100 inches inside and the on-road bicycle lane

When I last wrote an article for this column it was spring of 2014 and the topic was MnDOT’s success with the application of centerline and edge line rumble strips. Specifically we looked at data for TH 95 where they basically eliminated the lane departure fatal and A-severity crashes in the rumble strip areas. Props to MnDOT! In the setup to that article I mentioned two observations from my frequent trips to Cambridge to visit my Dad. The second thing that caught my attention was the little “100 inches inside” sign I would see on the back of semi-tractor trailers. Beyond “how soon can I pass this vehicle that’s only going 6-mp over the speed limit,” seeing this note so often would set my mind to thinking about lane widths and space on the roadway. Because it was right there in front of me I could easily see how well this vehicle functioned along Highway 95 with the wider lanes and rural space. But how would the space-challenged and active urban road system I was used to perform with these wider vehicles?

As engineers we are often asked to fit all the community’s needs and desired uses into the cross-section. We have finite space but we may need to (or are asked to) provide for vehicle lanes, turn lanes, a bicycle lane, parking, shoulders/gutters for drainage, signs, snow storage, sidewalk/trails, walls and other things. As a former Transportation Engineer for a metro urban county, I was often involved in discussions to implement complete streets and accommodate all users with the constraint of the existing cross section. Occasionally we would receive a request for narrow (10-foot-wide) vehicle lanes to reallocate space for other uses on the cross-section. I wondered about the 102-inch outside-width trailer traveling along next to a bicycle lane adjacent to on-street parking. Sounds like a worst case scenario but we did have those situations.

(Continued on page 13)
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**University of Minnesota (ITSO)**

North Dakota State University

**Fall 2015**

www.nc-ite.org
Hello Members! As the 2015 year is drawing to an end I would like to highlight two NCITE Board Initiatives that took place this year.

First, the Board archived a large amount of historical data ranging from old newsletters, meeting invites, papers and pictures dating back to 1968. This data was sorted and scanned to electronic files. Hard copies of the original NCITE Charter and numerous awards have been stored in a safety deposit box. This was a daunting task and many Board members worked on the weekends to accomplish this. A big thanks to those involved.

Second, NCITE has switched website servers to a more streamlined management software platform. The new website will manage event registration, membership data, emails, and communications all in one spot. The website is currently live and is a work in progress as the Board continues to refine the data and add more content. Feel free to let us know if you have comments.

The NCITE Annual Meeting was recently held on Friday, November 13th at the Four Seasons Curling Club in Blaine. The well attended event consisted of a dinner and presentation followed by curling. During the presentation the new 2016 NCITE Board was announced.

I am excited to broadcast the 2016 NCITE Board:

**President:** Joe Gustafson  
**Vice President:** Mike Martinez  
**Secretary:** Scott Poska  
**Directors:** Ken Levin, Max Mooreland, and Jacob Folkeringa

I have had a great experience as the 2015 President. The NCITE Board and members consist of many dedicated and talented individuals and it has been a pleasure to work with everyone.

As always, the Executive Board and myself are open to suggestions or comments regarding any aspects of the organization. Feel free to contact us.
UPCOMING EVENTS

Transportation Research Board 95th Annual Meeting
January 10-14, 2016
Walter E. Washington Convention Center—Washington D.C.
See the event website for more information.

2016 ITS Heartland Annual Meeting
April 25-27, 2016
Des Moines, IA
See the event website for more information.

For professional development opportunities:
http://nc-ite.org/content.php?page=Professional_Development_Meetings

NCITE Calendar:
http://nc-ite.org/calendar.php
Thank you to everyone who voted in the 2016 NCITE Election. Members elected to the 2016 NCITE Executive Board were announced at the Annual Meeting on November 13th.

Your 2016 NCITE Executive Board Members are:

President: **Joe Gustafson**  
Vice President: **Mike Martinez**  
Secretary: **Scott Poska**  
Treasurer: **Jeff Preston**  
Directors: **Kevin Levin**  
**Max Moreland**  
**Jacob Folkeringa**  
Past President: **Katie Schmidt**

Congratulations to the 2016 NCITE Executive Board!
The following awards were presented at the Annual Meeting on November 19th:

**Young Transportation Professional of the Year Award**

**Mike Bittner**

Mike is a national leader in the area of alternative intersection design concepts. He has presented at seven national conferences and written three papers on this topic. Mike’s charismatic personality helps build excitement for the topic as he has been awarded “best speaker” at both national conferences where the honor was available.

