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

December 1995

A new name and address for the Iowa Transportation Center

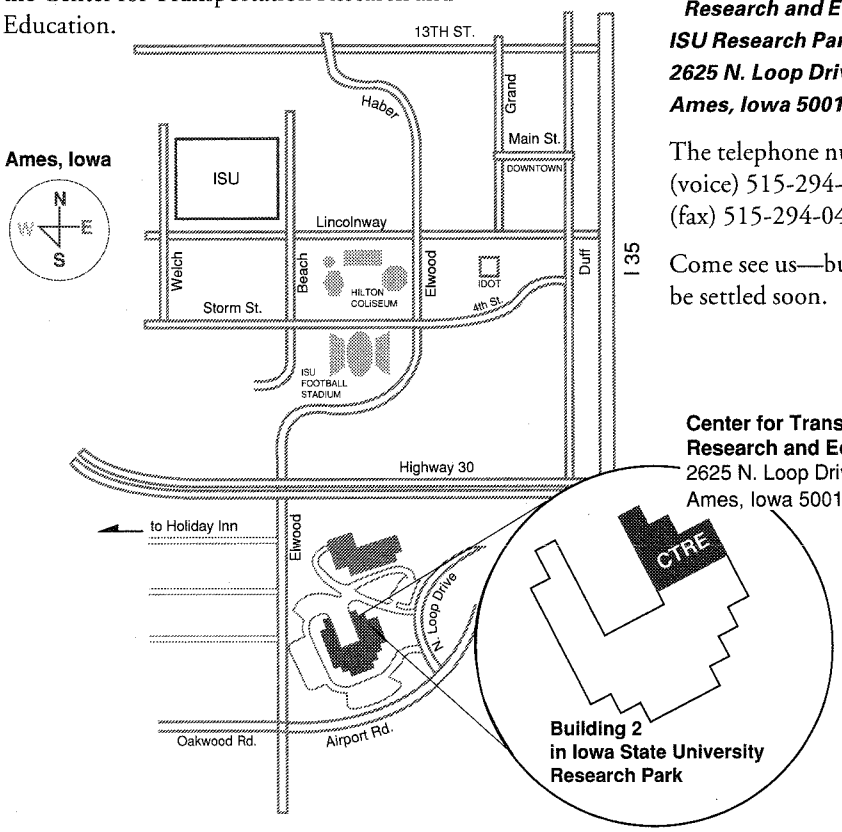
THE IOWA TRANSPORTATION CENTER is happy to announce its new name—CTRE (say "see-tree"): the Center for Transportation Research and Education.

As of December 1, 1995, our new address is

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

The telephone numbers remain the same:
(voice) 515-294-8103;
(fax) 515-294-0467.

Come see us—but ignore the mess. We'll be settled soon. ■



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

Federal research dollars become more accessible

The state's new research management plan encourages all transportation personnel in Iowa to help identify pressing transportation research needs and to become active in research.

TRANSPORTATION RESEARCH in Iowa is entering an exciting era as it comes under the umbrella of a bold new statewide research management plan. The plan fundamentally changes the way Iowa will manage its federally funded, state planning and research (SPR) program.

The most important change, according to Tom Welch from the Engineering Division at the Iowa Department of Transportation, a member of the research management plan committee, is to place more emphasis on identifying the department's

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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.

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RESEARCH . . . **continued from page 1**

research needs. Transportation problems and research needs will be identified through a statewide solicitation of public and private organizations. Identified needs will be prioritized, and specific requests for proposals will be sent to the research community.

Iowa's new transportation research management plan has been brewing since the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) increased the percent of federal funding for state planning and research (SPR) from 1.5 to 2.0 percent. This increase must be spent on research, development, and technology transfer (RD&T). The Federal Highway Administration (FHWA) is requiring each state to submit a management plan for administering its federally funded SPR program, including the RD&T funds. Iowa's plan was developed by the Iowa DOT and was recently approved by the FHWA.

Incorporating FHWA requirements with Iowa's unique transportation organizational structure, the research management plan contains several key elements that support and complement the primary change to a need-driven research program:

- Federal RD&T funds will support multimodal transportation systems as well as highway planning, design, construction, and maintenance.
- State research funds (the Iowa Highway Research Board) and federal research funds (SPR) will be administered independently but coordinated cooperatively.
- Research that duplicates efforts in other states will be avoided.
- Partnerships and cooperation among researchers, including other states and the private sector, will be encouraged.
- Research projects may include funding for implementation or for developing implementation plans.
- Technical review/advisory committees will assist most funded projects.
- The research management program will undergo a peer review every three years.

Need-based research

"Up to now," says Welch, "the Iowa DOT has approved research proposals primarily on a case-by-case basis as they were submitted to the department or the Iowa Highway Research Board. Under the new plan, funds will be spent on research projects that address Iowa's priority transportation problems and needs."

The nuts and bolts of Iowa's research plan will be administered by an interagency research advisory committee (RAC). The RAC will consist of representatives from each of the Iowa DOT's divisions, a member of the Iowa Highway Research Board, representatives of metropolitan planning organizations and regional planning affiliations, representatives from Iowa's universities, and representatives of Iowa's cities and counties.

Focus groups are now being organized. They will develop and collect problem statements from state and local agencies, universities, and the private sector to help the RAC and the Iowa Highway Research Board identify and prioritize transportation research needs.

Ultimately, a three-year research vision will be developed, based on the prioritized problem statements. The RAC will administer a specific annual research plan and oversee the expenditure of SPR funds. Specifically, the RAC will categorize needs into project types (contract or sponsored research, pooled fund projects, etc.) and, for most projects, assign a technical committee to prepare a request for proposals and generally oversee the project.

Of course, some critical needs and cooperative opportunities come up suddenly or unexpectedly. According to Welch, some funds will be reserved for immediate research opportunities and emergencies. Members of Iowa's transportation community are encouraged to submit problem statements whenever they identify a research need.

Cooperation and coordination with IHRB

Iowa is one of only a handful of states with its own state-funded research program—the Iowa Highway Research Board (IHRB). State research funds will continue to be administered through the IHRB, separately from the SPR funds. However, the IHRB and the RAC will work closely together, communicating regularly about opportunities for cooperative efforts. Appropriate projects may be partly funded by both programs. Input from the focus groups will be shared with the IHRB to broaden its knowledge of transportation research needs.

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RESEARCH . . . continued from page 2

Less duplication, more cooperation
Research projects that would duplicate efforts in neighboring states or across the nation will be avoided. The Iowa DOT will use the Transportation Research Information Service (TRIS), a national database of transportation research supported by the Transportation Research Board of the National Research Council, to help the department keep abreast of other state and national programs and to report Iowa's current RD&T activities to the nation.

Some research needs identified in Iowa may be addressed most effectively through collaborative research with other states, through regional or national pooled fund studies, or through partner projects with public and/or private sector partners.

Most research projects will be contracted to research teams. Whenever possible, proposals from Iowa researchers will be given first consideration for projects funded under Iowa's SPR program. The Iowa DOT wants to use the resources at hand in Iowa's state universities, take advantage of the already available expertise, and enhance Iowa students' opportunities to participate in research projects.

Focus on implementation, technology transfer
To ensure that transportation research results are promoted and used, funded SPR research projects will contain an implementation and/or technology transfer element. The goal is to get research results off the shelf and into the hands of organizations that will use the results to solve problems or improve procedures or products.

Welch is quick to point out, however, that not all research will be or must be immediately usable.

"We still need to allow for some high-risk research."

Improved project management
A technical review and advisory committee will be assigned to most funded projects to act as a resource and to help manage projects efficiently. Cash flow management and project tracking will be improved. Implementation activities will be documented and published via TRIS and other means. Follow-up (three years post-project) reports will be used to determine how well implementation efforts have succeeded and to identify barriers to implementing research findings.

