

CROSSROADS



WISCONSIN TRANSPORTATION INFORMATION CENTER – LTAP at the University of Wisconsin–Madison

Roundabouts replace dangerous intersections

National studies show that intersections on two-lane rural roads are good candidates. There is a substantial reduction in the severity of crashes at those locations with a roundabout.

INTERSECTIONS ACCOUNT for almost 40 percent of fatal and injury crashes on US highways every year. Along with roadway and lane departure crashes, they are a major focus of highway safety improvements at federal, state and local levels.

An intersection control solution gaining acceptance in states like Wisconsin is the roundabout. They first appeared on Wisconsin roads in 1999 and, over the last eight years, the Wisconsin Department of Transportation has incorporated roundabouts in state highway projects where engineering studies indicate they make sense. By the end of 2013, there will be about 200 roundabouts on state roads and 75 on local roads in Wisconsin.

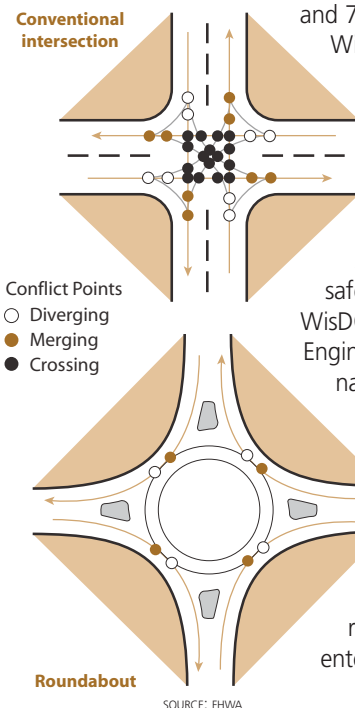
WisDOT now includes roundabouts in the design standards that appear in its Facilities Development Manual (FDM).

Safety factors

Are roundabouts an effective safety solution on local roads? WisDOT Standards Development Engineer Patrick Fleming says national studies show that intersections on two-lane rural roads are good candidates in particular. There is a substantial reduction in the severity of crashes at those locations with a roundabout because vehicles enter the intersection and



Roundabouts, like this one in Oconomowoc, are an intersection design gaining popularity in Wisconsin as a safety solution at certain locations.



Conventional intersections TOP have more potential conflict points than roundabouts BOTTOM, including T-Bone crashes that do not occur on the circular roadway.

circulate at slower speeds, and there are fewer conflicts than with conventional intersections.

Fleming illustrates this by comparing the possible conflict points of a two-lane roadway in a typical roundabout and a signalized intersection. He calculates eight conflict points in the roundabout scenario and 32 conflict points at the signalized intersection. Half involve crossing collisions (the deadly T-Bones) that do not occur with roundabouts.

The Traffic Operations and Safety (TOPS) Laboratory at the University of Wisconsin-Madison is conducting ongoing research on roundabout safety in Wisconsin that includes a review of crash data on state road projects before and after roundabout installation. TOPS Lab Traffic

Safety Engineering Research Program Manager Andrea Bill says they are analyzing information on factors that affect how the intersections perform to determine if they work as expected.

Early findings from the 2013 study of 30 roundabouts across the state show a 38 percent decrease in fatal and injury crashes after installation and no fatal crashes in that same period. TOPS researchers did find a 12 percent increase for all crashes across all study locations. These include low-severity crashes, a circumstance the researchers suggest resembles early outcomes on roadways with newly installed traffic signals or median barriers. They say important next steps are assessing the need

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Plan updates statewide safety priorities

The SHSP identifies specific areas that are the source for the majority of serious or fatal crashes and describes actions state or local highway and law enforcement agencies can take to lower the numbers.

ZERO IN WISCONSIN remains the goal behind a comprehensive framework for reducing traffic fatalities, injuries and crashes. Updated every three years since its release in 2001, the Strategic Highway Safety Plan (SHSP) identifies specific areas that are the source for the majority of serious or fatal crashes and describes actions state or local highway and law enforcement agencies can take to lower the numbers. Targets for change have included intersection design and operation, head-on and roadway-departure crashes, and work zone safety.

The next version of the SHSP is due out March 2014. It will fine-tune all priorities and implementation steps based on recent feedback from safety professionals and advocates across Wisconsin who participated in a statewide survey and a daylong peer exchange event.

Resetting priorities

The Wisconsin Department of Transportation's Traffic Safety

Council (TSC), a group that represents expertise in engineering, enforcement, emergency medical services and education, developed the latest draft of the SHSP. In that draft, they describe traffic crashes as avoidable events caused by one or more factors, most often human behavior, road or environment, and vehicle issues.

WisDOT's Scott Janowiak knows the SHSP well from his work with local governments who must include measures outlined in the plan to support their applications for safety-focused road improvement funds from the federally funded Highway Safety Improvement Program (HSIP).

"The baseline goals and key factors of the updated SHSP are much the same, but the findings from outreach the TSC did uncovered some good reasons to shift priorities in the direction of issues like driver alertness," Janowiak explains. The changes smooth out discrepancies and keep the plan relevant, he says. "It's a primary document that supports multiple initiatives and provides guidance to several other WisDOT highway safety plans and programs."

Research component

Traffic Safety Engineer Andrea Bill, with the Traffic Operations and Safety (TOPS) Laboratory at the University of Wisconsin-Madison, represents the research side of the data-driven plan. Bill leads the TOPS group that designed and hosted the survey for the TSC. She says a statistically significant number of responses gave them a good and current idea of existing problems and solutions, and information on which groups are in a position to take action on changes that prevent highway crashes.



