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Iowa State University's Center for Transportation Research and Education (CTRE) is the umbrella organization for the following centers and programs:

Bridge Engineering Center
Center for Weather Impacts on Mobility and Safety
Construction Management & Technology
Iowa Local Technical Assistance Program
Iowa Traffic Safety Data Service
Midwest Transportation Consortium
National Concrete Pavement Technology Center
Partnership for Geotechnical Advancement
Roadway Infrastructure Management Systems
Statewide Urban Design and Specifications

ctre

Center for Transportation
Research and Education

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UNIVERSITY

Spanish as a second language

To help bridge a growing communication gap between English- and Spanish-speaking workers in the Iowa highway construction industry, two new training resources are available for English-speaking supervisors of Spanish-speaking crew members:

- Spanish as a Second Language (SSL) Survival Course
- Concrete Pavement Construction Basics (CPCB) Courses

An ISU research team led by Ed Jaselskis, associate professor of construction engineering, modified the English as a Second Language (ESL) Survival Course the team developed last year into the two new courses. Both the SSL Survival Course and the CPCB Courses teach construction-related Spanish language skills to English-speaking construction supervisors. The project was completed with funding from the Iowa DOT.

Course content

The SSL Survival Course and the CPCB Courses are structured around three principles:

1. Awareness briefly introduces industry risks, accident rates, workforce demographic changes, and diversity issues.
2. Skill building teaches new adjustments and behaviors for better supervision of Hispanic crews.



Hispanic workers talk with Ed Jaselskis.

¿Como se dice esto en Español? (How do you say this in Spanish?)

3. Action planning develops problem solving and process improvement activities.

The SSL Survival Course teaches practical Spanish to American supervisors in four segments:

1. Meaning of a construction-related vocabulary word or phrase in Spanish
2. Meaning in English
3. Pronunciation in Spanish
4. A picture of the word or phrase as a visual aid.

The CPCB Courses follow a similar format, but are divided into 12 modular subtopics focused on quickly meeting the American supervisors' specific technical needs. The 12 subtopics include, among others, training in materials, jointing, and safety.

Workplace safety

According to the U.S. Census Bureau, Iowa's Hispanic population increased 153 percent between 1990 and 2000. At the same time, labor shortages in Iowa and other states have encouraged organizations to turn to the growing population of Hispanic workers.

In 2004, Hispanic workers made up 21.4 percent of the construction industry workforce across the United States. While that number continues to grow, Hispanics account for the highest number of workplace fatalities among all racial/ethnic groups, and foreign-born Hispanics account for a higher proportion of workplace fatalities than native-born Hispanics.

- Spanish continued on page 2

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 (at Iowa State University)
FHWA	Federal Highway Administration
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



U.S. Department of Transportation
Federal Highway Administration



Iowa Department
of Transportation

LTAP is a national program of the FHWA. Iowa LTAP, which produces this newsletter, is financed by the FHWA and the Iowa DOT and administered by CTRE.

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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 new, free service: Tech E-News. Send an email to Marcia Brink, mbrink@iastate.edu. Type "Subscribe Tech E-News" in the subject line.

- Spanish continued from cover

Hispanics are overrepresented in fatality and injury data in large part due to significant linguistic and cultural differences between English- and Spanish-speaking workers. A survey of foreign-born Hispanic workers, however, revealed that they often lack the basic literacy skills required to fully understand the training materials of an ESL course. Therefore, the two new courses help bridge the communication gap by training English-speaking supervisors in basic Spanish language skills.

For more information

To bring the Spanish as a Second Language Survival Course or the Concrete Pavement Construction Basics Courses to your crew supervisors, contact Ed Jaselskis, 515-294-0250, ejaselsk@iastate.edu.

Jaselskis and Fernando Aveiga Alcivar, a graduate student in International Development Studies, teach the CPCB Courses, while Aveiga Alcivar teaches the SSL Survival Course. Powerpoint slides of materials for both courses are also available from the ISU Department of Civil, Construction, and Environmental Engineering.

For additional information, contact Ed Jaselskis, associate professor of civil engineering, ISU, 515-294-0250, ejaselsk@iastate.edu, or Charles Jahren, associate professor of civil engineering, ISU, 515-294-3829, cjahren@iastate.edu. ■

Roads Scholar update

Iowa road workers' dedication to training is paying off.

Since the Roads Scholar program began in 2000, 375 people have qualified for Roads Scholar I and 121 people have qualified for Roads Scholar II. Gary Rank, an employee of the City of West Des Moines, was the first to reach the level of Senior Roads Scholar and Master Roads Scholar, the highest level. Congratulations, everyone!



