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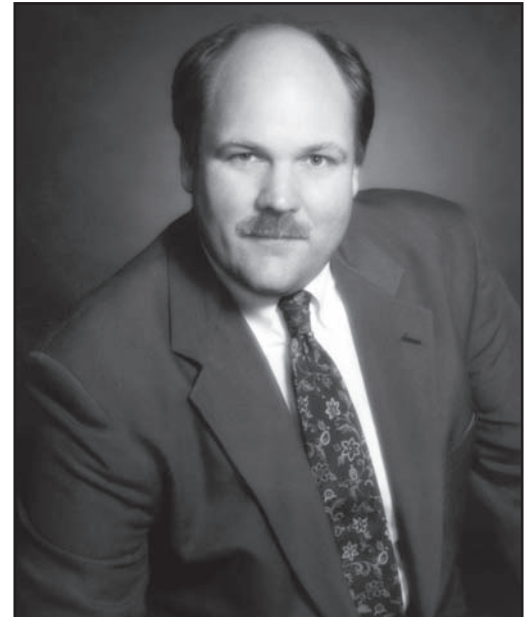
Don't miss the pull-out on best safety practices included at the back

## Tom Maze has died

Tom Maze, former director of Iowa LTAP and of CTRE and professor of civil and construction engineering at ISU, died of heart failure Monday afternoon, June 8, at University of Minnesota Hospitals.

In many ways, ISU was Tom's home away from home, and his colleagues and students were his family. His presence and contributions to the transportation and education communities will be greatly missed.

In addition to research, teaching, and mentoring, Tom was intensely involved in enhancing transportation technology transfer through professional training and outreach activities. One of his legacies is the Mid-Continent Transportation Research Symposium, a conference he initiated in 1996 in partnership with the Iowa DOT. This biennial event provides a Midwest venue for disseminating national research in a format similar to the Transportation Research Board's annual meeting. (This year's symposium is on August 20–21. See page 11.)



Former Iowa LTAP and CTRE director, Tom Maze.

Through ongoing activities like the symposium, as well as the extensive body of work he leaves behind, Tom's accomplishments will continue to have an impact across Iowa, the country, and beyond for a very long time.

Tom's students and colleagues at ISU mourn the loss of their teacher, mentor, research leader, motivator, and friend. ■

## Honoring Tom Maze

You can help preserve and share Tom's legacy in a couple of ways.

First, you can contribute to a memorial student scholarship being established in his name. Make checks payable to Iowa State University Foundation (with the memo "Maze Scholarship Fund") and send it to the following address:

Chris Knight  
Civil, Construction, and Environmental Engineering  
394 Town Engineering  
Iowa State University  
Ames, IA 50011

Second, if you would like to share memories of Tom, you can submit a brief writeup online ([www.intrans.iastate.edu/news/2009/mazeremembered.htm](http://www.intrans.iastate.edu/news/2009/mazeremembered.htm)). On InTrans's homepage ([www.intrans.iastate.edu/](http://www.intrans.iastate.edu/)), you can find links to other people's memories as well as to a timeline with more information about Tom's career at ISU.

## Acronyms in *Technology News*

AASHTO	American Association of State Highway and Transportation Officials
APWA	American Public Works Association
CTRE	Center for Transportation Research and Education
FHWA	Federal Highway Administration
IHRB	Iowa Highway Research Board
InTrans	Institute for Transportation (at ISU)
Iowa DOT	Iowa Department of Transportation
ISU	Iowa State University
LTAP	Local Technical Assistance Program
MUTCD	Manual on Uniform Traffic Control Devices
NACE	National Association of County Engineers
TRB	Transportation Research Board



U.S. Department of Transportation  
Federal Highway Administration



Iowa Department  
of Transportation

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## Subscribe to *Tech E-News*

For brief e-mail reminders about upcoming workshops and other LTAP news, subscribe to Iowa LTAP's free service: Tech E-News. Send an email to Marcia Brink, [mbrink@iastate.edu](mailto:mbrink@iastate.edu). Type "Subscribe Tech E-News" in the subject line.