"This is invaluable data that, along with the work done at the peer exchange session, will help all the safety partners focus resources where they belong."

The TSC tabulated material from the survey, peer-exchange interactions and input from other sources to narrow a list of 22 safety-related issues to those most important to Wisconsin's highway safety challenge and the state's ability to influence conditions that will produce positive change in the issue area. The result was a list of ten top priorities that, in some cases, combined two related areas into one.

Better intersection design and operation are on the list (at left) along with behavioral issues like lowering instances of aggressive and impaired driving.

The SHSP will present key performance measures and background for each priority and an action plan that outlines steps for achieving change. Issues that did not make the top ten, like designing safer work zones and reducing vehicle-train crashes, remain targets for improvement but at a "continuing" rather than priority level. In some cases, these issues moved off the priority list due to measurable improvements over the past three-year cycle.



The SHSP Top Ten

- 1 Reduce driver distraction; improve driver alertness
- 2 Reduce alcohol and drug-impaired driving
- 3 Reduce motorcycle crashes
- 4 Ensure drivers from teen to older are licensed and competent
- 5 Improve bicycle and pedestrian safety
- 6 Improve design and operation of intersections
- 7 Increase seat belt use; improve child safety seat use
- 8 Curb aggressive driving; reduce speed-related crashes
- 9 Prevent or mitigate lane-departure crashes; reduce head-on and cross-median crashes
- 10 Improve traffic incident management and safe travel in bad weather

SHSP as guidance

Local governments have a stake in making Wisconsin roadways safer. Among statistics cited in the SHSP is the fact that roads and streets under local jurisdiction accounted for 57 percent of all crashes in 2009. Becoming familiar with the priorities, action steps and use of data in the SHSP helps local road officials align their road safety efforts with others statewide. Janowiak explains it also gives them important guidance when applying for federal funds through HSIP.

"Intersection safety improvements and changes that reduce run-off-the-road crashes are some of the main project types funded through HSIP and those trace straight back to the SHSP," he says. "We ask agencies to reference it as supporting evidence for their applications, attaching their plans to the action plans described in the SHSP."

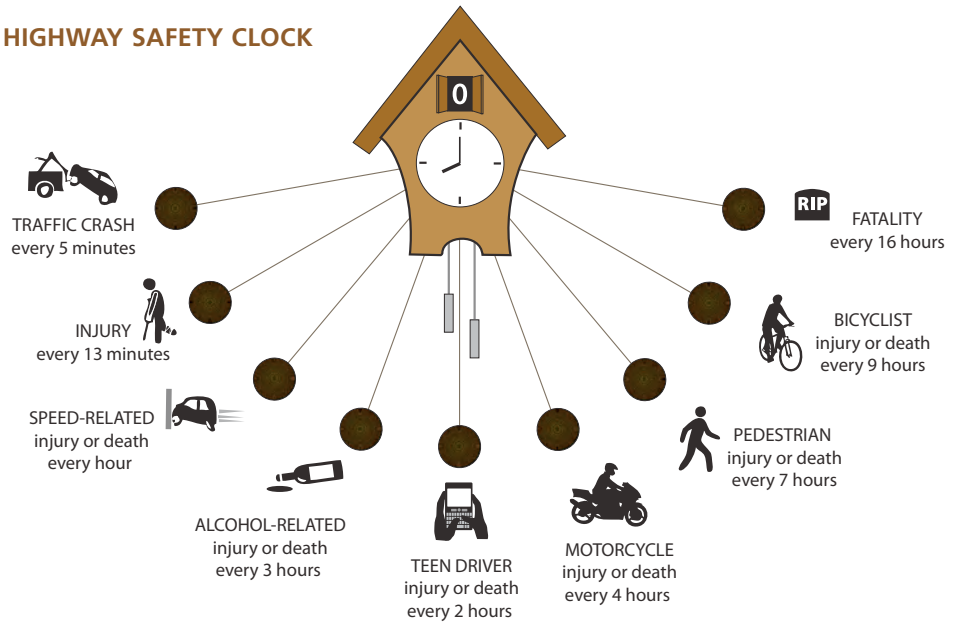
Janowiak considers the emphasis on making decisions based on facts an important message of the SHSP. Recommendations for achieving change in each priority area depend on analysis of quality data, some of which local governments contribute through their use of WisTransPortal where they review and update their local crash data.

Role of SHSP

Randy Romanski, Section Chief with the WisDOT Bureau of Transportation Safety (BOTS), Wisconsin State Patrol, notes the importance of cross-agency cooperation in the evolution of the SHSP. He says BOTS Director David Pabst chairs the TSC group and sees that sense of collaboration as a way to reinforce the impact of the SHSP as a working document.

The focus BOTS puts on changing behavior through education and enforcement complements the weight state and local highway engineers give to safety-related infrastructure improvements recommended in the SHSP. BOTS uses highway safety data to extract roadway crashes by severity. It

HIGHWAY SAFETY CLOCK



The Crossroads HIGHWAY SAFETY CLOCK graphically portrays the gap between the goal of ZERO deaths in Wisconsin and current crash statistics from WisDOT. As the clock ticks, it depicts crash incidents by type and frequency.

shows, for example, that there is a traffic crash on Wisconsin roads every five minutes and a fatality—from speed, alcohol, distracted driving or other causes—every 16 hours.

Like other public agencies in the state that rely on the SHSP to develop and implement their individual highway safety plans, BOTS uses the SHSP as a "safety playbook" when formulating its annual plan for improving highway safety in Wisconsin.

Leadership and input

Besides creating a focused set of top priorities for the three-year plan, Romanski says the peer exchange process helped identify leaders who can interact with WisDOT, BOTS and other divisions of state government on the issues related to highway safety and contribute to ongoing discussions on the SHSP.

