# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>From the Director</td>
<td>3</td>
</tr>
<tr>
<td>Local Economic Impact</td>
<td>4</td>
</tr>
<tr>
<td>Services for Iowans</td>
<td>4</td>
</tr>
<tr>
<td>Research and Technology Transfer</td>
<td>4</td>
</tr>
<tr>
<td>Training and Outreach</td>
<td>4</td>
</tr>
<tr>
<td>Most Popular Downloads</td>
<td>5</td>
</tr>
<tr>
<td>Student Success</td>
<td>6</td>
</tr>
<tr>
<td>Award Winners</td>
<td>6</td>
</tr>
<tr>
<td>Recruiting for the Future</td>
<td>7</td>
</tr>
<tr>
<td>Staff</td>
<td>8</td>
</tr>
<tr>
<td>New Visual Identity</td>
<td>9</td>
</tr>
<tr>
<td>Centers and Programs</td>
<td>9</td>
</tr>
<tr>
<td>Program Impacts</td>
<td>10</td>
</tr>
<tr>
<td>CP Road Map</td>
<td>10</td>
</tr>
<tr>
<td>Integrated Materials and Construction Practices:</td>
<td></td>
</tr>
<tr>
<td>A Manual for Concrete Pavements</td>
<td>10</td>
</tr>
<tr>
<td>Rating U.S. Road Safety</td>
<td>11</td>
</tr>
<tr>
<td>Managing Pavement Markings</td>
<td>11</td>
</tr>
<tr>
<td>Health Monitoring and Sensing</td>
<td>11</td>
</tr>
<tr>
<td>Geotechnical Mobile Lab</td>
<td>12</td>
</tr>
<tr>
<td>Iowa SUDAS Corporation</td>
<td>12</td>
</tr>
<tr>
<td>Construction Training Program for American Supervisors and Hispanic Construction Workers</td>
<td>12</td>
</tr>
<tr>
<td>Winter Weather Effects</td>
<td>13</td>
</tr>
<tr>
<td>National LTAP Conference</td>
<td>13</td>
</tr>
<tr>
<td>Developing Future Leaders</td>
<td>13</td>
</tr>
<tr>
<td>CTRE Research at a Glance</td>
<td>14</td>
</tr>
<tr>
<td>Projects, 2004–2005</td>
<td>20</td>
</tr>
<tr>
<td>Chapters in Books</td>
<td>26</td>
</tr>
<tr>
<td>Reviewed Journals and Symposia</td>
<td>26</td>
</tr>
<tr>
<td>Professional Journals</td>
<td>29</td>
</tr>
<tr>
<td>Resources</td>
<td>30</td>
</tr>
<tr>
<td>Partnerships/Sponsors</td>
<td>30</td>
</tr>
<tr>
<td>People</td>
<td>30</td>
</tr>
<tr>
<td>Transportation-Related Degrees at Iowa State University</td>
<td>30</td>
</tr>
<tr>
<td>Facilities</td>
<td>31</td>
</tr>
<tr>
<td>Contact Information</td>
<td>32</td>
</tr>
</tbody>
</table>
FROM THE DIRECTOR

Reducing diesel truck idling is becoming a national and a trucking industry priority, but it is not that easy to do. Idling engines keep drivers comfortable so they can rest and drive safely. Yet the practice consumes over a billion gallons annually. CTRE is working with the Iowa Energy Center, the Iowa Motor Truck Association (IMTA), and a manufacturer to demonstrate an innovative, technology-based alternative. A national workshop was held in 2004 that generated the demonstration idea, and CTRE is working with IMTA to hold a combined alternative fuel and idle reduction conference in 2006.

Transporting fresh fruits and vegetables from farm to store pays about four to five times more than producing those fruits and vegetables. According to Iowa State University's Leopold Center for Sustainable Agriculture, the revenue generated per acre by Iowa fruit and vegetable farms in 2002 was almost seven times the amount generated by grain and soybean farms—about $1800 per acre versus $260 per acre. The Leopold Center asked CTRE to work with them to identify ways to help Iowa farmers compete in the fruit and vegetable market. The initial result is a web-based planning tool that helps stakeholders identify supply gaps and assess potential shipping advantages that might be achievable with local production.

Managing access on arterial streets can reduce access-related crashes (caused by turns in and out of commercial driveways) by up to 40 percent. For six years CTRE's staff has provided assistance to cities and counties to manage access on such streets. In 2004 CTRE staff analyzed arterials throughout the Des Moines, Iowa, metro area. Working with the Des Moines Area Metropolitan Planning Organization, CTRE developed a comprehensive access management study and program for access-related improvements.

Winter weather is frequently on the minds of snowbelt residents and travelers. In 2005 CTRE integrated a number of weather-related activities into the Center for Weather Impacts on Mobility and Safety:

- The administration of the AURORA pooled-fund study that focuses on road weather information systems (RWIS) research.
- Maintenance of the Iowa DOT's “Weatherview” website that displays RWIS data in map form.
- Working with the Clear Roads pooled-fund states to facilitate development of a new approach to snow removal.

These are just a few of the results gleaned from CTRE research.

As CTRE's programs have begun to receive national attention, faculty and staff have begun to play a greater role in national-level research.

- CTRE/ISU is proud to be involved in three NCHRP projects: Intelligent Soil Compaction Systems, Performance Measures for Snow and Ice Control Operations (lead), and Median Intersection Design for Rural High-Speed Divided Highway (lead).
- CTRE is also conducting a demonstration for FHWA, in partnership with the Iowa DOT, to calm traffic entering small towns through the use of gateway treatments.
- The Bridge Engineering Center is working closely with the USDA Forest Products Lab to improve timber bridges and with both the USDA and FHWA to implement structural health monitoring.
- The GIS-based crash location tool developed for Iowa police officers five years ago has been replicated for six other states.
- A pavement markings management system developed for Iowa will be adapted for Alaska and Tennessee.

In 2005 CTRE and its Center for Portland Cement Concrete Paving Technology worked closely with a chartering committee of the American Concrete Paving Association (ACPA) to raise the Iowa-based program to the national level and evolve into the National Center for Concrete Paving Technology—CP Tech Center for short. The CP Tech Center will work closely with FHWA, state ACPA chapters, state DOTs, and AASHTO committees to implement concrete paving technology improvements.

As always I thank Iowa State University for its support. I also thank the Iowa Department of Transportation for their long-time support and partnership with CTRE and ISU.

Stephen J. Andrle
LOCAL ECONOMIC IMPACT

Through partnerships and contracts, CTRE leverages every dollar of support from Iowa’s taxpayers into $1.66 and every dollar from Iowa State University into more than $20 for transportation-related research, outreach, and education in the state. Ninety-three percent of CTRE’s financial resources go directly to transportation-related research, outreach, and education in Iowa.

CTRE employees and ISU/CTRE students support the local economy of central Iowa. In fiscal year 2005, CTRE employed:
- 41 Iowans in full-time positions
- 59 graduate student research assistants (acquiring field and research experience)
- 24 hourly student employees.

SERVICES FOR IOWANS

CTRE provides a variety of products and services that help Iowa’s transportation workers do their jobs better and help state and local transportation agencies spend tax dollars as effectively and efficiently as possible.

Research and Technology Transfer
- 64 projects completed and results disseminated.
- 34 new research and technology transfer projects begun to improve roads, bridges, transportation planning, etc.
- 23 technology transfer and special publications such as the Iowa Drainage Law Manual published.
- 102 technical papers and presentations shared with peers around the country.

Training and Outreach
- 2,916 Iowans participated in 87 workshops and other training events.
- 190 Iowans earned Roads Scholar certificates.
- 134 traffic safety data requests from 53 different Iowa agencies responded to and related presentation materials prepared for.
- 2,400 copies of Technology News, the Iowa Local Technical Assistance Program newsletter, distributed bimonthly to subscribers.
- 2,100 daily visitors to CTRE’s website.

