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Download short, 2–4 page summaries of research projects and a recent manual.

Page last updated August 5, 2008

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# CP Tech Center lab introduces teens to concrete

by Rebekah Bovenmyer

Forty-

five

teens

from

across

Iowa

poured

concrete

molds

and

toured

the CP Tech Center's concrete research lab at Iowa State University during the 4-

H conference June 24–26, 2008.

About half of the participants were young women. The teens came to the

workshop interested in college majors from structural engineering to business to

child care. Only a few had worked with concrete before.

Workshop leaders Jiong Hu and John Kevern, researchers on CP Tech Center

projects, showed the teens how to mix concrete and helped them make concrete



Jiong Hu helps two teen girls pour concrete molds.

paperweights.

During the lab tour, Hu and Kevern exploded concrete samples in a compression test, poured water through pervious concrete, and showed off testing equipment while students filled out a scavenger hunt activity sheet about the equipment.

Students who got all the scavenger hunt questions right were entered into a drawing for a t-shirt from *Go!*, CTRE's online teen transportation magazine. One teen won a t-shirt each day.

After the tour, Rachael Larkin, an undergraduate research assistant at CTRE, explained how Iowa State's concrete canoe team built a lightweight canoe and raced it in a regional competition.

"This is probably the best workshop I've been to [during the 4-H conference] because the kids got hands-on stuff to do rather than sitting and listening," says Debbie McCrea, who helped plan the conference.

Visit [www.go-explore-trans.org](http://www.go-explore-trans.org) to read the latest issue of *Go!*.

# Traffic studies in Iowa

Recently, Shauna Hallmark, transportation engineer, has been working on three Iowa traffic safety studies sponsored by the Iowa DOT. Tom McDonald, safety circuit rider, collaborated with her on two projects.

## In progress

### Rumble stripes

Edge line paint can lose its visibility after several months of service. Hallmark and McDonald are evaluating whether edge lines painted over rumble strips, otherwise known as rumble *stripes*, will improve edge line paint durability and visibility.

Rumble stripes have been installed on six



Milled-in rumble stripes soon be painted over with edge line

county road sites as

part of a research project that seeks to reduce the incidence and severity of run-off-road crashes. Test sites were chosen based on the Iowa DOT’s list of the top 5 percent of road sections with run-off-road crashes from 2001–2006. Evaluations are taking place on local roads in several Iowa counties. Most test sections are on horizontal curves. Since most county roads do not have paved shoulders, the narrow rumble stripes will be installed along the pavement edge.

Along with the Iowa DOT, the project is sponsored by the Iowa Highway Research Board and FHWA.

### **Research objectives**

“We’re mainly looking for increased visibility of the paint line,” says McDonald.

“Increased noise or vibration from the rumble strip is a side benefit.” During the first year after installation, the team will investigate the following:

- Wet weather visibility of rumble stripes versus traditional edge line painting
- Long-term durability of the painted edge line
- Driver travel distance from the edge line before and after installation of rumble stripes

An additional period of at least five years will be necessary to collect and analyze crash data valid for comparison with data collected before the installation of the rumble stripes.

## **Completed**

## Low-cost traffic calming techniques

The main street through many small rural Iowa communities is a state or county highway with high speeds outside the city limits and a reduced speed section through the rural community. Consequently, drivers passing through the community often enter at high speeds and then maintain those speeds throughout.

When speeds in rural communities are problematic, traffic calming provides a potential solution. Traffic-calming measures are generally used in larger urban areas, and their effectiveness in small communities is unknown.

Hallmark evaluated

- two gateway treatments in Union and Roland, Iowa, and
- five single-measure treatments (speed table, on-pavement "SLOW" markings, driver speed feedback sign, tubular markers, and on-pavement entrance treatment) in Gilbert, Slater, and Dexter, Iowa.

Data were analyzed 1, 3, 6, 9, and 12 months after the measures were installed.

### Key findings

- In Gilbert, a speed table was successful in decreasing speeds both immediately upstream

and  
downstream  
of the speed  
table.