The TSC is organizing work groups to review and further refine actions related to each of the ten priority issues. Local road officials can provide input to those work groups, through their County Traffic Safety Commission or WisDOT regional safety engineers.

Closer to zero

Wisconsin claims a better highway safety record than most states: fatality rates here are below the national average and have been for decades. Those involved in the recent review of the SHSP say the willingness of public agencies at all levels to collaborate on how to keep improving on that record indicates that along with experts in the private sector, community organizations and concerned citizens, they see opportunities to move closer to zero in Wisconsin.

The updated plan, with its well-researched priorities and practical solutions, provides local governments and others who have a stake in highway safety guidance for including SHSP implementation steps in their projects. ■

Becoming familiar with the priorities, action steps and use of data in the SHSP helps local road officials align their road safety efforts with others statewide.

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Resource

<http://www.zeroinwisconsin.gov/index.html>

WisDOT consumer source for information about the Zero in Wisconsin campaign has links to traffic safety facts and resources.

February deadline for improvement funds

“Making good use of available data tells road officials which treatments will reduce crash severity but also prevent the occurrence or increase in serious incidents.”

APPLICATIONS FOR FUNDS through the federally supported Highway Safety Improvement Program (HSIP) are due by February 14, 2014. It is the final date to apply in the current funding cycle for the safety-focused road improvement program administered by the Wisconsin Department of Transportation.

Scott Janowiak, who coordinates HSIP, hopes to see numerous proposals this round. He suspects there are many low-cost stand-alone projects out there or those that are part of a larger effort to reduce fatal and injury crashes on local roads that qualify and local governments that can meet the required 10 percent dollar match. The federal government covers the remaining 90 percent of costs.

Crash data key

Discussing the fact that crash data analysis is integral to the HSIP application process, Janowiak cautions local road officials against the misconception that funds apply **only** to roads with a certain “high” percentage of fatal crashes. “Many projects have validity even without that kind of crash history,” he says. “Making good use of available data tells road officials which treatments will reduce crash severity but also prevent the occurrence or increase in serious incidents.”

Local public agencies applying for HSIP funds use the WisTrans-Portal online database for statistics and map data to justify how a recommended treatment will make a location safer. Wisconsin’s Strategic Highway Safety Plan (SHSP) also serves as supporting evidence for their application. The data-driven plan identifies WisDOT’s current top priorities for improving safety on all state roadways. *See an overview of the updated SHSP on page 2.*



Installing chevrons on curves is an improvement that qualifies for HSIP funds.

Project types that qualify for HSIP funds are those that will make a measurable difference at a low cost.

Another resource Janowiak suggests local governments tap for defensible data about proposed improvements is the Crash Modification Clearinghouse. The federally funded web-based depository (www.cmfclearinghouse.org) documents the expected number of crashes likely at a specific type of location after public road agencies implement a given countermeasure. Submitted studies on the searchable database identify effective treatments based on fact, like converting controls on a minor road to a four-way stop or installing chevrons on a horizontal curve.

Safety-focused ideas

Project types that qualify for HSIP funds are those that will make a measurable difference at a low cost. Typical treatments improve safety at dangerous intersections by installing traffic signals or adding turn, bypass or other auxiliary lanes. They also improve safety in crosswalks, school zones

and along bicycle routes. Local agencies use HSIP funds to straighten curves, install guardrails or remove roadside obstacles.

Engineering advice is essential to deciding if a project qualifies. This is why the traffic safety engineers in WisDOT regional offices are the first point of contact for local governments who plan to submit an HSIP application. Janowiak says the regional representatives know the area road network and work with local public officials to evaluate a project’s potential safety benefits. “A 15-minute conversation in the early stage of planning is the best way to separate good ideas from bad,” he notes. “The WisDOT engineers provide important help in developing a sound HSIP proposal.”

Realistic timelines

Finally, Janowiak draws attention to the fact that the completion date for qualified projects proposed in the current round of the HSIP can extend beyond the 2014-2017 funding cycle. “We encourage proposals for treatments that agencies can realistically complete in the next year or two, but **realistic** is the key word,” he adds. “A worthwhile project might justify a longer timeline.”

Improving safety on the roads they manage and maintain is a major concern for local public officials. For many of them, applying for federal funds through HSIP is a good way to analyze and pay for the best cost-effective road-safety solutions. ■

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Resources

www.dot.wisconsin.gov/localgov/highways/hsip.htm

WisDOT webpage with links to HSIP coordinators in regions and the latest application forms.

<http://transportal.cee.wisc.edu>

Entry point for the traffic information services and data management system developed and maintained by the TOPS Lab.

www.cmfclearinghouse.org

FHWA Crash Modification Factors Clearinghouse website with documents that report the impact of countermeasures on the number of crashes at specific locations.

Safety Edge becomes standard

INSTALLING SAFETY EDGE, the angled pavement edge, adjacent to an aggregate shoulder as part of an asphalt paving project is now a standard in Wisconsin. The 2014 Wisconsin Department of Transportation Standard Specifications include Safety Edge in Section 450 **General Requirements for Asphaltic Pavements**. The new specifications apply to projects with state or federal funding that are let starting in December 2013.

Local road agency specifications and bid documents that reference the WisDOT Standard Specifications Section 450 can expect contractors to include installation of the Safety Edge in their bid proposals and pave a Safety Edge using a paver equipped with a wedge maker that is on a WisDOT-approved product list. A local government can choose to leave the pavement detail out of a contract by referencing Section 450 in their bid document specifications, excepting the specifications (450.3.2.11) for Safety Edge.