# Shop focus: Thin maintenance surfaces

A thin maintenance surface (TMS)—a surface made of thin applications of an asphalt binder and aggregate that are applied to an existing bituminous pavement—can economically extend the life of a road, enhance its appearance, and improve road users' driving experience.

In a study sponsored by the IHRB (TR-435 and TR-507) and the Iowa Department of Transportation, Principal Investigator Charles Jahren, associate professor of civil, construction, and environmental engineering at ISU, researched and created guidelines for various TMSs.

It is important to remember that TMS treatments are more effective and perform better when applied to roads in good condition. TMS treatments are usually not as effective on roads that are in poor condition because the base and the existing surface to which they are applied cannot support the freshly applied TMS. Here are some guidelines to help make TMS treatments more effective.

## Collect information on candidate roads

A performance survey should be completed to determine the amount and type of distresses the road is experiencing. This information will help in deciding whether a TMS is appropriate.

Determine the input for the surface condition index (SCI). The recommended SCI values range from 60 to 95 for routine maintenance, 50 to 75 for preventive maintenance, 25 to 60 for rehabilitation, and 0 to 60 for rebuilding.

TMSs are used for preventive maintenance, so the SCI value should be between 50 and 75 at treatment time.

Other information that helps determine if a TMS is appropriate is the rate of deterioration of the road, the traffic count, and the number and locations of areas that must withstand turning and stopping movements.

## Road condition and service need—related factors

"One of the most important factors is figuring out the right treatment in terms of public/property owner/road user acceptance while also considering what a community can afford," says Jahren.

The following information and the decision matrix in Table 1 can be used to determine the right treatment.

- **Cracking.** Cracking is subjective, but generally, TMSs are not recommended for pavements with medium- to high-intensity cracking or alligator cracking.
- **Traffic volume.** TMSs can be generally recommended for all traffic volumes.
- **Bleeding.** Light to medium bleeding can be effectively addressed with TMSs. TMSs are not recommended for roads with heavy bleeding.
- **Rutting.** Research has shown that micro-surfacing is the most effective TMS for repairing ruts as deep as one inch.
- **Raveling.** Raveling, a surface defect, can be easily and effectively repaired with a TMS.
- **Friction.** When properly applied, any TMS can improve the friction of the road.
- **Susceptibility to snowplow damage.** Plow blades remove aggregate from the road, so TMSs are often susceptible to snowplow damage. Fog seals, micro-surfacing, and thin hot-mix asphalt overlays are less susceptible.

## Construction-related factors

Determining what TMS to use also depends on construction-related factors.

- **Past practices.** Consider if past treatments have been effective, and if not, identify reasons why they may not have been effective.
- **Curing time.** TMSs vary in curing time, causing roads to be closed to traffic for varying amounts of time. Consider how this will impact traffic patterns.
- **Timing.** TMSs are affected by the time of year they are applied. They may not perform as well if the binder does not have sufficient time to cure before the temperature drops.
- **Availability of local aggregates.** When determining what TMS is most appropriate for the pavement, think about what local aggregates could be used. Aggregates such as limestone, quartzite, and pea rock are commonly used in Iowa. Using local aggregates can help reduce transportation costs, helping reduce overall costs.

**Timing**

In order to be used for preventive maintenance, most experts suggest that TMSs be applied to a road seven to ten years after it is first constructed. The expected life of the treatment is five to ten years.

While TMSs are more effective for roads in good condition, they can be a good strategy for roads in poor shape.

“TMSs can be used on roads in poor condition to buy another year or two of service and are a lot less expensive than rehabilitation,” says Jahren.

