

Crossroads

Winter 2002



TRANSPORTATION Information Center — LTAP

University of Wisconsin—Madison

Good bid documents help road projects

It's a challenge to ensure high quality work on road projects at a reasonable cost. Getting competitive bids, as is frequently required, can add to the challenge, especially if bidders have different understandings of what the project entails.

The bid documents you prepare are your primary way of communicating with contractors. These written materials describe the nature of the project so that all bidders have the same understanding and can offer fair and competitive prices.

To help local officials, the T.I.C. offers sample specifications for small projects and a decision checklist. Updated and expanded for the 2002 construction season, the packet has new sample specifications for crack routing, crack sealing, and slurry seal, asphalt concrete materials, and crushed aggregate base course. There are also sample forms for bid advertisement, bid schedule, proposal, agreement, notice of award, and change order.

Initial decisions The T.I.C.'s checklist reviews critical decisions you must make. In general, it's a good approach if you specify the type and quality of the work, while the contractor decides how to do it. Talk with contractors and other experts for help in making these decisions.

Timing Summer is the best time to do asphalt paving and sealcoating. Be sure to seek bids in late winter or early spring, early enough so the contractor has time to finish the project in favorable weather.

Qualifications You must assure that the contractor can do quality work on your project. It may be easiest to require that all bidders be pre-qualified by the Wisconsin Department of Transportation. Smaller contractors, minority-owned businesses, and local businesses may be qualified to do your work, especially if it's a smaller job, but may not be on the state



Paving operations require expensive equipment and trained operators. That's why it's important to have good bidders and check qualifications.

list. If so, you must determine for yourself if they are qualified. What do their references say? Do they have the equipment needed for the job? How much experience does the work force have?

A good approach is to consider contractors on the DOT list as pre-qualified locally and then require others to submit references, experience and equipment lists, and financial information to seek qualification. Often the information is submitted with the bid.

If you are qualifying locally, think ahead and set standards for qualification. The process shouldn't be arbitrary. You may not favor local bidders without valid reasons.

It is helpful to schedule the bid opening a few weeks before the final award. This provides time to check qualifications and resolve any questions that may arise.

If competition is limited in your area, you may want to make an effort at advertising your project more widely. Include

your bid notice in statewide publications such as *The Western Builder* magazine. You can also mail the notice to other possible bidders. Contact the roadbuilder associations for ideas and names. Also, check with the WisDOT District construction office and with roadway agencies in neighboring cities or counties to learn which contractors may already have large projects in your area. "Piggybacking" your job along with another may save you considerable money.

Preparation work Who will do the pavement repairs and exactly what will be done before an overlay or sealcoat is applied? Be careful to clearly define the extent of the work and to assign specific responsibility to help ensure that bids are fair, equivalent, and competitive.

Specifications All bid documents should require that work be done in

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Idea Exchange



Halogen Stop/Slow paddle outshines the rest

In theory, flashing lights on the Stop/Slow paddle should make work zones safer for flaggers and crews. The extra safety also costs more: \$175-\$325 compared to \$70 for a passive paddle. What are you getting for that extra investment? In the case of most lighted paddles, not enough.

Dave Morena, Safety & Traffic Operations Engineer, Michigan FHWA Division office field tested five different flashing Stop/Slow paddles for a group of federal, state, and local highway safety people. "The results were dramatic," Morena says. In bright sunlight at 285 feet from the observers, only the paddle with halogen lights was visible.

"The group consensus was that the halogen paddle was the only one that would be able to draw a motorist's attention not just at 285 feet, but at the even greater distances required in the field," says Morena. Subsequent tests with two halogen paddles confirmed these findings.

Michigan DOT has supplied halogen Stop/Slow paddles to its road crews for the last six years. After a near miss, John Dault, a Transportation Maintenance Worker in the Superior Region, is very glad. He was working on a winding road section when suddenly a semi came barreling in from the west where traffic was supposed to be stopped.

"I immediately activated the Electronic Sign Paddle," Dault says. "Only skidding tires could be heard. The monster was halted...only 25 feet from the patch crew that occupied the lane. When I approached the driver...he stuttered: 'I never seen anything till the lights started to flash!'"

Despite their effectiveness, the halogen lighted paddles aren't widely used, even though both Michigan DOT and Minnesota DOT have them in service. Cost may be a factor. They are priced at \$325 each by Minncor Industries, a Minnesota vendor, and at \$530 by DeTronics, an Ontario company.