Peer review
"Iowa's research program will not operate in a vacuum," says Welch. Every three years Iowa's strategic research plan will undergo a review by a peer panel consisting of FHWA-trained reviewers from other states, university researchers, FHWA staff, and perhaps staff from organizations like the Transportation Research Board. The Iowa DOT will also participate in the review of other states' programs. Through the peer review process, states will have a chance to learn from each others' programs, build on strengths, and improve their research management programs.

Benefits
Welch is enthusiastic about the benefits to local agencies of the research management plan. First, it improves access to SPR funding for all transportation modes and disciplines.

"This management plan will help anyone who wants to get involved in research but hasn't known how to access research funding," says Welch. "Under this plan, all proposals that address identified research needs will be considered."

Personnel in all transportation modes and disciplines will also have an opportunity to identify critical research needs via first-stage problem statements and participation in focus groups.

Another benefit of the plan, according to Welch, is its provisions for sharing Iowa's research accomplishments via avenues like TRIS, the peer review program, and follow-up project reporting.

"When budgets are tight," Welch says, "it's easy to cut research funding. To maintain or even increase research dollars, we've got to brag a little, let people know about the important research we're doing and the results we're achieving."

Get involved now!
Focus groups in areas such as structures, traffic and safety, public transit, etc., are now being organized to identify research needs in those areas. Throughout the winter of '95–'96, the groups will collect first-stage "problem statements" from Iowa DOT employees, public and private agencies, city and county agencies, universities, private citizens, and others. The focus groups will evaluate these requests and pass them on to the research advisory committee for prioritization. This process will be repeated regularly, perhaps annually.

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Iowa DOT garages

Adair	**515-742-3216**
Akron	712-568-2071
Albia	**515-932-7171**
Algona	515-295-5218
Allison	**319-267-2550**
Alton	712-756-8814
Altoona	**515-967-4246**
Ames	515-232-8226
Ames	**515-232-8226**
Ames-Serv&Insp	515-239-1371
Anamosa	**319-462-3676**
Atlantic	712-243-3114
Avoca	**712-343-2655**
Bedford	712-523-2383
Blairstown	**319-454-6322**
Bloomsfield	515-664-2231
Boone	**515-432-5411**
Carroll	712-792-2894
Cedar Rapids	**319-364-8189**
Centerville	515-856-2670
Chariton	**515-774-4217**
Charles City	515-228-4165
Cherokee	**712-225-2522**
Clarinda	712-542-3012
Clarion	**515-532-2626**
Clinton	319-243-6416
Colfax	**515-674-3383**
Columbus Jct.	319-728-7521
Colo	**515-377-2525**
Corning	515-322-4335
Correctionville	**712-372-4762**
Corydon	515-872-2445
Council Bluffs-4th	**712-366-0332**
Council Bluffs-N	712-322-7543
Cresco	**319-547-2461**
Creston	515-782-4417
Davenport	**319-391-3920**
Decorah	319-382-4565
Denison	**712-263-4792**
Des Moines - N	515-265-1614
Des Moines - W	**515-225-3322**
DeSoto - Inter	515-834-2368
DeWitt	**319-659-3551**
Donnellson	319-835-5211
Dubuque	**319-582-3063**
Dyersville	319-245-2724
Elkader	**715-852-4886**
Emmetsburg	712-362-2780
Estherville	**515-472-5367**
Fairfield	515-582-2073
Forest City	**515-955-8571**
Fort Dodge	515-923-2305
Garner	**515-352-3550**
Gowrie	515-743-8324
Greenfield	**515-236-3014**
Grinnell	319-824-5259
Grundy Center	**515-747-3561**
Guthrie Center	712-563-2268
Hamlin	**515-456-2721**
Hampton	515-896-3100
Hanlontown	**712-755-2558**
Harlan	515-332-2768
Humboldt	**712-364-2027**
Ida Grove	319-334-2484
Independence	**319-334-2484**
Indianola	515-961-3111
Iowa Falls	**515-648-3135**
Jefferson	515-386-2176

Iowa DOT reorganization: spotlight on Maintenance Division

With reorganization, the Office of Maintenance in the former Highway Division achieved division status—becoming the department's largest division in terms of number of employees. At the same time, the number of management levels in the maintenance area was actually reduced. Under the former system, the equivalent of the current transportation center maintenance engineer reported to a district engineer, who performed a variety of functions in addition to maintenance. The district engineer reported to a bureau director, who also performed multiple functions and reported to the director of the Highway Division. Under the new structure, transportation center maintenance engineers report directly to the Maintenance Division director.

According to Neil Volmer, director of the new Maintenance Division, reorganization has brought some other significant changes: an increased emphasis on finding, developing, and using new technologies; a renewed commitment to the environment; a more active role in highway projects; and a new interest in partnering.

Leland Smithson, deputy director of the Maintenance Division, specializes in research and technology and is the person to contact if you have questions about Strategic Highway Research Program (SHRP) products in the highway operations area. The Maintenance Division is testing and implementing SHRP products whenever possible.

Last year Smithson participated in a Federal Highway Administration (FHWA) sponsored tour of Japan, Germany, and Austria to learn about maintenance techniques and equipment in those countries. Iowa is currently adapting some of the items he saw, like a snow plow wind baffle that improves a plow's visibility to drivers approaching from the rear by preventing snow from sticking to the back of the plow.

The Maintenance Division is also involved in a partner project with the Center for Transportation Research and Education, the state departments of transportation of Minnesota and Michigan, and private industry to develop a maintenance concept vehicle that will make maintenance operations easier and more efficient. The Iowa DOT is currently surveying operators, mechanics, and supervisors to gather ideas for increasing the effectiveness of maintenance vehicles. If you have ideas, contact Smithson.

An example of the division's enhanced environmental program is its decision to prewet deicing salt over the entire interstate system in Iowa. Prewetting significantly increases salt's effectiveness, resulting in the use of less salt and sand. (See "Improve your deicing tactics: prewet with salt brine" in the October 1995 issue of *Technology News.*)

The new Maintenance Division takes a more active role in terms of project identification, selection, and conception for major rehabilitation projects on non-interstate highways and maintenance projects such as patching and sealing.

For example, a resident maintenance engineer working with a garage supervisor identifies areas of concern. The Maintenance Division takes the lead working with the transportation center managers to decide which of these areas identified throughout the state have the highest priority for repair. The Project Development Division then takes the lead to develop the concept of the project. The Planning and Programming Division is responsible to program the project with the Iowa Transportation Commission. The Maintenance Division then re-

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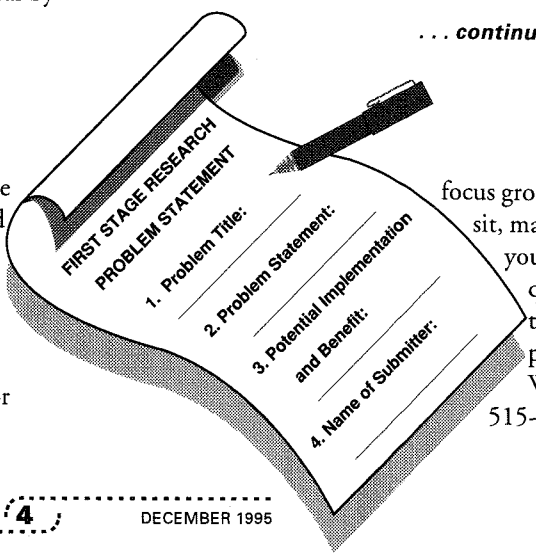
RESEARCH . . . continued from page 3

To submit a problem statement, include the information shown on the sample form and send your statement to Tom Welch, Engineering Division, Iowa Department of Transportation, 800 Lincoln Way, Ames, IA 50010; fax: 515-239-1891.