The Iowa Drainage Law Manual was sponsored by the Iowa Highway Research Board (TR 497). In 2005, 400 print copies and 94 CDs of this manual were distributed.
CTRE publishes virtually everything it produces on its website. In fiscal year 2005, the following were the most frequently downloaded publications (number of times downloaded in parentheses):

- **Iowa Traffic Control Devices and Pavement Markings: A Manual for Cities and Counties:**
  - Conversions and formulas (from the appendix (7,429))
  - Stop and yield signs (2,320)
  - Deer crossing signs (1,497)
  - Mailboxes in roadway right of way (1,424)

- **Handbook of Simplified Practice for Traffic Studies:**
  - Crash analysis (1,955)
  - Sight distance (1,700)
  - Traffic counts (1,614)

- **Proceedings of the International Workshop on Sustainable Development and Concrete Technology:**
  - “Properties of Green Lightweight Aggregate Concrete” (1,757)
  - “Development of Sustainable Cementitious Materials” (1,368)
  - “High-Performance, High-Volume Fly Ash Concrete for Sustainable Development” (1,299)

- **Brochure: Virtual reality and laser scanning applications** (1,392)

- **Report: Artificial-Intelligence-Based Optimization of the Management of Snow Removal Assets and Resources** (1,239)

- **Technology transfer summary: Soil Compaction Monitoring Technology** (1,086)

- **Report: Material and Construction Optimization for Prevention of Premature Pavement Distress in PCC Pavements (Phase I)** (1,080)

- **Proceedings of the Mid-Continent Transportation Symposium 2000: “Geotextiles and Loess: Long-Term Flow”** (1,002)

This map was created by the Iowa Traffic Safety Data Service and edited for use in this report. The location is US 6 and Interstate 35/80 in Des Moines, Iowa.
STUDENT SUCCESS

Award Winners

For the last five years, Iowa State’s Transportation Student Association, which CTRE advises, has received the regional best student chapter award from the Missouri Valley Chapter of the Institute of Transportation Engineers. CTRE is also attracting top-notch, award-winning graduate students, including some non-traditional students:

Fatih Bektas
• Won a $20,000 fellowship from the Portland Cement Association Education Foundation for his research on determining the effect of ordinary portland cement fineness on ASTM C 1260 expansion.

Hillary Isebrands (PhD student)
• Returned to ISU after six years as a transportation engineer.
• Was selected as a fellow by the Eno Foundation and attended its 12th annual Leadership Development Conference on Transportation Policy.

Tom Stout (PhD student)
• Worked as an engineer for county and regional governments and in consulting for 31 years before returning to graduate school.
• Won several awards, including one for teaching excellence, two for essays, and one for research.

Bektas tests the fineness of ordinary portland cement.

Isebrands (left) is studying safety. Stout (bottom, right in photo) accepts an award for an essay.
Recruiting for the Future

CTRE is helping attract high school students to transportation-related careers by co-sponsoring an annual transportation career fair. The first fair, held in 2004 at Iowa State University, hosted about 120 students. The third annual fair will be held April 20, 2006. Students from across Iowa are invited to this free event.

Other sponsors include Des Moines Area Community College, the Midwest Transportation Consortium, other Iowa higher education institutions, the Iowa chapter of APWA, FHWA (Iowa Division), and additional stakeholders.

Iowa high school students got close up views of a mobile concrete lab (right), an Iowa DOT snow plow (far right), and a National Guard helicopter (below) at the 2005 transportation career fair.
STAFF

Director
Stephen J. Andrle
andrle@iastate.edu

Assistant to the Director
Jan Graham
jjgraham@iastate.edu

Associate Directors and Program Managers
Bridge Engineering Center
Terry Wipf
Professor of Civil, Construction, and Environmental Engineering
tjwipf@iastate.edu

Bridges and Structures
Brent Phares
bphares@iastate.edu

National Concrete Pavement Technology Center
E. Thomas Cackler
tcackler@iastate.edu

Communications
Marcia Brink
mbrink@iastate.edu

Construction Management and Technology
Ed Jaselskis
Professor of Civil, Construction, and Environmental Engineering
ejaselsk@iastate.edu

Iowa Traffic Safety Data Service
Zachary Hans
zhans@iastate.edu

Materials and Construction Optimization for PCC Pavements
Jim Grove
jimgrove@iastate.edu

Midwest Transportation Consortium
Tom Maze
Professor of Civil, Construction, and Environmental Engineering
tmaze@iastate.edu

Outreach; Local Technical Assistance Program
Duane E. Smith
desmith@iastate.edu

Policy and Planning
David Plazak
dplazak@iastate.edu

Roadway Infrastructure Management and Operations Systems
Omar Smadi
osmadi@iastate.edu

Statewide Urban Design and Specifications
Larry Stevens
lstevens@iastate.edu

Transportation Information Systems
Roginald Souleyrette
Professor of Civil, Construction, and Environmental Engineering
reg@iastate.edu

Transportation Operations and Traffic Engineering
Neal Hawkins
hawkins@iastate.edu

Transportation Systems Analyst
Shauna Hallmam
shallmar@iastate.edu

Transportation Engineer
Assistant Professor of Civil, Construction, and Environmental Engineering
Jim Hogan

Transport Research Specialist
Travis Hosteng
hosteng@hotmail.com

Transportation Research Specialist
Dennis Kroeger
kroeger@iastate.edu

Bridge Engineer Specialist
Michael LaViolette
mlaviol@iastate.edu

Account Clerk
Diane Love
djlove@iastate.edu

Travie Hosteng
Bridge Research Specialist
hosteng@hotmail.com

Dennis Kroeger
Transportation Research Specialist
kroeger@iastate.edu

LaViolette
Bridge Engineer Specialist
mlaviol@iastate.edu

Diane Love
Account Clerk
djlove@iastate.edu

Tom McDonald
Safety Circuit Rider
tmcdona@iastate.edu

Jeremy McIntyre
PCC Research Technician
mcintyre@iastate.edu

Tim Morris
Accountant
tmorris@iastate.edu

Oksana Opsoemer
Writer/Editor
oksanaus@iastate.edu

Georgia Parham
Secretary
gparham@iastate.edu

Sharon Prochnow
CP Tech Center Program Coordinator
prochnow@iastate.edu

Laurel Raasch
SUDAS Research Coordinator
lraasch@iastate.edu

Michele Regenold
Webmaster and Editor
mregenol@iastate.edu

Beth Richards
SUDAS Program Coordinator
brich@iastate.edu

Matt Rouse
Bridge Research Specialist
jmr19@iastate.edu

Bob Rushing
Law Enforcement Liaison
rushing@dps.state.ia.us

Bob Steffes
PCC Research Engineer
stoffes@iastate.edu

Traci Stewart
Secretary
stewartt@iastate.edu

Denise Wagner
CP Tech Center Secretary
dfwagner@iastate.edu

Kejin Wang
PCC Engineer
Assistant Professor of Civil, Construction, and Environmental Engineering
kejinw@iastate.edu

Alison Weidemann
Graphic Designer
johnson9@iastate.edu

Paul Wiegand
Transportation Research Engineer
pwiegand@iastate.edu

Chris Williams
Materials Engineer
Associate Professor of Civil, Construction, and Environmental Engineering
rwilliam@iastate.edu

Hank Zaletel
Iowa DOT Librarian
hank.zaletel@dot.state.ia.us

Brian Zimmerman
PCC Research Technician
bzimmr@iastate.edu
NEW VISUAL IDENTITY

Changes were afoot at CTRE in 2005—visual changes that is.

CTRE has designed a new identity system that’s more consistent with Iowa State University’s. Gone is the old blue ball logo. In its place is a more flexible, text-based logo that will coordinate better with all of CTRE’s programs.

CTRE has developed a standard way of using its new logo in conjunction with the Iowa State University logo and individual programs’ logos. This consistency of design will help people associate CTRE and all its programs with Iowa State University.
PROGRAM IMPACTS

CP Road Map
In 2005, the Center for Portland Cement Concrete Pavement Technology completed development of the CP Road Map. Sponsored by the Federal Highway Administration (FHWA), the Long-Term Plan for Concrete Pavement Research and Technology: The CP Road Map is a comprehensive and strategic plan for concrete pavement research that FHWA has adopted to guide the investment of approximately $250 million over the next 10 years.