Congratulations, Gary Rank!

Criteria for each level

Roads Scholar I	30 hours (about 6 workshops)
Roads Scholar II	50 hours (about 10 workshops)
Senior Roads Scholar	70 hours (about 14 workshops) plus core courses
Master Roads Scholar	100 hours (about 20 workshops)

For more information

To learn more about the Roads Scholar program, in which all Iowa transportation workers are automatically enrolled, see www.ctre.iastate.edu/roadscholar/. Or contact Traci Stewart, Roads Scholar coordinator, 515-294-8103, stewartt@iastate.edu. ■

Update on train horn final rule

The Federal Railroad Administration (FRA) issued a final rule in April that allows communities to establish quiet zones where train horns will remain silent. The rule went into effect June 24, 2005.

Several changes were made in the final rule from the interim rule:

- New quiet zones can be in effect 24 hours a day or just overnight from 10 p.m. to 7 a.m.
- The public authority must provide a written notice of its intent to create a new quiet zone or partial quiet zone. This notice goes to all railroads operating over the crossings within the quiet zone; the state agency responsible for highway and road safety, and the state agency responsible for grade crossing safety. In Iowa, that agency would be the Iowa DOT's office of Rail Transportation. Recipients of the notice then have 60 days to comment.
- The "public authority" is defined as only those public entities that are responsible for traffic control and law enforcement at public highway-rail grade crossings.
- Quiet zones are eligible for risk reduction credit for some pre-existing supplementary safety measures (SSMs) such as four-quadrant gate systems, gates with medians or channelization devices, one-way streets with gates, and permanent crossing closures. Note that surface-mounted tubular delineators were removed from this list in the final rule unless they're attached to longitudinal channelizers.
- Risk reduction credit is also provided for a new category of alternative safety measures that address engineering improvements other than SSMs. These may include improvements that address underlying geometric conditions such as sight distance.

FRA staff members Howard Gillespie and Bennie Howe, who presented a workshop on the final horn rule in September, suggest that as a community considers establishing a quiet zone, it should do the following:

- Make sure the community is behind the effort.
- Keep the railroads involved and informed.
- Weigh the safety concerns against the quiet and quality-of-life issues.

For more information

Gillespie and Howe recommend reading the final rule for full details. See Appendix C of the rules for guidelines on establishing quiet zones. The final rule is available on the web at www.fra.dot.gov/us/content/1318. This site also includes links to the FRA's quiet zone calculator. See the Iowa DOT's list of railroad contacts for quiet zone issues at www.iowarail.com/pdfs/quietzonerrcontacts.pdf. ■



A wayside horn is a one-to-one replacement for a train horn. It is not required for a quiet zone.



Having gates and lights at a railroad crossing is not enough to qualify that crossing for a quiet zone.

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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A digital world of pavements

A world of pavement information is now available with one click at www.fhwa.dot.gov/pavement. The Federal Highway Administration's (FHWA) new topic-based website is the one-stop destination for information on everything from pavement design and construction to maintenance and rehabilitation.

Visitors can select a specific topic, such as design, or choose a focus area, such as "Optimize pavement performance," "Advanced quality system," "Pavement surface characteristics," or "Environmental stewardship." Also featured are listings for publications, software, upcoming conferences and events, and workshops and training, including National Highway Institute courses. Additional options for site users include looking up technical guidance and technology transfer resources, as well as information on pavement research.

Site visitors can also find links to pavement-related communities of practice, such as one on the Mechanistic-Empirical Pavement Design Guide. A list of links to other useful websites offers related sites in the categories of asphalt, concrete, recycling, and the Long-Term Pavement Performance program.

The site's comprehensive list of contacts include FHWA staff across the country, as well as state highway agencies' key personnel and contacts at various industry associations.

For information on specific pavement subjects, please contact the individuals listed by topic on the website. For more information on FHWA's topic-based websites, contact Bob Hayes at FHWA, 202-366-4970, robert.hayes@fhwa.dot.gov. A topic-based site is also available for hydraulics engineering (www.fhwa.dot.gov/engineering/hydraulics), with additional sites for other program areas under development. ■

Adapted from the Federal Highway Administration's (August 2005) Focus, which is available online, www.tfhrc.gov/focus/focus.htm.