**For more information**

Consult the *Thin Maintenance Surfaces Handbook* for detailed information about road distresses, treatment options, and costs. This manual is available for download at [www.intrans.iastate.edu/pubs/thin\\_maint\\_surf/index.cfm](http://www.intrans.iastate.edu/pubs/thin_maint_surf/index.cfm). For other questions, contact Charles Jahren, 515-294-3829, [cjahren@iastate.edu](mailto:cjahren@iastate.edu). ■

**Table 1. Recommended TMSs for various distresses and traffic volumes.**

Road condition and service need factors	Fog seal	Seal coat	Slurry seal	Micro-surfacing	Thin HMA overlay
<b>Traffic volume:</b>					
ADT<2,000	✓	✓	✓	✓	✓
2,000>ADT>5,000	✓	↔ <sup>(1)</sup>	↔ <sup>(1)</sup>	✓	✓
ADT>5,000	✓	↔ <sup>(4)</sup>	↔ <sup>(1)</sup>	✓	✓
<b>Bleeding</b>	⊗	✓	✓	✓	✓
<b>Rutting</b>	⊗	⊗	✓	✓	✓
<b>Raveling</b>	✓	✓	✓	✓	✓
<b>Cracking</b>					
Few tight cracks	✓	✓	✓	✓	✓
Extensive cracks	⊗	✓	⊗	⊗	✓
Alligator cracking	⊗	↔	⊗	⊗	⊗
<b>Low friction</b>	May improve <sup>(3)</sup>	May improve	May improve	May improve <sup>(2)</sup>	May improve
<b>Susceptibility to Snowplow damage</b>	Least susceptible	Most susceptible	Moderately susceptible	Least susceptible	Least susceptible

✓ Recommended      ⊗ Not recommended      ↔ Marginal

<sup>1</sup> There is a greater likelihood of success when used in lower speed traffic.

<sup>2</sup> Micro-surfacing reportedly retains high friction for a longer period of time.

<sup>3</sup> Fog seal will reduce friction for the first few months until traffic wears binder off the tops of aggregate.

<sup>4</sup> Not used in Iowa, but other states have seen success.

# Watch for slow moving vehicles on Iowa’s rural roadways

It may not always be obvious to many motorists, but some of Iowa’s most vulnerable vehicles include farm equipment, construction machinery, horse-drawn buggies, and other slow moving vehicles (SMVs) that cannot maintain a constant speed of at least 25 mph.

A recently completed IHRB Project (TR-572), *Improving Safety for Slow Moving Vehicles on Iowa’s High-Speed Rural Roadways*, conducted by Principal Investigator Neal Hawkins, associate director for traffic operations at InTrans, examines the safety concerns specific to SMVs and outlines a few ways to improve conditions.

**Unique safety issues for slow moving vehicles**

While SMV-related crashes are much less frequent than other crash types, the slow, often awkward, and oddly sized SMVs tend to be involved in particularly severe crashes. For instance, crashes involving agricultural vehicles are about five times more likely to result in a fatality than other crash types. Additionally, the mostly rural roads that

carry many SMVs around farms and Amish communities are the roads that usually have high posted speed limits. For horse-drawn buggies especially, crashes tend to involve a high-speed differential for the colliding vehicles and minimal safety protection for the SMV’s occupants.



Crashes involving agricultural vehicles are about five times more likely to result in a fatality than other crash types.

**Slow moving vehicle safety: Concerns and countermeasures**

To determine ways to improve safety for Iowa’s SMVs, the study involved

- examining crash statistics and in-use countermeasures in Iowa and across the United States, and
- soliciting recommendations from three SMV communities in Iowa: the Amish

communities in Buchanan and Davis Counties and farmers in Marion County.

**Crash statistics and in-use countermeasures**

An examination of Iowa crash statistics showed that a total of 1,203 SMV crashes occurred from 2004 to 2006. Farm vehicles were involved in 50 percent of the crashes,

*Slow moving vehicles continued on page 4*

## Iowa LTAP Mission

To foster a safe, efficient, and environmentally sound transportation system by improving skills and knowledge of local transportation providers through training, technical assistance, and technology transfer, thus improving the quality of life for Iowans.

