TECHNOLOGY NEWS
roads / bridges / transit
Transportation technology transfer for Iowa's local governments

April 1996

3 Reclaimed fly ash being tested as highway base material
4 Metrication news
5 New technology for bridge inspections
6 Safety shorts: Safety is no accident!
6 Meet Safety Circuit Rider Ed Bigelow
8 From pyramids to pavement management
8 Iowa's Pavement Management Program: an update
10 Tip from the field: City crew likes concrete saw rack
11 Library materials
12 Conference calendar

Excavation season begins: Protect your workers!

By Jack L. Mickle, Excavation Safety Consultant, Professor Emeritus of Civil Engineering, ISU

LAST SUMMER two young Iowans were killed when a deep trench caved in on them while they were installing a sewer line. A third young man escaped without serious injury. This tragic "incident" is one of many that happens at excavation sites across the country every year. The term "incident" is preferred over "accident"; incident may seem to trivialize, but an accident is "a happening that is not expected, foreseen, or intended."

Cave-ins are certainly not intended, but most can be foreseen and expected when worker protection systems are neglected. According to a report on the incident, no measures such as a shoring system, as prescribed by state law, or sloping the walls were used to protect the employees from a cave-in. Also, the potential hazards of such excavations had not been explained to the employees.

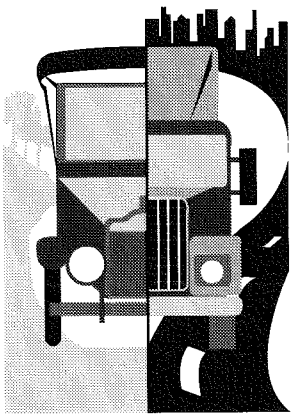
. . . continued on page 2

May conference to focus on local and national transportation research

Highway maintenance, traffic safety features, pavement and bridge design, transportation planning, and many other topics will be discussed by researchers at this unique event hosted by the Iowa Department of Transportation and Iowa State University.

IT'S NOT TOO LATE to register for the Semisesquicentennial Transportation Conference celebrating the 75th anniversary of the Transportation Research Board.

The conference will be held May 13 and 14 at ISU's Scheman Building, Ames, Iowa.



Nearly 60 presentations in concurrent sessions will highlight the state of the art in transportation research by respected professionals from around the country.

Robert E. Skinner, Jr., executive director of the Transportation Research Board, will open the conference.

A special presentation by ISU's R. Douglas Hurt, professor of agricultural history and rural studies, will highlight Iowa's historical role in developing local and national transportation research agendas. And a unique "Semisesquicentennial Award for Transportation Excellence" will be presented to individuals who have have made significant lifelong contributions to the improvement of transportation or whose research has substantially advanced transportation.

Distinguished guest speakers include Frank Francois, executive director of the American Association of State Highway and Transportation Officials; Damian Kulash, president and CEO of the Eno Foundation; and Thomas Larson, former administrator of the Federal Highway Administration.

For more information about the conference and/or the evening awards banquet, contact Tom Maze or Sharon Prochnow at CTRE, (telephone) 515-294-8103; (fax) 515-294-0467; (Tom's e-mail) tom@ctre.iastate.edu; (Sharon's e-mail) sharon@ctre.iastate.edu.

Registration deadline is May 6. For registration information, contact Connie Middleton, (voice) 515-294-6229; (fax) 515-294-6223. ■

The preparation of this newsletter was financed through the Local Technical Assistance Program (LTAP). LTAP is a nationwide effort financed jointly in Iowa by the Federal Highway Administration and the Iowa Department of Transportation. Its purpose is to translate into understandable terms the latest state-of-the-art technologies in the areas of roads, bridges, and public transportation.

Subscriptions to **TECHNOLOGY NEWS** are free, and we welcome your comments, questions, and suggestions. To subscribe, or to obtain permission to reprint articles, contact the editor at the address below.

Center for Transportation Research and Education
2625 N. Loop Drive, Suite 2100
Ames, Iowa 50010-8615
Telephone: 515-294-8103
Fax: 515-294-0467
BBS: 515-294-9784

Tom Maze
Director
(e-mail: tom@ctre.iastate.edu)

Jan Graham
Assistant to the Director
(e-mail: jan@ctre.iastate.edu)

Duane Smith
Associate Director for Outreach
(e-mail: desmith@iastate.edu)

Marcia Brink
Editor
(e-mail: x1brink@iastate.edu)

Ed Bigelow
Safety Circuit Rider
(e-mail: ed@ctre.iastate.edu)

Sharon Prochnow
Program Coordinator
(e-mail: sharon@ctre.iastate.edu)

Stan Ring
Library Coordinator
(e-mail: stan@ctre.iastate.edu)

Diane Love
Account Clerk
(e-mail: diane@ctre.iastate.edu)

Margaret Hammer
Secretary
(e-mail:margaret@ctre.iastate.edu)

TECHNOLOGY NEWS nameplate and graphic elements were designed by Jennifer J. Reed.