Standard Detail Drawing 14B29 in the WisDOT **Facilities Development Manual** (FDM) illustrates correct construction of the Safety Edge. Materials required remain the same with only a slight increase in quantity (less than 1 to 2 percent) to create the sloped edge. FDM also discusses WisDOT policy on when to use Safety Edge and how to specify.

Safety and performance

A primary safety benefit of Safety Edge is that it helps prevent or reduce severity of run-off-the-road crashes. Drivers who veer to the shoulder have an easier time making a correction without over steering into oncoming traffic. This is especially significant on local roads, which usually are narrower than state roads and typically lack a paved shoulder.

Fewer pavement problems along the edge of asphalt roadways are another advantage, says WisDOT Standard Development Engineer Erik Emerson. He notes that



PHOTOS: CMSC

Some locations in Wisconsin with completed Safety Edge

USH 45 near Town of Monico in Oneida County
STH 47 near Neopit in Menominee County
STH 13 near Cornucopia in Bayfield County
USH 2 east of Ashland in Ashland County
USH 62 near Drummond in Bayfield County
STH 17 from Merrill to Rhinelander
STH 13 from Wisconsin Dells to Adams
STH 173 near Meadow Valley and Nekoosa
STH 73 from Plainfield to Wisconsin Rapids in Central Wisconsin
STH 33 from Baraboo to Portage in Columbia County
STH 54 at STH 172 in Green Bay



pavement performance on the first group of two dozen or more Safety Edge projects completed by WisDOT on state highways, for example, show good retention of gravel on the shoulders.

Constructability

State roads in every region of Wisconsin have been paved using Safety Edge as part of WisDOT's effort to test the technology and demonstrate it for public road agencies and contractors. Many projects are featured in the **Constructability Review** reports about Safety Edge use on state roads in 2011 and 2012. The Construction and Materials Support Center (CMSC) in the UW-Madison Department of Civil and Environmental Engineering produced the reports which gave WisDOT useful information to include in the standard.

CMSC analyzed the asphalt installation process and did follow up on the earliest Safety Edge projects to measure performance. Their findings showed that adding the edge element to paving operations worked well with minor adjustments and that, over time, the edge maintained its shape and served its purpose.

Low-cost improvement becomes routine

Experience with Safety Edge in Wisconsin and evidence of its effectiveness as a low-cost safety improvement on road projects makes the technology a routine part of all future asphalt paving contracts. Local road officials can learn more through the resources included here and by working closely with knowledgeable contractors. ■

A primary safety benefit of Safety Edge is that it helps prevent or reduce severity of run-off-the-road crashes.

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Resource

<http://roadwaystandards.dot.wi.gov/standards/stdspec/index.htm>

WisDOT 2014 Standard Specifications document online with link to Section 450 and information on Safety Edge for road designers.

Additional resources on page 11

Be responsible for good communications

Good communication starts with a consistent, practiced approach that local road officials follow whether communicating something routine or urgent.

KNOW YOUR AUDIENCE. Use a combination of outlets to reach them. And be responsive. These essentials of good communication are an important part of the job for people who manage local road and street operations. Communicating clearly and regularly with the public about policies or events that affect their use of the local transportation system helps set reasonable expectations for how that system meets their needs.

It also saves public agencies time and resources spent answering complaints and responding to negative press, says Consultant Al Guyant, who led a recent workshop on communication skills as part of the UW-Madison/APWA Public Works Supervisory certificate program. Guyant has experience developing and implementing communication plans for public sector organizations that need to deliver credible information to key audiences. He talks here about strategies public works managers can use to frame and deliver their messages effectively, whether in presentations before a board, a public meeting, or using media outlets to reach or alert the public.

Carl Weber, Public Works Director for the City of Janesville with 40 years of experience in local public works organizations also

discusses some of the strategies he follows when communicating with customers and other stakeholders about his department's operations.

Consistent and precise

Good communication starts with a consistent, practiced approach that local road officials follow whether communicating something routine or urgent. Guyant says it is especially critical during an unexpected storm event or other situation that affects public services. "Being prepared to communicate accurate, concise information reduces anxiety on the part of the public and improves cooperation," he notes, adding that everyone who provides statements should follow the same precise message.

Local governments might assign someone other than the public works director or highway superintendent to serve as official spokesperson. Choose a person who is comfortable making clear, succinct statements and answering questions in that same manner. "The top person in a department can be too busy in a crisis to handle all the demands of frequent communication with the media and other inquiries," Guyant says. "Relying on a staff member trained in communicating key information and fielding questions can improve the process for the public, the media and the agency."

Janesville's Weber grew into the communication role for public works as he started moving up the management ladder more than 30 years ago. Today, he routinely gives younger staff members the responsibility of making public presentations about projects they lead so they gain confidence as communicators. Weber says opportunities like that early in his career helped him acquire and improve his own skills over the years. "It's an important training ground for people who work with the public and represent local government," he notes.

Work with the media

From his first job as a field engineer for the City of Racine to managing public works departments in several Wisconsin and Illinois cities, Weber says he developed a practical approach to communicating with citizens and elected officials, but also with the media.

"I learned early on to establish a good rapport with local reporters so they got used to contacting me directly for answers," Weber explains. He advises other managers to respond when reporters call and call them when the agency has something of interest to share. "They need stories and helping them do their job helps me do mine."

Guyant agrees about the wisdom of developing a cordial working relationship with local print and broadcast media. He includes local bloggers on that list, new-media journalists who appeal to a certain segment of the audience that does not follow traditional outlets.