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*Slow moving vehicles continued from page 3*

construction/maintenance vehicles were involved in 19 percent, and horse-drawn vehicles were involved in 1 percent. Crashes varied by time of day, driver age, major cause, and other factors.

Countermeasures in several states include mandating high-visibility devices, such as triangular SMV emblems or flashing and static lights. Warning signage may also be installed in roadway conditions with potential SMV safety issues. However, research has shown that the impact of the triangular emblem can be diluted through overuse on non-SMV applications, and drivers often misinterpret signage regarding SMVs. Other safety strategies include requiring a learner's permit for young SMV drivers, public education campaigns, and roadway improvements such as minimizing pavement edge drop-off or installing pull-off lanes.

### Observations from slow moving vehicle communities

The Amish communities in Buchanan and Davis Counties expressed the following concerns regarding their horse-drawn SMVs:

- Shoulder width is often insufficient to get out of the way of motorists.
- Shoulder edge drop-off creates a hard transition from road to shoulder.
- High-speed vehicles and impatient or hostile behavior by local motorists can spook the horses.
- Rumble strips and large asphalt chunks used for shoulder maintenance are hard on horses and buggies and add to the horses' unpredictability.

Farmers in Marion County expressed the following concerns regarding farm vehicles:

- Farm vehicles regularly travel on 55 mph roads and sometimes 65 mph expressways.
- Pulling over to let other motorists pass can put both drivers at risk due to obstacles in the shoulder, a soft shoulder, or limited maneuvering space.
- Passing vehicles often do not give enough clear distance away from farm equipment.
- Especially large farm equipment allows

little space for passing maneuvers, and seeing around the SMV to select a safe passing gap is difficult.

- Flashing yellow lights placed on tractors seem to get a better reaction from motorists than the triangular SMV emblem.

### Recommendations

To mitigate the identified SMV safety issues on Iowa roadways, the researchers recommend practical approaches for both road agencies and SMV operators. Strategies entail identifying specific safety problems, working closely with local communities, and identifying solutions.

Agencies can take the following steps:

- Identify roadways where SMVs mix with vehicular traffic and routes with horse-drawn buggy traffic to identify problem areas.
- Recognize that the needs and solutions for different SMV types vary greatly.
- Reach out to advocacy groups and communities that rely on SMVs to exchange ideas and plan for long-term solutions.
- Review existing roadway signage, lighting, pavement and shoulder treatments, and shoulder widths and coordinate activities among city, county, and state agencies.
- Develop consistent safety campaign information for driver awareness.

SMV operators can take the following steps:

- Go beyond minimal conspicuity requirements to alert motorists of the SMV's presence.
- Notify agencies of roadway locations that offer minimal sight distance and no ability to get out of the traveled lane.
- Educate SMV operators about safe roadway driving and vehicle operation.

### For more information

Download the complete report, *Improving Safety for Slow Moving Vehicles on Iowa's High-Speed Rural Roadways*, from [www.intrans.iastate.edu/research/detail.cfm?projectID=923972613](http://www.intrans.iastate.edu/research/detail.cfm?projectID=923972613), or contact Neal Hawkins, 515-294-7733, [hawkins@iastate.edu](mailto:hawkins@iastate.edu). ■

# Chain saw safety

According to the U.S. Centers for Disease Control and Prevention, there are more than 36,000 chain saw–related injuries every year. Whether you are a new or experienced chain saw user, it is important for you to know chain saw safety. Before using a chain saw, be sure to read the owner's manual and make sure that the saw and chain are in good working condition. Here are a few safety tips to help you stay safe while using a chain saw.

## Clothing

Wearing proper clothing and protective gear can help reduce chain saw injuries.

