Current High Speed Detection at Signalized Intersections – Are you Maximizing your Operational and Safety Benefits?

By Joanna Bush

Much debate abounds in the traffic signal world around the subject of detection. Typical discussion is centered on the benefits of non-intrusive detection over loop detectors. For the Wisconsin Department of Transportation (WisDOT), where loop detectors still control upwards of 90% of the state owned signalized intersections, the conversation has been much different.

In 2006 the Traffic Signal Design Manual (TSDM) was updated and re-published. The TSDM provides, among other things, guidance on the number and placement of loops for advance detection at signalized intersections. A two-loop layout referred to as the Green Extension System has long been the recommended layout for detection on high speed approaches to a signalized intersection. However, in the years since the Manual was rewritten, several WisDOT regional offices had migrated to a single loop layout for advance detection (dilemma zone coverage) citing both operational and safety benefits.

To bring some resolution to this ongoing debate, WisDOT established a test bed at the intersection of USH 12 and CTH P in the Town of Springfield, Dane County. This intersection was selected for studying the operational impacts of different loop Configurations/operation because it offered high speed approaches (55 mph
posted) as well as multiple loops on each high speed approach. A camera was installed at the intersection to capture red light runners as well as to supplement problematic stop line detection at the intersection. A data collection device was designed, built and installed in the cabinet to capture information such as max outs, gap outs, red light runners, and the number of times the signal cycled in the hour.

Three different loop Configurations were used for the study capturing the different standard practices of the WisDOT regional offices. These Configurations are described below. It is important to note that the “travel time” shown is relative to the posted speed limit. The 85th percentile speed limit was found to be just over 60 mph thereby making the loops at 525’ approximately 6.0 seconds from the stop bar.

Max outs and red light runners do not tell the whole story alone, but they certainly begin to reveal information about the operational efficiency and crash potential at the intersection. Other, less easily quantifiable, indicators of an effective loop configuration are black marks on the pavement or complaint calls.

Configuration 1 boasted the fewest max outs per hour, but that came at a price, as it was also the Configuration with the most red light runners per hour. The advance loop at 400 feet was only 4.5 seconds from the stop bar given the 85th percentile speed and; therefore, this study Configuration was terminated early due to safety concerns. Inadequate dilemma zone coverage was provided with this Configuration, which inherently increases the crash potential and was evidenced by the increase in the number of red light runners.

Configuration 2 represents the ‘Green Extension System’ currently recommended in the TSDM. This Configuration exhibited the highest number of max outs of all three Configurations, but it also saw the fewest red light runners (by a very small margin over Configuration 4). As can be expected, Configuration 2, with its high percentage of max outs also boasted the longest average cycle length.

The single loop layout associated with Configuration 3 maxed out half as often as Configuration 2, but it still maxed out more often than Configuration 1. On the flip side, the occurrence of red light runners was only slightly higher than Configuration number 2, which was still a significant reduction compared to Configuration number 1.
It is important to note that drivers run red lights for a variety of reasons. Not all red light running is the result of a driver being caught in the dilemma zone when the light goes yellow. Distracted driving, aggressive driving (“it wasn’t red, it was pink!”), and mob mentality (“the car ahead of me is going, I will too!”) can also result in red light running. As engineers, there is only so much that can be done to eliminate the red light runner. However, one other factor that was considered and adjusted for only in Configuration 4 was the clearance interval. Historically WisDOT engineers have calculated the yellow and all red clearance times based upon the posted speed limit. A recent NCHRP study showed that, when known, the 85th percentile speed should instead be used. If the 85th percentile speed is not known, it was recommended to add 7 to the posted speed limit. At the subject intersection, this increased the yellow clearance interval by 0.5 seconds. Since the highest percentage of red light runners were within that first 0.5 seconds of the all red, this change further reduced the number of red light runners and Configuration 4b surpassed Configuration 2 with the fewest red light runners per hour. Please note, however, that the passage time and min gap were also adjusted for Configuration 4b, so unsurprisingly, the number of max outs also decreased and this too, would have influenced the total number of red light runners.