- In Union, the transverse markings appeared to be moderately effective in decreasing vehicle speeds directly downstream of the markings for all three locations, although none of the differences were large. The lane narrowing did not appear to be effective. Once the speed feedback signs were installed, significant speed decreases resulted.
- In Dexter, a "35 mph," on-street pavement marking and an 8-in. edgeline were installed. The treatments were effective in reducing speeds at all three of the locations where they were tested. The effectiveness varied over time. Nine months after installation, the effectiveness of the treatments appeared to decrease, most likely due to the fact that the markings had faded over time. The treatments were re-painted, and the effectiveness increased again at the 12-month data collection period.
- In Roland, the gateway entrance treatments, which consisted of converging chevrons and a "25 mph" on-street pavement marking, were reasonably effective. Speeds decreased at all of the data-collection locations, and decreases remained constant over the year-long data collection period.
- In Slater, results indicate that the longitudinal channelizers used to form a center island for the southern section of R-38 reduced speeds significantly. The driver speed feedback sign was also found to be effective in reducing speeds. Use of the on-pavement "SLOW" markings did not appear to be effective.

In many cases, even the most effective treatments only reduced mean and 85th percentile speeds by a modest amount. Their true effectiveness is their ability to

significantly reduce the number of vehicles traveling over the speed limit.

For more information, visit [www.ctre.iastate.edu/research/detail.cfm?projectID=-226410767](http://www.ctre.iastate.edu/research/detail.cfm?projectID=-226410767).

## **Automatic red light running enforcement**

A statewide analysis of red light running (RLR) crashes, using crash data from 2001 to 2006, indicates that an average of 1,682 red light running crashes occur at signalized intersections every year. As a result, red light running poses a significant safety issue for communities.



Front view of a red light running camera

In Iowa, three communities have used camera enforcement.

Results of the research indicate that RLR cameras were very successful in reducing crashes related to red light running in Davenport and Council Bluffs.

- In Davenport, a 40 percent reduction in RLR crashes was found.
- In Council Bluffs, a 90 percent reduction was found. Total crashes also decreased at intersections with RLR camera enforcement.

Reductions in total crashes of 20 percent and 44 percent were found in Davenport and Council Bluffs, respectively.

The reduction in RLR violations was evaluated for Clive. However, a crash analysis could not be conducted since there was less than one year of crash data. The number of RLR violations for intersections with no RLR cameras was compared against RLR violations at camera-enforced intersections. Results of a statistical analysis indicate that on average, RLR violations were 25 times higher in locations without cameras than with cameras.

For more information, visit [www.ctre.iastate.edu/research/detail.cfm?projectID=1158685907](http://www.ctre.iastate.edu/research/detail.cfm?projectID=1158685907).

Page last updated August 4, 2008

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# Awards

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Neal Hawkins holds his Professional of the Year award.

## Professional of the Year

Neal Hawkins, associate director of traffic operations, won the 2007 Missouri Valley Section Institute of Transportation Engineers Melvin B. Meyer Transportation Professional of the Year Award for outstanding contribution to transportation engineering.

## **Best Paper Award**

Brent Phares, associate director for bridges and structures, co-authored "Accelerated Construction and Innovations: The 24th Street Bridge," which was named best paper at the 2008 FHWA Accelerated Bridge Construction: Highway For Life Conference. Several Bridge Engineering Center (BEC) staff members are involved in this ongoing project.

The paper described the innovative approach to a bridge reconstruction in Council Bluffs, Iowa. The primary BEC role is to provide evaluation of accelerated bridge construction technologies implemented on the 24th Street bridge through laboratory and field testing.

## **Outstanding Dissertation**

Nadia Gkritza, transportation engineer, has been selected to be the recipient of the 2007 Wootan Award for Outstanding Ph.D. Dissertation in Policy and Planning by the Council of University Transportation Centers (CUTC).

The award presentation will be made at the CUTC Annual Dinner on Saturday, January 12, 2008 at the Annual TRB meeting in Washington, DC.

## **Engineering Institute Director**

Ed Jaselskis, CTRE researcher, was the first director of the Engineering Policy and Leadership Institute in the College of Engineering. The goal for the institute

is to help engineering students and faculty learn more about current legislative policies and understand how their expertise can help inform and shape public opinion.

## **Webmaster Earns MFA**

Michele Regenold, webmaster and editor, received her Master of Fine Arts in Writing for Children and Young Adults from the Vermont College of Fine Arts in January 2008. She wrote *Smells Like Money*, a young adult mystery set in rural Iowa.

# Changing faces at CTRE

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Two new people have joined CTRE, one retired but stayed close, and two familiar faces have left.