The following clothing/protective gear should be worn when operating a chain saw:

- Comfortable, close-fitting clothes that will not get caught in the chain
- Safety boots with steel toes and nonskid soles
- Leg protective pants or chaps that cover the upper thigh to boot tops
- A hard hat with a protective shield or goggles to protect the face and head from flying chips and sawdust
- Ear muffs or earplugs to protect from hearing loss
- Heavy duty leather gloves to protect hands from cuts and scrapes

## Planning

Advance planning can help reduce the risk of injury.

- Know the recommended fuel mixture, choke setting, and throttle control.
- Be alert for potential hazards and problems that could occur, such as nails, wires, or other foreign objects in the wood.
- Make sure the chain is sharpened, lubricated, set at the correct tension, and functioning properly.

## Handling and operating

When starting a saw, use proper starting techniques; never start a saw on your knee or by drop-starting. Use the following

techniques when handling and operating to maintain control:

- Keep a firm footing with your legs apart to maintain balance.
- Do not overreach or cut above waist height.
- When in a crouched position, support your elbows on your knees to prevent back strain.
- Keep the weight of the saw near your body, but keep the body out of the saw's path.
- Keep wrists straight to prevent muscle strain in the arms.
- Keep the thumb around the front handle to prevent the saw from being wrenched from the hands in the event of a kickback.
- Let the chain saw do the work.
- Know your physical limitations because fatigue leads to accidents.
- Work slowly because working quickly can lead to mistakes and accidents.
- Rest often so that you don't become too tired.

## Kickback

The most common cause of kickback is when the teeth come in contact with an object as they rotate around the tip of the bar, causing the saw to kick backward and upward toward the operator in a matter of

2/10 of a second. Here are some ways to prevent kickback injuries:

- Firmly hold the saw with both hands.
- Keep the thumb around the front handle.
- Use a chain saw equipped with a chain brake or kickback guard.
- Be aware of twigs that can snag or foreign objects in the wood.
- Don't pinch the bar.
- Use the lower part of the bar to saw.
- Maintain adequate saw speed when beginning or finishing a cut.

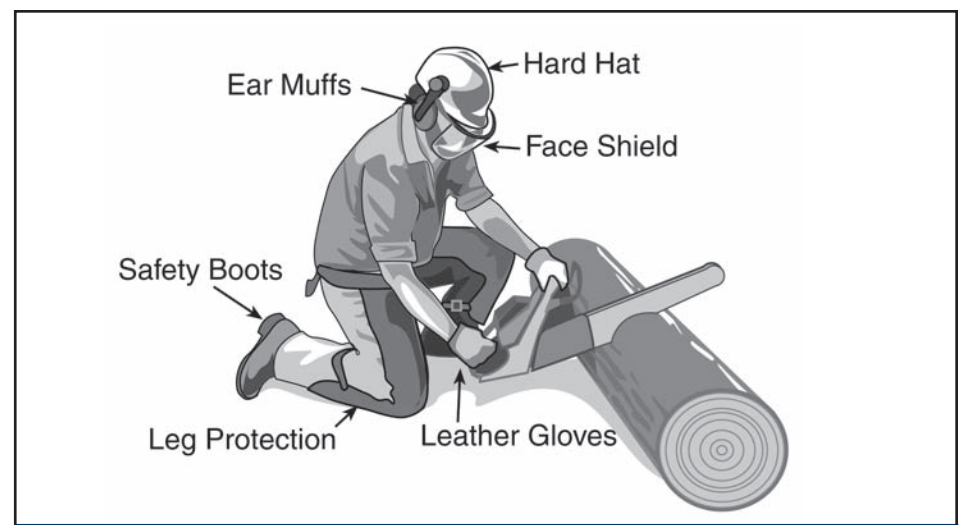
## Safety

A chain saw accident can happen to the most experienced user, so it is important to have safety measures in place in case an accident should occur.