Printed on Recycled Paper

EXCAVATION . . . ***continued from cover page***

Official statistics, which are tragically flawed, state about 100 persons die in cave-ins every year. A more realistic count would be two to four times that number, with serious injuries an order of magnitude larger.

The construction season is underway and summer means more jobs in the industry. Many young people will find employment in construction. Unfortunately, accidents will increase as well. Construction is the most dangerous activity in the work force. Excavating, which includes trenching, is one of the most dangerous activities in construction.

It has been shown that with individuals starting new jobs, 40 percent of the injuries and illnesses they will suffer will occur during their first year of employment, and one-half of those afflictions will occur during their first three months of employment. New employees are unfamiliar with the job, may not be aware of the hazards, and will often take chances that more seasoned employees avoid. New employees are eager to please and often more susceptible to mishap.

Public Law 91-596, 91st Congress, S. 2193, December 29, 1970 established the "Occupational Safety and Health Act of 1970." The OSHA Act states:

> Sec. 5.
> (a) Each employer
> (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
> (2) shall comply with occupational safety and health standards promulgated under this Act.
> (b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

Subpart C, 1926.21, Safety Training and Education states in (b) (2): "The employer shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury."

The regulations governing excavating and trenching are found in Part 1926, Subpart P–Excavations.

The basic premise of Subpart P is that every worker in an excavation will be protected by a system designed by a registered (licensed) professional engineer. In the vast majority of cases, the worker protection system is selected by a competent person from pre-designed solutions found in the appendices of Subpart P or in tabulated data furnished by manufacturers of worker protection devices. OSHA will recognize the license of an engineer registered in any state provided that the worker protection device he or she designs is marketed in interstate commerce. Only when conditions are unique and pre-designed systems cannot be utilized will an engineer be called upon to design a special worker protection system. In this case the design must be made by an engineer licensed in the state where the work is to be performed.

The competent person who selects the pre-design must first classify the soil and the environment. The competent person is defined as "one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them."

Regulations may seem burdensome at times, but they exist for a very good reason. Every worker has the right to return home safe and sound each day after work. Subpart P is an easily understood standard written to be complied with by the contractor and competent person and to be enforced by conscience and the compliance officer.

Two young Iowans are dead and their families and co-workers have suffered immensely; such tragedies must not be repeated. ■

Editor's note: A version of this article appears in the April 1996 issue of the Iowa Section ASCE Newsletter.

Reclaimed fly ash being tested as highway base material

By Josh Murphy, Editorial Assistant

An Iowa State University study indicates that high calcium fly ash, waste products of power plants, may have potential use in highway base materials.

FLY ASH IS RESIDUE produced from the combustion of coal at coal-fired electric generating plants. According to Ken Bergeson, associate professor of civil and construction engineering at Iowa State University, reclaimed fly ash is a valuable resource that may substitute for existing aggregates, such as crushed limestone or gravel, as a highway base material.

Bergeson and his colleagues are monitoring the performance of two Iowa roadway sections in which reclaimed fly ash was used as the base material.

In the past, fly ash that is not sold (approximately 70 percent) has been disposed of in sanitary landfills. Recently, part of this ash is being placed in monofills at utility sluice pond sites. The process involves spreading, watering, and compacting the ash in lifts and allowing it to harden. After hardening, the ash is reclaimed using conventional equipment to produce an artificial aggregate.

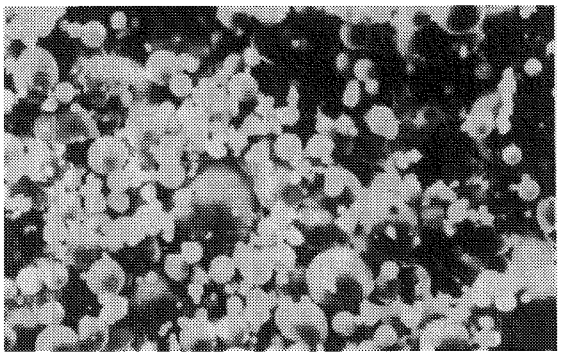
Reclaimed fly ash may make a good road base material because it is a pozzolan—a siliceous material which, in the presence of water, combines with lime and produces a cementitious material.

One reason for using reclaimed fly ash as a highway base material is that our supply of crushed limestone and gravel is limited. Fly ash is a waste product that is continually produced. According to the United States Department of Transportation pamphlet "Fly Ash Facts for Highway Engineers," coal-fired electric generating plants produce 51.3 million tons of fly ash annually.

As a waste product, fly ash's cost per ton is approximately half the cost of natural aggregates.

Another reason is that any fly ash not stored at sluice pond sites is dumped in landfills. As space in landfills continues to be depleted, the cost of disposal will increase.

Reclaimed fly ash aggregates used for Bergeson's study were obtained from the sluice pond disposal site at the Council Bluffs Unit # 3 power plant. The material is a Class C fly ash, which means that it is cementitious—if water is added to it, it cements. This particular fly ash is disposed of by direct dumping into a pond where it hardens without further alteration.