Mike is also a civic leader, helping promote engineering throughout the communities in which he works. Specifically, he assisted St. Joseph’s Catholic School in Waconia develop a STEM curriculum, developed and facilitated “Engineer’s Day” for the West Fargo middle school STEM program and continually volunteers to judge at the BISON’s Best Robotics Competition and MSUM Popsicle Bridge Competition for middle and high school students.

Mike continually manages hundreds of millions of dollars’ worth of transportation infrastructure improvements. He is an office manager and group leader for KLJ’s transportation planning division, leading a staff of eight engineers and planners, with direct access to more than 100 design engineers, environment planners and construction management professionals.

**Past President’s Award for Transportation Professional of the Year**

**Tom Sohrweide**

2002 President of NCITE; Tom has been with SEH for 25 years, is a company Principal, and leads the company’s traffic engineering group in Minnesota, North Dakota, and South Dakota. You can find evidence of his traffic engineering work across the state of Minnesota. Specifically Tom works with his many clients to develop traffic studies, traffic signal designs, traffic signing and pavement marking design, roadway designs, and Intelligent Transportation Systems (ITS) solutions. He is certified as a Professional Traffic Operations Engineer® (PTOE), which is validation and demonstration of his knowledge, skill, and ability in the specialized application of traffic operations engineering.

Other Professional Involvement:
University of Minnesota Capstone Senior Design Class Mentor
ITS Minnesota Marketing and Outreach Committee;
Minnesota Toward Zero Deaths Conference Planning Committee;
University of Minnesota Center for Transportation Studies Safety and Traffic Flow Research Council
The September Section Meeting was held on September 30th, 2015 at Jax Cafe in Minneapolis, Minnesota.

Luke Hanson from the City St. Paul presented on the City of St. Paul’s Bike Plan. Highlights of the presentation included:

- St. Paul’s 2008 comprehensive plan had a goal for a city-wide system.
- The planned network is significantly denser. It includes off-street paths, in-street separated lanes, bike boulevards and enhanced shared lanes.
- St. Paul’s Grand Rounds, downtown and city-wide networks are some of the main goals of the bike plan.

Kelley Yemen from Hennepin County presented a summary of the Hennepin County Bicycle Plan. Highlights of the presentation included:

- There are five main goals of the Hennepin County bicycle plan:
  - Ridership Promotion
  - System and facilities build out
  - Safety and comfort
  - Sustainability
  - Maintenance
- The plan has a number of specific targets:
  - Quadruple bike commuter ridership
  - Towards Zero Bike Deaths
  - Average 20 miles of new system per year
  - Provide a bike facility in the vicinity of 90% of all homes in the county.
The Annual Meeting was held on November 13th, 2015 at Four Season’s Curling Club in Blaine, MN.

Kristi Sebasitan provided an update on MWITE and Shawn Leight provided an update on ITE. Shawn noted that a primary initiative for the organization is for better attendance at regional and national meetings and additional support from local sections to organize those meetings.

Mike Bittner provided a glowing review of his experience in the Leadership ITE. The program provides opportunities to enhance a variety of skills, including:

- Networking: the 2015 class consisted of almost 20 participants
- Social: Meetings included dinners and college football games giving participants opportunities to interact outside of the professional environment.
- Professional and technical: The program consisted of a number of trips throughout the country to meet in person, attendance at the 2015 International Annual Meeting and Exhibit, instruction on soft skills, technical webinars and a class project.

2015 President Katie Schmidt provided a year in review including the year’s activities, scholarship fundraising, and the technical and standing committees.

Highlights:

- 5 section meetings
- 2nd Annual WTS/ITS/NCITE Fundraiser at Tin Whiskers
- Summer Social event at Brit’s Pub
- Award of $4,000 in scholarships and student paper awards
- Completed board initiatives of a historical data archive and conversion to a new website.
- The addition of 22 new members and 8 student members.