In summary, Configuration 4b with a single loop at 525’ from the intersection, a passage time of 5.5 seconds and a Min Gap of 3.6 seconds was the most effective loop configuration for this intersection. The single loop layout not only provides dilemma zone detection, but it also allows for more effective gap selection. This configuration resulted in the lowest number of red light runners, the second lowest number of max outs, and the second lowest cycle length, thereby supporting the claims of more efficient and safer operation as cited by the engineers that had already begun making the change to the single loop configuration.

For WisDOT this means a drastic change in how we have been designing our intersections for the past several decades. Thankfully, the conversion to a single loop installation can typically be made by simply disconnecting the front loop and updating the loop detector settings. It also means it is time to update the TSDM. Look for that in 2015!
Thought the elections were over? Not quite. The Wisconsin Section annual elections are underway and will be open through November 24th. Please consider voting this year. Positions contested include Member Director and Affiliate Director. Information on the candidates can be found in this newsletter as well as our website. Please contact Brian Porter Brian.Porter@dot.wi.gov if you did not receive an e-mail notifying you to vote. Remember, you have to be a member in good standing (paid dues for 2014) to be eligible to vote.

Fifteen people responded to me that they read my last message in August. That is only 5% of our distribution list. Maybe more read the newsletter and just didn’t respond but that would still be only a small percentage of our overall membership. The Board is considering other mechanisms to reach out to our membership to keep them informed of important topics. This will likely result in more direct e-mails than what you have seen in the past. If you have other suggestions please let me or other board members know.

The December Annual Meeting will be held on December 3rd at the Delafield BrewHaus this year. We are excited to be providing all participants a chance to play a round or two of the Traffic Bowl. Prizes will be given to the winners. The meeting will also announce the winners of the election and inaugurate the 2015 Section officers. Also, several awards will be presented including the Distinguished Service Award, the Harvey Shebesta Award, the Young Professional Award, and Past President’s Award. Several other recognitions will be presented to our committee leaders. Please plan to attend this meeting to honor those recognized and to have some fun with the Traffic Bowl-Wisconsin.

It is that time of year again for International dues. This is a reminder for those ages 23 to 30 that ITE International has special discounted rates for Young Members beginning at $0 at the age of 23 with $30 dollar increments up to 30 years of age. If you or someone you know if interested in joining ITE please visit ite.org/membership/youngmember.asp for more information. Also, new for 2015 is a Public Agency Membership which offers significant savings in annual dues over individual dues rates. Visit the membership page of ite.org for additional information on these discounts.

If you have any questions or ideas you would like to share regarding upcoming events or the Wisconsin Section, please contact me at mmccarthy@emcsinc.com. Also, be sure to check out our Section website www.itewisconsin.org for the latest news and event information.

Are you interested in advertising in our quarterly newsletter? Advertising is a great way to sponsor the Wisconsin Section and promote your firm/agency to hundreds of fellow Wisconsin Section members! Advertising options start at just $50 per issue. Contact Yang Tao, Newsletter Editor, at (608) 266-4815 or ytao@cityofmadison.com for more details.
Recent Meetings and Events

Joint WTS/ITE Breakfast Meeting – September 10, 2014
By Yang Tao and Stacey Peirce

The joint Women’s Transportation Seminar (WTS)/ITE breakfast meeting was held at the Country Springs Hotel in Pewaukee on September 10. The meeting had a great turn out from both WTS and ITE.

Jess Billmeyer, Traffic Engineer and Planner from AECOM and John Bridwell, WisDOT Standard Development Engineer, both gave presentations about diverging diamond interchanges.

Jess discussed the lessons learned from the I-39/90 diverging diamond interchange projects, both from a traffic engineering and public involvement perspective.

John’s presentation focused on geometric design of diverging diamond interchanges.

Thank you to WTS for jointly hosting the meeting with ITE and thank you to Jess and John for their presentations!
ITE UW-Platteville/UW-Madison Student Night – October 15, 2014
By Yang Tao and Jeff Roemer

Students and faculty from UW-Platteville hosted our annual fall “Student Night” dinner at the Deer Valley Lodge in Barneveld. Student chapter updates were provided by both the UW-Madison and UW-Platteville Student Chapters.