(x 3000)

Fly ash particles are composed of glass with some crystalline matter and carbon. Varying amounts of lime are also present. Class C ash (from subbituminous and lignite coal) contain the most lime.

Bergeson and his colleagues conducted Los Angeles abrasion and freeze-thaw soundness tests on a reclaimed fly ash sample. These tests are typically used to evaluate the quality of crushed stone. The results indicated that reclaimed fly ash in its raw form is similar to low quality crushed stone, although it is not quite strong enough alone to act as a highway base material.

However, test results did suggest that the material may contain a very open pore system. An open pore system allows water to move into and out of the material. When water is allowed to move in this manner, it usually possesses high freeze-thaw durability. High freeze-thaw durability, high strength, and high frictional characteristics indicate good base materials.

To evaluate fly ash strength development characteristics, Bergeson and his colleagues conducted compressive strength and freeze-thaw durability tests on samples treated with various percentages of portland cement kiln dust and free water. Cement kiln dust is a material rich in calcium which reacts pozzolanically with the aggregate particles' surface and creates a cementing agent.

The researchers concluded that the treated samples

. . . continued on page 4

FLY ASH . . . continued from page 3

This article is adapted from Reclaimed High Calcium Fly Ash Use As A Highway Base Material *by K.L. Bergeson, R.K. Lapke, and D.R. Overmohle.*

developed significant strength characteristics as the level of cement kiln dust added increased.

According to Bergeson, these results indicate that cement kiln dust may function as a strong pozzolanic activator and may produce additional cementitious reaction products. This means that reclaimed fly ash treated with cement kiln dust gains long-term strength and the ability to heal or re-cement itself across cracks if moisture is present.

Therefore, the researchers believe that reclaimed fly ash treated with cement kiln dust or another pozzolanic activator, such as atmospheric fluidized bed combustion residue, may potentially be used as an aggregate in highway base materials.

To test these results, Bergeson and his colleagues conducted two field tests using treated reclaimed fly ash in actual roads. One of these is a 1,700-foot access road to a power plant in Marshalltown, Iowa, constructed in 1994. The other is an access road for the Ottumwa-Midland Landfill in Ottumwa, Iowa, constructed in 1995. Both field tests used 100 percent waste byproducts—reclaimed fly ash with pozzolanic activators added. The test roads are owned by IES Utilities.

For several years, the researchers will regularly examine cores extracted from the roads to monitor the performance of the base material. To date, Bergeson says the roads are performing well and show no significant signs of distress.

Bergeson adds that the performance of these roads is a crucial factor in widespread use of reclaimed fly ash. Currently, the Iowa DOT does not consider reclaimed fly ash to be an acceptable base material. However, Bergeson's studies and private sector use may illustrate reclaimed fly ash's viability as an aggregate base material.

Ken Bergeson has studied fly ash for several years. Other studies illustrate that fly ash can be used for cement and concrete products, structural fills and embankments, filler in asphalt mixes, and grouting. If you would like to learn more about fly ash and its uses, contact Bergeson at the Department of Civil and Construction Engineering, Iowa State University, 515-294-9470. ■

Researchers extract core samples from the Ottumwa-Midland Landfill access road to test the performance of reclaimed fly ash.

Metrication news

ALTHOUGH THE DEADLINE for converting highway design standards and specifications has generally been postponed until the year 2000, 40 state departments of transportation, including the Iowa DOT, are scheduled to implement full metric conversion by October 1996. If you have questions about the status of Iowa's conversion or any other issue involving preparing to do business in a metric environment, AASHTO's Metrication Clearinghouse can help.

The clearinghouse acts as a referral service for local governments, consulting engineers, state DOT metric coordinators, private firms contracted by state DOTs to provide metrication services, and others. Working closely with the 50 state DOTs, the clearinghouse gathers, organizes, and shares up-to-date information with the transportation community.

The clearinghouse's free services include a newsletter, files posted on the WorldWide Web, and a customer support desk. Customer support staff have access to databases of current information about transportation-related metric issues, metrication publications, metric standards, conferences, and contracts.

For more information contact Anne Menefee, clearinghouse coordinator, 409-845-5770; (fax) 409-845-9848; (e-mail) amenefee@tamu.edu; (WWW) http://tti.tamu.edu/metric. ■

New technology for bridge inspections

By Michele Regenold, Editorial Assistant

WITH OVER 12,000 substandard bridges in Iowa vying annually for limited state transportation funds, how can budget concerns be eased? Since bridge inspections are almost entirely visual, detecting problems in bridges before visible signs of deterioration appear may be one answer.