Katie also presented the section awards for 2014:

- The Young Transportation Professional of the Year Award, given by NCITE to a member 35 years of age or younger who is active in NCITE and the profession was presented to Mike Bittner.
- The Past President Award for Transportation Professional of the Year, given by the past presidents of NCITE to a member who has contributed greatly to the profession over his or her career was presented to Tom Sohrweide.
Katie then announced the results of the 2015 NCITE elections:

President:      Joe Gustafson
Vice President: Mike Martinez
Secretary:      Scott Poska
Treasurer:      Jeff Preston
Directors:      Ken Levin
                Max Moreland
                Jacob Folkeringa
Past President: Katie Schmidt
Staff at the Four Seasons Curling Club provided a short training session on curling and attendees teamed up to engage in spirited competition. No injuries were reported.
This summer North Dakota State University sent a team to represent the University at the Midwest District ITE Conference and Student Traffic Bowl Competition. Traffic Bowl is a Jeopardy-style knowledge bowl covering all things traffic. They fell to a strong University of Illinois Urbana-Champaign team, that held their own in the final round. Pictures are from the competition in Branson, MO, from June 28th - July 1st.

They also assisted in a STEM Club event with 1st through 3rd graders to learn about designing, building, and evaluating their team design of a marshmallow shooter.

The student chapter also holds regular monthly meetings with guest speakers from the industry to talk about local companies and projects that they have worked on/completed. They try to bring in a variety of topics to expose to students, such as city planning and roadway projects. Pizza and pop are provided at every meeting. For more information on how to join the NDSU Student Chapter Contact Dylan Dunn, ITE President, NDSU Student Chapter.
Technical Committee Update

Geometric Design Technical Committee
Committee Chair: Kelly Besser - kbesser@stonebrookeengineering.com
Recent Agenda Items: SuperStreet Corridors, CAP-X Planning-Level Analysis
Future Agenda Items: TBD
Next Meeting: December 17, 2015 (meetings are typically held on the third Thursday of each month at Stantec).

Intersection Traffic Control Technical Committee
Committee Chair: Dean Chamberlain - dchamberlain@wsbeng.com
Recent Agenda Items: ATMS System Planning, Current Traffic Control Projects
Future Agenda Items: Flashing Yellow Arrows, LRRB Training: Tool for Time-of-Day Use
Next Meeting: Wednesday, December 2, 2015 (meetings are typically held on the first Wednesday of each month, No summer meetings).

ITS Technical Committee
Co-Chair: Durga Panda - dppanda@hotmail.com, Luke Morris morris.luke@state.mn.us
Recent Agenda Items: CTSCS Systems Engineering, NTCIP Compliance
Future Agenda Items: TBD
Next Meeting: December 1, 2015 1:00 PM—3 PM, Waters Edge (meetings are typically held on the first Tuesday of even numbered months)

Pedestrian and Traffic Safety Technical Committee
Committee Chair: Pete Lemke - petele@bolton-menk.com
Recent Agenda Items: Minneapolis Bicycle and Pedestrian Traffic Counts presentation by Simon Blenski
Future Agenda Items: Cedar Ave Reconfiguration
Next Meeting: TBD

Planning Methods and Applications Technical Committee
Committee Chair: Steve Wilson - swilson@srfconsulting.com
Recent Agendas Items: Travel Behavior Inventory and Metropolitan Council Regional Model Updates
Future Agendas Items: TBD
Next Meeting: TBD (meetings are typically help on the last Wednesday of every other month)

Traffic Operation and Maintenance Discussion Group
Committee Chair: Adam Bruening - adam.bruening@co.washington.mn.us
Recent Agenda Items: Pavement Message Materials including 3M’s New Polyurioa and Ennis Paints modified HPS4 epoxy
Future Agenda Items: TBD.
Next Meeting: TBD

Simulation and Capacity Analysis Technical Committee
Committee Chair: Bryan Nemeth - bryanne@bolton-menk.com
Recent Agenda Items: Presentation of the developing Large Scale Hybrid Simulation Model of the Minneapolis Metropolitan Area, Peak Hour Factor and HCM Analysis discussion, review of micro modeling and microsimulation task groups.
Future Agenda Items: Macro Task Group to present PHF testing results, data collection strategies.
Next Meeting: TBD
How close to the minimum dimension for each elements could we go to (in an urban setting) and still provide a safe design and favorable experience? State Aid Rules provide 11-foot minimum lane widths, but we’ve received requests for 10-foot lanes. The MnDOT Bikeway Facility Design Manual provides guidance for 5-foot bicycle lanes at 25 mph, and parking lanes range from 8 – 10 feet (depending on ADT) and could be narrower with a variance. In addition, Minnesota Statutes 169.18 Subd 3 (3) requires “in no case less than three feet clearance” when passing a bicycle.