Welch would also appreciate suggestions for focus group areas (transit, materials, etc.). If you have any questions about the research plan, contact Welch, 515-239-1267. ■



MAINTENANCE DIVISION . . . continued from page 4

enters the process, performing annual maintenance to preserve the assets of the completed project.

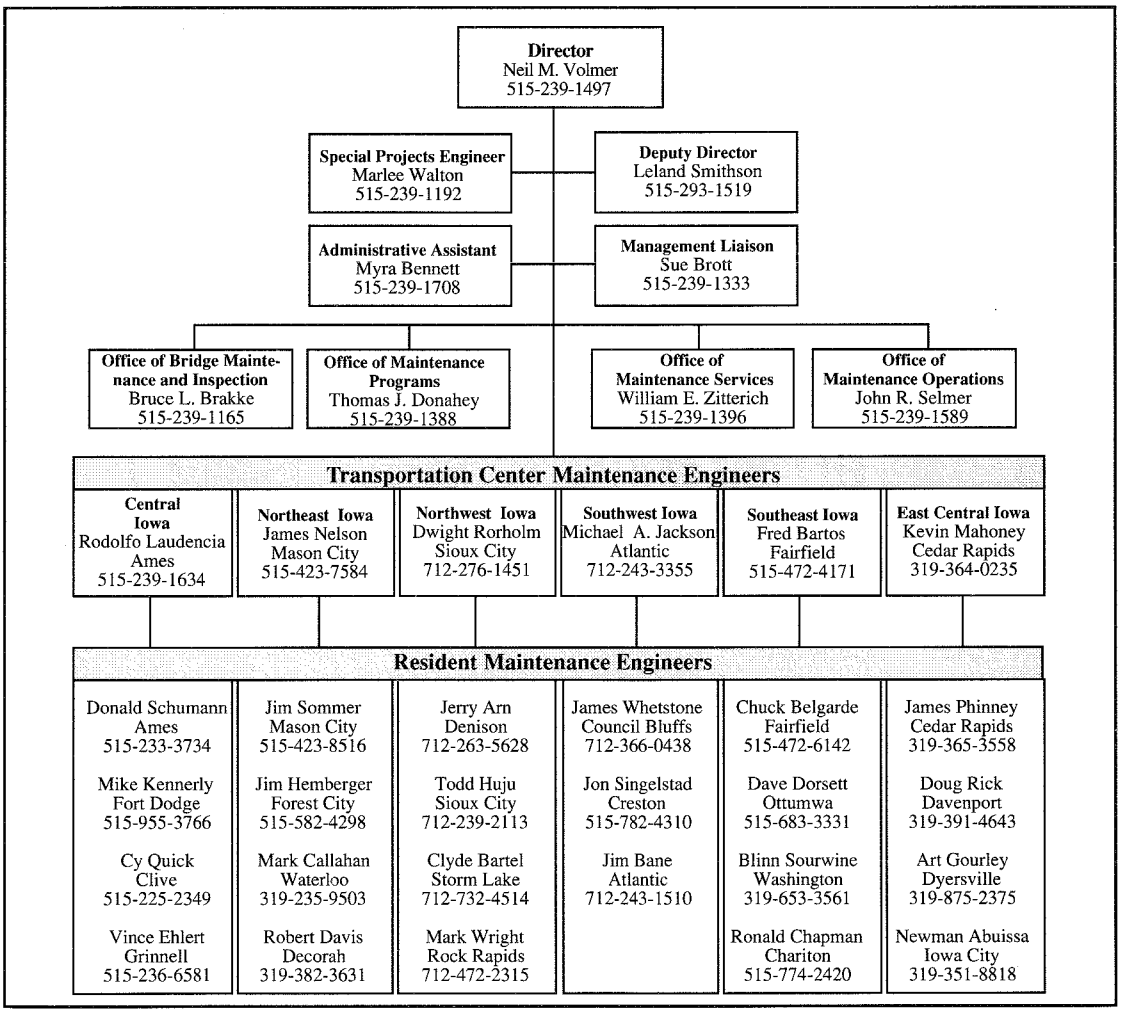
To enhance the effectiveness of the Maintenance Division, the division hopes to do more partnering with entities outside the department. This includes working with cities and counties to share technology, data, facilities, and equipment.

For example, the City of Cedar Falls recently installed a Roadway Weather Information System (RWIS) that provides real-time weather information and pavement condition data. The Iowa DOT has a network of RWIS sites throughout the state and has agreed to exchange weather information with Cedar Falls. This will provide the city with access to all Iowa DOT RWIS sites to watch approaching storms, while helping the DOT by providing an additional source of weather information.

The Maintenance Division has relatively few staff at the central office in Ames. The vast majority of maintenance personnel are located at the six transportation centers, the resident offices, and the area garages. "We are basically a field operation with some policy makers located in a central office," says Volmer.

According to Volmer, reorganization caused basically no change at the garage level. The division is, however, currently conducting a review of the field organizational structure to identify ways to improve efficiency and more effectively provide services to the public. "We want to become an organization that utilizes teams and employee participation."

Most maintenance-related questions can be answered by personnel at the area garages or by resident maintenance engineers at the resident offices. ■



With relatively few personnel in the Iowa DOT's central offices, the Maintenance Division is primarily a field operation, with maintenance supervisors and crews located at convenient garages across the state (see outside columns).

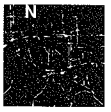
Iowa DOT garages

Keosauqua	515-293-3363
Knoxville	**515-842-4714**
LeMars	712-546-6401
Latimer	**515-579-6466**
Leon	515-446-6214
Malcom - Inter	**515-528-3775**
Manchester	319-927-3979
Mapleton	**712-882-2821**
Maquoketa	319-652-2885
Marion	**319-373-1277**
Marshalltown	515-753-7783
Martensdale	**515-764-2755**
Mason City	515-423-9441
Missouri Valley	**712-642-2178**
Mt. Pleasant	319-385-8641
Muscatine	**319-263-6242**
Mt. Ayr	515-464-2340
New Hampton	**515-349-2541**
Newton	515-792-7783
Neola	**712-485-2591**
Oakdale	319-626-2386
Oakland	**712-482-3190**
Oelwein	319-283-5214
Osage	**515-732-3637**
Onawa	712-423-2040
Osceola	**515-342-2711**
Oskaloosa	515-673-7697
Ottumwa	**515-684-8231**
Paullina	712-448-3441
Parkersburg	**319-346-1254**
Pacific Jct.	712-622-8140
Perry	**515-676-2233**
Pocahontas	712-335-4590
Red Oak	**712-623-2450**
Rock Rapids	712-472-3719
Rock Valley	**712-476-5553**
Rockwell City	712-297-8222
Sabula	**319-687-2708**
Sac City	712-662-7674
Sheldon	**712-324-3631**
Shenandoah	712-246-4320
Sibley	**712-754-3121**
Sidney	712-374-2515
Sigourney	**515-622-3170**
Sioux City - Leeds	712-239-2856
Sioux City - Inter	**712-252-1836**
Sloan-Inter	712-428-3300
Soldier	**712-884-2265**
Spencer	712-262-1645
Spirit Lake	**712-336-2112**
Stanwood	319-945-3935
Storm Lake	**712-732-5670**
Tama	515-484-2402
Tipton - Inter	**319-946-2391**
Traer	319-478-8120
Urbana	**319-443-2370**
Wapello	319-523-4991
Washington	**319-653-3233**
Waterloo	319-233-3055
Waukon	**319-568-3773**
Waverly	319-352-1045
Webster City	**515-832-4707**
West Burlington	319-752-6065
West Union	**319-422-3279**
Williams	515-854-2217
Williamsburg	**319-668-2397**
Winterset	515-462-2742
Wyoming	**319-488-3496**

Black Hawk County sets stage for GIS

"With this project, I'm more than a technical person. I'm an educator."