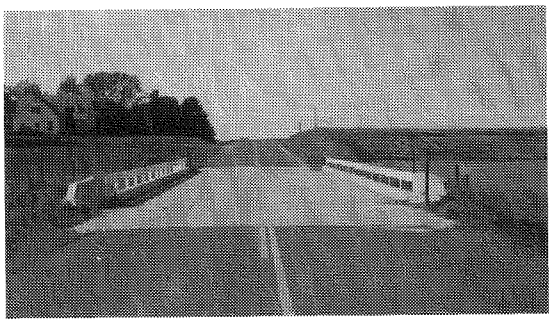
Steven Chase, research structural engineer at the Federal Highway Administration (FHWA), is conducting research on nondestructive evaluation (NDE) for bridges. NDE involves new ways for assessing the condition of bridges before visible signs of deterioration might be noticed. According to Chase, NDE for bridges research is "developing technologies to quickly, efficiently, and quantitatively measure global bridge parameters such as stiffness and load carrying capacity."

In Chase's article "NDE Sensor Research at the FHWA, an Overview," he writes that the FHWA's first priority in its NDE for bridges research is developing technologies to detect problems on steel bridges and concrete bridge decks. A backpack computer with a heads-up display and one-handed operation is currently in development for detecting fatigue cracks. This instrument will combine ultrasonic and magnetic inspection capabilities and is one of the closest to being ready for commercial use.

One of the projects being developed for concrete bridge decks is technology originally used in mine detection. A dual-band infrared imaging system will scan a bridge deck with two different infrared wavelengths simultaneously. Combined with advanced image analysis techniques, this method of scanning shows significant improvement over traditional infrared scanning. A prototype delivered this spring will be thoroughly evaluated under field conditions.

Another bridge deck inspection tool is a ground-penetrating radar imaging system. It will show three-dimensional images of the interior of an entire lane on an asphalt-covered bridge deck. This system can be driven across the bridge deck at traffic speeds and it will quantify distress. A prototype should be ready this summer.

Future NDE projects include a telerobotic system for visual inspections of steel bridges; it will go where no man wants to go, either because the location is too hard to reach or the traffic disruption and expense would be too great. According to Chase, similar systems have been used by the power industry.



Bridges that appear to be in excellent condition may have problems that can be detected by nondestructive evaluation technologies.

Photo courtesy of Story County engineer's office.

Other NDE technologies that may be adapted for bridges include laser holographic systems used on aircraft skin inspections. Thermoelastic heating is another possibility for its ability to locate tiny temperature differences in fatigue cracks undergoing cyclic loading.

Is this new technology going to completely change how inspections are conducted? No. According to Chase, it "won't replace visual inspection as the main inspection tool." In fact, Chase says the research team has been working with a group of states to make sure the technology is a solution to actual problems.

Will the technology be usable by ordinary human beings? Naturally there will be training involved in learning how to use these new instruments. However, Chase says the technologies are being developed so "typical highway engineers and technicians can use them."

Since none of these instruments has been commercially produced yet, it is difficult to make accurate cost projections. Chase foresees costs varying from the thousands of dollars to the hundred thousands. Even though that sounds expensive, next to the cost of major construction on just one bridge, it may be money well spent. Since few cities and counties have enough bridges to warrant such purchases, hiring consultants to do technological inspections may be a better way to spend some transportation funds.

Although it may be several years before NDE technology for bridges is implemented at the county or city level, it is on its way. With over 26,000 bridges in Iowa, approximately 21,600 of them locally owned, tight budgets will necessitate finding more cost-effective ways to maintain these bridges. ■

safety shorts

Safety is no accident!

By Ed Bigelow, Safety Circuit Rider

PREPARING a comprehensive safety program for a city street department or county road department takes a lot of planning. Each government unit is unique, and local safety officers have to adapt, modify, and adjust standard policies to fit the local situation.

Traffic safety

Traffic safety is an essential part of any transportation agency's comprehensive safety program. Effective traffic safety programs protect both road workers and the traveling public and also protect transportation agencies from tort liability suits.

Three items to emphasize include the following:

(1) **Work zone traffic control.** Training road workers is essential. Every street or road department employee needs to know how to set up traffic control for roadway maintenance and construction and how to flag traffic correctly.

Every road employee should be trained annually in traffic safety for work zones.

(2) **Traffic sign management, including inspection, analysis, and replacement.** The plan should provide for annual day and night inspection of traffic signs, analysis to see if signs serve their purpose while complying with the Manual on Uniform Traffic Control Devices, and replacement of worn or damaged signs in a timely manner.

(3) **Traffic accident records and analysis.** The plan should provide for timely inspection of roadways where traffic accidents have occurred and for prompt repair of any damages to the roadway system or traffic signs.

The plan should also provide for an annual analysis of traffic accidents for the local jurisdiction, with action determined for high-rate-of-accident locations.

The Center for Transportation Research and Education provides training to local governments in work zone traffic control, sign management pro-

. . . continued on page 7

Meet Safety Circuit Rider Ed Bigelow

Ed Bigelow

With this issue, we introduce "Safety Shorts" (see article this page), nuggets of safety information for Iowa's town and county road departments by our Safety Circuit Rider, Ed Bigelow. If you haven't met Ed, you're missing a real treat. If you haven't attended one of his workshops, you're missing a great learning experience.

