



- | | | | |
|---|--|----|--|
| 2 | Installing soil nails | 6 | Building accessible sidewalks |
| 3 | New resources train transit employees for emergencies | 7 | Precast concrete light pole bases |
| 3 | Online resources help agencies reduce deer-vehicle crashes | 7 | Iowa DOT paves US 30 shoulders with foamed asphalt |
| 4 | 2003 "roadeo" winners | 8 | Final MUTCD rule |
| 5 | Installing a reciprocating chute | 8 | Roundabouts training |
| 5 | "Build a Better Mousetrap" winners for 2003 | 8 | Improve worker safety in your shop |
| 6 | Shelby County crushes old concrete into aggregate | 9 | Transportation career fair for high school kids |
| | | 10 | New library acquisitions |
| | | 11 | Conference calendar |

Acronyms in this issue

AASHTO	American Association of State Highway and Transportation Officials
CTRE	Center for Transportation Research and Education
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

Soil nailing helps in a tight spot

BUILDING A RETAINING WALL close to busy streets and utilities can be a headache, especially when using conventional retaining wall construction methods, which require significant excavation. Soil nailing, a relatively new construction technique, reduces the amount of excavation for the wall because it uses top-down construction.

The wall is built in stair-stepped levels beginning at the top and working down. Nails (steel bars, the length measuring 60–80 percent of the wall height) are inserted into grouted holes drilled into the cut slope. The friction between the soil and the nail stabilizes the wall.

A soil nail wall was built for the first time in Iowa on a 63,000 square foot, two-tiered wall on I-235 in Des Moines.

Soil nailing isn't used only on retaining walls near highways and interstates, though. It should be considered any time construction has a limited right of way, such as when adding additional lanes underneath a bridge or working near a busy street close to utilities.

According to Curtis Monk, division bridge engineer with the Iowa Division of the FHWA, soil nailing competes with other cut slope methods, such as tie-back walls. Nationally, soil nailing costs \$29–40 per square foot, compared to tie-back walls at \$45–60 per square foot.

Along with reducing the cost of the project, soil nailing may reduce the following:

- noise and traffic obstruction from construction
- environmental impact on nearby properties
- manpower needed to complete the project

Soil nailing isn't appropriate for all projects, though. Sites must have cohesive and high shear strength soil, little groundwater, and good drainage, especially when building permanent structures in an environment with freezing and thawing cycles.

"If the site's conditions are right, consider soil nailing; it may save you time and money," says Monk.

For more information, check out the reference manuals on the FHWA website at www.fhwa.dot.gov/bridge/geopub.htm. Under "Reinforced Soil Structures," look for *Geotechnical Engineering Circular No. 7—Soil Nail Walls* and *Soil Nailing Field Inspectors Manual—Soil Nail Walls*. Or contact Curtis Monk, 515-233-7320, curtis.monk@fhwa.dot.gov.



Soil nails can help stabilize retaining walls.

Preparation of this newsletter was financed through LTAP, a nationwide effort financed jointly in Iowa by the FHWA and the Iowa DOT. Iowa's LTAP is housed and administered at ISU's Center for Transportation Research and Education (CTRE).

The mission of Iowa's LTAP:

To foster a safe, efficient, 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.

Subscriptions to *Technology News* are free. We welcome readers' comments, questions, and suggestions. To subscribe, or to obtain permission to reprint articles, contact the editor.

ISU Research Park
2901 S. Loop Drive, Ste. 3100
Ames, Iowa 50010-8632
Telephone: 515-294-8103
Fax: 515-294-0467
www.ctre.iastate.edu/

Stephen J. Andrie
Director of CTRE
andrie@iastate.edu

Duane Smith
Director of Iowa LTAP
desmith@iastate.edu

Marcia Brink
Editor
mbrink@iastate.edu

Tom McDonald
Safety Circuit Rider
tmcdonal@iastate.edu

Lori Wildeman
Program Coordinator
lwild@iastate.edu

Michele Regenold
Rebekah Bovenmyer
Brett Hansen
Contributing Writers

Any reference to a commercial organization or product in this newsletter is intended for informational purposes only and not as an endorsement. The opinions, findings, or recommendations expressed here do not necessarily reflect the views of LTAP sponsors. The materials herein are provided for general information, and neither LTAP nor its sponsors represent that these materials are adequate for the purposes of the user without appropriate expert advice. ISU makes no representations or warranties, express or implied, as to the accuracy of any information herein and disclaims liability for any inaccuracies.