UW-Platteville gave an overview of their student section activities. In fall of 2013, they performed several intersection sight distance studies. In spring of 2014, they also investigated 85th percentile speed versus the actual posted speed limit on Bus 151. Brat sales were used to do some fund raising, and the student section also participated in the Adopt-a-Highway clean-up program. Other activities include Engineering Expo, Crosswalk Signal Competition, and field trips to Dubuque’s Traffic Operation Center and Platteville Airport.

UW-Madison also provided an overview of their student section activities. They performed before and after study with the University Transportation Services on the effects of the illuminated stop, pedestrian and speed limit signs. Several members attended the annual Midwestern ITE Conference in June, and placed second in the District Traffic Bowl Competition. Section members also participated in events such as SimpCap meetings and the annual ITS Forum. Outreach and education efforts by the section included a tour of the Driving Simulator Lab of the TOPS Lab. UW-Madison was also awarded the 2014 Student Chapter Award by the Midwestern ITE District.

Dr. Christina Curras, Chair of UW-Platteville Department of Civil and Environmental Engineering, gave an insightful presentation about emergency response and traffic re-routing at Platteville. She spoke about the June 16th tornadoes that struck Platteville and the impact they had on the campus and city infrastructure, along with some lessons learned. The biggest lessons were that preparedness pays off, and that communication between various entities (city, university, county, police, and so on) is crucial as events unfold.

Special thanks to Allan Pacada of EMCS, Inc. for coordinating the meeting arrangements!
ITE Board Candidates

2015 ITE Wisconsin Section Board Candidates

The following candidates have been nominated for the 2015 ITE Wisconsin Section Board. Electronic ballots will be distributed to all members in mid-November. Affiliate Members will have the opportunity to vote for the Affiliate Director. International Members will have the opportunity to vote for Member Director and Affiliate Director. The nominating committee consisted of: Todd Szymkowski (Chair), Rich Coakley, and Bill Bremer.

Past President  Michael McCarthy
President        Dawn Krahn
Vice President   Stephan Hoffmann
Treasurer        Brian Porter
Secretary        Yang Tao
Member Director  Candidate #1 Allan Pacada
                 Candidate #2 Susan Paulus
Affiliate Director (Year Two)  Stacey Pierce
Affiliate Director (Year One)   Candidate #1 Justin Schueler
                                 Candidate #2 Ashley Vesperman

Thank you to Rich Coakley and Jeff Roemer for their years of service on the ITE Wisconsin Section Board!

Member Director Candidates:

Allan Pacada

I am originally from California and graduated with a Bachelor’s Degree in Civil Engineering from the University of California - Davis in 2001. After graduation and before moving to Milwaukee in 2008, I worked as a construction engineer for Kiewit Construction. Currently, I am a project engineer for EMCS, Inc. and have worked on a variety of projects, including STH 67 & CTH B Intersection in Oconomowoc, Mill Road and Pilgrim Road in Menomonee Falls, Mayfair Road and Bluemound Road in the City of Wauwatosa, as well as the GMIA Runway Safety Improvements project and the Hank Aaron State Trail Extension. I am also a registered Professional Engineer in the state of Wisconsin.

Since 2008, I have been actively involved with the ITE Wisconsin Section and I am your current Section Meeting Committee Chair, which I have proudly served for the past four years. In 2013, the Wisconsin Section was the recipient of the ITE Section Activities Award, which I was proud to be a part of in organizing the section meetings. That same year, I was also involved with the Local Arrangements Committee for the ITE Midwestern District Annual Meeting in Milwaukee. I served as the chair for the Social Activities and Family Program Subcommittee that arranged social activities/events, such as the Brewers game, Summerfest outing and a scavenger hunt.
If elected as Member Director, I will continue to devote my time and effort to an organization that I truly believe in. I will ensure that the Section Newsletter is informative and a valuable resource for our members. And, I will continue to encourage membership growth by providing new ideas as part of the Section Board.