IT'S NOT EASY to catch Ed Bigelow in his office. More often than not, CTRE's dedicated Safety Circuit Rider is out on his Iowa beat delivering invaluable safety information to Iowa's city and county road department employees.

Bigelow is a familiar face across Iowa. He personally presents close to 60 safety workshops each year to more than 1,000 Iowa transportation personnel, usually right where they work—in meeting rooms, garages, and shops—and plans and organizes many others. Bigelow has presented workshops in every county in Iowa and several in Nebraska. He also participates on many safety-related committees and organizations, like Iowa's Strategic Planning Project (StraPP) Committee on Information Systems for Highway Safety and the Iowa Traffic Control and Safety Association (ITCSA).

The core of the Safety Circuit Rider program is three workshops funded by the Federal Highway Administration and the Iowa Department of Transportation: a Professional Flagging workshop, which is part of the Work Zone Safety Program; an Accident Location and Analysis (ALAS) workshop,

. . . continued on page 7

SAFETY . . . continued from page 6

grams, and traffic accident records and analysis. For more information or to schedule a workshop, contact Ed Bigelow, Safety Circuit Rider, 515-294-8103.

Workplace safety

Another key element of a comprehensive safety program is workplace safety. Local transportation agencies need to provide safe work environments for their employees and comply with OSHA regulations.

An informal consortium of safety-related organizations across Iowa is teaming up to provide five one-day seminars devoted to making Iowa's public sector workplaces safer. These seminars, developed for safety coordinators from cities, counties, and other government agencies, will provide an intensive introduction to safety principles and resources in Iowa.

The seminar series is sponsored by the following organizations:

- Iowa Association of Municipal Utilities
- Iowa Association of Regional Councils
- Iowa Department of Economic Development
- Iowa Department of Labor (Occupational Safety and Health Consulting)
- Iowa League of Cities
- Iowa Municipal Workers Compensation Association
- Iowa Rural Development Council
- Iowa State University Extension (Fire Service Institute).

Following are tentative dates and locations for these seminars:

Wednesday, May 29, 1996	Mt. Pleasant
Thursday, May 30, 1996	Readlyn
Tuesday, June 4, 1996	Spencer
Wednesday, June 5, 1996	Atlantic
Thursday, June 6, 1996	Ankeny

For more information about the seminars, contact Shashi Patel, Director, Bureau of Consultation and Education, Iowa Department of Labor, 1000 E. Grand Avenue, Des Moines, IA 50319, 515-281-5352.

BIGELOW . . . continued from page 6

which uses state-managed accident records to identify problems and plan safety improvements; and a Sign Inventory and Analysis workshop.

Bigelow also provides programs on safety management systems, excavation safety, construction inspection, pavement markings, county engineers' safety policies, and many more. He instigated CTRE's popular motor grader operator training program as well as roadside design workshops.

Before joining CTRE in 1989, Bigelow worked as a county engineer, a city engineer, and a consulting engineer. He has a clear vision for the Safety Circuit Rider program.

"My job is to pass on information about transportation safety to city and county employees as effectively as I can."

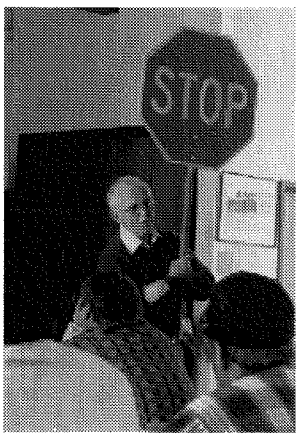
Bigelow's dedication and effectiveness have not gone unrecognized. He has been awarded the FHWA's Best Overall Safety Program Award for his Safety Circuit Rider program and has received numerous accolades and expressions of appreciation from the transportation community.

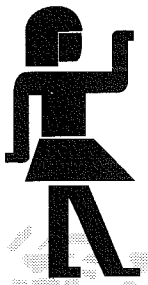
Bigelow says he's never found anyone in the road maintenance industry who doesn't want to do a good job, and he's proud of Iowa's road workers.

"In the long run, it's the people you've worked with over the years that you remember. They really stick with you."

The people he's worked with feel the same way about Bigelow.

"You can always ask Ed for help," says John Goode, Monroe County engineer. "I don't think 'no' is in his vocabulary." ■





From pyramids to pavement management

FORTY-SIX HUNDRED YEARS ago, give or take a few years, some clever Egyptians piled flagstones along a 13-kilometer route from a basalt quarry to waterways near the Nile River, and the first "paved" road was born. Even as they celebrated their engineering triumph over their neighbors to the north (the Romans, after all, didn't pave their roads for at least another 500 years), the ancient Egyptian road builders may have faced a new challenge: shifting flagstones.