As we work to accommodate all users in a limited space, one might be tempted to go to the minimum for these dimensions. When you consider guidance, vehicle characteristics, and user behavior, whether through experience, application, or a thought experiment, when minimizing dimension you should see that at some point you diminish safety and experience for users and possibly set up a situation where a violation of minimum clearance is likely (see cross section exhibit on next page). This is based on the concept of essential maneuvering space required for bicycles and vehicles. Big trucks, cars, and small (relatively) bicyclist need space to “get out of the way.” I would often explain this in a more colloquially non-technical way, calling it “forgiveness of the roadway.” While realizing that people are generally attentive, reasonable, and careful when driving and our travel framework is organized and well-planned (e.g. always drive on the right) – there are times when unexpected things happen and we must react in a manner different from normal driving. A forgiving cross-section provides you the ability for reasonable action/reaction to avoid an incident as opposed to very limited opportunity for deviation from “rules of the road” before something bad happens. An example would be evasive action by a cyclist to avoid a suddenly-opened parked-car door. Can the bicyclist maneuver without entering the driving lane or requiring evasive action by the truck? A forgiving cross section answers yes. If the answer is “no” for the bicyclist, then we might ask “is there enough room for the truck to maneuver/avoid and still stay in the lane provided?” Will the driver be able to react in time? Hopefully yes to both, but if you asking those questions about your project, you might be trying to fit too much in. Most of you work with these concepts every day and the guidance and criteria we use to design our roads, trails, and sidewalks have the needed factors of safety built into them.

Whether it’s complete streets, ADA and accessibility, road safety, or improving public health by fighting obesity, many engineers, planners, and practitioners work hard every day providing safe and accessible travel opportunities for all. Personally, I am a big fan accommodating all users and commend the work of MnDOT, counties, cities, other agencies, and consultants to provide safe travel opportunities for pedestrian, bicyclists, and vehicles. Keep working at it!

As engineers we are responsible for the safety and operations of our roads, trails, and sidewalks. I believe we are also responsible for the user experience; because of this we must consider the setting (context), what is practical, guidance, and our engineering judgement. When you’re “fitting it all in,” consider the characteristics and needs of each user; the bigger trucks needs space to travel, maneuver, and avoid (minimum clearance) and bicyclists needs space to travel and maneuver as well. The urban setting is likely to have semi-tractor trailers and bicycle accommodations placed next to each other along the same corridor. Along with trucks and bicycles, personal vehicles of all shapes and sizes will use the travel lane, maneuver in and out of parking, and avoid other vehicles. Throw in driveways, pedestrians, cell phones, drinking coffee, texting, running late, and you can see there’s so much happening along our roads. As you are likely well aware, allocating space on the cross-section in a way that ensures safety, accommodates users, and provides a favorable experience can be a complex consideration of choices. Each situation is unique and it would be impossible to consider all them here. That is where you and your engineering judgement comes in - continue with your good work providing safety, accessibility, and mobility – consider the user experience because that is important too. I think we do a really good job, and as an engineering community we should be proud of that. Travel safe!
Allocating Space on the Cross Section (continued from page 13)

Concerns with regard to combining minimum roadway design components

Standard Single-Unit Delivery Truck

[Diagram showing dimensions and components]

Notes & Assumptions
- Bicycle zone dimensions from MnDOT Bike Design Manual
- Single Unit Truck dimensions from AASHTO Green Book
- Passing zone based on MN State Statute 166.16, Subd. 3
- Essential maneuvering space for truck was estimated as 2 feet based on reasonable assumptions and observations

Other Considerations
- The conflict zone between the maneuvering spaces of the bike and truck could easily have a greater overlap - the bike could be positioned closer to the lane of traffic, and the truck could be positioned closer to the bike lane.
- There will be a natural tendency for the truck to stay away from the roadway centerline in order to maintain a clear zone about equal to the estimated maneuvering space. This again could increase the overlap of the truck & bike maneuvering spaces.
- It is apparent that the State 3-foot passing lane would likely be in frequent violation if minimum roadway dimensions were used.