- Be sure to have a first-aid kit at the work site.
- Never work alone. Have a companion who can be called for assistance, but make sure that s/he maintains his/her distance when the saw is in operation so that s/he isn't injured by the saw or flying chips.

## For more information

Consult DVD 63 "Chain Saw Safety, Maintenance, & Operation" from the LTAP library, or contact LTAP Safety Circuit Rider Tom McDonald, 515-294-6384, [tmcdonal@iastate.edu](mailto:tmcdonal@iastate.edu). ■



An operator's protective gear. (Photo courtesy of Kansas Forest Service)

## Stanley L. Ring Memorial Library: Current materials

**Note about delivery of materials:** The library now sends orders through the U.S. Postal Service. This change is resulting in important savings for LTAP, but ordered materials do not arrive as quickly. If you have an urgent need for library materials, let us know when you place your order and we will arrange faster delivery.

### Three ways to order LTAP library materials

- Use the online catalog, [www.intrans.iastate.edu/ltap/library/search.cfm](http://www.intrans.iastate.edu/ltap/library/search.cfm).
- Contact Jim Hogan, library coordinator, 515-294-9481, [hoganj@iastate.edu](mailto:hoganj@iastate.edu), fax 515-294-0467.
- Mail or fax the order form on the back cover of *Technology News*.

## Videos

### DVD258 Some Mistakes Last Forever: West Virginia Logger's Safety Video

This video provides a comprehensive view of logger safety. It covers topics including manual felling, limbing and bucking, skidding/yarding, loading and transporting, and first aid and emergencies.

### DVD 63 Chain Saw Safety, Maintenance & Operation

This video provides information on how to properly use and care for a chain saw. Multiple chapters include chain saw features, maintenance, saw chain sharpening, protective apparel, and proper operation. ■

## Pull-outs on best safety practices

As mentioned in the March–April 2009 issue of *Technology News*, the Iowa LTAP recently published a manual on low-cost best safety practices for local agencies. To help get the information to the people who can use it, we will be including an insert in each issue of *Technology News* that highlights a few of the tips from the manual.

The first insert is based on Chapter 1: Signing and Delineation and is included in this issue. Feel free to pull it out, post it, photocopy it, and distribute it to your staff.

Look for the insert on Traffic Calming in the August–September 2009 issue. ■

## Battery-powered bikes come to ISU

Iowa LTAP Director (and bicycle enthusiast) Duane Smith was one of 100 faculty and staff at Iowa State University to test electric-assisted bikes loaned to the university May 22–29, 2009, by X-Treme Scooters of Newton. The lithium battery-powered bikes run on a 300-Watt motor mounted on the rear hub. The cost of the electric bikes runs between \$1,200–\$1,500.

The electric bike looks like a traditional bike, but it's a bit heavier and has thicker tires. The rechargeable battery pack is located behind the seat, and a throttle on the handlebars lets riders decide how much of a boost they want at a given time.

The charge on the battery will last for around 20–25 miles. If the charge runs out, riders can still pedal on their own to complete a trip.

Test riders said they liked the fact that they could bike to work on the electric bike without working up a sweat. The battery power also let them make their commutes in a relatively short time, since the bikes can travel up to 20 miles per hour.

Smith enjoyed the week he spent riding the electric bike, particularly since he was recovering from a knee injury. “The pedal assistance helped keep the pressure off my knee, so I could still ride

**Best Practices for Low-Cost Safety Improvements on Iowa's Local Roads | Excerpt 1 - Signing and Delineation**

This and several other issues of *Technology News* will include summarized excerpts from a new manual *Best Practices for Low-Cost Safety Improvements on Iowa's Local Roads*. The first in the series is based on Chapter 1: Signing and Delineation. Feel free to pull it out, post it, photocopy it, and distribute it to your staff.