The screenshot shows the FHWA Pavements website. At the top, it says "U.S. Department of Transportation Federal Highway Administration" and "Pavements". Below that is a navigation menu with tabs for Design, Construction, Preservation, Maintenance, Management, and Rehabilitation. Underneath the menu, there are sections for Focus Areas, Knowledge System, and About Pavements. The Focus Areas section includes links to Optimize Pavement Performance, Advanced Quality System, Pavement Surface Characteristics, and Environmental Stewardship. The Knowledge System section includes links to Publications, Software, Community of Practice, Pavement Notebook, Events, and Workshops and Training. The About Pavements section includes links to Sponsors, Pavement Forum, and FHWA's Strategic Goal for the Pavement Technology Program. The page footer includes a copyright notice and a link to the FHWA Home page.

FHWA's new one-stop website for everything about pavements.



Measuring the smoothness of wet concrete pavement

Any driver enjoys a smooth ride. In fact, it is known that highway user satisfaction largely depends on pavement smoothness. This has led highway engineers to measure smoothness of both operating and new highways. However, equipment used for measurements does not provide the same values.

In an attempt to correct this inconsistency, several lightweight profilers are currently being designed. Iowa State University researcher Jim Cable evaluated two such systems: GOMACO Smoothness Indicator (GSI) and Ames Engineering Real Time Profiler (RTP).

Lightweight profiler systems

The GSI is a noncontact pavement profiler that can be used to measure the pavement profile of either wet or hardened concrete. The RTP is a laser-based profiler system that can be used to measure and record the pavement profile during construction. Both the GSI and the RTP provide the data in a variety of useful formats.

What profilers can do

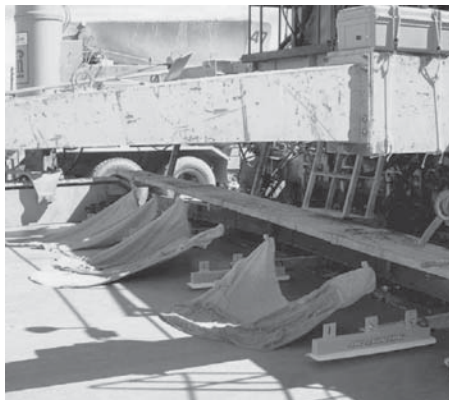
The profilers evaluated in this study were found to be able to do the following:

- Detect roughness in the final profile, including localized roughness and roughness at joints.
- Detect dowel basket ripple, which is a significant source of pavement surface roughness, with enough clarity to warn the paving crew.
- Detect some stringline disturbances, which degrade smoothness, during paving operations.

Additionally, the RTP produced profile values with a clear relationship to those produced by an inertial profiler after paving was completed.

What profilers can't do

The profilers evaluated in this study are not currently able to produce the same absolute IRI values on the plastic concrete that can be measured by inertial profilers on the hardened concrete.



Ames Engineering Real Time Profiler (RTP)

Benefits of these profilers

The profilers evaluated in this study

- are able to provide real-time warnings for most surface roughness problems
- can be used to take corrective action prior to set of concrete

For more information

Construction guidelines are provided in the project report *Measuring Pavement Profile at the Slip-Form Paver* on CTRE's website, www.ctre.iastate.edu. For specific questions, contact James K. Cable, associate professor of civil, construction, and environmental engineering, Iowa State University, 515-294-2862, jkcable@iastate.edu. ■



GOMACO Smoothness Indicator (GSI)

Using fly ash to stabilize non-uniform subgrade soils

Two facts about non-uniform subgrade soils are clear. First, PCC pavements laid over non-uniform subgrades experience long-term performance problems. Second, conditioned fly ash (CFA) or hydrated fly ash (HFA) can help stabilize subgrade soils. Neither fact, though, has been well understood.

So David White, assistant professor of civil engineering at ISU, led a research team to look into the matter. In a two-part project sponsored by the Iowa Highway Research Board (TR-461) and the Federal Highway Administration (Project 4), White's team combined laboratory evaluations, analytical models, and in situ field tests to study two aspects of fly ash-soil stabilization:

- the engineering properties of soil-fly ash mixtures
- the influence of non-uniform subgrades on long-term pavement performance

The results suggest not only that subgrade uniformity is a key issue for predicting long-term pavement performance, but that fly ash effectively stabilizes Iowa soils' engineering properties. With these findings, White and his team proposed three specifications for using self-cementing fly ash, HFA, and CFA.