At the heart of all concrete pavement projects is the concrete itself. CTRE is developing a manual to help practitioners build better pavements by taking a more integrated approach to concrete materials and construction. Available in August 2006, the manual will be unique in several ways:

• Formatted to be useful as a field reference and as a teaching/learning tool.
• Explains the basics of concrete chemistry in simple terms, relating the chemistry to variables throughout a paving project.
• Accompanied by a full-size poster for the materials lab or construction shop.
• Includes a detailed troubleshooting guide.
**PROGRAM IMPACTS**

**Rating U.S. Road Safety**
Imagine motorists being able to review maps like the one below before setting out on a trip. Europe already has a program for evaluating the safety of roads and informing motorists about it, but no such program currently exists in the United States. CTRE is working with the Midwest Research Institute to pilot test a U.S. Road Assessment Program in Iowa and other states for the AAA Foundation for Traffic Safety and the Iowa DOT. Researchers are preparing risk maps of rural, state-owned primary highways to document the risk of death and serious injury accidents and show where risk is high and low. They’ve considered issues such as what crash severity levels should be addressed in risk maps and what safety-related measures are most appropriate as the basis for specific maps.

![Sample risk map.](image)

**Managing Pavement Markings**
Implementing a pavement markings management system is one way to improve pavement marking durability, quality, and performance. CTRE has been working with the Iowa DOT to implement such a system. CTRE is developing tools that allow DOT staff access to pavement marking inventory and condition information. These tools offer easy identification of marking deficiencies and help in determining where improvements are needed in the future.

![Interactive tool to show the history of any marking condition by date.](image)

**Health Monitoring and Sensing**
Madison County, Iowa, is breathing a little easier thanks to the remote sensing technologies installed by the Bridge Engineering Center on one of the county’s famed covered timber bridges. The system detects vandalism, arson, and other unauthorized activity and automatically alerts authorities. Health monitoring processes and remote sensing technologies have the potential for implementation on major river crossings or where there are concerns about national security.

![One of the famous bridges of Madison County is now being remotely monitored to detect unauthorized activity.](image)
**PROGRAM IMPACTS**

**Geotechnical Mobile Lab**
The Partnership for Geotechnical Advancement’s new mobile lab, which is unique in the field of soil research, will help researchers improve the quality and efficiency of earthwork construction. Thanks to the generous support of Duane McAninch and the McAninch Corporation, the 44-foot-long lab was custom-built and is capable of performing a wide range of geotechnical tests at construction sites.

**Iowa SUDAS Corporation**
In 2004 the Statewide Urban Design and Specifications (SUDAS) program formed the Iowa SUDAS Corporation and in 2005 officially received ownership of the design and specifications manuals. From 2004 to 2005, SUDAS sold nearly 400 specifications manuals and 150 design manuals. Nearly 1,300 specifications manuals and 500 design manuals are now in circulation providing uniformity in urban design and construction throughout Iowa.

The SUDAS manuals are available for purchase. They are also online at www.iowasudas.org/.

**Construction Training Program for American Supervisors and Hispanic Construction Workers**
The Construction Management & Technology (CM&T) program is exploring innovative ways to improve communication between American supervisors and their Hispanic construction workers. CM&T has developed several training courses, including Spanish as a second language for supervisors and concrete pavement basics for workers. One course is designed for both American supervisors and Hispanic workers together. CM&T staff have taught the courses for several construction companies, both on the job site and in the classroom.
PROGRAM IMPACTS

Winter Weather Effects
The Center for Weather Impacts on Mobility and Safety is analyzing 10 years (1995/96 to 2004/05) of Iowa winter crash history data. Preliminary analysis shows what a dramatic impact winter weather can have. In winter (October 15–April 15), more than half of the injuries occurring on rural interstates are weather related, while one-third of crashes and injuries on urban interstates are weather related. Considering that Iowa averages about 18 days per winter where weather is a factor, a significant number of crashes occurs during about 10 percent of the whole winter season.

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<th>Urban Interstate</th>
<th>Rural Interstate</th>
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<tr>
<td>Total Crashes</td>
<td>36%</td>
<td>45%</td>
</tr>
<tr>
<td>Total Injuries</td>
<td>34%</td>
<td>56%</td>
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Winter weather related crashes/injuries as a percentage of all crashes in winter

National LTAP Conference
The Iowa Local Technical Assistance Program (LTAP) hosted the National LTAP Conference in Dubuque, Iowa, July 23–27, 2005, in conjunction with its sister LTAPs in Kansas, Missouri, and Nebraska. Approximately 200 LTAP staff from across the country gathered to discuss management, programming, and marketing/communications issues.

Developing Future Leaders
Since 1999 the Midwest Transportation Consortium (the U.S. DOT’s University Transportation Center for Iowa, Kansas, Missouri, and Nebraska, which is administered by CTRE) has worked to develop future leaders for the transportation industry. The MTC has supported 30–40 graduate students, primarily masters’ degree students, each year at Iowa State University, Lincoln University, the University of Missouri-Columbia, University of Missouri-Kansas City, the University of Missouri-St. Louis, and the University of Northern Iowa.

Participants visit with vendors between sessions. Photo by Jonathan Keane, Florida LTAP.

Eric Peterson, master’s student and MTC scholar, installs road tubes for collecting data on traffic speed as vehicles enter and exit small towns. The project is on rural traffic calming.
CTRE research at a glance

This section highlights research projects that are representative of CTRE’s broad spectrum of interest and expertise.

The full list of projects that were completed or in progress during 2004–2005 begins on page 20.

Safety

1. School Zone Safety Handbook
   Will help schools address safety and operations on school grounds and public streets adjacent to elementary and middle schools in Iowa.

2. Crash Mapping Analysis Tool
   Software developed for the mapping and analysis of statewide crash report data collected and maintained by a jurisdiction.

3. Rural Expressway Intersections Synthesis of Practice and Crash Analysis
   A national synthesis of rural expressway, two-way stop-controlled (TWSC) intersection safety strategies and intersection designs; also includes an analysis of Iowa expressway TWSC intersection crash characteristics.

4. Safety Impacts of Pavement Edge Dropoffs
   Analyzing existing guidelines and standards and their applications to better understand related problems.

5. Appropriate Traffic Calming Techniques for Small Iowa Communities
   Providing guidance that can be used by both engineers and communities to select economically feasible alternatives for conditions typical of Iowa’s county roads and other major roads within small rural communities.

6. Impact of Left-Turn Phasing on Older and Younger Drivers at High-Speed Signalized Intersections
   Overall, left-turn crash rates indicated that protected phasing is much safer than protected/permitted and permitted phasing.
Traffic

2 Iowa Event Operations
Collecting traffic and observational data for events, including the Iowa State Fair, Iowa State University and University of Iowa football games, and Iowa Events Center.

Trucks and Twin Cities Traffic Management
Identified strategies that will reduce congestion for trucks traveling within and through Minneapolis and St. Paul, Minnesota.

One-way to two-way roadway conversions
Evaluated the transportation and safety impacts of converting existing one-way roadways to two-way operations in downtown Des Moines, Iowa.

Work zones

3 Smart Work Zone Deployment Initiative
Administering this on-going effort among cooperating states’ DOTs, the FHWA, universities, and industry to evaluate new products and conduct research focused on the enhancement of safety and mobility in highway work zones.

Procedures to Forecast and Monitor Work Zone Safety and Mobility Impacts
Synthesis of what is currently being done by state transportation agencies across the country to plan, manage, operate, and evaluate work zone safety and mobility.

Planning

4 Investigating the Impact of Rural Development on Secondary Road Systems
Developing a simple impact assessment tool that can be used by Iowa counties to assess the service and fiscal impacts of rural developments as they are proposed.

New Process for Determining Design Year Traffic Demands
Creating a more detailed method to develop traffic projections specific to new growth areas, which are difficult to plan for, and creating tools for scenario planning.

Access Management Plan for Des Moines MPO
Developed a plan for the Des Moines, Iowa, metropolitan area to make improvements that will reduce access-related crashes.
Environment

5 Review of Stability Berm Alternatives for Environmentally Sensitive Areas
Determined which stability berm alternatives afford practical solutions for avoiding and minimizing impacts to environmentally sensitive areas.

Weather

6 Integrating Road Weather Information with Traffic Data
Weather matters—weather conditions have an important impact on traffic safety, traffic demand, and traffic flow.

Forecasting Frost on Bridges
Testing a model for weather forecasting that includes specific forecasts of bridge surface temperature.

Improving Snow Plow Design
Will identify and test snow plow features that address the following snow-removal objectives: clear roadway in one pass; reduce snow residue behind the plow; develop a contour-following blade or alternative to a blade; reach plow speed that is within ten mph of traffic speed—about 40–45 mph.