— Harold Jensen, Black Hawk County Engineer



AN INFORMAL PARTNERSHIP of public and private agencies and utilities in Black Hawk County is developing a common basis for geographic information systems (GIS) applications in the county. The partnership includes county and city engineers from Waterloo and Cedar Falls; the Waterloo Water Works; the Cedar Falls Utilities (gas, water, electric, and communications); a private utility; and private surveyors and engineers.

According to Harold Jensen, county engineer in Black Hawk County and one of the prime movers behind this effort, the group is nearly finished with the first part of its task: preparing digital orthophotos of the entire county. Digital orthophotos are computerized aerial photographs that have been electronically rectified so they can be scaled.

Aerial Services, Inc. (ASI) has delivered the first set of orthophotos, which all together cover the county seamlessly. With the appropriate software, the orthophotos can be enlarged, reduced, scaled, printed, and overlaid with maps and other information to create specific GIS applications.

With the photos as a backdrop, users in Black Hawk County can build thematic layers, check the accuracy of their existing overlays, and perform routine database maintenance procedures. The potential applications are endless.

For example, the photos can be overlaid with political boundaries (city limits, voting precincts, school districts, townships, zoning districts, etc.). Within the county engineer's office alone, the photos can be overlaid with snow removal routes, motor grader routes, sign and bridge inventories, and the county pavement management system.

City personnel can use the photos to help them design streets, saving field work. Fire departments, emergency response companies, and police departments will be able to find specific locations more quickly in emergencies. By overlaying the photos with their utility line maps, utility companies will be able to locate underground utility lines and valves or trouble spots easily. Citizens will more easily understand zoning maps that have been laid over actual photographs, and, at the assessor's office, citizens will be able to literally see the property boundaries on their land.

Getting started

Of course, the GIS implementation issues faced by the partnership in Black Hawk County have been and continue to be numerous. First, they had to assess the need for GIS in the county and convince the board of supervisors to invest in the backdrop for county-wide GIS applications: countywide digital orthophotos.

Jensen explains his role in this process:

"Quite frankly, I see my most important job in this project as educating our elected officials and the general public about what GIS is and what it can do for our county. You can't expect officials to come up with funds to support your GIS unless they understand the system and believe in its potential benefits.

"With this project, I'm more than a technical person. I'm an educator."

Jensen recruited spokespeople from various organizations with an interest in GIS to bring their cases before the board of supervisors. With the project approved and underway, Jensen continues to meet regularly with the project's management committee consisting of mayors, agency and county board members, utility directors, and politicians—the people whose continued input and/or financial support are essential to the project's success. This committee is in addition to the project's technical committee, the group that up to this point has overseen the production of the digital orthophotos.

Preparing the orthophotos

The Black Hawk County engineer's office hired ASI, a local Cedar Falls firm, to perform the aerial photography and prepare the orthophotos. This involved three major tasks: installing permanent, three-dimensional monuments for ground control; conducting a GPS survey; and shooting, digitizing, and rectifying the aerial photographs.

With the assistance of the Black Hawk County sign crew, ASI set 158 permanent monuments throughout the county, coordinating their location with existing National Geodetic Survey control monuments. The monuments act as ground control points for both the aerial photographs and the GPS survey. At each monument location, ASI placed

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temporary ground targets—10-feet by 2-feet white Xs made from nylon weather-resistant material. The county also painted targets on a majority of section corners of hard surfaced roads.

ASI then conducted a GPS survey. GPS surveying is a revolutionary geodetic surveying technique that produces an accurate network of photogrammetric control points, providing efficient and economical ground control for large-scale mapping. GPS surveying produces three-dimensional positional accuracy within centimeters. GPS field observations from the permanent monument sites were post-processed in-house at ASI.

Finally, ASI took black and white aerial photographs of the entire county at altitudes of 3,000 and 12,000 feet, using cameras with forward motion compensation and automatic exposure control. True ground coordinates were computed for each position in the photos. Then the photos were digitally ortho rectified by mapping them to a three-dimensional surface, using the control produced from the GPS survey and analytical aerial triangulation to remove displacement caused by variations in ground elevation.

The resulting images show ground features with true locations and accurately tie together with adjoining images.

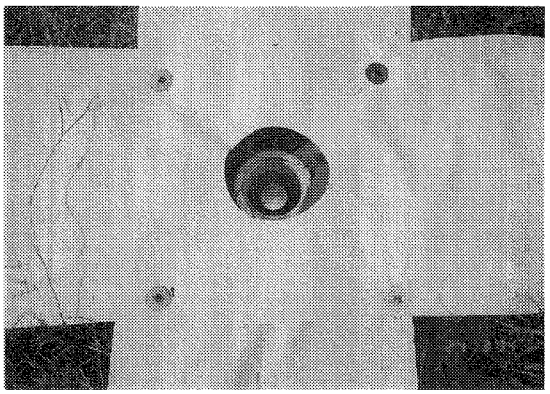
The result is a visual backdrop that can be scaled and combined with parcel boundary and infrastructure overlays. When combined with the GPS survey data, east-west-north-south coordinates are known for every point on the photographs.

ASI has completed 400-scale photos for the entire county (one inch equals 400 feet) and will have 100-scale photos of urban areas finished in about six months.

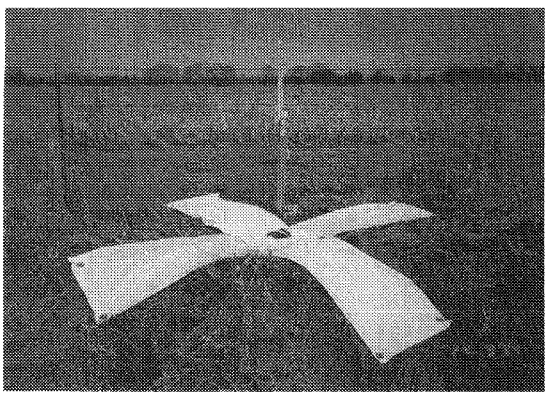
"The great thing about these photos is their clarity," says Jensen. "Even at 400-scale, it's fantastic. With the 100-scale, we should be able to see a manhole clearly."

Because they are generic tag image file format (TIF) files, the photographs can be supported by all kinds of software, from CAD systems with graphics overlays to full-scale GIS packages like ArcInfo.

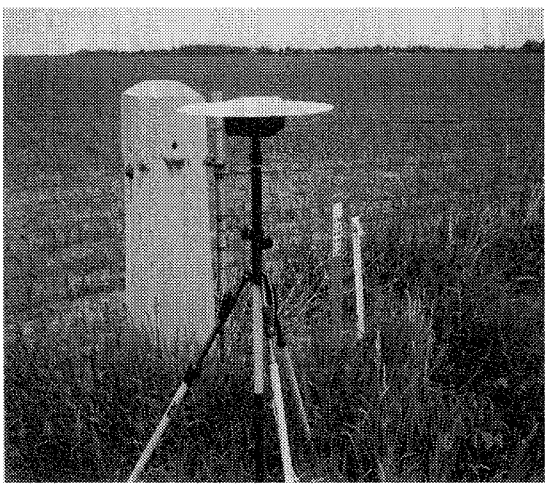
"This product doesn't lock anyone into any one hardware or software system," Jensen emphasizes.