ITE LOL

HIGHWAY ENGINEER PRANKS:

THE INESCAPABLE CLOVERLEAF:

THE ZERO-CHOICE INTERCHANGE:

THE ROTARY SUPERCOLLIDER:

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Flashing Yellow Arrow (FYA) left-turn signal indications have seen increasingly widespread use since their adoption into the Manual on Uniform Traffic Control Devices as a standard treatment in 2009. Flashing yellow arrow indications can be a very cost effective way to have an immediate impact to drivers in a community. FYA indications offer benefits both in terms of improved safety and efficiency. The greatest benefit of FYA indications is that left turn phasing can be varied by time of day to respond to varying traffic demands, which reduces delay. For example, FYA indications may be used to allow protected-only phasing during peak periods and permissive-only phasing during off-peak periods. According to the National Cooperative Highway Research Program Report 493, having a dedicated left arrow indication for left turning movements is better understood and obeyed by the driving public, leading to fewer crashes.

As a result of this widespread use and popularity, agencies that own and operate traffic signals frequently get requests or suggestions from drivers for signals that should be revised to have FYA. Most often, the question is “Why do I have to wait for a green arrow here, but there with a flashing yellow arrow I can go after yielding to oncoming traffic?” In most cases, an agency does not have the time or resources to evaluate the benefits of flashing yellow arrow indications at an individual location, let alone make revisions to the signal to provide flashing yellow arrow indications. Therefore, within an agency, there is often a need to evaluate intersections for feasibility of flashing yellow arrow indications as well as prioritize those eligible intersections based on a relative benefit to cost ratio.

In the spring of 2015, the City of Plymouth, MN commissioned a study to evaluate and prioritize 70 signalized intersections within the City for flashing yellow arrows. This represented all of the signals within the City that either did not already have flashing yellow arrows or signals that were programmed for near-term reconstruction. The study required an intense data collection effort that was coordinated across multiple agencies that own and operate traffic signals (55% Hennepin County, 30% MnDOT, and 15% City of Plymouth) within the City. This included a site visit to each cabinet to inventory FYA compatible components.
Each intersection was broken down by movement and evaluated for feasibility of FYA, both from a geometric standpoint (sight distance limitations) and a safety standpoint (crash history review). Out of the 70 study intersections, 57 intersections (81%) had at least one movement that was FYA eligible. Movements that passed the initial screening were evaluated using criteria to estimate the amount of benefit and assigned a relative benefit score. Planning-level signal revision construction cost estimates were prepared for each intersection that had FYA eligible movements. A method was developed to rank each intersection based on cost and potential benefit. In the final step of the study, a 3-year phasing plan for implementation was developed based on intersection rankings, geographical areas of the City, and the City’s allocated CIP funds per year for the FYA retrofit project.

The results of the study were presented to the City Council in late June, and they adopted the phasing plan for implementation. Shortly thereafter, signal revision designs for the 2015 implementation groups consisting of 21 City and Hennepin County intersections began. The City partnered with Hennepin County to furnish the signal components required at each County intersection. In turn, the County’s signal maintenance crews will install these components and make flashing yellow arrows operational.

In conclusion, agencies that own and/or operate traffic signals should carefully evaluate the feasibility and anticipated benefits of FYA installation before spending limited resources installing FYAs at every intersection.
New Members

Indrajit Chatterjee, U of MN (student member)

Vahid Mostagh, SRF Consulting Group

Jennifer Vanderheiden, NDSU (student member)

Philip Kulis, SRF Consulting Group

Caitlin Wotruba, Kimley-Horn

Moves

Ken Levin, Hennepin County, formerly with Alliant Engineering

Morgan Hoxsie, Kimley-Horn, formerly with MSU

Jeffrey Hilden, TKDA, formerly with Jacobs Engineering

Paul Glaser, HNTB, formerly with Alliant Engineering

Sudheer Dhulipala, WSB, formerly with Ulteig

Richard Storm, HDR, formerly with CH2M Hill

If you or a friend has changed jobs or moved, we would like to stay in touch. Members, please update your information by visiting [http://www.ite.org/membership/index.asp](http://www.ite.org/membership/index.asp). To access this area, you will need to know your membership number. Your “username” is your membership number, and your “password” is the first 6 letters of your last name (e.g. Johnson=Johnso). Non-members please contact Nicklaus Ollrich via phone (612.373.5350) or email (nicklaus.ollrich@metrotransit.org) for assistance. Please provide you name, title, employer, complete street address (including mailstop, if applicable), telephone number, fax number, and email address.