Engineering properties of soil-fly ash mixtures

For the first part of the research, White mixed CFA or HFA, reclaimed from six coal-fired power plants in Iowa, with five different soil types. Generally, he found, fly ash effectively stabilizes the engineering properties of Iowa soils in the following ways:

- increases dry density
- reduces optimum moisture content
- increases freeze/thaw durability
- increases strength
- raises the California Bearing Ratio of fine-grained soils

In addition to increased soil stability, fly ash has a few advantages over other select fill materials:

- environmental incentives, because the material used is not wasted
- cost savings, because fly ash is typically cheaper than cement and lime
- availability, because fly ash sources are distributed geographically across Iowa

From the results of this study, White proposed three specifications for using self-cementing fly ash, HFA, and CFA. These specifications describe laboratory evaluation, field placement, moisture conditioning, compaction, quality control testing procedures, and basis of payment.

Influence of non-uniform subgrade support on PCC pavements

In the second part of the research, White examined the impact of non-uniform subgrades on 12 reconstructed PCC pavement projects in Iowa. He studied four subgrade types:

- natural subgrade soils
- fly ash-stabilized subgrade
- reclaimed HFA subbase
- granular subbase

He then entered the data gathered on stiffness, moisture and density, strength, and soil classification into the ISLAB2000 finite element model program. This procedure modeled the elastic properties of the pavement structure and foundation.

White's data and analysis revealed some important features of subgrade soils:

- Non-uniform subgrade support leads to premature failures, fatigue cracking, faulting, rutting, and other long-life problems in the pavement.
- Natural Iowa subgrade soils vary in moisture content, density, stiffness, and strength more than the other three types of subgrades studied.

- Stabilizing the subgrade using fly ashes or a granular subbase will improve uniformity and pavement performance.
- Without an effective drainage layer, natural Iowa subgrade soils saturate and become unstable, intensifying pumping in the subgrade layer.
- Pavement foundations analytically modeled with a uniform subgrade experience lower maximum principal stresses and deflections, increasing these pavements' fatigue life.
- ISLAB2000 pavement modeling shows that maximum bending/principal stresses and pavement deflection decrease as the modulus of subgrade reaction increases.

Because a uniform subgrade is crucial for reliable pavement performance, White suggests that subgrade uniformity should be a key issue for determining long-term pavement performance. However, consistent subgrade uniformity will require better construction methods and field quality control testing.

For more information

The two project reports for *Fly Ash Soil Stabilization for Non-Uniform Subgrade Soils* include *Volume I: Engineering Properties and Construction Guidelines* and *Volume II: Influence of Subgrade Non-Uniformity on PCC Pavement Performance*, as well as two technology transfer summaries. These are available at CTRE's website, www.ctre.iastate.edu.

If you have specific questions, contact David White, 515-294-1463, djwhite@iastate.edu. ■

Iowa SUDAS: It's just good for you

Communities of all sizes benefit from the use of uniform designs and specifications. How? For one thing, using the same specifications encourages more contractors to bid. That means communities save money. Contractors are also less likely to make mistakes when they work with the same consistent specs and designs.

The Iowa Statewide Urban Designs and Specifications (SUDAS) will eventually be the acceptable standards for Iowa DOT urban primary highways and city and county federal-aid projects let through the Iowa DOT.

Iowa DOT and SUDAS staff are currently working to identify the differ-

ences and inconsistencies between the two specifications. When the differences are corrected and the two specifications are maintained cooperatively, the specifications will complement each other.

Although SUDAS Director Larry Stevens can't say for sure how many communities are using SUDAS manuals, anecdotal reports indicate that the manuals are growing in popularity across the state. Since the SUDAS program began at CTRE in 2002, approximately 1,100 specifications manuals and 575 design manuals have gone into circulation.