Standards & Specifications

7 Object-Oriented Specifications for Iowa DOT and Urban Standards
Created a prototype object-oriented model and demonstrated it to potential users representing counties, cities, and the state. Findings suggest that a system like this could improve productivity to find information by as much as 75 percent.

Rural and Urban Roadway Lighting Practical Design Guide for Iowa
Creating a design guide that will be incorporated into SUDAS and will also provide a rural and urban application matrix that recommends where roadway lighting should be prioritized based upon roadway, land use, safety, and traffic conditions.
Asset Management

3 Sign Management System for Iowa DOT
Developing a system to improve the quality of signage, budgeting, and management of all aspects of signage.

Iowa Pavement Management Program
Developed and implemented this ongoing program in the 1990s to help local agencies make better decisions about how to spend their maintenance and construction dollars.

Implementing Highway Economic Requirements System in Iowa
Will train Iowa DOT staff in its use, summarize the Iowa experience as a pilot for other states, and integrate the Iowa experience into FHWA's training materials.

Maintenance

9 Manual of Practice for Roadway Maintenance Workers
A field guide for roadway maintenance workers that illustrates proper methods and procedures and explains why these procedures are important.

Cost Comparison of Treatments Used to Maintain or Upgrade Aggregate Roads
Resources to assist county and township governments in explaining to the public why certain maintenance or construction techniques and policy decisions are made.

Bridges & Structures

10 Bridge Constructed with Ultra-High-Performance Concrete
Leading the design, construction, and evaluation of an ultra-high-performance concrete (UHPC) bridge built on a secondary road in Wapello County, Iowa. This bridge is the first in the nation constructed with UHPC beams.

Field Testing of Integral Abutments
Evaluated the state of the art for the design of prestressed concrete, integral abutment bridges and recommended prestressed concrete girders and steel piles.
Soils, Subbase, and Subgrades

11 Determining Optimum Base Characteristics for Pavements
Made recommendations related to design, construction, and quality assurance/quality control for stability and permeability.

Field Evaluation of Compaction Monitoring Technology
Evaluated compaction monitoring technology developed by Caterpillar Inc. for use in earthwork construction and quality assurance/quality control practices.

Design Guide for Improved Quality of Roadway Subgrades and Subbases
Evaluating aspects of subgrade and subbase construction and best practices for inclusion in the Statewide Urban Design and Specifications.

Pavement

12 Method to Determine Pavement Damage Due to Detours
Developed a new procedure to be used by the Iowa DOT, cities, and counties—a gas tax method that provides a simple, easy to implement, and consistent approach to dealing with compensation for use of detours.

Implementing the Mechanistic-Empirical Pavement Design Guide
Developed a training and implementation strategy for Iowa.

Pavement Testing

13 Simple and Rapid Test for Monitoring the Heat Evolution of Concrete Mixtures
Evaluating a simple field-oriented device and developing a standard test procedure and system to characterize the heat evolution curve for quality control of pavement concrete mixtures.

Nondestructive Evaluation of Iowa Pavements
Developing a field-validated nondestructive pavement evaluation toolbox to assess pavement condition, estimate pavement remaining life, and eventually help assess pavement rehabilitation strategies.
Asphalt Pavement

14 Thin Maintenance Surfaces for Municipal Streets and Low-Volume Rural Roads
Developing a thin maintenance surface technology transfer program specifically for municipal and secondary road personnel.

Development of Moisture Sensitivity Testing for Superpave Compacted Hot Mix Asphalt
Examining typical construction variability, such as air voids, asphalt binder content, and nominal maximum aggregate size, and incorporating performance testing into pavement design.

Concrete Pavement

15 Deicer Scaling Resistance of Concrete Pavements, Bridge Decks, and Other Structures Containing Slag Cement
Investigating how specific variables influence the deicer scaling resistance of concrete mixtures.

PCC Pavement Surface Characteristics
Developing a strategic plan to optimize all the characteristics of the pavements, i.e., maintain good frictional properties, reduce spray, provide a good ride, while achieving low noise.

Self-Consolidating Concrete—Applications for Slip-Form Paving
Designed a new type of self-consolidating concrete for slip-form paving that can not only self-consolidate but also have sufficient green strength.

CTRE research online
All CTRE research projects, both completed and in progress, are published online.
Visit www.ctre.iastate.edu/research.htm.
CTRE research is also available through TRIS.
PROJECTS, 2004–2005

Asset Management

In progress ........................................
Access Management at Major Intersections
David Plazak
Sponsor: Iowa DOT Office of Traffic Safety

County Non-FAE Paved Road Condition: Data Collection, Summary, and Delivery, Phase II
Omar Smadi
Sponsor: Iowa DOT

FHWA Access Management Outreach Materials
David Plazak
Sponsor: SAIC, Berger, FHWA

Implementation of HERS-ST in Iowa and Development/Refinement of a National Training Program
Omar Smadi, Tom Maze
Sponsor: Midwest Transportation Consortium, Iowa DOT

Iowa Pavement Management Program, Phase X
Omar Smadi, Tom Maze, Reginald Souleyrette
Sponsor: Iowa DOT

Planning, Development, and Implementation of the Iowa Pavement Marking Management Program
Omar Smadi, Neal Hawkins
Sponsor: Iowa DOT, Midwest Transportation Consortium

Planning, Implementation and Operation of the IPMP, Phase IX
Omar Smadi, Reginald Souleyrette, Tom Maze
Sponsor: Iowa DOT

Completed .................................
Access Management Plan for Des Moines MPO
David Plazak
Sponsor: Iowa DOT

Access Management Workshops
David Plazak
Sponsor: Iowa DOT Traffic Safety

Automated Pavement Condition Data: Analysis, Feasibility and Data Integration
Omar Smadi, Stephen Andrele
Sponsor: Iowa DOT

County Non-FAE Paved Road Condition: Data Collection, Summary, and Delivery, Phase I
Omar Smadi
Sponsor: Iowa DOT

Implementation of Iowa DOT Pavement Management Optimization Model FY 2004
Omar Smadi
Sponsor: Iowa DOT

PONTIS Implementation and Operation, Phase II Implementation
Omar Smadi
Sponsor: Iowa DOT

Bridges and Structures

In progress ........................................
Construction and Evaluation of a Prestressed Concrete Bridge Constructed Using Ultra-High-Performance Concrete
Brent Phares
Sponsor: Iowa DOT

Development and Implementation of Design Recommendations for the Minimization of Timber Deck Panel Differential Deflection
Brent Phares, Terry Wipf
Sponsor: USDA Forest Service

Development of Acceptable Live Load Deflection Criteria for Various Timber Superstructure and Deck Types
Brent Phares, Terry Wipf, Doug Wood
Sponsor: USDA Forest Service

Development of an Improved Integral Abutment-to-Approach Slab Connection
Brent Phares, Mike LaViolette, Dean Bierwagen
Sponsor: Iowa DOT

Enhancement of Wisconsin DOT NDE Capabilities
Brent Phares, Terry Wipf, Lowell Greimann
Sponsor: Wisconsin DOT

Evaluation of a Bridge Constructed Using High Performance Steel
Brent Phares, Lowell Greimann, Terry Wipf
Sponsor: Iowa DOT

Evaluation of a Prestressed Concrete Bridge Constructed Using Ultra-High-Performance Concrete
Brent Phares, Sivalingam Srinatharan, Terry Wipf
Sponsor: Wapello County

Evaluation of a Single-Span Steel-Girder Bridge Using a Steel-Free Deck System in Tama County
Terry Wipf, Wayne Klaiber, Brent Phares
Sponsor: Tama County

Evaluation of a Steel Girder Bridge Strengthened Using Fiber Reinforced Polymer Plates
Wayne Klaiber, Brent Phares, Terry Wipf
Sponsor: Iowa DOT

Evaluation of a Three-Span, Prestressed Concrete Girder Bridge Constructed with FRP Components
Terry Wipf, Brent Phares, F. S. Fanous
Sponsor: City of Bettendorf

Evaluation of a Timber Bridge for the Secondary Road System Using FRP Reinforced Glulam Girders
Terry Wipf, Brent Phares
Sponsor: Delaware County

Evaluation of FRP Temporary Bypass Bridge
Terry Wipf, Brent Phares
Sponsor: Iowa DOT

Evaluation of the Effectiveness of Glued Laminated Helper Stringers
Terry Wipf, Doug Wood, Brent Phares
Sponsor: USDA Forest Service

