process, which could result in an excess of funds that can be used in the future. A multimodal trust fund, called the Transportation Fund, invests some of these excess funds in hopes of improving general budget management on a year to year basis.

Kelvin Santiago, UW-Madison TOPS Lab

Spoke about some of the data collection techniques being used to get the most out of research. Using processes that utilize GPS technology allows researchers to avoid costly site visits, and can be used with other data such photolog and LiDAR data that can be used to properly analyze the data in the way that they're hoping to.

4-C Safety– Innovations in the Use of Data to Enhance Law Enforcement Activities

This session focused on the collection and use of crash data. The speakers spoke from differing perspectives about the data collection systems themselves, and how crash data is being used to improve the roads.

Randy Romanski, WisDOT and Steven Parker, UW-Madison

Spoke about the crash database used in the State of Wisconsin and some improvements being made to the system. The current database has been used for almost 20 years, but a lot of time is being used to improve the system, hoping to increase the efficiency of crash data processing, modernize the system, improve data quality, and support more frequent updates.

Major Charles Teasdale, WisDOT

Spoke about the State Patrol perspective of the crash data systems. The state patrol uses this data in order optimize the police force, increasing the visibility of police, reducing the response time to accidents, and optimizing the distribution of units. They also use crash data to try to predict the types of locations where certain crashes, alcohol related crashed for example, may occur.

Dr. Anuj Sharma, Iowa State University

Spoke about the use of big data in the process of trying to detect traffic incidents. In current research, speed is used to detect traffic incidents.

4-D Service– Transportation System Management & Operations

This session focused on some of the technologies, primarily related to the Transportation System Management & Operations (TSM&O). The TSM&O uses technologies that study the efficiency of many aspects of the traffic system and data analysis to study the infrastructure and find ways to improve the traffic systems. The session focused on the tools and processes used here in Wisconsin by the DOT and in research. Speakers included:

Natalie Smusz-Mengelkoch, Kimley Horn and Associates

Spoke about the use of TSM&O in Wisconsin in order to increase the efficiency and effectiveness of limited funding resources, while taking advantage of available data sources. She also described high-level benefit analysis used in order to determine efficiency regarding parameters such as safety, mobility, productivity, and environmental.

Dr. Jonathan Riehl, UW-Madison, TOPS Lab

Spoke about some of the plans and strategies that are being used in TSM&O to optimize existing infrastructure. He also talked about old and new technologies, that are being used in order to improve areas

such as work zone management, traffic incident management, and transit operation. He also added that technologies are quickly maturing and how technologies such as probe-based traffic data or in-vehicle travel time display are being used to improve efficiency in the public and private sectors.

Max Sauban, UW-Madison

Spoke about the new technologies being utilized by the Wisconsin DOT in the statewide traffic operation center (STOC), where they hope to manage congestion and improve transportation safety, mobility and efficiency on Wisconsin state highways. He talked about the impact that technological advances such as the strong GIS capabilities, and how they are being used to relate data from outside to the entire road network.

Session 5

5-A Safety– Active Transportation Research and Implementation

This session focused on the use of research to improve safety for pedestrians and bicyclists. The speakers used examples from Wisconsin, Michigan, and the Netherlands to explain some of the ways that research is being used. Speakers included:

Kristina Fields, UW-Platteville

Spoke about the design of bicycle lanes in the Netherlands, and how these designs have led to less fatalities involving bikers as compared to the US. Using different types of bike lanes, more clearly marked signs, and by starting safety classes for children as young as 10, the Netherlands has managed to create safer roads for bicycles.

Cara Hamann, University of Iowa

Spoke about research being done to study driver behavior in situations involving bicycles, using driving simulators. Using recording of nearly 57 hours of bicyclist activity, they found that most bike crashes occur at intersections and that the presence of shared-lane markings leads to safer overtake distance being used by cars.

Robert Schneider, UW-Milwaukee

Spoke about the analysis of the pedestrian and bicyclist crash trends in Wisconsin. They found that from 2004 to 2013, pedestrian and bicyclist crash rates decreased while number of trips increased. It was found that a very high percentage of crashes involved cars driving straight (77%), took place at locations without a signal or stop sign (83%), and nearly 27% of bicycle crashes involved alcohol use by one of the parties.

Peter Savolainen, Iowa State University

Spoke about some data that was collected in Michigan, regarding driver/pedestrian interactions. According to studies, 78% of pedestrian fatalities occur at mid-block crossing. It was also found that only 62% of motorists studied would yield to pedestrians. Using this type of data, more efficient crosswalks have been created to improve pedestrian safety.

5-C Preservation– Materials, Testing, and Installation Techniques to Extend the Useful Life of Transportation Infrastructure

This session focused on the materials and techniques used to preserve roadways and bridges. The speakers talked about the materials themselves, along with some of the methods used to implement these materials. Speakers included:

Dr. Marcus Knight, Middle Tennessee State University

Spoke about the use of thin overlays on Tennessee bridges, that are used to improve skid resistance and to improve some of the underlying wear of the surfaces. He also spoke about some different methods for applying the thin overlays, such as manual to more automated methods. He concluded by saying that the Tennessee DOT is seeing good results from the overlays, and are hoping to have more communities using them in the coming years.

Dr. James Tinjum, UW-Madison

Spoke about injected polyurethane technology used to remediate rail substructure and increase rail freight capacity. Polyurethane injections are already being used in airports, roadways, and bridges, but a new approach is being taken to help remediate the increased the loads on rails due to fracking sands, and some of the issues that come from the spillage of these sands. The results of a field test in Madison showed that the stiffness of the track modulus doubled with the polyurethane injections.

Dr. Hussain Bahia, UW-Madison

5-D Mobility– Breaking Down Barriers to Optimizing Freight Investments

This section focused on how the Wisconsin DOT is developing the commercial ports of Wisconsin. Through its State Freight Plan (SFP), the DOT hopes to improve safety, security, mobility and efficiency, in order to preserve and enhance the port systems. Speakers included:

Ben Zietlow, UW-Madison CFIRE/MAFC

Ernie Perry, UW-Madison MAFC/CFIRE

Donna Brown-Martin, WisDOT