Inya Nlenanya

## New faces

### **Inya Nlenanya**

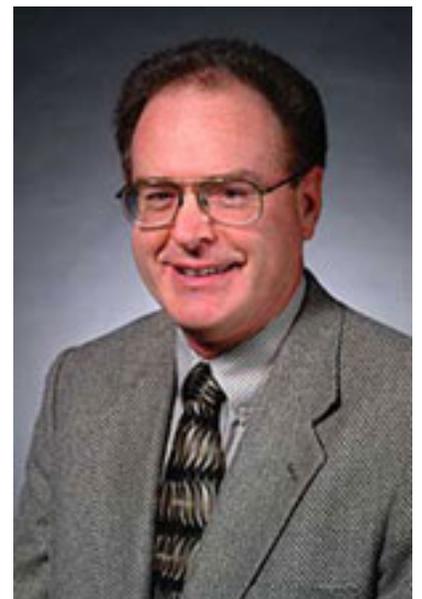
Inya Nlenanya is the new geographic information systems (GIS) technician with the Iowa Pavement Management Program. He spends most of his time analyzing and processing road data and preparing the interactive maps road agencies have come to rely on.



Bob Sperry

His GIS skills also support other asset management projects.

Nlenanya has an undergraduate degree in electronic engineering from Nigeria and an MS (agricultural engineering) from Iowa State University.



### **Bob Sperry**

Bob Sperry holds the new half-time Local Roads Safety Liaison position with the Local Technical Assistance Program. He meets with engineers around the state about Iowa DOT resources and grants that can help prevent rural highway deaths.

He is also working on a manual called "Best Practices for Low-Cost Safety Improvements on Local Roads in Iowa."

Sperry has a BS (civil engineering) from Iowa State University and was a county engineer for 31 years in Taylor, Webster, and Story counties before joining CTRE in March 2008.

"It's great to be able to go out and help a lot of people I know so well and accomplish things and save lives at the same time," says Sperry.

## New position

Jim Grove, portland cement concrete paving engineer with the CP Tech Center for 5 years, retired in March 2008. But he didn't go far. He took a position as FHWA's senior project engineer for the mobile concrete laboratory. His office is only a few doors down from his old CP Tech office.



Dennis Kroeger



Dave Plazak

Grove was the project leader for the Material and Construction Optimization for Prevention of Premature PCC Pavement Distress (MCO) pooled fund study, a 5-year project involving 17 states.

## **Faces we'll miss**

After 12 years each, two familiar faces left CTRE in summer 2008.

### **Dennis Kroeger**

Dennis Kroeger, CTRE transportation research specialist, took a job as a safety specialist with the Federal Motor Carrier Safety Administration in the Ames division office after 12 years at CTRE.

At CTRE, he focused on intelligent transportation systems (ITS) for commercial vehicle operations (CVO). He oversaw field operational tests and research in ITS/CVO to expedite commercial vehicle traffic.

"CTRE has been a great place to be the past 12 years," says Kroeger.

### **Dave Plazak**

David Plazak, CTRE's associate director for policy, joined the Transportation Research Board in Washington, D.C. as a senior program officer with the Strategic Highway Research Program.

Plazak was the educational coordinator and the first director of the Midwest Transportation Consortium. Plazak worked on many access management projects and was a lecturer in the community and regional planning department at Iowa

State University. In 2006, Plazak led an interdisciplinary transportation summer seminar in Rome.

"CTRE is easily the best place I have worked in almost 30 years of my professional life. I will miss my friends here, the faculty, the staff, the students, and the sponsors who I have been able to work with over the past 12 years.

Thanks for making this such a great experience," says Plazak.

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# Recently completed research

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Below is a list of projects that were completed since summer of 2007. All links will take you out of this newsletter site. Each project page includes a link to the final report.

## Bridges



Sections of Piles 6 and 7 removed. From the [Investigation of Steel](#)

[Stringer Bridges: Substructures and Superstructures \(TR-522\)](#) project.

- [Investigation of Steel Stringer Bridges: Substructures and Superstructures \(TR-522\)](#)
- [Field Evaluation of Timber Preservation Treatments for Iowa Highway Applications \(IHRB-05-10\)](#)

## Concrete

- [Development of Performance Properties of Ternary Mixes, Phase 1](#)
- [Concrete Pavement Surface Characteristics \(Proj. 15, Part 2\)](#)

## Design

- [Development of Fatigue Design Procedures for Slender, Tapered Support Structures for Highway Signs, Luminaries, and Traffic Signals Subjected to Wind-Induced Excitation from Vortex Shedding and Buffeting](#)

## Geotech

- [Embankment Quality, Phase 4: Application to Unsuitable Soils \(TR-492\)](#)

## Safety

- [Updated Rule on Safety and Mobility](#)
- [Evaluation of Iowa's Graduated Driver's Licensing Program](#)