Multiple outlets

According to Guyant, those traditional outlets still reach about 50 percent of the driving public. Which means distributing a press release to print and broadcast media announcing a planned road closing or other action that affects travel routes remains a standard. But with fewer people subscribing to or reading their local paper, Guyant says local governments must communicate through multiple outlets, from mailings and simple flyers to websites and social media.

Many are low cost and help reinforce other communications. For example, Guyant suggests alerting the public about a bridge closing with posters displayed in schools, grocery stores, local taverns and churches, any place with steady traffic that allows the posting of announcements.

On the electronic front, municipal websites are becoming essential to communicating with the public as more people and businesses rely solely on electronic sources for



This public works page on the Janesville city website features news about projects, contact numbers, links to services and policies, a feedback tool and more.

Weber routinely gives younger staff members the responsibility of making public presentations about projects they lead so they gain confidence as communicators.

information. The sites give highway and public works departments a platform to post news about road projects, snow and ice policies, or other services. If kept up to date, Guyant says even a basic site gets the reputation as a dependable source for accurate information. "They are worth the investment of staff time and other resources because they provide the public with instant access to closings, policy and schedule changes, and other facts a street or highway department needs to communicate."

Electronic tools really do change the way his department communicates, says Weber. "It can be intimidating at first, but using web outlets in conjunction with newspaper, TV and radio, gives us a better chance to reach our audience," he explains. Besides posting on the city website, Janesville Public Works has active Facebook and Twitter accounts that younger staff members maintain. Members of the public also sign up to receive email blasts about snow emergencies, road closings or other public works-related news.

Room for feedback

Including a response mechanism on a municipal website or department page helps strengthen the connection with the public. Weber describes the comment tool on the City of Janesville website as a source of useful feedback.

"Citizens can alert us right away via email to a bad pot hole or burned-out street light that we don't know about yet," he says. "I can direct resources to those problems more quickly and follow up."



Emergency road closings, snow and ice operations, and planned road projects that affect road users are some of the reasons local highway and street departments implement comprehensive communication plans.

Listen and be heard

Weber uses a strategy developed over many years of responding promptly and clearly to inquiries or complaints from citizens or elected officials. It is a standard he trains staff members to follow, along with using plain language in their replies. "We can't assume the public knows what we know or understands our technical terms," he says. "They want and deserve a clear explanation or answer when they contact us."

Weber also makes it a rule to communicate with city leaders, letting them know what he is communicating to local residents.

Understanding the capacity of the audience—local residents, council members, heads of other city departments and all city employees—to "hear" a message is an overlooked aspect of successful communications, says Guyant. He divides the audience into three basic groups, starting with the 20 percent of people who already know or agree with the information they hear. People unaware of the topic but receptive to the message account for 60 percent of a typical audience. And Guyant

describes another 20 percent as unreachable for various reasons, like having a strong bias about the message or difficulty comprehending it. Knowing this helps local governments fine-tune communications and send them through an effective combination of outlets.

Fundamental responsibility

Good and consistent communication with the public provides a level of customer service that benefits agency operations. It is easier for staff members out plowing streets, managing work zones or providing general road maintenance to interact with members of the public who have ready access to information and reasonable expectations about snow and ice operations, planned detours or other policies that affect them.

Public agencies are responsible for providing services and protecting public safety. As Weber and Guyant suggest, sharing information with the public is a fundamental part of that responsibility. ■

Local governments must communicate through multiple outlets, from mailings and simple flyers to websites and social media.

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Resource

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Consultant Al Guyant offers tips on communication tools and strategies.

from page 1

“Experience matters in the design of roundabouts. It requires knowledge of traffic control issues, conflict points, access management and other considerations that apply uniquely to these intersections.”

Bill notes that roundabouts are an additional tool for local governments exploring intersection design. "When highway and street departments consider their options, it's important to document what type of turning movements occur at an intersection, the travel speed on the road and other conditions to come up with the safest, most operationally effective solution," she advises.

Modern roundabout design

Modern roundabouts are smaller than the so-called “rotaries” of decades past—circular intersections that could measure up to 800 feet in diameter. The designs WisDOT makes a standard on state road projects today range from a diameter of about 140 feet for a single-lane roundabout to about 210 feet for a triple-lane design.

Fleming says the other change apparent in roundabouts versus the older rotaries is how they operate. Drivers entering the roundabout must yield to circulating traffic, pedestrians and bicycles. Roundabouts tend to slow travel speeds and reduce weaving or unexpected lane changes as long as drivers follow lane markings and signs. The FDM has a specific standard for roundabout pavement marking and signing that clearly indicates to drivers when to yield and what lane to follow for going straight or turning. Roundabout entry lanes that see more truck traffic often feature a painted gore area on the pavement that denotes extra space for large trucks to line up and maneuver safely into the circle.

Roundabouts constructed in Wisconsin using state or federal funds require a ***design consistency review***. An experienced roundabout designer conducts the review in the proposal stage to verify that the preliminary design is a viable

solution and the project meets FDM guidance. Local governments constructing a roundabout with local dollars do not need this review but Fleming encourages them to work with a designer who has experience designing roundabouts.

Information in the FDM can help local road agencies judge the viability of a roundabout design and conduct an operational analysis for a proposed project. It also contains details about space requirements and design elements like entrances, lane size, signing, marking and landscaping. WisDOT maintains a list of designers qualified in roundabout design that is available as a resource to local governments.

"Experience matters in the design of roundabouts," Fleming says. "It is a solution that requires knowledge of traffic control issues, conflict points, access management and other considerations that apply uniquely to these intersections."