Aerial Services, Inc. (ASI) of Cedar Falls, Iowa, installed the GPS monuments. Note the PVC casing.



Completed GPS installation is ready for aerial photography by ASI.



Typical survey quality GPS station operation by ASI.

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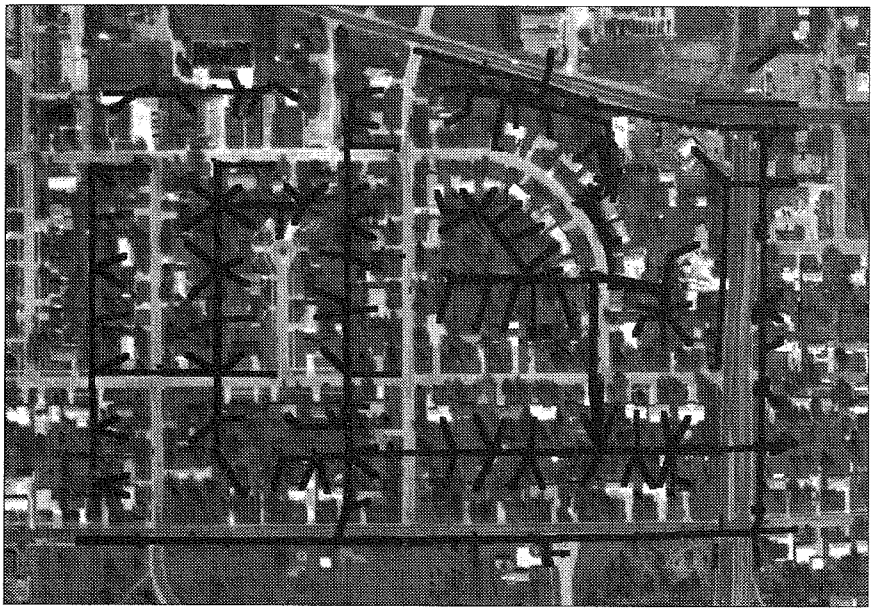


Cedar Falls utility lines (heavy black) are "layered" over a TIFF (tagged-image file format) image of a 400-scale aerial photo showing a Cedar Falls neighborhood. The utility lines have been emphasized in this reproduction.

Public and private organizations alike will have access to the photos. The goal is to keep users' costs down to encourage widespread use of the photos and, consequently, cooperation and data sharing among users throughout the county.

Applications

Cedar Falls Utilities is already overlaying its utility line maps on the digital orthophotos. One of the county engineer's first GIS projects using the photos will be to develop a sign management system. Jensen also looks forward to creating a digitized incident management system that uses GIS in real time.

The Black Hawk County assessor's office plans to use the photos to prepare cadastral (property boundary) maps for the county.

"We have a wealth of property information that, if linked to these photographs, can be helpful to maintenance and utilities personnel," says Vicki Atkins, county assessor. "And a lot of city groups, like community development groups, are parcel driven."

Many of the GIS applications developed in Black Hawk County may eventually be accessible by Cedar Falls residents and businesses via Cedar Falls Utilities' newest utility: broad band fiber optic communications.

What's next?

The county engineer's office will distribute the digital orthophotos on compact disk for a nominal fee. Public and private organizations alike will have access to the photos. The goal is to keep users' costs down to encourage widespread use of the photos and, consequently, cooperation and data sharing among users throughout the county.

Such cooperation implies common data standards among users. For example, agencies that exchange data sets will probably want to use the same name and symbol for the same item. They will also want to produce their data on compatible platforms.

If the countywide cadastral maps are prepared as planned, the assessor's office will be in the position of setting many standards for data sets throughout the county. The technical committee that has been overseeing production of the digital orthophotos in Black Hawk County will continue to meet to try to establish a standard architecture for GIS applications in the county.

"Other governmental agencies in Iowa in the future are likely to similarly embrace the use of GIS. At some point, it may be prudent for the State of Iowa to take the lead in establishing a coordinated GIS architecture," says Tom Maze, director of the Center for Transportation Research and Education. "What's happening in Black Hawk County is an exciting model."

To facilitate continued cooperation, the entities in the informal partnership in Black Hawk County are promoting the Memorandum of Agreement (MOU) prepared by the Iowa Geographic Information Council. The MOU outlines an agreement among the council members to work together to implement GIS in Iowa. Black Hawk County supervisors have already signed the MOU. By signing the MOU the entities working together to implement GIS in Black Hawk County and in other areas around the state will have a formal agreement to cooperate together.

"The MOU is a grassroots effort," emphasizes Jensen. "It's not mandated by the state or the feds. It's a voluntary agreement to facilitate the exchange of data and reduce duplicate efforts in creating data sets."

For more information about GIS-related efforts in Black Hawk County, contact Harold Jensen, 319-291-2419. For information about the MOU, contact Reg Souleyrette at the Center for Transportation Research and Education, 515-294-8103 (e-mail: reg@iastate.edu). ■

January 1 deadline looms for implementing drug and alcohol testing programs

By January 1, 1996, all Iowa counties and towns requiring one or more employees to have a commercial drivers' license (CDL) must have a drug and alcohol testing program for those employees. The goal is to prevent employees from performing safety-sensitive functions while under the influence of alcohol or controlled substances.

THE OMNIBUS TRANSPORTATION EMPLOYEE TESTING ACT of 1991 requires drug and alcohol testing of safety-sensitive employees in all modes of transportation. Safety-sensitive positions include those that require a commercial drivers' license (CDL).

The February 15, 1994 *Federal Register* published the Federal Highway Administration's policy and procedures governing drug and alcohol programs for commercially licensed drivers. These programs must be in place by January 1, 1996. Examples of organizations affected by the FHWA rules are state, county, and city governments; schools; for-hire and private motor carriers; civic organizations; churches; Indian tribes; and farmers. In this article, local governments employing drivers with CDLs are referred to as "employers"; CDL drivers are "employees."

An overview of FHWA requirements

In general, an employer's FHWA-prescribed drug and alcohol testing and prevention program involves

- establishing a formal policy regarding drug and alcohol testing and informing employees about the policy,
- conducting drug and alcohol tests on employees in defined situations and according to defined procedures,
- training supervisors to recognize employees' symptoms of drug use and alcohol abuse,
- referring employees who fail tests to treatment resources, and
- complying with FHWA recordkeeping and reporting requirements.

Employee notification. Prior to testing, employers must notify employees that they will be subject to testing as required by the FHWA. The notification must include details of the required testing procedures. Any additional local policies or consequences must be clearly stated and identified as based on local authority.

Employee testing. In all drug and alcohol tests, employees' privacy and confidentiality must be strictly assured.

Generally, employees must be tested in the following situations:

- **Pre-employment** (drug tests only). A negative result must be received by the employer before an employee can perform a safety-sensitve function.
- **Post-accident.** An employee in an accident involving a fatality must be tested, regardless of who is at fault. In accidents not involving a fatality, an employee must be tested if he or she receives a citation *and* someone had to receive immediate medical treatment away from the accident scene or a vehicle had to be towed from the scene.
- **Random.** Employees are periodically selected for testing according to a scientifically valid method of random selection.
- **Reasonable suspicion.** An employee must be tested whenever a trained supervisor has sufficient reason to suspect alcohol abuse or drug use.
- **Return to duty.** An employee must be tested before returning to work after testing positive for alcohol or controlled substances.
- **Follow-up.** If the employer retains an employee who has tested positive, the employee must be evaluated by a substance abuse professional (SAP) and may be subject to unannounced follow-up tests.

Alcohol testing is performed by trained breath alcohol technicians (BATs) using approved devices and procedures. A saliva test has also recently been approved. If an employee has a confirmed alcohol concentration of between 0.02 and 0.039, he or she cannot perform safety-sensitive job functions for 24 hours.