In Wisconsin, Mashuda Contractors in Princeton started using a set of them in July. "They're really good. I think they should use them in all areas where there is high traffic or low visibility," says Safety Director Deb Hilscher. "They're highly visible and help protect the flagger. Flaggers need all the protection they can get because they're right out in the traffic."

Hilscher says the paddles are also much more reliable than a previous model of lighted paddle they tried. The batteries last a full work day and then are recharged overnight.

"It comes down to spending extra money to get extra safety for the workers," says Morena of the Michigan FHWA. "What's worse, though, is to spend extra money and get nothing. You can spend \$250-\$325 for the LED paddles and you can't see them at all."

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conformance with the Wisconsin Department of Transportation Standard Specifications for Road and Bridge Construction. Local officials will need to make some additional specification decisions because the standard has many options, some of which are not appropriate for local roads. For example, the specs say asphalt materials may conform to mix type specifications: E-0.3, E-1, E-3, or E-10. Most local roads would benefit by conforming to low volume specifications, E-0.3. Materials designed for very high volume roads are generally not appropriate.



It is important to be clear in bid documents who will do patching and repairs before the sealcoat or overlay is applied.

Doing your specification writing homework up front can save you headaches at construction season. Good specs make for good roads.

Sample specifications and bidding documents for small projects are available through the T.I.C. See Resources on page 6 for details.

Crossroads

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For information on the field test contact Dave Morena at 517/702-1836. For product information contact Minncor Industries at 800/646-6267 or DeTronics Ltd. at 905/640-1216.

Do you have an idea that could help another streets or highway agency? Tell us about it. Call, fax, write or e-mail and we'll help share your idea with others.

Roundabout use grows in Wisconsin

More traffic planners and developers are going in circles these days – promoting and installing modern roundabouts to slow vehicle speeds, reduce accidents, unplug traffic, and create more attractive intersections.

Brown County, which built the state’s first roundabouts in the Village of Howard, has just opened three new ones in the City of DePere. In Dane County, developer David Simon of Don Simon Homes has made roundabouts a gateway feature in several neighborhoods. They are joining a legion of communities in Michigan, Maryland, Colorado, Florida, and Kansas that now have roundabout intersections.

“The main reason they are popular is their immediate safety benefits to motorists,” says Joe Bared, Research Highway Engineer for the FHWA Research and Development Office.

“Any time traffic volumes are below 35,000 ADT the safety benefits will range from 20%-70% in crash reduction. The latest study by the Insurance Institute of Highway Safety has confirmed these benefits, showing a 70% reduction in injury and fatal crashes at 24 intersections converted to roundabouts.” Bared coordinated work on a recently published FHWA guidebook, *Roundabouts: An Informational Guide*.

Safety improvements come from minimizing conflicts, especially in single-lane roundabouts, by reducing speed differentials at intersections, and by forcing drivers to slow as they proceed into and through the intersection.

“Safety has increased dramatically at the Howard roundabouts,” says Cole Runge. “Six months after the roundabouts went in, the sheriff’s department removed the intersection’s 25-year-old hazardous designation. Students from nearby subdivisions now walk and bicycle to school.”

There are concerns about how roundabouts affect bicyclists and pedestrians. Slower speeds are better for both types of

users. Pedestrians cross one lane at a time, so they only have to look for traffic in one direction. Pedestrians with visual disabilities may find them a challenge since they use cues from traffic sounds to determine when to cross the roadway. The free-flowing traffic at a roundabout can sometimes make this very difficult.

Bikes can cross like pedestrians or enter with traffic depending on the rider’s skill and confidence.

Traffic flow improves

Better traffic flow is another benefit of roundabouts. In most cases they cause less vehicle delay than stop sign controlled or signalized intersections—5-15 seconds less per vehicle for roundabouts according to Bared. Per year it can add up to thousands of vehicle hours. Charts in the FHWA’s Roundabout Guide compare various types of intersections to single lane and double lane roundabouts. However, if the roundabout is close to capacity (over 85%), the operational benefits begin to drop off.

In Brown County, all the roundabouts are in school zones. One of the new ones is at the traffic exit from the high school. “It was important to slow traffic through the school zones but you don’t want to inhibit flow on the major street,” says Cole Runge, Principal Planner for the Brown County Regional Planning Commission. “These roundabouts do it. People have to



Roundabouts are attractive features in residential neighborhoods.