Susan Paulus

Susan is a traffic engineer with Lakeside Engineers; she is currently on-site at the WIS 441 Tri-County Project Office in Appleton, WI as the Traffic Management Engineer. Susan has more than nine years of professional engineering experience, including previous employment with WisDOT and TTI. Her specialties include work zones, incident management, traffic and safety studies, and traffic control and detour plans. Susan has been an active member of ITE for 10 years. Most recently she participated in the augural class of LeadershipITE. Susan has also served on the student chapters at UW-Milwaukee and Texas A&M and was on the planning committee for the 2013 Midwestern District meeting. She is also active in WTS, and the Wisconsin Green Building Alliance and serves on two TRB committees. In her free time, she enjoys traveling, rock climbing, baking, and spending time with her daughter.

Affiliate Director (Year One) Candidates:

Justin Schueler

Justin has six years of experience as a traffic engineer at R.A. Smith National in Brookfield. He holds bachelor’s and master’s degrees in Civil Engineering from Marquette University and is a registered professional engineer in Wisconsin. During his time at R.A. Smith National, Justin has worked on a variety of major projects including the US 41/WIS 441 Operational Planning Study and I-39/90 Central Segment Reconstruction. He has completed numerous Transportation Management Plans (TMP), Intersection Control Evaluations (ICE), and Traffic Impact Studies for state and local projects. In addition, he worked on-site for two years at WisDOT Southeast Region reviewing traffic studies and providing technical traffic support.

Justin is also involved in professional societies and volunteer work. He has been an active member of ITE as a student and professional, serving on planning committees for ITE Wisconsin section meetings and the 2013 ITE Midwestern District Conference held in Milwaukee. Justin has also volunteered with the Milwaukee Public Library, R.A. Smith National highway cleanup, and Marquette Senior Design program.

Ashley Vesperman

Ashley has been a traffic engineer at AECOM for the past five years. During her years at AECOM, she has worked on a variety of traffic and planning projects. Currently Ashley is the Deputy Project Manager for the I-39/90/94 Interstate Study from Madison to Portage, which is evaluating traffic operations in the design year 2050, developing long term improvements, and completing an Environmental Impact Statement. Previous to her job at AECOM, she worked at the Washington State Department of Transportation for two years as a transportation design engineer. Ashley has been an active member of the ITE Wisconsin Section and served as the Hospitality Chair for the 2013 ITE Midwestern District Meeting that was held in Milwaukee. Ashley is a registered Professional Engineer in the State of Wisconsin and a Professional Traffic Operations Engineer.
LeadershipITE Experience

My LeadershipITE Experience
By Todd Szymkowski, P.E., PTOE

I had the fortunate opportunity to participate in the inaugural class of LeadershipITE which was held from November 2013 and concluded at the Annual Meeting and Exhibit held in Seattle this August. The group of 30 participants from North America met in person three times:

- November 2013 in Washington, DC – Meet fellow classmates, introduced to International ITE Board and sat in on some of their meetings related to trends in transportation, started Leadership classes and started to form group project focus.
- March 2014 in Miami, FL – Leadership classes and presentation of initial group project findings.
- August 2014 in Seattle, WA – Leadership classes, final presentation of group projects to Board of Directors, and graduation.

Between in-person meetings, there were several webinars and group project coordination conference calls over the 9-month period. Webinar topics ranged from building effective relationships with appointed and elected leaders to online reputation management. The five groups consisting of 6 participants worked on a
wide range of activities. Some of the topics included how can ITE better promote other transportation modes to tackling the organization’s dues structure to better accommodate younger members. The group I worked with took on the issue of how can ITE help prepare incoming graduates to perform better when entering the workforce. The table below highlights some of the group recommendations.