Useful FDM criteria

For local road officials deciding whether a roundabout is the right solution, the FDM outlines eight criteria to guide their planning. Briefly, the key factors and evaluation steps include:

1-Safety Review crash data for the intersection and access points to evaluate how a roundabout or signalized intersection can reduce the type and percent of crashes.

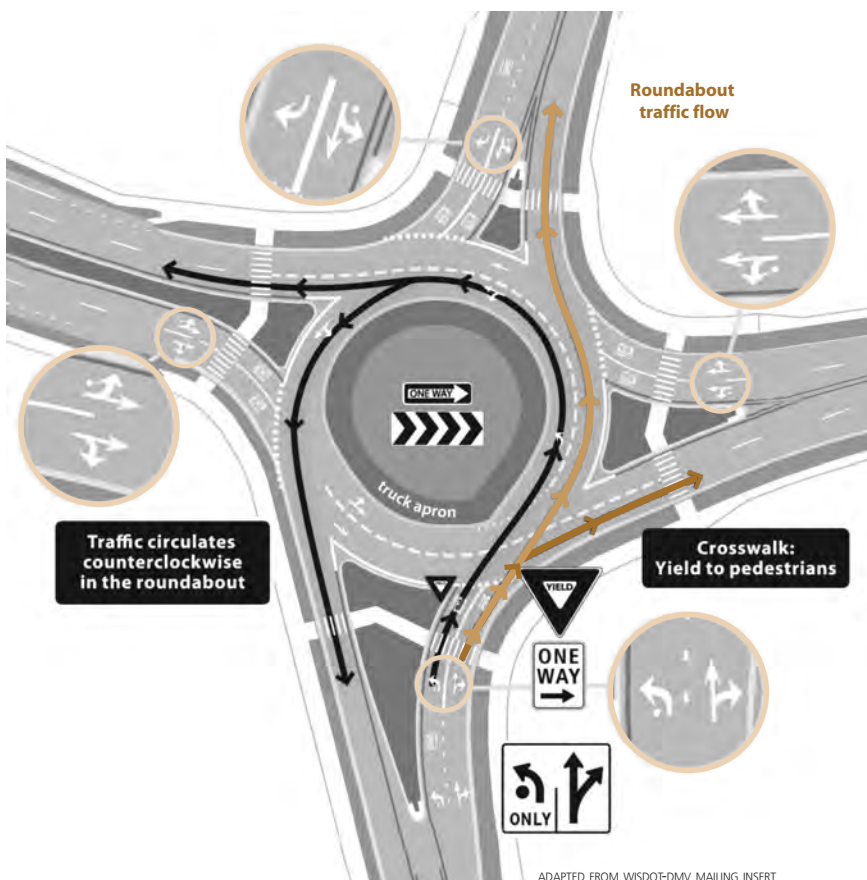
2-Operational analysis Look at capacity, including normal peak traffic times and whether the intersection can handle traffic diverted due to incidents on a nearby state highway.

3-Right-of-way impacts Evaluate land-use issues and costs of land acquisition.

4-Costs Compare costs for each alternative that includes operations and maintenance.

5-Practical feasibility Document impact of each alternative on businesses, parking, real estate and utilities.

6-Pedestrians and bicycles Identify need for pedestrian and bicycle facilities.



ADAPTED FROM WISDOT-DMV MAILING INSERT

Pavement markings and signage indicate the correct lane choice for all turns and through traffic in a roundabout.



Two examples of entry lanes in a two-lane roundabout. At left, pavement markings guide drivers' lane choice and, at right, a gore area between lanes gives large trucks room to maneuver safely into the circle.

7-Oversize/overweight freight network Evaluate use by large and heavy vehicles to determine how to move them safely.

8-Environmental impacts Consider how intersection types affect protected natural areas or a site with hazardous materials.

Costs of roundabouts and signalized intersections are comparable, says Fleming, but site-specific conditions like earthwork, utilities, drainage and real estate requirements can have a significant budget impact.

Answering all or most of the questions raised by the FDM criteria gives agencies and designers the basis for deciding which intersection control solution to recommend for a road improvement project. "Documenting their recommendation with information gathered from this exercise, especially the safety data, also helps explain to decision makers and the public why one design stands out as a good choice for a given location," Fleming says.

Pedestrians and bicyclists

Besides reducing the number of severe vehicle crashes that occur at the intersection of two or more roadways, the slower speeds in a roundabout can improve safety for foot and bicycle traffic through an intersection. Fleming notes that pedestrian exposure to moving traffic is much less in a roundabout since the distance from one side

to another for someone using the crosswalk is about 34 feet. That compares to 60 feet of exposure at a conventional intersection with its four travel lanes and, in some cases, left or right turn lanes.

Bicyclists can exit the roadway and use the pedestrian path and crosswalks or ride in the roundabout by commanding a travel lane, which means abiding by the same rules as motorized vehicles. Some urban roundabout designs include the option of a separate multi-use path that goes around the perimeter of the traffic circle and entry lanes.

Educate all road users

Roundabouts have a reputation as confusing, Fleming says. But a design that addresses all operational issues and uses adequate signage and pavement markings helps drivers find their way. He cites studies showing a measurable change in attitude about roundabouts from 22 to 44 percent favorable before construction to 57 to 87 percent favorable one year after installation. "Young drivers, in particular, catch on quickly," he observes.

Lane choice is critical for getting around and through a roundabout with two or more lanes. Traffic signs and markings must communicate the correct action for all road users. Signs and pavement arrows show the right lane is for right

turns, and the left lane for left turns and U-turns. Through traffic similarly follows pavement markings and signage as it navigates the roundabout.