Curved roundabout entries force vehicles to slow down, reducing crash severity.



Unlike traffic signals, traffic is slowed but keeps flowing, saving 5-15 seconds per vehicle.

slow down to go through them but they’re not stopped for a minute or minute-and-a-half like they would be at a red light.”

Roundabouts work well for a variety of traffic volumes, although probably not as well if there is a big discrepancy between flows on the major and minor roads. The heavy dominant flow restricts the number and frequency of gaps for cars to enter from the minor road.

A good application for a roundabout is a location where a signal cannot be warranted or is just on the margin of the warrant. “They are considering one in Kansas where there is a high accident frequency, but they could not meet the criteria for placing a signal,” says Bared.

Average annual crash frequencies at 11 US intersections converted to roundabouts

Roundabout type	Sites	Crashes before roundabout	Roundabout crashes	Percent change
Small/moderate ¹	8	4.8	2.4	-51%
Large ²	3	21.5	15.3	-29%

¹ Mostly single lane roundabouts with an inscribed circle diameter of 30 to 35 m (100 to 115 ft.)

² Multilane roundabouts with an inscribed circle diameter greater than 50 m (165 ft.)

Source: *Roundabouts: An Informational Guide*, p.112.

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Winter survival basics

In 1998 more than 2,000 people in the US died from exposure to winter conditions. Carbon monoxide poisoning caused more than 85% of the deaths; hypothermia caused the others. If you work, play, or travel in winter conditions, you should understand some basics about these hazards and know simple protective measures.

Plow drivers and other highway workers need to look after their own safety and be alert for symptoms in their fellow employees. In addition, plow drivers often encounter stranded motorists and need to perform immediate aid and know when to seek medical help. Local highway maintenance personnel learned about winter survival at recent T.I.C. workshops from Steve Jenkins of the Montana LTAP Center.

Carbon monoxide poisoning

You cannot detect carbon monoxide (CO). The gas is odorless, tasteless, and colorless. When inhaled, it attaches to red blood cells, replacing oxygen. The lack of oxygen causes death. Symptoms of CO exposure are headache, drowsiness, nausea, and confusion.

Vehicle exhaust has high CO levels. When a vehicle is moving the gas disperses into the air, but when it is stopped or parked some CO will likely enter the vehicle. We have all driven by a dead skunk on the road and noticed how quickly the smell enters the vehicle. Carbon monoxide from exhaust enters just as quickly.



"In general, people need to know that if their vehicle is parked and running, there is going to be some CO buildup in the cab," says Jenkins. "Be very careful. There are always leaks even in the safest vehicles, even brand new cars."

Being stranded in a snowstorm may make vehicles even more susceptible to carbon monoxide since snow can clog the exhaust system and prevent normal dispersal of the gas. If you are stopped in a storm and running your vehicle be sure the exhaust system is clear of snow and ice. Open the windows about an inch to let in fresh air. Burning candles, Sterno, or other forms of canned heat in a closed vehicle can also introduce carbon monoxide. Keep fresh air moving to supply oxygen and flush out CO. Be alert for carbon monoxide in any combustion that is inefficient. Watch for smoke; if visible, it probably has significant amounts of carbon monoxide.

Carrying a portable carbon monoxide detector in your vehicle can be a good precaution. It is a small pill which you activate if you become snowbound. It turns black if CO is present and loses color when the gas is removed. It will activate again if the gas returns. It is effective for many days and costs only a few dollars.

Hypothermia

Hypothermia, or lowered body temperature, can be fatal if your heart and other vital organs drop below 86°F. Surprisingly,

most hypothermia fatalities happen when outdoor temperatures are above freezing. Getting wet and being exposed to wind can cause the condition to develop very quickly. Hypothermia severity is divided into five stages from initial symptom (shivering) to a body temperature of 77°F where death is almost certain. (See table.)

"If a person is shivering uncontrollably, then they are probably in first or second stage hypothermia," says Jenkins. "When you find someone who has been exposed to the elements for a long time and see symptoms, and the body is not shivering, that tells you that the body core temperature is below 90 degrees and the person is at third stage hypothermia."