Iowa State University and the Center for Transportation Research and Education provide equal opportunities and comply with requirements of the Americans with Disabilities Act in programs and employment. Call the Affirmative Action Office, 515-294-7612, to report discrimination.

Installing soil nails

Following is a general description of the soil nailing process. (Begin at the top of the wall and work down.)

1. Excavate a bench 4–6 feet high. Because soil can collapse after excavating the bench, excavate only as much as you can complete within the same work shift.
2. Drill holes (the number of holes and their distance apart depend on the site) measuring 6–8 inches in diameter in soil or 3–4 inches in rock, angled 15 degrees below the horizon.
3. Fill holes with ready-mixed grout soon after drilling.
4. Insert nails immediately after grouting. Nails should be equipped with centralizers and long enough to penetrate the excavation failure plane.
5. Install horizontal and vertical drain strips on the facing to control seepage and eliminate hydrostatic pressure buildup.
6. Cover face with reinforced steel.
7. Apply shotcrete (concrete applied with a hydraulic hose) to the face.
8. Fit steel plate and anchor nut on protruding nails before the shotcrete sets.
9. Repeat steps 1–8 through the height and length of wall.
10. Apply final facing.

For more detailed information, contact Curtis Monk, division bridge engineer with FHWA, Iowa Division, 515-233-7320, curtis.monk@fhwa.dot.gov.



Photos (including cover photo) courtesy of Curtis Monk, FHWA Iowa Division



New resources train transit employees for emergencies

TRANSIT SECURITY has changed since September 11, 2001. Are you and your employees ready for an emergency?

Two new resources from the National Transit Institute educate transit employees about system security:

- “System Security Awareness for Transit Employees” (CD-ROM) and
- “Warning Signs: System Security Awareness for Transit Employees” (video).

The interactive, 90-minute course on CD-ROM allows transit employees to learn at their individual pace. Employees follow specialized tracks within the course, based on their jobs: bus operations, bus maintenance, light rail, heavy rail, and transit facilities personnel. Topics include

- introducing system security
- reducing the organization’s vulnerability
- identifying suspicious activities, packages, and devices
- dispelling myths about anthrax and other substances
- prioritizing employees’ actions during an emergency

The 15-minute video trains transit employees to identify and respond to suspicious activities, packages, and devices.

Order forms for free copies of the CD-ROM and video are available through Jim Hogan, CTRE library coordinator, 515-294-9481, hoganj@iastate.edu.

Online order forms are available at www.nationline.com/documents/CD-ROM_order_form.pdf (for the CD-ROM) and at www.nationline.com/documents/Warning_Signs_order_form.pdf (for the video).

The video can also be borrowed from the CTRE library. •

Online resources help agencies reduce deer-vehicle crashes

ACCORDING to the Deer-Vehicle Crash Information Clearinghouse (DVCIC) in Madison, Wisconsin, 7,800 Iowans were involved in deer-related crashes in 2000, resulting in \$13 million in property damage, 600 injuries, and three deaths.

The Iowa Department of Public Safety (DPS) and the DVCIC have published online resources to help road agencies and drivers learn how to reduce these statistics.

Road agencies can help educate drivers by circulating a brochure DPS created as part of its “Don’t Veer for Deer” campaign. The brochure is available electronically in portable document format (.pdf) in color or black and white at www.dps.state.ia.us/deercrashes.

It warns drivers against losing control of the vehicle by swerving to avoid deer. “No one wants a deer to die, but striking the animal is often the safest action.”