**LeadershipITE Group 2 Recommendations**

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<th>ITE can help improve quality of workforce by:</th>
<th>ITE can encourage students to join the transportation profession by:</th>
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<tr>
<td><strong>International Level</strong></td>
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<td>• Student-oriented evening webinars on:</td>
<td>• Student Chapter Membership Drives</td>
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<td>• Professions of Transportation</td>
<td>• Customized approach for undergraduate vs. undergraduate / graduate programs</td>
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<td>• Interview Skills</td>
<td>• Bigger Promotion of New Student Chapters</td>
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<td>• Technical Writing Skills</td>
<td>• More outreach to schools w/ urban planning programs</td>
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<td>• Generational Differences</td>
<td>• Investigate high school level chapters</td>
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<td>• Student-Oriented Clearinghouse</td>
<td>• Investigate non-faculty student chapter advisors</td>
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<tr>
<td><strong>District Level</strong></td>
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<tr>
<td>• Align Student Chapter Committees and</td>
<td>• Consistent Student Chapter Start-up Packages</td>
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<td>approaches across District</td>
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<td><strong>Section/Chapter Level</strong></td>
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<tr>
<td>• Most Improved Student Chapter Awards</td>
<td>• Customized, Personal Approach (Concierge service) to transition students into profession</td>
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<tr>
<td>• Mock Interviews</td>
<td>• Student Chapter Liaison Best Practices (possibly in ITE Journal)</td>
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<td>• Encourage attendance (food, prizes)</td>
<td>• Sophomore Year Target for ITE involvement</td>
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<td>• Mentoring Programs</td>
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While it’s a significant commitment in both time and finances, I am very thankful for being able to participate in LeadershipITE. Beyond all the training and group projects, I value the lifetime relationships I have developed as well as the ability to tap into a wide range of specialties within the transportation industry across North America. If you are considering applying in the future, please do not hesitate to contact me at todd.szymkowski@lakesideengineers.com.
Upcoming Awards

Martin Bruening Award

Mr. Martin Bruening worked from 1924 until 1972 for the City of Milwaukee in the area of Traffic Engineering. He was not only a leader in Milwaukee but was recognized as a national leader. During his illustrious career, he was an advocate and supporter of the three “E’s” of traffic safety: Engineering, Education and Enforcement, and his sound geometric design principles and early attention to good traffic signal design and operation were partly responsible for Milwaukee’s consistent first place ranking in traffic safety for cities in its population class. Although Bruening believed in and was professionally involved in the planning and design of Milwaukee’s freeway system to ensure the coordination and design for traffic operations on the local street system, he consistently warned of the necessity for a balanced transportation system. He authored several reports on the financially favored position of the automobile over mass transit, and advocated a metropolitan transit authority and mass transit subsidy.

The Wisconsin Section of ITE, in recognition of Martin Bruening, has an annual award for papers by its members. The Martin Bruening Award Committee is again calling for technical papers to be submitted to compete for this annual award.

ELIGIBILITY REQUIREMENTS:

Any member of the Wisconsin Section of the Institute of Transportation Engineers or its student chapters may submit a candidate technical paper. The paper must result from a study or design project in the field of transportation or traffic engineering in which the author served as a principal participant. The paper:

a) must have been completed within two years of the deadline date for the award
b) may have been previously submitted to another group or publicized in another media
c) may be an expansion or revision of a paper previously submitted
d) may be a work related study, a design project, or a research investigation
e) may be co-authored

EVALUATION CRITERIA

Papers will be evaluated on the basis of organization, clarity and usefulness of tables and figures, adequacy and conciseness in covering the subject, simplicity and effectiveness of language, proper support of conclusions, completeness of credits and references, and relevancy of transportation engineering.

The Martin Bruening Award is open to both professional and student members of the ITE Wisconsin Section. Two winning paper(s), one in the Professional and one in the Student category will be recognized at the March 2015 Section Meeting, along with a $500 award to the winning author(s). Papers are due by January 30, 2015. Please email papers in Adobe pdf format to Marcus Januario at marcus.januario@meadhunt.com. A confirmation email will be sent after your paper is submitted. If you do not receive confirmation within 2 business days please call Marcus Januario at 262-790-0232.
Midwestern District Update

2015 Midwestern District Annual Meeting
June 29-July 2, 2015, Branson, Missouri

2015 Midwestern District Annual Meeting will be held in Branson, Missouri. Branson is truly a one-of-a-kind family vacation destination — and an incredible value — with dozens of live performance theaters, three pristine lakes, championship golf courses, an international award-winning theme park, dozens of attractions and museums, an Historic Downtown district, shopping galore, a full range of dining options, and a host of hotels, motels, resorts, RV parks, campgrounds and meeting and conference facilities.