**Signing and Delineation**


**Post-Mounted Delineation and Chevron Curves**  
Post-mounted delineation and chevron signs have been implemented in several scattered locations in Henry County since the 1990s. These signs, which are reflective, are only during the day but also at night, are generally used on curves to give drivers a better assessment of the degree of sharpness of an approaching curve and guidance as they travel through the curve. Post-mounted delineation and chevron signs have been shown to reduce the number of non-fatal, non-injured crashes and help reduce 15 percent of all crashes and up to 20 percent for bicyclist crashes on curves.

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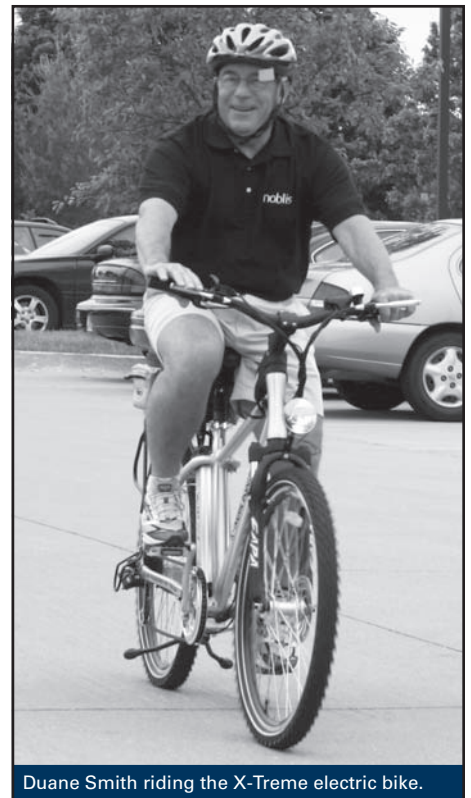
**Solar Powered Flashing Beacons (Not in Manual)**  
Solar powered flashing beacons can be used in many different applications including: general lighting on bridge sidewalks and pedestrian/bike paths or on corners. Flashing yellow lights emphasize caution and warning situations, while red lights emphasize stop applications. Washington County implemented a flashing beacon in July 2007 at the junction of a quarter-mile-long road and HWY 99. Because the beacons use solar power, the cost is approximately \$2,200 per beacon plus \$300 for software. If programming is desired. Despite the cost, flashing beacons reduce up to 50 percent for all crashes.

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**Best Practices for Low-Cost Safety Improvements on Iowa's Local Roads | Chapter 1 - Signing and Delineation | Illustrations: Illustrations by Duane Smith and others. Photo: Duane Smith**

The first insert based on Chapter 1: Signing and Delineation is in this issue.



Duane Smith riding the X-Treme electric bike.

without aggravating the injury,” he says.

X-Treme Scooters of Newton loaned the bikes to university employees for one week, in support of ISU's Live Green Initiative.

### For more information

Contact Merry Rankin, ISU director of sustainability, 515-294-5052, [mrankin@iastate.edu](mailto:mrankin@iastate.edu). ■

## Conference calendar

### August 2009

4	Motor Grader Operator Workshop	Mt. Pleasant	Duane Smith 515-294-8103 desmith@iastate.edu
6	Motor Grader Operator Workshop	Cedar Rapids	Duane Smith 515-294-8103 desmith@iastate.edu
20-21	Mid-Continent Transportation Research Symposium	Ames	Judy Thomas 515-294-1866 jathomas@iastate.edu

### September 2009

16	Snow Roadeo	Des Moines	Duane Smith 515-294-8103 desmith@iastate.edu
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### October 2009

1	Crash Analysis and Safety Improvements Workshop	Fort Dodge	Tom McDonald 515-294-6384 desmith@iastate.edu
20-22	Iowa Streets and Roads Conference	Ames	Duane Smith 515-294-8103 tmcdonal@iastate.edu

## Mid-Continent Transportation Research Symposium

On August 20–21, 2009, ISU and the Iowa DOT will host Iowa's seventh biennial transportation research symposium.