Other safety tips include the following:

- Watch for deer near wooded areas and waterways, especially from dusk to dawn in the spring and fall
- Slow down in marked deer caution areas
- Remember that deer travel in groups

The DPS website also includes a map of Iowa with the number of crashes per county and will eventually include a map of each county showing where crashes occur.

The DVCIC site (www.deercrash.com) provides deer and vehicle crash prevention research, including current information about deer whistles, roadway lighting, and deer crossing signs. •

LTAP Advisory Board

The people listed below help guide and direct the policies and activities of Iowa’s Local Technical Assistance Program (LTAP). Contact any of the advisory board members to comment, make suggestions, or ask questions about any aspect of LTAP.

Saleem Baig
Local Systems, Iowa DOT
Telephone: 515-239-1051

Gary Fox
Traffic and Transportation Director
City of Des Moines
Telephone: 515-283-4973

John Goode
Monroe County Engineer
Telephone: 641-932-7123

Neil Guess
Howard R. Green Company
Telephone: 515-278-2913

Bret Hodne
City of West Des Moines
Telephone: 515-222-3475

Larry Jesse
Local Systems, Iowa DOT
Telephone: 515-239-1291

Wally Mook
Director of Public Works
City of Bettendorf
Telephone: 319-344-4128

Greg Parker
Cedar Rapids Engineer
Telephone: 319-286-5828

Bob Sperry
Story County Engineer
Telephone: 515-382-7355

Chris Whitaker
Transportation Planner
Region XII Council of
Governments
Telephone: 712-792-9914



Center for Transportation
Research and Education

2003 “roadeo” winners



Snowplow winners (from left): Kevin Decker, Bill Bauer, Matt Dolan, Del McDaniel, Greg Householder, and Mark Goins.



Motor grader winners (from left): Jamie Campbell, Chris Archer, Kevin Gibb, and Kip Dolder.

NEARLY 80 PEOPLE competed in the Iowa Snow Plow and Motor Grader Roadeo in Ames on September 11, 2003. Participants took a written exam and drove a snow plow truck or motor grader through the appropriate obstacle course.

Snow plow truck competition

Twenty-nine teams demonstrated their skill in the truck division. First- and second-place teams have won previously. The winners are listed below:

- Mark Goins and Greg Householder, City of Ankeny, won first place. Combined they have 38 years experience driving a snow plow.
- Matt Dolan and Del McDaniel, City of West Des Moines, placed second, with combined eight years of experience.
- Bill Bauer and Kevin Decker, City of Des Moines, placed third, with combined 11 years of experience.

Motor grader division

Twenty-one drivers competed in the motor grader division. The third-place driver has won previously. The winners are listed below:

- Jamie Campbell, Des Moines County, placed first, with four years of experience driving a motor grader.
- Kevin Gibb, Des Moines County, and Kip Dolder, City of Des Moines, tied for second.
- Chris Archer, Pocahontas County, placed third, with nine years of experience. •

Build a Better Mousetrap

Installing a reciprocating chute

Editor's Note: The "Reciprocating Chute" is the second in a series of several winning innovations from the "Better Mousetrap" competition at the Iowa Maintenance Training Expo in 2003. In each issue of Technology News we'll highlight one of the winners. For information about other winning "mousetraps," see CTRE's website: www.ctre.iastate.edu/ (see "Popular Links").

Lyle Haburn and Brian Cerny with the Iowa DOT in Spencer wanted snowplows to lay salt more evenly and prevent it from bouncing off the road during salting.

So, they connected a chute to a spinner motor on the back of a snowplow, allowing the chute to move back and forth (reciprocate). The operator controls the chute's direction from the truck cab, and rubber on the bottom of the chute allows it to drag directly on the road.

Haburn and Cerny installed the chute using stainless steel, a conveyor belt, hydraulic hoses, a hydraulic spinner motor, and miscellaneous hardware.

For more information about installing a reciprocating chute, contact Lyle Haburn, 712-336-2112. •



The stainless steel and rubber reciprocating chute spreads salt more evenly on the road.