Practically at the center of the United States, Branson is less than a day's drive for one-third of Americans, and with low-cost flights to the Branson Airport, as well as Springfield-Branson National Airport, it's never been easier for your family or group to get to Branson.

Branson, Missouri, nestled in the lakeside beauty of the Ozark Mountains, is America’s affordable, wholesome family entertainment capital that emphasizes fun, comfort and the feeling of being right at home. Featuring an array of live theaters and attraction venues and active recreational pursuits, the community embodies essential American values such as patriotism, faith, courage and generosity of spirit in a warm inviting atmosphere that is truly genuine and heartfelt.

Mark your calendar now for the 2015 Midwestern District Annual Meeting!
**2015 ITE Collegiate Traffic Bowl Program**
By John Davis, Chair, ITE Collegiate Traffic Bowl Committee

Over 190 students representing ITE student chapters from universities in the United States and Canada will compete in District and Section traffic bowls during the 2015 season. The nine winners of the district traffic bowls will compete in the Grand Championship that will be held in Hollywood, Florida in August 2015.

Students who participated in the Grand Championships have remarked that “it was a moment they will never forget, that they had a chance to make new friends, and that they had tremendous fun!” The Traffic Bowl Grand Championship has turned out to be a highlight event of the ITE International Annual Meeting since the first event in 2010.

In 2009, the first collegiate traffic bowl was conducted by the Midwestern District during the District’s Annual Conference. Over the past six years, a total of 15 schools have competed at the district level. Each of the student chapters in Wisconsin have competed in at least one traffic bowl with the University of Wisconsin-Madison chapter participating every year!

The 2015 District Conference will be held in Branson, Missouri in June 2015, and it would be outstanding if each of the Wisconsin Section’s student chapters were present and competed. Please encourage students to attend the meeting not just for the traffic bowl, but for the opportunities to network with professionals, see the excellent technical presentations, and understand what it is to be a professional in the field of transportation engineering and planning.

Additional information regarding the 2015 competition can be found at the ITE website, www.ite.org. You will find the rules and instructions, links to video highlights from the previous Grand Championships, and photos from many of the previous years’ District events. And, by the way, plan now to attend the District’s traffic bowl, encourage the student chapter of your school or in the section, wear your school’s or adopted school’s colors and cheer them on to victory. See you all in Branson!

The Traffic Bowl was created by the ITE International Board of Direction to foster competition between student chapters and increase the awareness and participation of students in the Institute. The objectives of the ITE Collegiate Traffic Bowl are to encourage students to become more active members in the Institute, to enhance their knowledge of the traffic/transportation engineering and planning profession and of the Institute itself, and to strengthen the programs of the ITE student chapters.
Upcoming Events

December 3  
Annual Section Meeting, Distinguished Service Award, Harvey Shebesta Award, and Young Professionals Award  
Delafield, WI

6PM at Delafied Brewhaus (3832 Hillside Drive) in Delafield. Topics include annual election results, new officer inductions, award presentations and traffic bowl. Menu choices include roasted prime rib au jus, chicken parmesan risotto and broiled salmon. Cost: $30 for ITE members, $15 for students, and $35 for non-ITE members. Please RSVP by NOON on Wednesday, November 26th, 2014, with Allan Pacada of EMCS, Inc. by email at: apacada@emcsinc.com or by phone at 414-939-7024. Reservations are considered firm unless cancelled by NOON on Monday, December 1st, 2014. No shows may be billed.

January 11-15  
Transportation Research Board 94th Annual Meeting  
Washington, D.C.

January 21  
January Section Meeting - Public Service Appreciation Luncheon  
Madison, WI

January 30  
Martin Bruening Award submittals are due

Do you have some information or great ideas to share? The ITE Newsletter is an excellent medium for reaching section members. If you would like something published in the upcoming newsletter, please contact the 2014 Wisconsin Section Member Director, Yang Tao at (608) 266-4815 or ytao@cityofmadison.com.