Treating hypothermia in stage one or two is most effective. Simply warming the body core works well. Conscious victims who can swallow should drink warm liquids with a quick energy boost such as hot chocolate or water sweetened with honey or sugar. At first, warm only the chest, back and groin areas, leaving the arms and legs until the core body temperature is restored. People with circulatory problems or older victims need special care. You must warm the body core before the limbs. If limbs warm first, cold blood can rush to the heart and cause a heart attack.

It is much easier to prevent hypothermia than to treat it. Take action when shivering begins. Insulate the body from cold and wind. If clothes are wet, change

Stage	Characteristics	Body Temperature
Initial Symptom	Shivering (may become uncontrollable). Stage of recognition and self-help.	95°F
Second Stage	Sluggish thinking; irrational reasoning, false feeling of warmth. Body cuts circulation, loses muscle control.	95-90°F
Third Stage	Disoriented, stumbling, uncoordinated. Most don't survive alone in the field.	90-86°F
Fourth Stage	Muscle rigidity, unconsciousness and barely detectable signs of life.	86-78°F
Fifth Stage	Death is almost certain. Cardiac arrest.	77°F and below

quickly into dry ones since moisture trapped near the body is the number one enemy. Drink warm fluids loaded with calories; avoid alcohol and caffeine.

"The myth of the St. Bernard dog carrying the flask of brandy remains widespread," says Jenkins. "It's not that alcohol is bad by itself," he says. "But in a winter survival situation, alcohol is not a good thing. It's important to distinguish between watching a Green Bay Packers game and a winter survival situation."

Alcohol dilates pores and increases perspiration rate and circulation making you give off heat rapidly—not the effect you want for hypothermia. It is usually cold or iced and cools the body. Alcohol also puts you in a state of delirium, similar to second stage hypothermia, where you tend to make bad decisions.

Frostbite

Frostbite is another winter hazard. It occurs when body tissues freeze. With light frostbite the skin turns red first, then later turns pale gray or waxy white. In dark-skinned people the waxy white area may be surrounded by a blackish color. To treat light frostbite on the face, cover the area with your hands and warm it until pain returns. On hands, place them uncovered under armpits, on the stomach, or in the crotch. Warm feet next to the skin of a buddy. If frostbite is deep, do not treat it in the field. Do not thaw the area. Transport the victim to a medical facility. Walking on frozen feet can do a lot of damage. The ice crystals act like sharp objects and cut the tissue.

Whether you're working or playing in Wisconsin winter, be aware of the symptoms for CO poisoning, hypothermia, and frostbite. Prevention and early treatment are best. Watch yourself and others and be prepared to act.

"I like the words of Black Elk, a Sioux Chief: *It is in the darkness of their eyes that men lose their way. Not as they suppose in any darkness that shrouds their path,*" says Jenkins. "When it comes to winter survival, those who survive make good decisions. They prepare properly and understand how to survive in the outdoors."

For a copy of the Winter Survival materials, contact the T.I.C. See Resources, page 6. The Air-Zone CO detector is made by Ultra Hardware Products (item No. 7608). It is available for about \$6 on the Web at DoitBest.com (search for "carbon monoxide") or from the manufacturer: Ultra Hardware Products, 800/426-6379.

Calendar

T.I.C. workshops

Specific details and locations are in the announcements sent to all **Crossroads** recipients. For more copies or other information, call the T.I.C. at 800/442-4615. Registration begins after announcements are distributed.

Work Zone Safety

Jan 23	Brookfield	Jan 29	Eau Claire
Jan 24	Brookfield	Jan 30	Cable
Jan 25	Barneveld	Jan 31	Rhineland
Jan 28	Tomah	Feb 1	Green Bay

Highway Safety

Feb 12	Tomah	Feb 18	Green Bay
Feb 13	Eau Claire	Feb 19	Brookfield
Feb 14	Cable	Feb 20	Barneveld
Feb 15	Rhineland		

Road Maintenance

Mar 25	Tomah	Apr 2	Brookfield
Mar 26	Eau Claire	Apr 3	Barneveld
Mar 27	Cable	Apr 4	Green Bay
Mar 28	Rhineland		

Local Transportation Issues (ETN) The T.I.C. and UW Local Government Center present a series on transportation over 103 Wisconsin ETN locations. Fee: \$15/session. Workshops are 10:30 am to 12:20 pm, Thursdays. Call 608/262-9960 for a brochure.