Fast-track Paving Notch Replacement
Brent Phares, Mike LaViolette
Sponsor: Iowa DOT

Instrumentation and Monitoring of Precast, Post-tensioned Bridge Approach Pavement
Brent Phares, Michael LaViolette, Dean Bierwagen
Sponsor: Iowa Highway Research Board

An Integral Abutment Bridge with Precast Concrete Piles (TR 438)
Lowell Greimann, Robert Abendroth
Sponsor: Iowa DOT, Iowa Highway Research Board

Investigation of Steel Stringer Bridges: Substructures and Superstructures
Terry Wipf, David White, Wayne Klaiber
Sponsor: Iowa Highway Research Board
PROJECTS, 2004-2005

Environment
In progress
Design Guide and Construction Specifications for NPDES Site Runoff Control (TR-508)
Larry Stevens
Sponsor: Iowa Highway Research Board

Completed
Feasibility of Cooperative Development of Wetland Mitigation Projects
Timothy Ellis, Stephen Andrle
Sponsor: Iowa Highway Research Board

Iowa Drainage Law Manual (TR-497)
Stephen Andrle, Tom McDonald
Sponsor: Iowa Highway Research Board

Review of Stability Berm Alternatives for Environmentally Sensitive Areas
David White
Sponsor: Iowa DOT

Pavement
In progress
Using Scanning Lasers for Real-Time Pavement Thickness Measurement, Phase I
Ed Jaselskis, Russell Walters, Tom Cackler
Sponsor: Iowa DOT

Completed
Development of a Method to Determine Pavement Damage Due to Detours (TR-470)
Omar Smadi, Zach Hans
Sponsor: Iowa Highway Research Board

Implementing the Mechanistic-Empirical Pavement Design Guide (TR-509)
Halil Ceylan, Dale Harrington
Sponsor: Iowa Highway Research Board

Pavement, Asphalt
In progress
Development of Moisture Sensitivity Testing for Superpave Compacted Hot Mix Asphalt
Chris Williams, Vitton
Sponsor: Michigan DOT

Completed
Investigation of Electro-Magnetic Gauges for Determination of In-Place Density of HMA Pavements (TR-547)
Chris Williams, Halil Ceylan
Sponsor: Iowa DOT

Investigation of Low Temperature Cracking in Asphalt Pavements
Marasteanu, Chris Williams, Bahia, Buttlar
Sponsor: Federal Highway Administration

Rail to Truck Modal Shift: Impact of Increased Freight Traffic on Pavement Maintenance Costs
Stewart, Chris Williams, Pagano, Oggard
Sponsor: Midwest Regional University Transportation Center

Pavement, Concrete
In progress
Deicer Scaling Resistance of Concrete Pavements, Bridge Decks, and Other Structures Containing Slag Cement
Tom Cackler, Scott Schlorholtz
Sponsor: Slag Association, Iowa DOT

Evaluation of Composite Pavement Unbonded Overlays, Phase III (TR-478, HR-1093, Proj. 2)
James K. Cable
Sponsor: Federal Highway Administration, Iowa Highway Research Board

Evaluation of Elliptical Steel Dowel Performance
James K. Cable, Max Porter
Sponsor: American Highway Technology, Carlson, Inc., Federal Highway Administration

Monitoring Wind-Induced Vibrations/Stresses in a High Mast Lighting Tower (TR-518)
Brent Phares, Terry Wipf
Sponsor: Iowa DOT, Robert Dexter & Sub-consultants

Performance Evaluation of Steel Bridges: Phase II (TR-493)
Terry Wipf, Lowell Greimann, Brent Phares, Doug Wood
Sponsor: Iowa Highway Research Board

Remote Monitoring of Historic Covered Timber Bridges in Madison County for the Prevention of Arson and Vandalism
Brent Phares, Terry Wipf
Sponsor: U.S. Department of Agriculture

Completed
Field Testing of Integral Abutments (HR-399)
Robert Abendroth, Lowell Greimann
Sponsor: Iowa DOT, Iowa Highway Research Board

Health Monitoring of Bridge Structures and Components Using Smart-Structure Technology
Brent Phares, Lowell Greimann, Terry Wipf
Sponsor: Wisconsin DOT

Impacts of Overweight Implements of Husbandry on Minnesota Roads and Bridges
Brent Phares, Halil Ceylan, Terry Wipf
Sponsor: Minnesota DOT

Steel Diaphragms in Prestressed Concrete Girder Bridges (TR-424)
F. S. Fanous, Robert Abendroth
Sponsor: Iowa DOT, Iowa Highway Research Board

Completed
Evaluation of Composite Pavement Unbonded Overlays, Phase II
Chris Williams
Sponsor: Iowa DOT

Testing Wisconsin Asphalt Mixtures for the AASHTO 2002 Mechanistic Pavement Design Procedure
Chris Williams
Sponsor: Wisconsin Highway Research Program

Thin Maintenance Surfaces, Phase III: Municipal Streets and Low-Volume Rural Roads (TR-507)
Charles Jahren, Duane Smith
Sponsor: Iowa Highway Research Board

Completed
Predicting Critical VMA in Hot Mix Asphalt, Phase II
Brian Coree
Sponsor: Iowa DOT

Rehabilitation of Concrete Pavements Utilizing Rubblization and Crack and Seat Methods (TR-473)
Brian Coree, Halil Ceylan
Sponsor: Iowa Highway Research Board

Maintenance
In progress
Manual of Practice for Roadway Maintenance Workers (TR-514)
Charles Jahren, Duane Smith
Sponsor: Iowa DOT

Completed
Cost Comparison of Treatments Used to Maintain or Upgrade Aggregate Roads
Charles Jahren, David White, Duane Smith
Sponsor: Minnesota DOT

Completed
Investigation of Electro-Magnetic Gauges for Determination of In-Place Density of HMA Pavements (TR-547)
Chris Williams, Halil Ceylan
Sponsor: Iowa DOT

Investigation of Low Temperature Cracking in Asphalt Pavements
Marasteanu, Chris Williams, Bahia, Buttlar
Sponsor: Federal Highway Administration
PROJECTS, 2004-2005

Laboratory Study of Structural Behavior of Alternative Dowel Bars (Proj. 7)  
Tom Cackler, Brian Coree, F. S. Fanous, Max Porter, James K. Cable  
Sponsor: Hughes Brothers, Iowa Highway Research Board, Federal Highway Administration

Manual for Optimizing Materials and Construction Practices (Proj. 10)  
Dale Harrington, James D. Grove  
Sponsor: Federal Highway Administration

Material and Construction Optimization for Prevention of Premature Pavement Distress in Portland Cement Concrete Pavements  
James D. Grove, Tom Cackler  
Sponsor: Iowa DOT, Portland Cement Concrete Pavements, Federal Highway Administration, Concrete paving industry, Other state DOTs

PCC Pavement Surface Characteristics  
Dale Harrington, Tom Cackler, Paul Wiegand  
Sponsor: Federal Highway Administration, Iowa Highway Research Board, American Concrete Pavement Association

Self-Consolidating Concrete—Applications for Slip Form Paving  
James D. Grove, Kejin Wang  
Sponsor: Active Materials, Iowa DOT, Pooled Fund States, W R Grace

Completed  
Computer-Based Guidelines for Job-Specific Optimization of Paving Concrete  
James K. Cable, Dale Harrington  
Sponsor: Transtec Group, Federal Highway Administration

Defining the Attributes of Good In-Service Portland Cement Concrete Pavements (Proj. 9)  
Halil Ceylan, James K. Cable  
Sponsor: Federal Highway Administration

Development of In-Situ Detection Methods for Material Related Distress in Concrete Pavements, Phase II (HR-1081, Proj. 1)  
Kejin Wang, Scott Schlorholtz  
Sponsor: Federal Highway Administration, Iowa Highway Research Board

Developing Smooth, Quiet Concrete Pavements (Proj. 14)  
James K. Cable  
Sponsor: Federal Highway Administration

Development of Performance Properties of Ternary Mixtures (Proj. 13)  
Scott Schlorholtz, Kejin Wang  
Sponsor: Federal Highway Administration

Evaluation of Using Non-Corrosive Deicing Materials and Corrosion Reducing Treatments for Deicing Salts (TR-471)  
Kejin Wang, Wilfred Nixon  
Sponsor: Iowa Highway Research Board, PCC Center, University of Iowa