Nearly five millenia later, roadway maintenance remains one of the most complex challenges facing transportation agencies. Pavement management decisions, like how and when to repair aging roadways and how and when to reconstruct them, are made by agencies with fewer real dollars to spend. Traditional, often subjective, approaches to pavement management (like repairing or rebuilding the "worst" roads first) are not necessarily the most cost-effective approaches—or the ones that will help agencies compete effectively for limited funds.

Transportation agencies need a defensible system for making decisions regarding the type and timing of pavement maintenance, rehabilitation, and reconstruction—a system that can help them determine and prioritize needed road work and determine how much money is required to do that work. More realistically, they need a system that helps them reconcile needed road work with the number of dollars actually available.

A good pavement management program performs those functions, helping agencies make smart decisions regarding both individual roadway projects (project-level pavement management) and a network of roadways (network-level pavement management). Such a program combines a database of history and condition information about roadways with analysis software.

The pavement management program being implemented by the Iowa Department of Transportation for Iowa's federal-aid-eligible, non-National Highway System roadways will support participating local governments at the project level while helping regional planners make decisions at the network level.

The following article by Omar Smadi outlines the current status of Iowa's pavement management program. Smadi, pavement management specialist at CTRE, provides support to a task force of city, county, and regional transportation representatives and Iowa DOT staff who have developed and are now implementing Iowa's pavement management program.

If your decision-making tools are as old as the pyramids, read on. Iowa's pavement management program could help you get your roads and streets in shape for the 21st century. ■

Iowa's Pavement Management Program: an update

By Omar Smadi, Pavement Management Specialist

This is the fourth in a series of periodic articles updating local governmental agencies on the progress of Iowa's pavement management program for federal-aid-eligible, non-National Highway System (non-NHS) roads.

IOWA'S STATEWIDE pavement management system has gone through some changes since the June 1995 update in *Technology News*. Most obvious is the name change to Iowa's pavement management program (IPMP). The new name reflects a major shift in emphasis from a statewide system in which all transportation agencies must participate to a voluntary program in which local agencies may choose to participate. This shift was precipitated by the National Highway System Designation Act of 1995, which generally made optional those management systems previously mandated by the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA).

Freed from ISTEA's mandate to implement a statewide pavement management system according to a federal time line, the Iowa Department of Transportation Management Policy Committee has elected to continue to develop and implement the IPMP, but with a new focus on local transportation agencies. The IPMP task force (a committee of Iowa DOT staff and local and regional transportation representatives) has revised the mission and objectives of the project to reflect these changes.

. . . continued on page 9

PAVEMENT . . . continued from page 8

Mission

To support the management, planning, and programming needs of transportation agencies in Iowa, the IPMP mission is twofold: First, help participating local agencies make informed project-level decisions regarding pavement design, construction, and maintenance. Second, support the development of transportation improvement programs (TIPs) at the local, regional, and Iowa DOT levels. The IPMP will fulfill this mission by providing pavement management information, data analysis tools and training, and other technical support.

Project-level analyses will be the responsibility of local highway operating agencies. Network-level analyses will be the responsibility of regional planning agencies and the Iowa DOT. The Iowa DOT is committed to using the IPMP as an invaluable decision-making tool for the state non-NHS network. Local and regional agencies and representatives have the option to use this valuable tool.

Current status

The IPMP has entered the second part of the implementation phase, scheduled to be completed in September 1997 and consisting of five major tasks. Due to changes in the program mission and objectives, the deadline for selecting pavement analysis software, originally scheduled to be completed in 1995, has been extended to 1996.

Following is a brief description of ongoing and future tasks:

Collection of pavement condition (distress) data. In 1995 roadway inventory and history data were collected from all Iowa jurisdictions (including cities with 5,000 or more population and all counties), and surveys requesting updated 1995 construction information were sent to these jurisdictions in January 1996.

The task force has selected ROADWARE Corporation as the vendor for the automated collection of pavement condition data (distress data). These data include information about cracks, potholes, patches, rutting, and ride. ROADWARE will begin collecting distress information in May 1996. The task force anticipates that condition data for half the state system and a third of the local system will be collected by the end of 1996.

Design of the database. The basic design of the database has been completed. By the end of the first quarter of 1996, a full operating demonstration of the data for an entire region was completed based on actual inventory/history data for the region and simulated distress data. Regional Planning Agency 10 (East Central Iowa Council of Governments) has been selected for the demo.

After the demo is finished and any needed refinements have been made to the database design, complete population of the database will start.

Mechanism for data exchange. One of the primary benefits of the IPMP is to give government jurisdictions access to pavement management data necessary for making decisions regarding pavement maintenance, rehabilitation, and reconstruction. This task involves data exchange between the managers of the IPMP and all the different jurisdictions responsible for the management of Iowa's federal-aid-eligible, non-NHS highways, including the Iowa DOT.

Data will flow both from the IPMP to highway agencies and from highway agencies to the IPMP. Data provided to highway agencies will include pavement condition information for individual pavement management sections, raw pavement distress data from the automated distress collection equipment, and inventory and history information.