## Training

- [Developing an Effective Construction Training Program for Hispanic Supervisors and Craft Workers, Phase 4](#)

## Traffic

- [Appropriate Traffic Calming Techniques for Small Iowa Communities \(TR-523\)](#)
- [The Effectiveness of Iowa's Automated Red Light Running Enforcement Programs \(RLR, Phase 2\)](#)
- [Temporary Traffic Control and Enforcement of Traffic Laws in Closed Road Sections](#)
- [Asset Management Strategies to Mitigate Freeway Work Zone Congestion](#)

## Winter Weather

- [Performance Measures for Snow and Ice Control Operations](#)

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# Recently started research

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Below is a list of projects that were started between (roughly) August 2007 and August 2008. All links will take you out of this newsletter site.

## Asphalt

- [Early Permeability Test for Asphalt Acceptance](#)

## Concrete

- [Development of Performance Properties of Ternary Mixtures: Laboratory Study on Concrete](#)
- [Impact of Low-Shrinkage Mixes on Late-Age Random Cracking in Pavements with Use of Early-Entry Sawing \(TR-587\)](#)
- [Effect of Admixtures on Roller-Compacted Concrete Mixes](#)
- [Establishment of a Technology Transfer Concrete Consortium to Identify, Advise, and Fund Research and Technology Transfer for Concrete](#)
- [National Training for Integrated Materials and Construction Practices for Concrete Pavements, Phase II](#)

## Geotechnical

- [Establishing a Dynamic Formula for Pile Design and Construction Control of Pile Driving \(TR-584\)](#)
- [Geotechnical Solutions For Soil Improvement, Rapid Embankment Construction, and Stabilization of the Pavement Working Platform](#)

# Access Management

[Access and Corridor Management Support Program for Iowa, Phase I](#)

## Safety

- [Pavement Markings and Safety](#)
- [Safety Analysis of Low Volume Rural Roads in Iowa](#)
- [Evaluation of Rumble Strips on Low-Volume Rural Roads in Iowa](#)
- [Low-Cost Strategies to Reduce Speed and Crashes on Curves](#)
- [Evaluation of Electronic Speed Limit Signs for Unified Consolidated School on US 30, Eastbound and Westbound](#)
- [Evaluation of Speed Activated Displays on Curves](#)
- [Synthesis of Traffic Calming Techniques in Work Zones \(<http://www.ctre.iastate.edu/research/detail.cfm?projectID=1199717207>\)](#)
- [Development of an Improved Agriculturally Based Deicing Product \(TR-581\)](#)

## Tools/software

- [CARS Location Database Creation](#)
- [Develop an Expanded, Improved, and Upgraded Version of Probabilistic Optimization for Profit Software](#)

# Recent publications

Below is a list of publications completed during the fall of 2007 and spring of 2008.

Most links are to pdf files. To view pdf files, you may need to [download the free Adobe Acrobat Reader](#).

## Manual

- [Integrated Materials and Construction Practices for Concrete Pavement: A State-of-the-Practice Manual](#) (off-site link)

## Technology transfer summaries

### Bridges

- [Flexible Start/Fixed Duration Contracting: A Case Study](#) (\*pdf)
- [Field Testing of Railroad Flatcar Bridges](#) (\*pdf)

## Integrated Materials and Construction Practices for Concrete Pavement:

A State-of-the-Practice Manual

FHWA Publication No. HIF - 07 - 004



U.S. Department of Transportation  
Federal Highway Administration

Second printing October 2007  
[December 2006]



National Concrete Pavement  
Technology Center



ctre

Center for Transportation  
Research and Education  
IOWA STATE  
UNIVERSITY

Cover of [Integrated Materials and Construction Practices for Concrete Pavement: A State-of-the-Practice Manual](#)

- [Timber Preservation Treatments for Highway Applications](#) (\*pdf)

## Concrete

- [Material Thermal Inputs of Iowa Materials for MEPDG](#) (\*pdf)

## Traffic

- [Evaluating Red Light Running Programs in Iowa](#) (\*pdf)
- [Gateway Traffic Calming in Union, Iowa](#) (\*pdf)
- [Gateway Traffic Calming in Roland, Iowa](#) (\*pdf)
- [Low-Cost Traffic Calming in Slater, Iowa](#) (\*pdf)
- [Single-Measure Traffic Calming in Gilbert, Iowa](#) (\*pdf)
- [Single-Measure Traffic Calming in Dexter, Iowa](#) (\*pdf)

## Construction

- [Prefabricated Elements Case Study](#) (\*pdf)

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