Roger Vigdal explains how the reciprocating chute works.

NOTE: The Better Mousetraps submitted by Iowa DOT personnel have not been officially approved by the Iowa DOT and will undergo further testing and evaluation before being considered for statewide implementation.

"Build a Better Mousetrap" winners for 2003

CITY, COUNTY, AND STATE WORKERS submitted 11 innovations in the "Build a Better Mousetrap" competition on September 9, 2003, during the Iowa Maintenance Training Expo in Ames.

Six winners were selected, each receiving \$100.

Articles about winning "mousetraps" are being published in *Technology News* throughout the year:

- Heavy-duty wing wheel, maintenance crew, Iowa DOT—Elkader (see September–October 2003 issue)
- Reciprocating chute, Lyle Haburn and Brian Cerny, Iowa DOT—Spencer (see article on this page)

- Salt shed door, Dale Sexton, Iowa DOT—Cedar Rapids
- Sign trailer modification, Ed Black, Iowa DOT—Council Bluffs
- Portable stop sign trailer, Bob Sledge, City of Ankeny
- Telspar hand driver, Phil Brumm and Mark Mullenbach, Iowa DOT—Osage

Congratulations to the winners, and thanks to everyone who submitted entries. •

Shelby County crushes old concrete into aggregate

SHELBY COUNTY has recycled 6,500 tons of old concrete into aggregate, reducing its need for new limestone aggregate.

The process

The county hired a portable concrete crushing plant to crush accumulated road slabs, curbs, culvert pipe, sidewalks, and other miscellaneous concrete.

Concrete crushing plants vary in function, size, etc. The plant used by Shelby County had a 24 x 30-inch bin, which was filled by a loader; an excavator was used to break up large pieces before loading. During processing, the plant separated dirt from the concrete.

Many crushers can create different grades, or sizes, of aggregate. Large pieces can be recycled as stabilizing agent; smaller pieces can be used as road aggregate.

Shelby County has used crushed concrete as roadbed base aggregate. Dan Ahart, Shelby County engineer, says that the durability of the recycled concrete base is comparable to limestone and that he and his engineers are satisfied with its performance.

Lessons learned

Ahart says that he and his staff learned several lessons about crushing concrete into usable material:

1. Monitor input of the concrete into the crusher. Dirt and debris can clog the machine. The crushing company may even refuse to process concrete containing too much dirt and debris.
2. Remove concrete that may contain metal. Some culvert pipe, for example, has a metal mesh that helps it hold its shape. If used as aggregate, the exposed metal may puncture vehicle tires.
3. Select a crusher that fits your needs. Criteria may include bin size, gradation capability, and mobility.

Cost

At \$5.50 to \$6.50 a ton, recycled concrete can save more than two dollars per ton compared to new limestone. Limestone costs about \$7.50 per ton, plus transportation costs of 12–14 cents per mile.

For more information

Contact Dan Ahart, Shelby County engineer, 712-755-5954, dahart@shco.org.

Durability of the recycled concrete base is comparable to limestone.

Building accessible sidewalks

HAVE YOU EVER WALKED a mile in someone else's shoes? Or ridden in someone else's wheelchair?

City planners and engineers can design more accessible sidewalks after seeing the hazards of unsafe and inaccessible sidewalks through the eyes of a disabled pedestrian.

Now this is possible through a video created by the Access Board, a federal agency developing and enforcing accessibility guidelines—such as Section 508. The video, *Accessible Sidewalks: Design Issues for Pedestrians with Disabilities*, shows how people with disabilities experience different sidewalk and pedestrian crossing designs.

The 40-minute video is divided into four sections focusing on issues for pedestrians with different accessibility requirements, as follows:

- pedestrians who use wheelchairs
- pedestrians with ambulatory impairments
- pedestrians with low vision
- pedestrians who are blind

Each section explores the specific needs of that group. For example, the section dealing with accessibility for blind pedestrians discusses the importance of auditory crossing signals, while the section for those who use wheelchairs shows the importance of wide sidewalks and gradual slopes from the street to the sidewalk.