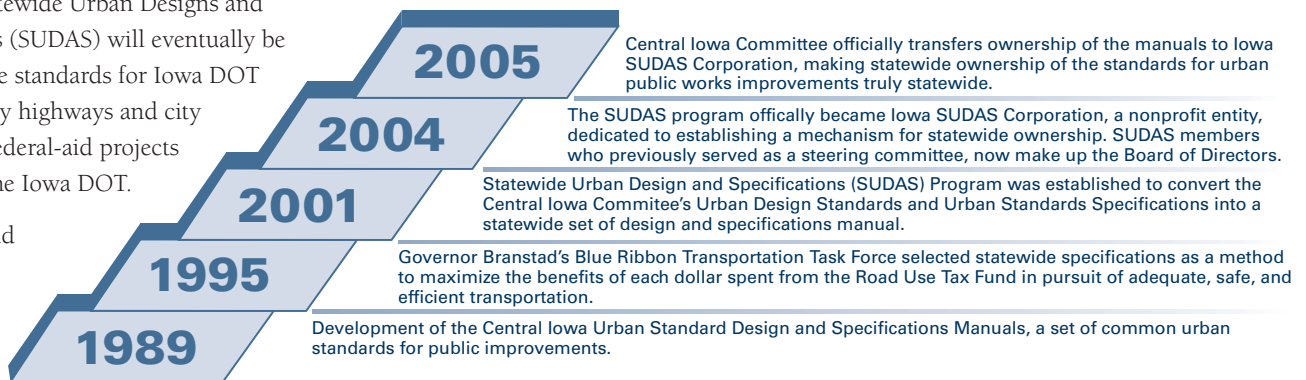
Constant improvements

SUDAS is also involved in research to create new and improved urban designs and specifications based on the latest techniques and newest materials. For example, SUDAS is

- Completing a research project on utility cuts that's being incorporated into design and specification revisions and includes pavement patching standards.
- Developing a design guide and construction specifications for NPDES site runoff control and stormwater quality initiatives.



SUDAS TIMELINE



- Continuing to work with Iowa DOT and Snyder & Associates to identify inconsistencies and differences between the SUDAS and Iowa DOT specifications and develop recommended changes to both specifications to rectify the differences.
- Developing subgrade and subbase design standards and modifying construction specifications.
- Creating local agency roadway lighting design standards.
- Revising various asphalt repair and rehabilitation specifications.
- Reviewing jointing design standards, revising PCC pavement specifications and figures, and revising PCC repair and rehabilitation specifications and figures.
- Revising sanitary and storm sewer structure specifications and figures.
- Revising the structural design of the pipe design section.
- Revising water main specifications and figures.

Volunteer assistance

More than 300 engineers around the state have stepped up to donate significant time and effort to the SUDAS program. They serve on the board of directors, on the executive committee, on six district committees, and on 14 technical committees.

In the coming year these volunteers will be doing the following:

- Revising the seal coat and slurry seal specifications and drafting new specifications for cold in-place asphalt recycling.
- Identifying and determining the feasibility of separating technical and contractual components.

For more information

To learn more about SUDAS, check out its website: <http://www.iowasudas.org/>. Or contact Beth Richards, program coordinator, 515- 294-2869, brich@iastate.edu. ■

Stanley L. Ring Memorial Library: new acquisitions

Order LTAP library materials in three ways:

- Order online, www.ctre.iastate.edu/library/search.cfm.
- Contact Jim Hogan, library coordinator, 515-294-9481, hoganj@iastate.edu, fax 515-294-0467.
- Mail or fax the order form on the back cover of *Technology News*.

Note: A few videos are available in both VHS and DVD format. New videos will generally be DVD format.



Publications

P 1665 Backcountry Road Maintenance and Weed Management

This report provides recommendations for reducing or eliminating the spread of weeds during road maintenance. Noxious weed species frequently colonize roads and are likely to be spread during road maintenance. Included is a list of references and links to a few web-based resources.

P 1666 Covered Bridge Manual

This manual covers general terminology and the historic development of covered bridges. It also addresses loads, structural analysis, connections, and design issues. The last six chapters contain discussion of evaluation, maintenance, strengthening, and preservation of existing covered bridges, historic considerations, and a state-of-the-art guide on wood preservatives. Historic preservation requirements as they relate to the U.S. Department of the Interior standards for these important and unusual structures are also provided. The appendices include an extensive series of case studies.

CD-ROM

CR 72 Mid-Continent Transportation Research Symposium

This CD-ROM contains the proceedings of this conference held at Iowa State University August 18–19, 2005.

DVD

DVD 12 Flagger Safety Training: English and Spanish (also in video)

This video covers proper equipment, safety pointers, special situations—emergency vehicles, pilot cars, mobile operations—and dealing with impatient, rude, or angry drivers.

DVD 13 Communicating for Results: How to Be Clear, Concise, and Credible

This video provides strategies to offer ideas with credibility, logic, and emotional power. It presents methods to connect with your audience, focus on your listener's mood, organize your thoughts using the Goal 1-2-3 Formula, and make it easy for other to say yes.

DVD 15 Becoming a Leader: Communication Techniques That Motivate, Guide, and Inspire Employees to Excel

This video demonstrates how to make it easy for others to approach you, give straight answers to even the most difficult questions, and encourage dedication among those you work with.