The symposium covers a broad spectrum of transportation issues, ranging from advances in infrastructure design to transportation policy. Several sessions will be offered, each focusing on specific topics.

### Who should attend?

Transportation researchers and practitioners alike will benefit from this unique symposium. Attendees from local, state, and national agencies and from the public and private sectors will find a variety of relevant topics for today's post-interstate, global transportation challenges.

Five concurrent sessions (three on Thursday and two on Friday) will allow attendees to select exactly those presentations that address their interests or sample a broad spectrum of today's transportation issues. One poster session will also be held along with a meet-and-greet on Thursday.

Speakers include Sandra Larson, Director, Research and Technology Bureau, Iowa DOT; Kevin Mahoney, Director, Highway Division, Iowa DOT; Shashi Nambisan,

Director, InTrans, ISU; Sharron Quisenberry, Vice President, Research and Economic Development, ISU; Lubin Quinones, Division Administrator, FHWA; Ed Kannel, Professor, Department of Civil, Construction, and Environmental Engineering, ISU; Marty Wachs, Director, Transportation, Space, and Technology, Rand Corporation; Jon Wickert, Dean, College of Engineering, ISU; Ann Brach, Deputy Director, Strategic Highway Research Program 2, TRB; Bill Fennelly, Head Coach, Women's Basketball, ISU.

### Registration fees

The registration fee for non-students is \$160 and \$60 for students. Participants can register at [www.intrans.iastate.edu/events/midcon2009/registration/index.cfm](http://www.intrans.iastate.edu/events/midcon2009/registration/index.cfm).

### Location

The symposium sessions, social hour, and banquet dinner will be held at The Hotel at Gateway Center in Ames.

### For more information

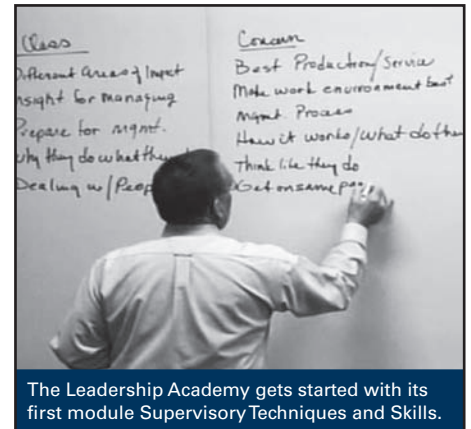
Consult the symposium website [www.intrans.iastate.edu/events/midcon2009](http://www.intrans.iastate.edu/events/midcon2009), or contact Judy Thomas, 515-294-1866, [mctrs2009@iastate.edu](mailto:mctrs2009@iastate.edu). ■

## Leadership Academy gets off the ground

The Iowa Public Employees Leadership Academy, a training program designed to create better leaders and supervisors for Iowa's public agencies, is underway with several opportunities for almost everyone to brush up on important job roles.

The academy consists of ten core modules:

1. **Supervisory Techniques and Skills**  
Status: available on the ISU Engineering Distance Education website, [www.ucs.iastate.edu/mnet/supervisoryskill/about.html](http://www.ucs.iastate.edu/mnet/supervisoryskill/about.html)



The Leadership Academy gets started with its first module Supervisory Techniques and Skills.

2. **Basic Management Skills**  
Status: workshop being held at the Streets & Roads Conference in September
3. **Effective Communication**  
Status: workshop has been taped and will be available online soon
4. **Leadership Skills**  
Status: workshop was held July 15
5. **Community Service/Customer Orientation Skills**  
Status: coming soon
6. **Legal Understanding**
7. **Fundamentals of Government**  
Status: coming soon
8. **Finance**
9. **Resource Management Skills**  
Status: workshop taped in June and will be available online in late summer
10. **Public Works Operations**

### For more information

Contact Duane Smith, 515-294-8103, [desmith@iastate.edu](mailto:desmith@iastate.edu). ■

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