Fleming and Bill agree that education is the key to making roundabouts work in Wisconsin. They advise local road officials to encourage road users to visit the WisDOT roundabout webpage (wisconsinroundabouts.gov). It has informational videos, how-to animations and other materials to help acquaint people with navigating around and through the circular intersections without incident.

Other state efforts involve testing new drivers on safe travel through roundabouts and including roundabouts in driver training.

Quantify advantages

Preventing fatal and injury crashes at intersections are important considerations in all road construction projects. A roundabout can be an effective solution worth closer scrutiny in the planning stages of a project. With guidance from the FDM and other resources, local officials can quantify the advantages and consider installing one in their jurisdictions. ■

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Resources

www.wisconsinroundabouts.gov

WisDOT roundabout resource page with links to photos, diagrams, videos, animated how-to clips and more.

<http://roadwaystandards.dot.wi.gov/standards/fdm/>

WisDOT link to **Facilities Development Manual**. Chapter 11, Sections 25 and 26, contain guidance on roundabouts standards, required for state and federally funded road projects and recommended for all others.

<http://safety.fhwa.dot.gov/intersection/roundabouts/>

Roundabouts information at the Federal Highway Administration website with technical information and additional outreach tools.

www.topslab.wisc.edu/programs/safety/projects/roundabouts

Link to TOPS Lab 2013 study report on roundabout safety.

Hands-on with equipment calibration

PROPER CALIBRATION of salt and sand spreaders was the focus at hands-on workshops offered in October by the Wisconsin Transportation Information Center (TIC).



Workshop participants watch the weighing process during a hands-on session. **INSET:** A full auger.

Participants from local road agencies learned firsthand the importance of controlling salt applications with an emphasis on reducing cost and environmental impact.

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TIC held three educational sessions around the state where participants from local road agencies learned firsthand the importance of controlling salt applications with an emphasis on reducing cost and environmental impact.

Mark Cornwell of Sustainable Salting Solutions, Steve Wells and Nick Wiegmann of Monroe Truck Equipment, and TIC Staff Engineer Ben Jordan provided classroom instruction beforehand and worked with host agencies in the field demonstrations. Thanks to the City of Beloit, the City of Fond du Lac and Manitowoc County for providing locations, spreaders, materials and staff members for the hands-on part of the workshops, and to the Village of North Fond du Lac for providing a spreader at the Fond du Lac session.

Real-world examples

The hands-on demonstrations featured calibration of manually controlled and ground-speed controlled spreaders. Workshop leaders demonstrated calibration using trucks from the fleets of city and county street and highway departments so the process

reflected the real world. Trucks ranged from being within recommended application rates on all auger settings and travel speeds, to exceeding recommended application rates at any auger settings and travel speeds.

Demonstrators also ran spreaders at different application speeds and spinner speeds over a grid painted on the pavement. This exercise demonstrated how slower speeds and lower spinner settings can reduce the bounce and scatter of salt and get more of it to hit the target. This target is the centerline, the top of the crown, on a normal crowned road.

Participants learned not to assume a new spreader arrives pre-calibrated. Local road agencies must check calibration with the salt materials they use in their operations. Calibrate spreaders and controls at least annually before the start of the snow season, the workshop group was advised, and any time the spreader undergoes a modification or major repair.

Make adjustments

The calibration demonstrations offered an opportunity for mechanics and operators to review details about making adjustments to winter equipment. For example, if a spreader controller on a manual

control spreader exceeds recommended application rates, the mechanic may need to adjust the hydraulic control valves in the controller to a lower flow rate. Agencies also can consult with the truck supplier or spreader controller manufacturer about other valves with lower flow rates they can substitute for the existing valves.

For ground-speed controllers, each manufacturer provides calibration instructions that match the specific sequence of keypad or touchscreen entries the equipment requires to initiate and complete the calibration steps.

The workshop group heard that all ground speed controller calibration procedures begin with determining the "trim settings" that establish minimum and maximum auger speeds. The next step is running a test where the controller drops a set amount of material and then enters the actual weight of the material collected back into the controller. The controller uses this weight to adjust the calibration. The verification test that follows checks the application rate with the controller simulating a specific road speed. Operators verify calibration by comparing the weight of the discharged material to the expected weight of the simulated speed.

Other steps

Workshop topics also covered some basic but necessary steps to ensure accurate calibration. These include making sure the truck is warmed to normal operating temperature, has an adequate amount of material loaded and a full auger. Finally, it is important to zero out the scale with the collection container in place or record the tare weight of the container.

Moving forward

Calibrating salt and sand spreaders is an effective way for local governments to reduce operational costs while minimizing environmental



Participants learned that a tarp and bucket **TOP** are effective stand-ins for a hopper and electronic scales **BOTTOM** in calibrating salt and sand spreaders.

Continues on next page

RESOURCES

impacts of their winter operations. Agencies that currently do not calibrate their spreaders can start with inexpensive calibration equipment. Hardware, home improvement and outdoor stores carry the basics: a muck bucket, five-gallon buckets, a bathroom scale or game scale, and a stopwatch.

Publications and videos from TIC that outline the steps involved in spreader calibration are a useful resource for every street and highway department as they work to implement or improve their calibration programs. ■

Resources

<http://www.clearroads.org/research-projects/05-02calibration.html>

Link to Clear Roads report on Calibrating Accuracy of Manual and Ground-Speed-Control Spreaders that includes practical guidelines for plow operators.

[www.dot.state.mn.us/maintenance/research/files/MnDOT Salt and Sander Calibration Guide.pdf](http://www.dot.state.mn.us/maintenance/research/files/MnDOT%20Salt%20and%20Sander%20Calibration%20Guide.pdf)

Minnesota Department of Transportation Calibration Guide features easy-to-use steps for calibrating winter equipment developed by experienced calibrators.