To check out the video, contact Jim Hogan, library coordinator, 515-294-9481, hoganj@iastate.edu. For more information about accessibility requirements, visit www.access-board.gov.

Iowa DOT paves US 30 shoulders with foamed asphalt

THE IOWA DOT is researching new applications for foamed-asphalt stabilizing agent, which cuts down on curing time for cold-in-place projects and uses less water than other stabilizing agents.

Foamed asphalt basics

Foamed asphalt is created when a small amount of cold water is injected into hot asphalt binder (approximately 300 degrees Fahrenheit). The water immediately turns into steam that creates air bubbles in the asphalt binder, or foam.

“The process is practically instantaneous,” says Mike Heitzman, Iowa DOT bituminous engineer.

The foam acts a stabilizing agent for other materials in the mixture like recycled asphalt.

Developed in Iowa in the fifties, foamed asphalt was set aside due to lack of practical production equipment. In the 1970s, however, a European firm refined Iowa’s idea and manufactured workable field equipment.

Since 2000, Iowa contractors have used the new technology to produce foamed-asphalt stabilizing agent for both cold-in-place and full-depth reclamation projects.

New application

In fall 2002, the Iowa DOT used foamed asphalt in full-depth-reclamation of highway shoulders west of Boone on US Highway 30.

Engineers decided to use foamed asphalt as a binding agent because other types of emulsion techniques would add too much water to already wet shoulder material, which could cause construction problems.

“We recognize that foamed asphalt is a viable alternative as a stabilizer and we can use it right now using current pavement rehabilitation strategies,” says Heitzman. “We are taking the foamed asphalt technology and looking for and improving on ways to use it.”

For more information

For questions about foamed asphalt, contact Mike Heitzman, Iowa DOT bituminous materials engineer, 515-239-1003, michael.heitzman@dot.state.ia.us. •

Precast concrete light pole bases

GREG BENEDICT, traffic control technician with Mason City, Iowa, has used precast concrete light pole bases for over a year and is pleased with the technology.

“I order a hole, and the base is up and running,” he says.

The bases come with a bolt cage and conduits for grounding, making installation quick and easy.

The specifications match those for poured bases. The precast bases, however, can be installed when weather prohibits pouring concrete.

For more information, visit www.iowabase.com. •

Photos courtesy of Michelle LaRue, Iowa Base, Inc.



Precast bases come ready with a bolt cage and grounding conduits for fast and easy installation.



**Modern Roundabouts
Workshops
February 3, 4, and 5, 2004
Comfort Suites
Ames, Iowa**

Roundabouts training

ROUNDABOUTS constructed today are different from those constructed 50 years ago. However, few people understand the advances made in roundabout design.

The FHWA and Iowa DOT are sponsoring three free, one-day workshops to introduce state DOT and city and county engineers to modern roundabouts.

Fred Ranck, safety engineer with the FHWA Resource Center, Safety and Design Team, will conduct the workshop, with sessions on policy considerations, planning a roundabout, using a roundabout, safety, geometric design, traffic design and landscaping, and systems considerations.

Contact Jerry Roche, jerry.roche@fhwa.dot.gov, for more information. •

Final MUTCD rule

WITH OVER 1,000 CHANGES from the 2000 (millennium) edition, the FHWA has published the final rule for the 2003 edition of the MUTCD. Updates include the following:

- recommendations for worker and flagger apparel
- guidance for accommodating pedestrians with disabilities
- rules about temporary traffic control for incident management activities

Copies of the MUTCD can be obtained from AASHTO, the American Traffic Safety Services Association, or the Institute of Transportation Engineers.

Online copies of the 2003 edition are available at <http://mutcd.fhwa.dot.gov>.