Pavement data transmitted from highway agencies to the IPMP will include maintenance and rehabilitation updates, as well as changes to, removal of, and/or changes in location of pavement management sections. Changes affecting the base record information (i.e., the original pavement inventory and history information) will also be transmitted to the IPMP for modification of the base records.

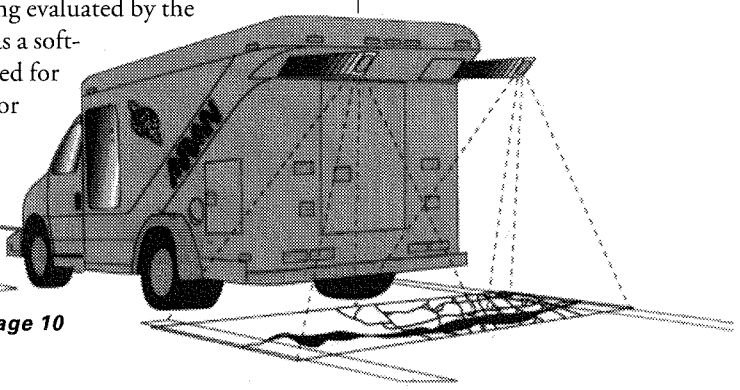
The IPMP task force is considering both paper and online mechanisms for exchanging these data.

Selection and calibration of pavement management analysis tools. Possible softwares for data analyses are still being evaluated by the task force. As soon as a software has been selected for the IPMP, models for predicting performance, selecting treatment, and allocating resources

. . . continued on page 10

Omar Smadi, Pavement Management Specialist

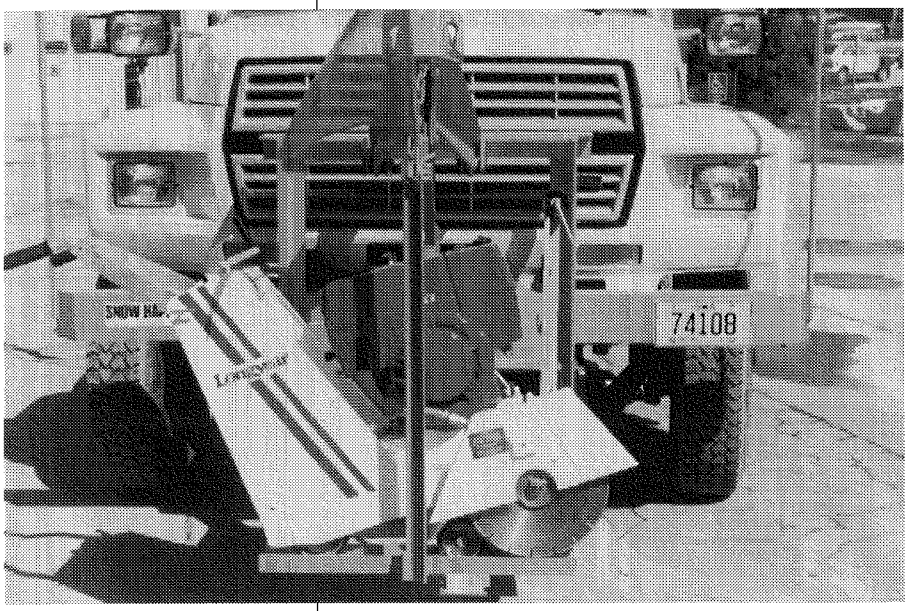
The vehicle for collecting roadway distress data is equipped with technologies for recording information about cracks, potholes, patches, rutting, and ride.



tip from the field

City crew likes concrete saw rack

TO DEAL with water main breaks and many other street-related problems, city crews often have to cut into concrete curbs or other portions of the pavement. A concrete saw makes this a routine task, but transporting the saw to the work site can be a hassle.



Front view shows the saw rack lifted off the ground for transporting.

Willard Wray, director of public works for the City of Clive, and his crew have designed a saw rack that greatly simplifies the task of transporting a concrete saw.

Mounted on the snow plow frame on the front of a truck, the rack can be moved up and down with the hydraulic plow lift. Simply lower the rack to load or unload the saw, and raise the rack during transport. A pin locks the saw in place.

Made from about 150 pounds of scrap iron, the rack is inexpensive (about $45 plus labor) and environmentally friendly.

Wray says city crews will have to adapt the design of the rack for different types of saws.

For more information on the design and/or construction of the saw rack, contact Wray, 515-223-6230. ■

PAVEMENT MANAGEMENT . . . ***continued from page 9***

optimally will be developed to fit the needs of highway agencies. Each highway agency will be responsible for its own highway network and will conduct its individual project selection and resource allocation.

Initial testing and evaluation. After the pavement management analysis tools have been completely calibrated and implemented, the IPMP will be tested on sample pavement management sections and then on a full-scale network (anticipated by the end of 1997).

Pavement managers from jurisdictions throughout Iowa will be asked to review the results of the program and critique the models. Testing and evaluation will be an ongoing process to ensure that the analysis tools used in the IPMP will fit the needs of highway agencies participating in the program.