Truck & Heavy Equipment Engines – Jan 17 Experts explain what is new with engines for large public works vehicles. Let future trends in diesel and large gasoline engines help you write specs for future equipment bids.

Local Road Inventory – Mar 14 Learn about early results of the WISLR program. Share experiences and data-use stories with fellow street and road supervisors.

Liability and Legal Issues – Apr 11 Improve your understanding of modern risk management practices and legal obligations relating to road, sidewalk, and bridge maintenance.

Pesticide Applicator Training

Workers applying pesticides along roadsides must be certified or work under a Certified Pesticide Applicator. Two sessions for Right-of-Way Applicators are offered in 2002:

Jan 28 Milwaukee (application deadline Jan 14)

Jan 29 Wausau (application deadline Jan 15)

Note fee changes The fee for first time training and exam is still \$45, but a \$25 fee is now required for each supplemental training session. Pre-registration is mandatory. For details contact the P.A.T. Office at 608/262-7588, e-mail: PAT-program@facstaff.wisc.edu, or on-line at: <http://ipcm.wisc.edu/PAT>. Training videos are also available.

UW-Madison Seminars

Local government officials are eligible for a limited number of scholarships for the following engineering courses. Contact the T.I.C. for details. Courses are in Madison unless otherwise noted.

Effective Bridge Rehabilitation, Dec 3-5

Urban Street Design, Feb 25-27

Minimizing the Impact of Utilities on Streets and Right-of-Ways, Mar 4-5

Improving Public Works Construction Inspection Skills, Mar 18-19

Maintaining Asphalt Pavements, Mar 20-21

Effective Roadway Lighting, Apr 22-24

Traffic Access Design and Control
Apr 24-26, 2002, Milwaukee

Remind drivers of safety around snowplows

Winter snow on roads makes conditions difficult for everybody. Here are some safety reminders you can pass along to the general public:

Maintain your distance to avoid collisions and damage from flying sand and salt.

Move your vehicle to the left side of the lane so the equipment operator can see you in the mirror.

Turn on headlights and windshield wipers for added visibility.

Snow removal equipment may have to slow down, stop, or back up. Beware!

Snowplows usually leave a ridge of snow making passing hazardous. Do not pass until the snowplow reaches a clear area.

Snowplows cause soft snow to swirl, making it difficult to see the plow, and for the plow operator to see you.

Plowing snow on a multi-lane roadway is often done in tandem (more than one snow-

plow at a time). Give them plenty of room. Do not pass on the right side and stay where the operator can see you.

When passing a plow truck, watch out for wing plows that often extend out several feet. Wing plows may be on either side of the truck.

Adapted from an article in the June 2001 issue of *Better Roads*, the newsletter of the Nebraska LTAP center.

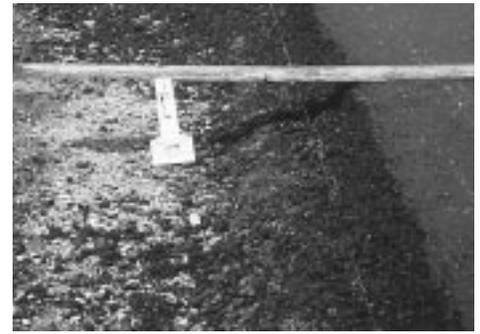
Don't overlook safety

Be sure to include safety in next year's road improvements. Last year over 320 people in Wisconsin were killed and 15,000 people were injured when their vehicles left the roadway. Sixty percent of these crashes and close to 50 percent of the fatal injuries occurred on local roads.

As a local official or roadway maintenance person it's your responsibility to address safety when you make road surface improvements. When you plan overlays, sealcoating, and reconstruction projects, use your experience with accidents and near misses to pinpoint safety

problems. You can also get segment crash records from WisDOT. Everybody knows that drivers tend to drive faster on newly improved roads. That makes it even more important to look for hazards and make corrections during the project. The T.I.C.'s Highway Safety workshops in February can help you learn what to look for.

It may not be possible to do all the safety improvements needed on your local roads. However, make it a priority to review roadway improvement plans for next year and integrate safety into the project. If upgrades were done on every project every year, roadway safety would continually improve in easily financed increments.



Prevent drop-offs Take care that the road improvement project itself doesn't create a hazard. Remarkably, every construction season you can still spot roads with a new asphalt overlay but no new rock shouldering. This practice leaves a dangerous drop-off that can contribute to serious crashes.