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Publications

Identification and Laboratory Assessment of Best Practices to Protect DOT Equipment from the Corrosive Effect of Chemical Deicers, March 2013, Washington State DOT. Extensive report includes information on corrosion-reduction effectiveness of vehicle washing, and use of corrosion inhibitors and salt removers. Report is available for download at:

www.wsdot.wa.gov/research/reports/fullreports/796.1.pdf

Minnesota's Best Practices for Pedestrian/Bicycle Safety, Minnesota Department of Transportation. Resource for local agencies wanting to improve safety for pedestrians and bicyclists on their road systems. Discusses both proven and experimental practices. Provides information on cost and effectiveness. Available for download at:

www.dot.state.mn.us/research/TS/2013/201322.pdf

DVD/Video/Multi-media

Sand and Salt Spreader Calibration, 13-minute DVD from Baystate Roads Program in Massachusetts discusses calibration procedures for salt and sand spreaders. Available from the TIC Video Library.



Web Sources

An updated page on the Wisconsin Department of Natural Resources site provides information on permitting for transportation projects and Transportation Liaison County contacts. Also explains WisDOT and WDNR cooperative agreement, a flood disaster facts sheet and other useful links.

<http://dnr.wi.gov/topic/Sectors/Transportation.html>

Section 11-45 of the **Facilities Development Manual** includes WisDOT Policy and Design Guidance related to Safety Edge and link to Standard Detail Drawing 14B29.

<http://roadwaystandards.dot.wi.gov/standards/fdm/11-45.pdf>

FHWA resource on Safety Edge technology with quick facts and case studies.

www.fhwa.dot.gov/everydaycounts/technology/safetiedgeintro.cfm

Links to **Constructability Review** reports for 2012 and 2011 WisDOT Safety Edge projects from the Construction and Materials Support Center at the UW-Madison.

<http://cmssc.engr.wisc.edu/2012-safety-edge-evaluation.pdf>

<http://cmssc.engr.wisc.edu/2011-safety-edge-final-report-3-12-12.pdf>

WisDOT page with link to Approved List that includes approved equipment for Safety Edge construction.

www.dot.wisconsin.gov/business/engrserv/lap2013.htm

Print copies of listed publications available free from TIC. Download or request items at **Publications** on TIC website. Video, CDs, and DVDs loaned free at county UW-Extension offices. Also see **Video Catalog** on TIC website.

TIC website

<http://tic.engr.wisc.edu/>



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- 1 Roundabouts replace dangerous intersections
- 2 Plan updates statewide safety priorities
- 4 February deadline for improvement funds
- 5 Safety Edge becomes standard
- 6 Good communications
- 10 Hands-on with equipment calibration
- 11 Resources
- 12 Calendar

“Intersection safety improvements and changes that reduce run-off-the-road crashes are some of the main project types funded through HSIP and those trace straight back to the SHSP.”

— page 3

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CALENDAR

TIC Workshops

Details, locations and registration forms sent prior to each workshop. More information and online registration at: <http://tic.engr.wisc.edu/workshops/listing.lasso>

Public Works Supervisory Academy

Courses are available as part of a Certificate Program or individually. More information at <http://tic.engr.wisc.edu/Certificates>.

Nuts & Bolts of Personnel Management Reviews

Effective recruitment, hiring and performance evaluations in the public personnel system. FEE: \$155

APR 15, 2014 FOND DU LAC

Employee and Labor Relations

Overview of personnel management and public-sector labor relations, including techniques, and administrative protocols. FEE: \$155

APR 16, 2014 FOND DU LAC

Work Zone Flagger Safety

Set up and use approved temporary traffic control devices in various situations to meet MUTCD and Wisconsin requirements. Receive TIC's March 2013 edition of the pocket-sized work zone guidebook. FEE: \$80

APR 28	TOMAH
APR 29	BARNEVELD
APR 30	OCONOMOWOC
MAY 1	FOND DU LAC
MAY 5	GREEN BAY
MAY 6	WAUSAU
MAY 7	EAU CLAIRE
MAY 8	HAYWARD

On-Site Workshops

TIC brings instruction to shop or office. Train more people for the same cost or less. Contact TIC to schedule program from these topic areas:

- Basic Surveying for Local Highway Departments
- Basic Work Zone Traffic Control
- Flagger Training

UW-Madison Seminars

Wisconsin local government officials are eligible for a limited number of scholarships for these EPD courses held in Madison or online as indicated. Details at <http://epd.engr.wisc.edu> or 800-462-0876.

JANUARY

- 6 Fundamentals of Public Works Construction Inspection P144
- 7-8 Improving Public Works Construction Inspection Skills P698
- 9-10 Maintaining Asphalt Pavements P247
- 24 Engineering Ethics and Professional Responsibility **Online** P350
- 27-29 Foundation Engineering and Design P566

FEBRUARY

- 7 Engineering Ethics and Professional Responsibility **Online** P351
- 28 (to Apr 25) Using HEC-RAS to Model Bridges, Culverts, and Floodplains **Online** P398

MARCH

- 5-7 Effectively Managing Technical Teams P345
- 14 Engineering Ethics and Professional Responsibility **Online** P352
- 24-25 Introductory Principles of Engineering Project Management P134

APRIL

- 21-22 Municipal Engineering for Non-Engineers P440
- 25 Engineering Ethics and Professional Responsibility **Online** P353
- 28-30 Mastering the Transition from Technical Expert to Manager P137

Independent Study

ENROLL ANYTIME

Project Management 100: The Basics, Plus Important Insights P218