Field Evaluation of Elliptical Fiber Reinforced Polymer Dowel Performance (Proj. 5)  
Max Porter, James K. Cable  
Sponsor: Federal Highway Administration, Hughes Brothers

Implementing the Mechanistic-Empirical Pavement Design Guide (TR-509)  
Halil Ceylan, Dale Harrington  
Sponsor: Iowa Highway Research Board

International Workshop on Sustainable Development and Concrete Technology  
Kejin Wang  
Sponsor: National Science Foundation

Iowa Data Collection and Analysis for the 2005-2006 National Surface Characteristics Field Experiment Plan  
Paul Wiegand, James K. Cable  
Sponsor: Iowa DOT

Long Term Plan for Concrete Pavement Research and Technology (Task 15)  
Dale Harrington  
Sponsor: IPRF/Federal Highway Administration

Measuring Pavement Profile at the Slipform Paver (TR-512, Proj. 12)  
James K. Cable, Stephen Karaimihis  
Sponsor: Ames Engineering, Federal Highway Administration, Gomaco, Iowa Highway Research Board, PCC Center

Portland Cement Concrete Patching Techniques vs. Performance and Traffic Delay  
James K. Cable, Kejin Wang  
Sponsor: None—personal project

Self-Consolidating Concrete—Applications for Slip Form Paving, Phase I  
Kejin Wang, Surendra Shah  

Two Lift Portland Cement Concrete Pavements to Meet Public Needs (Proj. 8)  
James K. Cable  
Sponsor: Federal Highway Administration

Pavement Testing

In progress  
Developing a Simple and Rapid Test for Monitoring the Heat Evolution of Concrete Mixtures for both Laboratory and Field Applications (Proj. 17)  
James D. Grove, Kejin Wang  
Sponsor: Federal Highway Administration

Nondestructive Evaluation of Iowa Pavements, Phase I  
Halil Ceylan  
Sponsor: Iowa DOT

Nondestructive Testing Technology for Quality Control and Acceptance of Flexible Pavement Construction  
David White, Brian Coree, Tom Cackler, Ed Jaselskis  
Sponsor: National Cooperative Highway Research Program

Using Scanning Lasers for Real-Time Pavement Thickness Measurement, Phase I  
Russell Walters, Tom Cackler, Ed Jaselskis  
Sponsor: Iowa DOT

Completed  
Evaluation of Hot Mix Asphalt Moisture Sensitivity Using the Nottingham Asphalt Test Equipment (TR-493)  
Brian Coree  
Sponsor: Iowa Highway Research Board
PROJECTS, 2004-2005

Planning

In progress ...........................................
I-394 Business Impacts Case Study
David Plazak
Sponsor: CH2M Hill

Clinton/Fulton Multimodal Bridge Study
Economic Analysis
David Plazak
Sponsor: Howard R. Green Company

Development of a New Process for Determining Design Year Traffic Demands (TR-528)
Neal Hawkins, Reginald Souleyrette
Sponsor: Iowa DOT

Evaluating Land Use and Transportation Network Structure on Emission-Specific Travel Behavior
Shauna Hallmark
Sponsor: Iowa DOT

I-90 Corridor Study
Tom Maze
Sponsor: CH2M Hill

Investigation of the Impact of Rural Development on Secondary Road Systems (TR-548)
David Plazak
Sponsor: Iowa DOT

Iowa Transit ITS Needs Analysis
Dennis Kroeger, Stephen Andrle
Sponsor: Iowa DOT

Iowa Produce Market Potential Calculator
Stephen Andrle, Randy Boeckenstedt
Sponsor: Leopold Center for Sustainable Agriculture

North American International Trade Corridor (Corridor 23) Intelligent Infrastructure Study Work Plan Support
Stephen Andrle, Dennis Kroeger
Sponsor: Iowa DOT

Ongoing Long-Range Planning Assistance
David Plazak
Sponsor: Iowa DOT Systems Planning

Roadway Alignments as Assets: Evaluating Alternatives for Valuing Major Highway Corridor Rights of Way
David Plazak
Sponsor: Iowa DOT, Midwest Transportation Consortium

State Transportation Plan Update Assistance: Development of a Performance Measures-based Planning System
David Plazak
Sponsor: Iowa DOT

Western Growth Area Land Use Sensitivity Analysis, Phase II
Neal Hawkins
Sponsor: City of West Des Moines

Safety

In progress ...........................................
Appropriate Traffic Calming Techniques for Small Iowa Communities
Shauna Hallmark, David Plazak, Neal Hawkins
Sponsor: Iowa Highway Research Board

Best Practices and Recommended Strategies for Shared Left Turn Lanes at Signal Control Approaches
Shauna Hallmark, Neal Hawkins
Sponsor: Iowa DOT

Crash Mapping Analysis Tool for Minnesota DOT
Reginald Souleyrette, Dan Gieseman
Sponsor: Minnesota DOT

Empirical Bayes Analysis of High Speed Signalized Expressway Safety
Reginald Souleyrette
Sponsor: Iowa DOT

Incident Location Tool Support for Delaware State Police
Dan Gieseman
Sponsor: Iowa DOT

One- to Two-Way Roadway Conversions
Neal Hawkins
Sponsor: City of Des Moines

Phone Support and Minor Development/Testing for States Using the Incident Location Tool Developed by CTRE
Dan Gieseman
Sponsor: Iowa DOT

Safety Impacts of Pavement Edge Dropoffs
Shauna Hallmark
Sponsor: AAA Foundation, Midwest Research Institute

School Zone Safety Handbook
Shauna Hallmark
Sponsor: Iowa DOT

Using Digital Video Analysis to Monitor Driver Behavior at Intersections
Derrick Parkhurst, Reginald Souleyrette, Stephen Andrle
Sponsor: Iowa DOT

US Road Assessment Program
Reginald Souleyrette, Zachary Hans
Sponsor: Midwest Research Institute

Completed ...........................................
Crash Mapping Analysis Tool (CMAT)
Reginald Souleyrette, Dan Gieseman
Sponsor: Iowa DOT

Development of New Strategies for Locating Safety Improvements Candidate Locations
Shauna Hallmark
Sponsor: Iowa DOT

Four-Lane to Three-Lane Analysis
Reginald Souleyrette
Sponsor: Iowa DOT

Guidelines for Removal of Traffic Control Devices in Rural Areas
Reginald Souleyrette, Tom Maze
Sponsor: Iowa Highway Research Board

Impact of Left-Turn Phasing on Older and Younger Drivers at High-Speed Signalized Intersections
Shauna Hallmark
Sponsor: Iowa DOT

Incident Location Tool
Reginald Souleyrette
Sponsor: Delaware State Police, Florida State University, Georgia DOT, Iowa DOT, New York State Police, North Dakota DOT, South Dakota DOT

Incident Location Tool Support for Florida State University
Dan Gieseman, Nick Burdine
Sponsor: Iowa DOT
PROJECTS, 2004-2005

Incident Location Tool Support for South Dakota DOT
Dan Gieseman
Sponsor: Iowa DOT

Incident Mapping and Analysis Tool
Reginald Souleyrette
Sponsor: Iowa DOT, New York State Police

In-Pavement Pedestrian Flasher Evaluation, Cedar Rapids, Iowa
Ed Kannel
Sponsor: Iowa Department of Public Safety

Rural Expressway Intersection Synthesis of Practice and Crash Analysis
Neal Hawkins, Tom Maze
Sponsor: Iowa DOT

Safety Impacts of Street Lighting at Isolated Rural Intersections, Part II
Shauna Hallmark, Tom McDonald, Zachary Hans
Sponsor: Minnesota DOT

Software Enhancements for the Crash Mapping and Analysis Tool
Dan Gieseman, Reginald Souleyrette
Sponsor: Iowa DOT

Soils, Subbase, Subgrade
In progress

Design Guide for Improved Quality of Roadway Subgrades and Subbases (TR-525)
Halil Ceylan, Vern Schaefer, Radhey Sharma, Larry Stevens, David White
Sponsor: Iowa Highway Research Board

Embankment Quality, Phase IV: Application to Unsuitable Soils (TR-492)
David White
Sponsor: Iowa Highway Research Board

Field Evaluation of Compaction Monitoring Technology, Phase II
David White, Ed Jaselskis, Vern Schaefer, Tom Cackler
Sponsor: Iowa DOT, Iowa Highway Research Board