Videos

V 741 Flagger Safety Training: English and Spanish (also in DVD)

See description for DVD 12 above.

V 742 Courtesy Promotes Safety

This video describes how the three “Es” of safety (engineering, education, and enforcement) were coordinated to produce a long lasting, safer environment for pedestrians in St. Petersburg, Florida. It offers simple solutions to improve crosswalk functionality and promotes the use of courtesy to change behavior and enhance the results.

Selected Iowa DOT library new acquisitions

The Iowa DOT library and Iowa's LTAP library are teaming up to provide Iowa's local agencies with the broadest possible variety of relevant resources.

To receive the following publications, contact Hank Zalatel, Iowa DOT librarian, 515-239-1200, hank.zalatel@dot.iowa.gov.

You can search the entire Iowa DOT library online as part of the State Library of Iowa. Go to the LTAP library site, www.ctre.iastate.edu/library/search.cfm; click on Iowa DOT Library.

Greetings from the Lincoln Highway: America's First Coast-to-Coast Road, Brian Butko; Stackpole Books. 2005, 288p. HE356/.L7/B87/2005.

Conference calendar

December 2005

6–8	Iowa County Engineers Conference	TBA	Jim Cable 515-294-2862 jkcable@iastate.edu
13	Geotechnical Earthwork Process Workshop	Ames	Sharon Prochnow 515-294-3781 prochnow@iastate.edu
15	Successful Management	West Des Moines	Georgia Parham 515-294-2267 gparham@iastate.edu
16	Concrete Pavement Design Workshop on New Software	Ames	Sharon Prochnow 515-294-3781 prochnow@iastate.edu

January 2006

10	Work Zone Safety Workshop	Peosta	Tom McDonald 515-294-6384 tmcdonal@iastate.edu
11	Work Zone Safety Workshop	Iowa City	Tom McDonald 515-294-6384 tmcdonal@iastate.edu
12	Work Zone Safety Workshop	Amana	Tom McDonald 515-294-6384 tmcdonal@iastate.edu
13	Work Zone Safety Workshop	Ottumwa	Tom McDonald 515-294-6384 tmcdonal@iastate.edu
18	Successful Management	West Des Moines	Georgia Parham 515-294-2267 gparham@iastate.edu
18–19	Asphalt Pavement Recycling Technologies for Iowa	Carroll	Georgia Parham 515-294-2267 gparham@iastate.edu
25–26	Asphalt Pavement Recycling Technologies for Iowa	Cedar Rapids/Marion	Georgia Parham 515-294-2267 gparham@iastate.edu

February 2006

1	Successful Management	Bettendorf	Georgia Parham 515-294-2267 gparham@iastate.edu
7	Successful Management	Council Bluffs	Georgia Parham 515-294-2267 gparham@iastate.edu
7	Work Zone Safety Workshop	Mason City and Calmar	Tom McDonald 515-294-6384 tmcdonal@iastate.edu
8	Work Zone Safety Workshop	Mason City	Tom McDonald 515-294-6384 tmcdonal@iastate.edu
8–9	Asphalt Pavement Recycling Technologies for Iowa	Ames	Georgia Parham 515-294-2267 gparham@iastate.edu
9	Work Zone Safety Workshop	Ames	Tom McDonald 515-294-6384 tmcdonal@iastate.edu
10	Work Zone Safety Workshop	Ames	Tom McDonald 515-294-6384 tmcdonal@iastate.edu
16	Successful Management	Storm Lake	Georgia Parham 515-294-2267 gparham@iastate.edu

Get more information and/or register online for these events at www.ctre.iastate.edu/calendar/.

Asphalt Pavement Recycling Technologies for Iowa

This two-day workshop is for roadway designers and construction staff who are responsible for rehabilitating pavements. Instructors from FHWA, Iowa DOT, industry, and academia will cover

- an introduction to recycling
- pavement distress
- stabilizing and rejuvenating agents
- cold planing and uses of RAP
- hot in-place recycling
- cold in-place recycling
- full-depth reclamation
- selecting a recycling method

Registration is \$75 per person. See the calendar for workshop dates and locations. ■

Successful Management

This one-day workshop covers basic supervisory and management techniques. Participants will learn about

- the supervisor's role and leadership responsibilities
- how to motivate employees
- how to communicate effectively
- how and when to take disciplinary action
- how to manage effectively

This workshop is a core requirement in the Roads Scholar curriculum for anyone who wishes to qualify for Senior Roads Scholar.

Registration is \$75 per person. See the calendar for workshop dates and locations. ■