Resources

NEW! **Brick and Block Pavement PASER Manual**, Transportation Information Center, 2001, 8 pp. Helps local officials evaluate brick and block streets and may be used to develop PASER ratings for the WisDOT Local Road Inventory.

Updated! **Sample Bid Documents**
The T.I.C.'s sample bid documents have been updated for the 2002 construction season. The packet includes new sample specifications for crack routing, crack sealing, slurry seal, and other operations and includes a decision checklist and sample forms for bid advertisement, bid schedule, proposal, agreement, notice of award, and change order.

SAFER Manual, Safety Evaluation for Roadways, Transportation Information Center, 1997, 40 pp. Using a hazard rating scale, demonstrated with many pictures and brief text, the SAFER Manual can help you identify potential hazards along roadsides, at intersections and railroad crossings, and associated with roadway geometrics. It will also help you rate safety needs, address immediate problems, and budget for longer-term safety improvements.

Roundabouts: An Informational Guide (FHWA-RD-00-067), FHWA, 2000. This book collects the best available information on roundabouts. It includes a methodology for siting roundabouts and estimating their capacity, design principles and standards, information on all transportation modes, operational features, and public acceptance and legal issues. Hard copies are available free from the FHWA Report Center at (301) 577-0818 or online at <http://www.tfhrc.gov/safety/00068.htm>.

Winter Survival This handout from the September T.I.C. workshop describes hazards, examples, and treatments of hypothermia and carbon monoxide. It also includes suggestions for vehicle safety kits.

Gravel Roads Maintenance and Design Manual, FHWA and South Dakota LTAP, 2000. Provides a wealth of information on gravel road maintenance and rehabilitation techniques, drainage, dust control/stabilization, and innovative use of equipment for maintenance. Has many color photographs and drawings to illustrate the techniques.

A Walkable Community is Much More than Just Sidewalks, FHWA, 2000. Lists typical pedestrian/vehicle conflicts and crash types along with suggested remedies for each. The brochure unfolds to a color poster that illustrates 22 measures for improving pedestrian safety, including traffic calming measures.

Videotapes

Videotapes are loaned from UW-Extension county offices. The complete videotape lending library catalog is available from the Transportation Information Center or can be viewed online at tic.engr.wisc.edu The following videos are new to the T.I.C. collection:

Gas Cylinders: Overview, #18472, National Safety Council, 5 min., revised 2001. Safety practices in using compressed gas cylinders, including storage, handling and use of all types of gas cylinders.

Hearing Protection Devices, #18473, 6 min, 1992. Covers the impacts of loud noise on workers. Reviews types of hearing protection devices including fitting, cleaning and use.

Heat Illness, #18474, 6 min, 1992. Describes stages of heat illness and explains prevention and treatment.

Websites

NEW! **The Transportation Information Center** has a new website address: <http://tic.engr.wisc.edu>. It has information about the T.I.C., workshop schedules, publications, video catalog, and links to other transportation related websites.

FHWA project on roundabouts The website <http://roundabout.kittelson.com/> collects information from the FHWA project on roundabouts, including a database of currently operating or planned roundabouts and a listing of other resources on roundabouts, including articles, papers, books, design guides, and videotapes.

The **Lighting Research Center at Rensselaer Polytechnic Institute** website <http://www.lrc.rpi.edu/Transport/SnowPlow/index.html> illustrates research results for improving visibility for snowplowing operations. Including details on best placement for front mounted plow lights, a comparison between steady burning and flashing lights on the rear of the snowplow, and video clips of what the driver sees with different lighting arrangements.

The **VMS Incorporated** website <http://www.vmsom.com/news/pro-paper.asp> has the report "Best Practices of Outsourcing Winter Maintenance Services." Recently released, this 63 page technical report summarizes best practices in contracting winter maintenance operations, the use of private contractors for snow removal on public roads, and detailed information on contracting practices in several states and countries.



Review signs and pavement markings It is good practice to upgrade signing on pavement improvement projects for good daytime and nighttime visibility. If you plan to use pavement markings such as center or edge line, coordinate it so they can be applied right after paving or sealing is done.



Check guardrail If you pulverize or add new base on a road overlay, the guardrail may no longer be safe. Guardrail height, offset, and end treatment all need to be reviewed when you improve the roadway.