Field Validation of Intelligent Compaction Monitoring Technology for Unbound Materials and HMA
David White, Tom Cackler
Sponsor: Minnesota DOT

Innovative Solutions for Slope Stability Reinforcement and Characterization in Iowa Soils (TR-489)
David White
Sponsor: Iowa Highway Research Board

Investigation of Improved Utility Cut Repair Techniques to Reduce Settlement in Repaired Areas (TR-503)
David White, Vern Schaefer
Sponsor: Iowa DOT

Measurements of Seasonal Changes and Spatial Variation in Pavement Subgrade Support Properties—a Link to Pavement Performance (TR-516)
Radhey Sharma, David White, Vern Schaefer
Sponsor: Iowa DOT

Optimization and Management of Materials in Earthwork Construction (TR-501)
Radhey Sharma, David White, Vern Schaefer
Sponsor: Iowa Highway Research Board

A Pilot Study to Investigate the Use of Aggregate Screenings in Roadway Construction
Tom Cackler, Vern Schaefer, David White
Sponsor: Martini Marietta Aggregates

Slope Stability Evaluation and Remediation Techniques for Iowa
David White
Sponsor: Iowa Highway Research Board

Completed

Determination of the Optimum Base Characteristics for Pavements (TR-482)
Charles Jahren, David White
Sponsor: Iowa Highway Research Board

Field Evaluation of Compaction Monitoring Technology, Phase I (TR-496)
David White, Ed Jaselskis, Tom Cackler
Sponsor: Iowa DOT, Iowa Highway Research Board

David White, Sivalingam Srinath
Sponsor: Iowa Highway Research Board

Soil Stabilization of Non-Uniform Subgrade Soils (TR-461, Proj. 4)
David White
Sponsor: Federal Highway Administration, Iowa Fly Ash Association, Iowa Highway Research Board, PCC Center

Synthesis of Non-Destructive Testing Technologies for Geomaterial Applications
David White, Ed Jaselskis, Vern Schaefer
Sponsor: Iowa DOT

Standards and Specifications
In progress

Developing a Rural and Urban Roadway Lighting Practical Design Guide for Iowa (TR-540)
Neal Hawkins, Shauna Hallmark, Omar Smadi
Sponsor: Iowa DOT

Revision to the SUDAS Traffic Signal Design Guide (TR-546)
Neal Hawkins
Sponsor: Iowa DOT

Roadway Design Standards for Rural and Suburban Subdivisions (TR-549)
Paul Wiegand, Larry Stevens
Sponsor: Iowa DOT

Completed

Development of Object-Oriented Specifications for Iowa DOT and Urban Standards (TR-487)
Dale Harrington, Ed Jaselskis, Russell Walters, Stephen Andrle
Sponsor: Iowa Highway Research Board

Electronic Reference Library, Phase II
Analysis of Web-Based Content Management Systems for Managing Iowa DOT Engineering Specifications: Assessing Best Practices
Stephen Andrle, Russell Walters, Lee Honeycutt, Geoffrey Sauer, Rebecca Burnett
Sponsor: Iowa DOT

Statewide Urban Standard Design and Specifications
Dale Harrington, Stephen Andrle
Sponsor: Iowa DOT
PROJECTS, 2004-2005

Traffic
In progress ............................
Iowa Event Operations
Neal Hawkins
Sponsor: Iowa DOT

Traffic Data Collection and Reduction Using Video Detection Equipment
Stephen Andrle
Sponsor: Iowa DOT

Completed .................................
Evaluating Speed Differences Between Passenger Vehicles and Heavy Trucks for Transportation-Related Emissions Modeling
Shauna Hallmark
Sponsor: Federal Highway Administration

Evaluation of Different Methods to Calculate Heavy-Truck VMT
Shauna Hallmark
Sponsor: Midwest Transportation Consortium

Traffic Monitoring Program Planning with Remote Sensing
Reg Souleyrette, Shauna Hallmark
Sponsor: Iowa DOT

Trucks and Twin Cities Traffic Management
Tom Maze, Dennis Kroeger, Mark Berndt
Sponsor: Minnesota DOT

Training
In progress ............................
Developing an Effective Construction Training Program for Hispanic Supervisors and Craft Workers, Phases II and III
Ed Jaselskis, Tom Cackler, Charles Jahren
Sponsor: Iowa DOT

Rewriting Supervisory Training Program Unit 8: Managing the Project—the Supervisor’s Role
Kelly Strong
Sponsor: Leading Change, Inc.

Weather
In progress ............................
Management Support of the AURORA Program
Tom Maze
Sponsor: Iowa DOT

Performance Measures for Snow and Ice Control Operations
Steve Andrle
Sponsor: National Cooperative Highway Research Program

Snow and Ice Operations Cost Analysis
Tom Maze
Sponsor: Minnesota DOT

Test and Validation of a Model for Forecasting Frost on Bridges
Gary Taylor
Sponsor: Minnesota DOT

Winter Weather Crash Trends on Iowa Primary Roads
Tom Maze, Zachary Hans
Sponsor: Iowa DOT

Weatherview: XML Data Structure & Maintenance
Dan Gieseman, Reginald Souleyrette, Nick Burdine
Sponsor: Iowa DOT

Completed .................................
Development of Internet-based RWIS (Road Weather Information System) and AWOS (Airport Weather Observation System) Information Delivery Tools (AKA Weatherview)
Reginald Souleyrette, Bill McCall
Sponsor: Iowa DOT

Integration of Road Weather Information with Traffic Data
Tom Maze
Sponsor: Iowa DOT

An Investigation of User Costs and Benefits of Winter Road Closures
Tom Maze, Michael Crum
Sponsor: Iowa State University, Midwest Transportation Consortium

Marketing Road Weather Information in Traffic Monitoring
Tom Maze, Chris Albrecht
Sponsor: Aurora Program

Work Zones
In progress .............................
Asset Management Strategies to Mitigate Freeway Work Zone Congestion
Kelly Strong, Tom Maze
Sponsor: Iowa DOT, Midwest Transportation Consortium

Smart Work Zone Deployment Initiative
Tom Maze, Tom McDonald
Sponsor: Iowa DOT

Synthesis of Procedures to Forecast and Monitor Work Zone Mobility and Safety Impacts
Tom Maze, Neal Hawkins
Sponsor: Kansas DOT

Completed .................................
Development of Internet-based RWIS (Road Weather Information System) and AWOS (Airport Weather Observation System) Information Delivery Tools (AKA Weatherview)
Reginald Souleyrette, Bill McCall
Sponsor: Iowa DOT

Integration of Road Weather Information with Traffic Data
Tom Maze
Sponsor: Iowa DOT
RESEARCH PUBLICATIONS, 2004–2005

Chapters in Books
Hallmark, S. L.

Phares, B. M.

Reviewed Journals and Symposia


Burchett*, G. D., and T. H. Maze Rural Expressway Intersection Characteristics that are a Factor in Reducing Safety Performance. Accepted by Transportation Research Record.


Ceylan, H. and M. B. Bayrak* Use of Artificial Neural Networks for Transportation Infrastructure. Submitted to Journal of Infrastructure Systems. American Society of Civil Engineers.


Ceylan, H. A. Guclu Use of Artificial Neural Networks for the Analysis and Design of Concrete Pavement Systems Serving the A380-800 Aircraft. Submitted to Journal of General Systems—Intelligent Systems Design.

RESEARCH PUBLICATIONS, 2004–2005


Meeting of the Transportation Research Board, Washington, D.C.


**RESEARCH PUBLICATIONS, 2004–2005**

**Luedtke, J. and D. Plazak**

**Maher, A., F. Jafari, W. S. Douglas, V. R. Schaefer, and N. Nucunski**

**Maze, T. H., M. Agarwal*, and G. D. Burchett**
Whether Weather Matters to Traffic Demand, Traffic Safety, and Traffic Operations and Flow. Accepted by *Transportation Research Record*.

**Maze, T. H., G. Burchett*, and N. R. Hawkins**
Using Data to Predict Relative Road Safety and Requirements for Road Closure During Severe Winter Weather Conditions. Transportation Research Board Annual Meeting.