Drug tests check urine for the presence of five controlled substances: marijuana, cocaine, opiates (including heroin), emphetamines, and phencyclidine (PCP). "Split-sample" urine collection is required, and analyses must be conducted by laboratories certified by the Department of Health and Human Services. In the case of a positive result with the primary specimen, an employee may elect to have the

. . . continued on page 10

Editor's note: The information provided in this article is a general overview of FHWA requirements only. It does not cover possible additional requirements by the state of Iowa and is not intended as a definitive guide for establishing a drug and alcohol testing program. Our thanks to the FHWA's Office of Motor Carriers for its help in the preparation of this article.

JANUARY 1 . . . continued from page 9

Employers ultimately responsible

EMPLOYERS HIRING outside services to manage their drug and alcohol programs still have responsibilities. They need to understand the basic FHWA program requirements so they can comply with those not handled by the contracting services.

Employers also need to develop their own policies regarding issues not specifically decided by the FHWA rules.

For example:

- Will employees who fail a test be disciplined, perhaps even fired?
- Will the employer cover the cost of an employee's alcohol or drug abuse treatment?
- Will the employer continue to pay employees while they cannot perform their safety-sensitive functions because they failed an alcohol or drug test?

For general information, contact the Office of Motor Carriers at the FHWA office in Ames, 515-233-7400. You still have time to start your program by the January 1, 1996 deadline.

result verified by testing the secondary specimen. If the secondary specimen test indicates the presence of the controlled substance(s) detected in the primary specimen, the employee cannot perform safety-sensitve functions until he or she has passed a return-to-duty test and has been evaluated by an SAP. A medical review officer (MRO) must review all test results.

Supervisor training. Employers must designate supervisors to be responsible for determining if reasonable suspicion exists for conducting drug and/or alcohol tests on employees. The supervisors must receive training regarding the indicators of probable alcohol misuse or drug use. The training consists of at least 60 minutes for alcohol abuse indicators and 60 minutes for drug use indicators.

Referral program. Employers are required to advise employees who have failed the drug or alcohol tests about available resources for evaluating and treating substance abuse. Federal law does not require employers to pay for such treatment or to hold jobs open for employees undergoing treatment.

Recordkeeping and reporting. Employers must maintain strict and confidential records of the testing process, test results, supervisor training, etc., and submit annual reports summarizing their alcohol and drug prevention and testing programs.

Facilities

Most hospitals and medical centers can perform specimen collection services for area employers. Contact your city or county hospital for more information. Urine specimen analyses must be conducted by laboratories certified by the Department of Health and Human Services. Currently, there are fewer than 80 such labs in the country. A list of certified labs is published the first week of each month in the *Federal Register.*

Resources

Luckily, many resources are available to help employers set up programs that comply with the FHWA's rules.

Third-party administrators. Many cities and counties do not have the time, money, or legal expertise to develop their own drug and alcohol testing programs from scratch. One option is to contract with third-party administrators who manage several employers' programs, administering tests and keeping records for pools of covered employees.

DATA. One resource specifically for Iowa's local governments is the Drug and Alcohol Testing Alliance (DATA), organized by the Iowa Association of Municipal Utilities, the Iowa League of Cities, and the Iowa State Association of Counties. For a one-time membership fee, DATA provides many services. It has hired a third-party administrator to manage the nuts and bolts of drug and alcohol testing programs for member agencies. For more information about DATA, contact the IAMU, 515-289-1999; the ILC, 515-244-7282; or ISAC, 515-244-7181.

STA United. State Trucking Associations United (STA United) is the largest drug-testing consortium in the nation. Agencies can belong through organizations like the Iowa Motor Trucking Association that are members of STA United. Agencies can also join STA United independently. STA United acts as a third-party program administrator. For more information, contact Craig Finch, director of technical services for the IMTA, 515-244-5193. Or contact STA United directly, 1-800-288-8504.

Other consortia. DATA and STA United are only two of many excellent drug and alcohol testing third-party administrators/consortia in Iowa. For a list of additional consortia, contact the FHWA's Office of Motor Carriers in Ames, 515-233-7400.

The FHWA's Office of Motor Carriers urges you to investigate several administrators/consortia, comparing services, costs, and member satisfaction. Some services include how-to guides, member newsletters, and training opportunities.

Publications. A concise brochure published by the FHWA, "Alcohol & Drug Rules: An Overview," generally describes the FHWA's rules. This brochure is available through the FHWA's Office of Motor Carriers in Ames, 515-233-7400. Ask for publication number FHWA-MC-94-013.

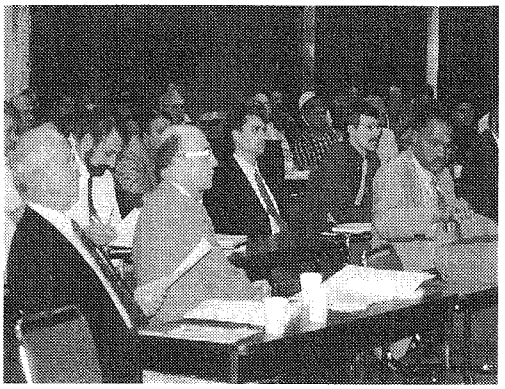
The International City/County Management Association has published a thorough and easy-to-follow explanation of FHWA regulations, *Drug and Alcohol Testing for Local Government Transportation Employees: The Public Employer's Guide.* This guide is available for loan through the Center for Transportation Research and Education library. Contact Stan Ring, librarian, 515-294-9481. Ask for publication number 1065. ■

Give us your opinions and win a FREE CTRE workshop!

Help us serve YOU better. Please take a few minutes to complete the following survey about the Center for Transportation Research and Education's library and newsletter. Your responses will help us improve our technology transfer services. Return postage is prepaid.

In exchange for your help, you could win a FREE registration to a CTRE-sponsored workshop of your choice. Topics include traffic engineering, equipment operations, snow and ice management, construction inspection, and many more. You can use the free registration for yourself or for someone in your office or shop. Approximate workshop value: $50–$75.

Please **return the survey by January 15, 1996.**



You may be the lucky respondent to win a free registration to a CTRE-sponsored workshop.

Library

Have you ever requested material from the center's library? Yes No

Do you read the "library materials" column in *Technology News*? Yes No

	excellent <— —> poor				
Rate the materials you have used:					
Publications	1	2	3	4	5
Videotapes	1	2	3	4	5
Slide presentations	1	2	3	4	5
CATT (computer-aided transportation training)	1	2	3	4	5

	excellent <— —> poor				
Rate the service you receive from the library/librarian:	1	2	3	4	5

If you could change one thing about the center's library, what would it be? _____

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Rate the following:	excellent <— —> poor				
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Microtechnology	1	2	3	4	5
Library materials	1	2	3	4	5
Conference calendar	1	2	3	4	5

Rate the following topics as possible subjects for upcoming articles in *Technology News*:

	excellent <— —> poor				
Computers:					
GIS	1	2	3	4	5
hardware	1	2	3	4	5
networks	1	2	3	4	5
communication	1	2	3	4	5
bulletin board service	1	2	3	4	5
TranPlan user group	1	2	3	4	5
transportation software	1	2	3	4	5
Environmental issues	1	2	3	4	5
Event coverage:					
special events	1	2	3	4	5
conference highlights	1	2	3	4	5
Maintenance:					
bridge	1	2	3	4	5
equipment	1	2	3	4	5
roadway	1	2	3	4	5
Management:					
budgeting	1	2	3	4	5
communication skills	1	2	3	4	5
grant writing	1	2	3	4	5

	excellent <— —> poor				
Management, continued:					
human resources	1	2	3	4	5
litigation	1	2	3	4	5
partnering	1	2	3	4	5
project planning	1	2	3	4	5
risk management	1	2	3	4	5
stress management	1	2	3	4	5
time management	1	2	3	4	5
Recycling	1	2	3	4	5
Regulations:					
ISTEA compliance	1	2	3	4	5
new legislation	1	2	3	4	5
Roadway design	1	2	3	4	5
Safety	1	2	3	4	5
Traffic engineering:					
design elements	1	2	3	4	5
MUTCD updates	1	2	3	4	5
signal design operations	1	2	3	4	5
signs and markings	1	2	3	4	5
studies and warrants	1	2	3	4	5

Are there other subjects you would like to see addressed in *Technology News*? _____

Please comment on the newsletter's new format (new as of October 1995): _____

_____

If you could change one thing about *Technology News*, what would it be? _____

_____

THANK YOU!