Look for information about training events related to the 2003 edition in future issues of this newsletter. •

Improve worker safety in your shop

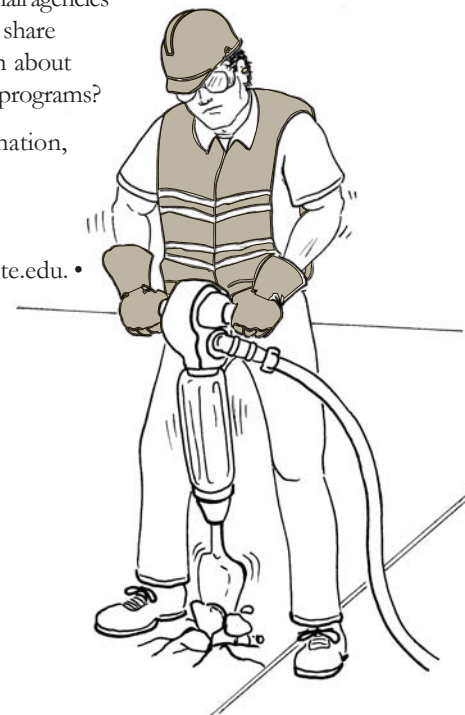
FIFTY WORKERS are injured on the job every minute of a 40-hour work week; 17 die every day. The Worker Safety Coordinators Conference, held in Ames on December 4, provided information to help safety coordinators protect their co-workers. They learned about employee safety programs, regulations, and resources and met and exchanged ideas with other safety-focused staff from Iowa agencies.

The following questions were addressed:

- How does an agency develop a safety program?
- What is the main responsibility of a safety coordinator and safety committee?
- What should be included in a safety policy?
- What are the major features of, and barriers to, an effective safety program?

- What resources and assistance are available for safety coordinators?
- How can small agencies continue to share information about their safety programs?

For more information, contact Tom McDonald, 515-294-6384, tmcdonal@iastate.edu. •



Transportation career fair for high school kids

WHAT DO KIDS know about transportation? Not much.

In fact, maintaining and developing the transportation infrastructure can be an invisible function to young people. Because of this, recruiting high school students into professional and technical careers in civil engineering and transportation can be challenging.

Iowa State University (through CTRE) and Des Moines Area Community College (DMACC) hope to change that.

On February 25, 2004, they will host "Moving Toward Your Future: Careers in Transportation," a career fair for central Iowa high school students.

The fair will be held at Iowa State University.

About the career fair

A planning committee of Iowa professionals in transportation and education has developed a program to appeal to a wide variety of students. As students participate in sessions throughout the day, they'll learn the basic construction process of planning, design, construction, and maintenance.

Although this formal process will be the backbone of the fair, the 16 informal session topics are designed to attract students' attention. A few of the topics include

- road kill clean up, brush control, roadside management
- environmental impact, historic sites, and endangered species vs. economic development
- automated snow and ice control
- art and architectural details on the I-235 project in Des Moines

Sponsors

The career fair, including a box lunch, will be free to students and their chaperones.

Event planners and presenters are donating their time. To help cover costs of space, meal, student transportation, and marketing, several public and private agencies have committed or already donated funds:

- Associated General Contractors
- Asphalt Paving Association of Iowa
- CH2M Hill
- Des Moines Area Community College
- Federal Highway Administration
- Geotechnical Services, Inc.
- Howard R. Green
- Iowa Chapter, APWA
- Iowa DOT
- Iowa Limestone Association
- Land Surveying Society of Iowa
- Martin Marietta
- Midwest Transportation Consortium (Iowa State University)

Can you help?

The planning committee still needs presenters. Additional sponsors are also welcome. Sponsors will receive special recognition at the fair and in marketing materials; they can also host informational booths during the fair. Sponsors typically donate \$150–1,000.

For more information, contact Deb Witt, project coordinator, dewitt@iastate.edu, 515-294-8958. •

Moving Toward Your Future: Careers in Transportation
February 25, 2004
Iowa State University
Ames, Iowa

Recruiting high school students into professional and technical careers in transportation can be challenging.



During the 2003 pilot career fair, CTRE and DMACC staff visited two area schools. This demo was at North High School in Des Moines.