Time line for local agencies
Although the IPMP will not be fully operational until late 1997, the implementation schedule allows for roadway condition data to be available to some local agencies later in 1996 to help them with their project-level decision making. A general time line follows:

September 30, 1996
Condition data will have been collected for half the state highways and one-third of Iowa's local roadways.

Early October 1996
Raw condition data for those pavement management sections for which distress data have been collected will be distributed to appropriate local agencies to use in their project-level planning.

November 30, 1996
Cities and counties submit proposals to Iowa's 18 RPAs for regional network-level analysis and development of TIPs.

Late 1997
Distress data for the remaining state and local roadways will have been collected, analysis software selected, and analysis models developed. Training will begin for local agencies that elect to participate in the IPMP.

For more information about Iowa's pavement management program, contact Omar Smadi, 515-294-8103. ■

library materials

FOLLOWING IS A SAMPLING of new or popular materials available from the CTRE library. To obtain materials or a catalog of library materials, contact Stan Ring, library coordinator, Monday, Wednesday, and Friday mornings at 515-294-9481. Or use this page as an order form. Check the box next to the materials you want and return this form to the Center for Transportation Research and Education, ISU Research Park, 2625 N. Loop Drive, Suite 2100, Ames, Iowa 50010-8615. (Please limit your request to four items.)

Publications

Culvert Repair Practices Manual, Vols. I and II (USDOT-FHWA-RD-94-096, 1995) 265 & 354 pages	These publications provide guidance on procedures for repairing problems that occur in metal and concrete culverts. **Free copies are available.**	**Request #P1118** ☐ **Request #P1119** ☐
Flexible Pavement Manual (American Coal Ash Association) 127 pages	This manual provides detailed information on pavement bases using fly ash. It covers the design, materials, and construction aspects. **Free copies are available.**	**Request #P1086** ☐
Tips from the Field—Trucks and End Loaders (Center for Transportation Research and Education, 1995)	The latest "Tips" booklet offers 21 of CTRE's best tips from all over Iowa regarding trucks and end loaders. **Free copies are available.**	**Request #P1079** ☐

Stan Ring, Library Coordinator

Videotapes

International Road Federation (IRF) Series (1995) (from 17:00 to 26:00 min. each)

The following videotapes are available **on loan**:

World Traffic Sign Systems	**Request #V428** ☐
Markings and Islands	**Request #V429** ☐
Traffic Controls for Schools, Railroad Crossings, Bicycle Facilities	**Request #V430** ☐
Special Use Traffic Controls	**Request #V431** ☐
Traffic Control Signals at Intersections	**Request #V432** ☐
Traffic Sign Inspection and Maintenance	**Request #V433** ☐
Traffic Sign Placement and Location	**Request #V434** ☐
Work Zone Safety Concepts	**Request #V435** ☐
Developing Job Site Traffic Control Plans	**Request #V436** ☐
Installation, Inspection, and Maintenance of Work Zone Traffic Control Devices	**Request #V437** ☐

Global Positioning Systems (GPS) Workshops I and II (Center for Transportation Research and Education, 1995) (120 min. each)	This tape covers operations and issues, applications, concepts, and equipment guidelines. **Loan copy.**	**Request #V412** ☐
	This tape covers GPS equipment, current and future uses, and benefits to the public. **Loan copy.**	**Request #V413** ☐

Name _____

Address _____

City/State/Zip _____

Phone _____

☐ Please send a complete catalog of all publications and audiovisual materials available from your office.

conference calendar

May 1996

13–14	Semisesquicentennial Transportation Conference	Ames	Sharon Prochnow, 515-294-8103
16	**ITCSA Spring Conference**	**Ames**	**Don Wall, 515-294-3811**
29	Making Workplaces Safer	Mt. Pleasant	Shashi Patel, 515-281-5352
30	**Making Workplaces Safer**	**Readlyn**	**Shashi Patel, 515-281-5352**

June 1996

4	Making Workplaces Safer	Spencer	Shashi Patel, 515-281-5352
5	**Making Workplaces Safer**	**Atlantic**	**Shashi Patel, 515-281-5352**
6	Making Workplaces Safer	Ankeny	Shashi Patel, 515-281-5352

July 1996

10, 17	**CTRE Satellite Workshop: Comparison of Four Geographic Information Systems (GISs)**	**Satellite "downlink" sites across the U.S.**	**Duane Smith, 515-294-8817**
10–11	Iowa County Engineers Association (ICEA) Midyear Conference	Ames	Jean Jesse, 515-239-1528

September 1996

19–20	**ITCSA Fall Conference**	**Ankeny**	**Don Wall, 515-294-8103**

P486-0524

TECHNOLOGY NEWS

Center for Transportation
Research and Education
ISU Research Park
2625 N. Loop Drive, Suite 2100
Ames, IA 50010-8615

DO NOT FORWARD
ADDRESS CORRECTION REQUESTED
RETURN POSTAGE GUARANTEED