Your name (optional) _____

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Blue Ribbon Transportation Task Force searches for ways to stretch highway dollars

ANTICIPATING SHRINKING federal budgets and growing transportation infrastructure needs, Governor Branstand has tapped nineteen Iowans from across the state to serve on a special task force. Their mission: Scrutinize state, county, and city transportation budgets and systems. Their goal: Find ways to "maximize the benefits of each dollar spent from the Road Use Tax Fund."

Since Governor Brandstad appointed the Blue Ribbon Transportation Task Force last summer, members have been hard at work. In December—several meetings and dozens of hours of hard work later—they will present their findings and suggestions to the governor.

Geographically and politically diverse, task force members bring a variety of perspectives about Iowa's transportation infrastructure to their assignment. Members include private contractors and business people, city and county transportation personnel, a chamber of commerce president, a mayor, a city manager, a county supervisor, four legislators, and two former Iowa transportation commissioners.

Says Suzan Stewart, a former state transportation commissioner and chair of the task force, "The members of this group have gone beyond the usual solutions, tried to look into the future."

With only a few months to accomplish their objectives, the task force divided into four subcommittees to investigate specific areas emphasized by the governor:

- The technology subcommittee is examining new technologies that could streamline processes and save dollars.
- The outsourcing subcommittee is researching possibilities for outside contracting of equipment or services.
- The sharing subcommittee is investigating possibilities for interagency (city, county, and state) sharing of equipment, facilities, and services.
- The legal subcommittee is examining legal issues raised by the other committees (e.g., liability questions involved with sharing equipment).

"The subcommittee chairs have been aggressive and committed," says Stewart. "They've taken on this work as their mission and are eager to do something that will benefit the state."

One of these committed chairpeople is Mike Blouin, president of the Cedar Rapids Chamber of Commerce. Blouin is enthusiastic about the rationale behind the task force. "Every organization can benefit from having an outside review periodically. It's not only healthy—it's essential—for all government, at all levels and divisions.

"In this case, most of us are not experts in transportation, so we're not telling engineers how to build roads or the legislature how to apportion funds. But expert or not, we're the ones paying the tab, and we know a lot about saving money and operating efficiently. You don't have to be an insider or a transportation expert to contribute at that level.

"I have no doubt that some of our recommendations will be right on the mark."

Blouin emphasizes the Iowa DOT's openness to the task force and the high level of cooperation between the task force and the Iowa DOT. "The department has given us excellent input. We've also had excellent help and advice from contractors and other stakeholders in the private sector."

Leland Smithson, deputy director of maintenance at the Iowa DOT, who presented a state-of-the-department report to the task force, sees the task force as a problem-solving model. "Here you have people from all walks of life and all levels of involvement with transportation working together to deal creatively with tight budgets. This has been an exciting process."

The task force has had only a few short months to perform their review and come up with recommendations. "That's a tall order," says Blouin. "We could easily have used another six months. But when you're working with volunteers—who are giving their time and paying their own expenses—the quicker the better. Plus, if implementing any of the task force's recommendations would require legislative action, the governor wants to know before the start of the 1996 session."

The Center for Transportation Research and Education, as facilitator to the task force, is providing support and acting as a conduit to resources like experts and stakeholders. ■

Editor's note: Look for a summary of the Blue Ribbon Transportation Task Force's report in the February 1996 issue of Technology News.

CTRE to host transportation conference

IOWA STATE UNIVERSITY will be the setting May 13–14, 1996, for a special national conference celebrating the 75th anniversary of the Transportation Research Board and the contributions of research to transportation. The conference is cosponsored by the Iowa Department of Transportation and Iowa State University.

You are invited to nominate an individual with a strong connection to the state of Iowa who has made a substantial contribution to transportation or transportation research.

For a copy of the call for nominations, contact the Center for Transportation Research and Education, (voice) 515-294-8103, (fax) 515-294-0467.

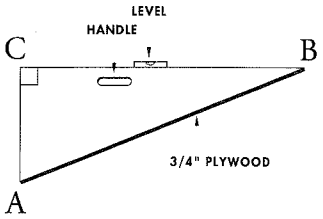
May 13–14, 1996: mark your calendar now! ■

tip from the field

Meter checks angle of slope

CONSTRUCTION INSPECTORS perform the time-consuming and difficult task of checking the angle of foreslopes, backslopes, and driveway cross-slopes at construction sites. The usual procedure requires at least two people—one at the bottom (or top) of the incline with a rod, another with a level on the flat roadway, measuring and calculating.

When Todd Miller was assistant to the engineer in Delaware County, he devised an easy-to-construct, portable "slope meter" that allows one person to quickly and easily check earth work to verify that the correct fill or cut has been made to achieve a desired slope. A meter can be easily constructed to check almost any slope—3:1, 2-1/2:1, 4:1, 10:1, etc.

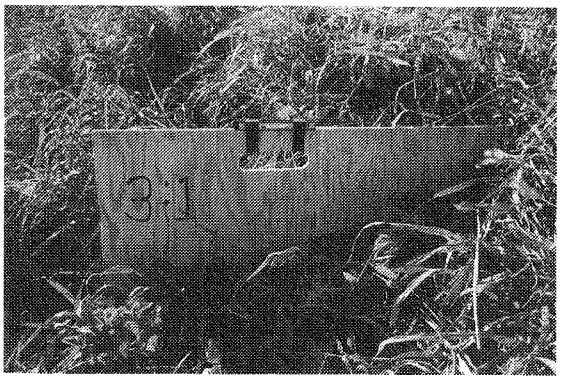


For example, to make a 3:1 slope meter, cut a piece of three-quarter-inch plywood into a right triangle as shown in the drawing. The sides of the right angle (AC and BC) should be one foot and three feet long, respectively. Install a simple, inexpensive line level along the top of the three-foot side (BC). Cut a hole or grip near the top of the three-foot side (BC) for a handle, and your slope meter is ready to go.

To use the meter, set the longest side (AB) on the slope as shown in the photo. If the bubble in the level indicates the top of the meter is level, the angle of slope is correct.

Miller has a final tip: To make the meters easier to carry, reduce the size of 6:1, 8:1, or 10:1 slope meters proportionally by half. For example, instead of making a meter 8 feet by 1 foot, reduce its size to 4 feet by 1/2 foot.

For more information, contact Todd Miller at Basic Materials Corporation, Wapello, Iowa, 319-235-6583. ■

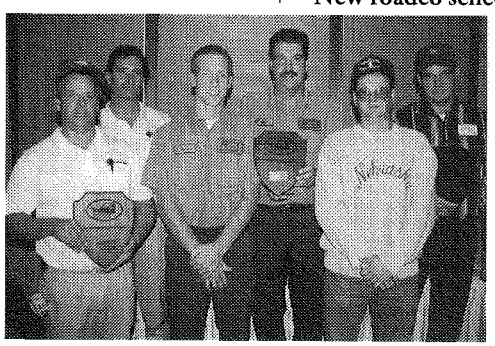


The level on this homemade meter shows at a glance that the slope is the correct angle.