Learn about roadside safety at one of the T.I.C.'s February Highway Safety workshops. These programs provide lots of detail on how to review your roadways for safety.

The T.I.C.'s SAFER Safety Evaluation and Rating Manual is also an excellent resource. (See Resources on page 6.)



Correct vision hazards Remember to check the sightlines at intersections and other critical locations. By planning ahead your maintenance crews can schedule brushing or tree removal for slow work periods before roadway project start dates.

Knapp to teach Highway Safety

Keith Knapp, who joined the T.I.C. this year, will be leading the February Highway Safety workshops. He has more than



10 years' experience and previously managed traffic engineering and traffic safety programs at the Iowa State University Center for Transportation Research and Education.

Knapp holds a joint appointment in Civil and Environmental Engineering. Among his research interests are intersection safety, conversion of four-lane undivided roadways to three lanes, context sensitive roadway design, red-light running, and traffic calming. He is also working on tools to help decide how to allocate highway and safety resources and with a Transportation Research Board subcommittee to help develop a national highway safety manual comparable to the TRB's *Highway Capacity Manual*.

Last July Knapp was appointed director of the Deer-Vehicle Crash Information Clearinghouse which is currently collecting information and hopes to have a summary of countermeasures and mitigation techniques available in early 2002.

Reader Response

If you have a comment on a **Crossroads** story, a question about roadways or equipment, an item for the *Idea Exchange*, a request for workshop information or resources, or a name for our mailing list, fill in this form and mail *in an envelope* to:

Crossroads
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University of Wisconsin-Madison
432 North Lake Street
Madison, WI 53706

Or call, fax, or email us:

phone 800/442-4615
fax 608/263-3160
email tic@epd.engr.wisc.edu
website http://tic.engr.wisc.edu

- Please put me on your **Crossroads** mailing list.
- Please send me information on _____

- My idea, comment or question is _____

(We'll contact you to get more details or answer your question.)

Name _____ Title/Agency _____
Address _____ City _____ State _____ Zip _____
Phone () _____ fax () _____ email _____



Roundabouts from page 3

Calm speeds and improve esthetics

Roundabouts also work to calm traffic in residential areas. "We looked at them initially as a calming device," says developer David Simon. "We wanted to make sure traffic would slow down and be more attentive to what's happening. Now we are building them as a landscape feature."

Since roundabouts slow speeds by geometry rather than by traffic control devices or traffic volume, they work at all times of day and on streets of any traffic volume. They can also be beneficial in rural areas. When a highway goes through a small town, drivers may not slow down, despite reduced speed signs. A roundabout can help define the transition from high speed to low speed and force drivers to recognize the significant change in the driving environment.

Roundabouts can also offer the opportunity to create attractive entries or centerpieces to communities through landscaping and varied pavement textures.

"We will be using the roundabout to promote our Grandview Commons development," says developer David Simon. "In a typical development, homes are designed with their backs to the collector street. In this development, we are promoting homes to front this collector and the roundabout." Simon believes the roundabout will also make the development feel more pedestrian friendly and attentive to issues like traffic speed.

Proper design is critical

A balanced geometric design that forces vehicles to slow down and drive at consistent speeds is the key to modern roundabouts. "Curves should be appropriate at the entries," says Joe Bared of the FHWA. "If there's no curvature at the entries people can drive very fast and there's also the potential for more severe accidents, especially fatal accidents." Most roundabouts also have a raised curb so vehicles can't go faster by driving on the shoulder.

Proper design is especially important when the roundabout has more than one entry lane. If the geometry is too tight, vehicles that enter or exit in parallel are more likely to collide. Good signing and driver education are important to reduce lane choice mistakes. However, accident severity is still lower since the roundabouts substitute merging conflicts that are generally low-speed, low severity sideswipes for the more severe crossing conflicts of conventional intersections.

Experience in Brown County shows that drivers, pedestrians and bicyclists all quickly learn how to navigate through roundabouts. "At first people come to the yield stripe and are reluctant to enter," says Cole Runge. "Over time in Howard people got used to it, and now there's no problem, and the capacity has increased."

For information about the Brown County roundabouts, contact Cole Runge at 920/448-3400, e-mail: coleru@ci.green-bay.wi.us. See the Resources on page 6 for information about how to get a free copy of the FHWA book Roundabouts: An Informational Guide.

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