**Maze, T. H., H. Preston, R. Storm, N. R. Hawkins and G. Burchett**

**Muniandy, R., A. Selim, and V. R. Schaefer**

**Omar, H., V. R. Schaefer, M. S. Salsidu, M. Daud, M. B. Zohadie, and R. Muniandy**

**Pham, H., M. Suleiman, and D. J. White**

**Pham, H. T. and D. J. White**

**Pham, H., D. J. White, and K. Wissmann**
Behavior of an Isolated Rammed Aggregate Pier from a Finite Element Analysis. Submitted to *Journal of Geotechnical and Geoenvironmental Engineering*.

**Phares, B. M., T. J. Wipf, F. W. Klaiber, A. Abu-Hawash, and Neubauer**

**Plazak, D. and H. Preston**

**Rupnow*, T. D., V. R. Schaefer, K. Wang, and B. L. Hermanson**

**Schaefer V. R., S. R. Burckhard, and J. A. Boomer**

**Schaefer V. R., M. T. Suleiman, K. Wang, and J. Kevern**

**Schaefer, V. R. and D. J. White**

**Sharma, R. S., D. J. White, and V. R. Schaefer**

**Souleyrette, R. R., S. L. Hallmark, D. Veneziano*, S. Pattnaik*, and M. O’Brien**
Grade and Cross Slope Estimation from LIDAR Based Surface Models. Submitted to *Computer-Aided Civil and Infrastructure Engineering*.

**Souleyrette, R. R. and T. Knox**
Safety of High Speed Expressway Intersections: Classical and Empirical Bayes Assessment. Submitted to *Transportation Research Record*.

**Souleyrette, R. R., R. Tenges*, T. McDonald and T. H. Maze**
Safety Effectiveness of Stop Control at Very Low Volume Unpaved Intersections. Accepted by *Transportation Research Record*.

**Sritharan, S., M. Suleiman, and D. J. White**
Effects of Seasonal Freezing on Bridge Column-Foundation-Soil Interaction and Their Implications. Submitted to *Earthquake Spectra*. Earthquake Engineering Research Institute.

**Sritharan, S., D. J. White, and M. Suleiman**

**Stewart*, J., E. Minchin, V. Dyal, G. Smith, and E. J. Jaselskis**

**Stout*, T. B., M. Pawlovich, R. R. Souleyrette, and A. Carriquiry**
Safety Impacts of “Road Diets” in Iowa. Submitted to *ITE Journal*.

**Stout*, T. B. and R. R. Souleyrette**
Matched Pair Safety Analysis for Four Lane to Three Lane Roadway Conversions in Iowa. Submitted to *Transportation Research Record*.

**Suleimann*, M. T., R. A. Lohnes, T. J. Wipf, and F. W. Klaiber**
RESEARCH PUBLICATIONS, 2004–2005

Suleiman, M. T., S. Sritharan, and D. J. White

Suleiman, M. T., S. Sritharan, D. J. White
Cyclic Lateral Load Response of Bridge Column-Foundation-Soil Systems in Freezing Conditions. Accepted to Journal of Structural Engineering.

Suleiman, M. T. and D. J. White
Load Transfer in Rammed Aggregate Piers. Accepted to International Journal of Geomechanics.

Veneziano*, D., S. L. Hallmark, and R. R. Souleyrette

Wang, K., J. K. Cable, and Z. Ge*
Evaluation of Pavement Curing Effectiveness and Its Effects on Concrete Properties. Accepted to Journal of Materials in Civil Engineering. American Society of Civil Engineers.

Wang, K., and J. Hu

Wang, K., A. Mishulovich, and S. P. Shah

Wang, K., S. M. Schlorholtz, J. Hu, and S. Zhang

Wang, K., S. P. Shah, and A. Mishulovich

White, D. J.
Reclaimed Hydrated Fly Ash as a Geomaterial. Accepted to Journal of Materials in Civil Engineering.

White, D. J. and K. Hoevelkamp

White, D. J., E. J. Jaselskis, V. R. Schaefer, and E. T. Cackler
Real-time Compaction Monitoring in Cohesive Soil from Machine Response. Accepted to Transportation Research Record.

White, D. J. and H. Pham
Influence of Lateral Stress on Soil Behavior. Submitted to Journal of Geotechnical and Geoenvironmental Engineering.

White, D. J., H.T. Pham, and K. Hoevelkamp

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CTRE’s relationships with the Iowa DOT and other agencies, sister universities, and the
private sector make it possible to organize productive partnerships. Since 1996, the center
and Iowa State University have participated in a research collaboration agreement with
the Iowa DOT and Iowa’s two other regents’ universities—the University of Northern Iowa
and The University of Iowa; this working agreement helps the organizations coordinate
resources and expertise.

Public organizations
Iowa DOT: For several years, CTRE and the
Iowa DOT have had a unique, long-term
contractual relationship. CTRE conducts
research through streamlined addenda
to a general contract, and the Iowa DOT
provides some administrative support for
CTRE’s overall program.

State/provincial/national departments of
transportation:
• Alaska
• Georgia
• Indiana
• Louisiana
• Minnesota
• Nebraska
• North Carolina
• Ohio
• Pennsylvania
• South Dakota
• Tennessee
• Virginia
• California
• Illinois
• Kansas
• Michigan
• Missouri
• New York
• North Dakota
• Ontario
• Quebec
• Sweden
• Texas
• Wisconsin

Other organizations
• AASHTO
• APWA
• City of Des Moines, Iowa
• City of West Des Moines, Iowa
• Federal Highway Administration
• Iowa Asphalt Paving Association
• Iowa Association of Municipal Utilities
• Iowa Association of Safety Educators
• Iowa Concrete Paving Association
• Iowa County Engineers Association
• Iowa Department of Natural Resources
• Iowa Energy Center
• Iowa Governor’s Traffic Safety Bureau

Academia
• Lincoln University
• Pennsylvania State University
• Purdue University
• Texas A&M University
• The University of Texas at Austin
• University of California, Santa Barbara
• University of Florida
• University of Iowa
• University of Massachusetts, Amherst
• University of Minnesota
• University of Missouri–Columbia
• University of Missouri–Kansas City
• University of Missouri–St. Louis
• University of Northern Iowa
• University of Wisconsin–Madison

Professionals, scientific, and
support staff with expertise in
• access management
• asset management
• concrete and asphalt pavements
• bridges and structures
• designs and specifications
• geographic information systems
• intelligent transportation systems
• laser scanning
• nondestructive evaluation
• policy and planning
• public transportation
• commercial vehicle operations
• remote sensing
• systems analysis
• traffic operations and safety
• weather, environment
• communications and publications
• outreach and training

Students
CTRE supports approximately 85 graduate
research assistants, interns, and hourly
student assistants.
RESOURCES

Facilities

With major support from outside sponsors, CTRE acquired two new labs in 2004–2005—the Mobile Concrete Lab and the Geotechnical Mobile Lab. Both labs facilitate on-site testing of plastic concrete and soils, respectively.

Along with its own facilities, CTRE has access to state-of-the-art laboratories and equipment at ISU and the Iowa DOT. By sharing physical space and support services, academic and technical expertise, and research facilities, CTRE’s programs foster synergy and creative ideas.

CTRE
- Computer Training Facility
- Geotechnical Mobile Lab
- GIS-Transportation Lab
- Mobile Concrete Testing Lab
- Remote Monitoring Lab
- Stanley Ring Memorial Library (LTAP)
- Videoconference Room

ISU
- Asphaltic Cement Concrete Lab
- Center for Nondestructive Evaluation
- Engineering Teaching and Research Complex
- Environmental Engineering Research Lab
- Gerald and Audrey Olson Soil Mechanics Lab
- Joseph C. and Elizabeth A. Anderlik Teaching Lab
- Livesay Structural Materials Testing Facility
- Materials Analysis and Research Lab
- Parks Library
- Portland Cement Concrete Pavement and Materials Research Laboratory
- Spangler Geotechnical Lab
- Structural Engineering Research Lab
- Synthetic Environments Lab
- Wallace W. and Julia B. Sanders Structures Lab

Iowa DOT
- State Transportation Library
- Midwest Transportation Knowledge Network
  Online Catalog
- Materials Laboratory

The PCC Lab acquired several new pieces of equipment in 2004–2005, including this freeze/thaw cabinet for use in a project on pervious concrete. The cabinet freezes and thaws concrete samples approximately 300 cycles per test to determine any damaging/destructive effects from freezing.
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