Snow plow roadeo contestants lasso prizes

IN OCTOBER, Iowa's snow plow operators demonstrated their preparedness for winter's snow and ice at the 1995 APWA Snow Plow Roadeo. Especially prepared are first-place winners Tom Herold and Dustin Stevens from the City of Clive (single-axle class) and Jon Thompson and Tom Spatz from the City of West Des Moines (tandem-axle class). Bob Dingman and Mike Coughlon from the City of West Des Moines captured first in the "celebrity" division.

First-place winners, left to right: Bob Dingman, Mike Coughlon, City of West Des Moines; Dustin Stevens, Tom Herold, City of Clive; and Tom Spatz, Jon Thompson, City of West Des Moines.



New roadeo schedule scores well

The City of West Des Moines hosted this year's roadeo. Bret Hodne, superintendent for the City of West Des Moines, says there were more participants this year, and they liked the new two-day schedule.

On the first day contestants collected points on a written test and a vehicle safety defects test, and attended a brief seminar on winter maintenance. The seminar was a first at the roadeo. The second day was devoted to the driving course competition. Also this year for the first time, a tandem-axle class joined the single-axle class. The driving course included situations normally found while clearing streets. Teams of two negotiated serpentine curves, backed into an alley, avoided parked cars, drove through narrow curves, and stopped the plow at a precise location.

Next year: course will offer some surprises

The driving course is usually published before the roadeo, and some teams practice on their own mock courses. Next year, however, the steering committee may change the course and not publish the new layout before the event. Teams will see it for the first time on the day of the competition.

The committee needs help coordinating and hosting next year's snow plow roadeo. If you have questions or would like to help, contact Hodne, 515-222-3480. ■

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

The National Bicycling and Walking Study (USDOT-FHWA-DD94-023, 1994)	This report is about enhancing the travel options of bicycling and walking. It presents a plan of action for activities at the federal, state, and local levels. Nineteen case studies (separate publications) are included with this item. Loan copy.	**Request #P1127**	☐
How to Create Standard Specifications (1982, 16 pages)	The adoption of standard specifications by cities, counties, and special agencies serves several purposes. Uniform standards simplify contract preparations and help contractors bid and prepare for work. This booklet describes how to tackle the job. Loan copy.	**Request #P1128**	☐
Transition to the Metric System: An Implementation Guide (APWA, 1995, 56 pages)	The purpose of this guide is to explain the importance of converting to and using the metric system and to suggest ways to implement this conversion. Loan copy.	**Request #P1131**	☐
FHWA Geotechnical Metrification Guidelines (USDOT-FHWA-SA-95-035, 1995, 57 pages)	The objective of this guide is to facilitate metric conversion for those agencies involved in geotechnical engineering. Loan copy.	**Request #P1133**	☐
Public Works Management Practices (APWA, 1991, 126 pages)	This publication will assist public works managers in planning and controlling operations, improving performance, and increasing productivity. Loan copy.	**Request #P1132**	☐

Videotapes

Digging Dangers (Underground Focus, 1992, 15:00 min.)	This video identifies dangers of digging before locating all underground utilities, emphasizes the "one-call" location technique, and summarizes legal responsibilities. Loan copy.	**Request #V422**	☐
Digging Dangers 2 (Underground Focus, 1992, 15:00 min.)	This video describes problems digging underground, example court rulings, uniform color coding system, nondestructive location methods, and effects of damage to underground communication lines. Loan copy.	**Request #V423**	☐
Digging Dangers 3 (Underground Focus, 1992, 15:00 min.)	This video describes the ramifications of hitting a gas line and the importance of the "one-call" technique. Loan copy.	**Request #V424**	☐
Digging Dangers 4 (Underground Focus, 1992, 10:00 min.)	This video reviews the accidents occurring increasingly in the U.S. and warns of consequences of not using the "one-call" location system. Loan copy.	**Request #V425**	☐
Digging Dangers 5 (Underground Focus, 1992, 12:00 min.)	This video identifies safety zones near utilities and several location methods. Loan copy.	**Request #V426**	☐
Digging Dangers 6 (Underground Focus, 1992, 15:00 min.)	This video shows many above-ground disasters resulting when excavators hit an underground utility line. The message: use "one-call" and be prepared. Loan copy.	**Request #V427**	☐

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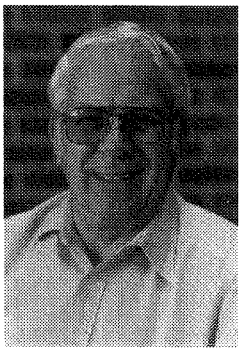
☐ Please send a complete catalog of all publications and audiovisual materials available from your office.



Stan Ring, library coordinator

Delays possible in December

DURING DECEMBER the Center for Transportation Research and Education is moving to new offices, and the library will be operating out of boxes as we organize the new library space. For a few weeks library clients may experience some delays receiving publications or videos, but be assured we will fill all requests.

If time is critical, order early! ■

conference calendar

December 1995

5–7	Iowa County Engineers Annual Conference	Ames	Jim Cable, 515-294-2862

January 1996

7–11	**Transportation Research Board (TRB) Annual Meeting**	**Washington, D.C.**	**Jim Cable, 515-294-2862**
11–12	Culvert Design Workshop	Ames	Jim Cable, 515-294-2862
19	**Society of Land Surveyors of Iowa (SLSI) Workshop**	**Ames**	**Jim Cable, 515-294-2862**
30	Asphalt Paving Conference	Ames	Jim Cable, 515-294-2862
31–2/1	**Hot Mix Asphalt Paving Workshop**	**Ames**	**Sharon Prochnow, 515-294-8103**

February 1996

3–8	National Association of County Engineers (NACE) Annual Meeting	Seattle, Washington	Jim Cable, 515-294-2862
13–14	**Hot Mix Asphalt Paving Workshop**	**Cedar Rapids**	**Sharon Prochnow, 515-294-8103**
14	Traffic Control in Construction, Maintenance, and Utility Zones	Storm Lake	Joyce Emery, 515-239-1016
15	**Traffic Control in Construction, Maintenance, and Utility Zones**	**Council Bluffs**	**Joyce Emery, 515-239-1016**
20	Construction Inspectors Workshop	Bettendorf	Sharon Prochnow, 515-294-8103
22	**Construction Inspectors Workshop**	**Waterloo**	**Sharon Prochnow, 515-294-8103**
27–28	Hot Mix Asphalt Paving Workshop	Storm Lake	Sharon Prochnow, 515-294-8103
28	**Traffic Control in Construction, Maintenance, and Utility Zones**	**Ames**	**Joyce Emery, 515-239-1016**
29	Traffic Control in Construction, Maintenance, and Utility Zones	Waterloo	Joyce Emery, 515-239-1016

March 1996

5	**Construction Inspectors Workshop**	**Fort Dodge**	**Sharon Prochnow, 515-294-8103**
6	Traffic Control in Construction, Maintenance, and Utility Zones	Iowa City	Joyce Emery, 515-239-1016
7	**Traffic Control in Construction, Maintenance, and Utility Zones**	**Ottumwa**	**Joyce Emery, 515-239-1016**
12	Construction Inspectors Workshop	Atlantic	Sharon Prochnow, 515-294-8103
19–20	**Hot Mix Asphalt Paving Workshop**	**Mason City**	**Sharon Prochnow, 515-294-8103**

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