

roads bridges transit technology news

Local Transportation Information Center
Iowa State University Engineering Extension Service

May 1984

Services available for microcomputer users

In a major effort to assist transportation agencies with their microcomputer usage, the FHWA has established three microcomputer support centers. Although each center offers similar services, the subject matter covered differs.

The three support centers are STEAM (Safety and Traffic Engineering Applications for Microcomputers), MAHP (Microcomputer Applications in Highway Projects), and MTP (Microcomputers in Transportation Planning).

Potential users should consider membership only in the center(s) that cover(s) subject matter in their

area of interest. The STEAM support center concentrates on applications specific to highway safety and traffic engineering. MAHP is for small town, rural county, and statewide highway issues. MTP's focus is on urban transportation planning, transportation systems management, and ridesharing applications for metropolitan planning organizations and state and local agencies.

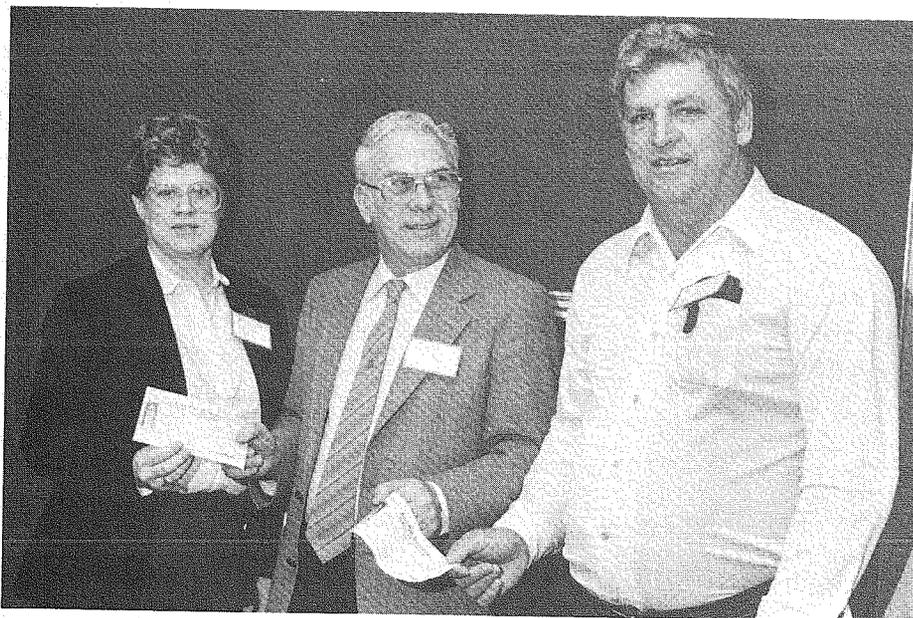
Each center provides the following services to users:

Technical bulletins. As ideas are developed, bulletins will be provided on the use of microcomputers. Articles range from technical information to brief hints for the average microcomputer user.

Software clearinghouse. Federally-developed software packages will be distributed, and software contributed by users will be collected, reviewed, and distributed. The support centers can produce copies of programs for many popular microcomputers and operating systems. To contribute software that you have developed, submit a floppy disk containing the program along with documentation describing its functions, system requirements, and instructions.

Software support. Federally-developed software packages and certain packages contributed by members will be maintained through corrections of errors and consultations for those who receive the packages. Only packages that have been tested thoroughly for correct operation and clear documentation will be fully supported. All packages will be screened prior to distribution to reduce chances of flaws or inadequate documentation.

Membership in each support center is free. To request membership in one of the microcomputer support centers, call the Local Transportation Information Center's toll-free Info-Line and ask for an application form. Please request the specific center or centers you are interested in.



Grant winners attend Public Works conference

Program manager Stan Ring (center) awarded \$100 checks to Ida Grove city clerk Diane Campbell and Ramon Johnson of the Pottawattamie County Engineer's office during the Public Works conference held at ISU in March. The two were winners of our continuing education grants for registration and travel expenses. During the conference they heard current information about innovative equipment, alternative fuels, supervision and management techniques, landscaping, and recycling asphalt. Applications for fall continuing education grants will be included in our July newsletter.

The preparation of this newsletter was financed in part through federal funds provided by the Federal Highway Administration. The opinions, findings, or recommendations expressed here are those of the Local Transportation Information Center and do not necessarily reflect the views of the Federal Highway Administration or those of the Iowa Department of Transportation.

\$250,000 judgment against county: diagnosing what went wrong

When an 18-year-old male driver failed to steer around a sharp turn on a loose surfaced county road, his 1969 Chevrolet crashed into the ditch. Both he and his companion were injured. Fortunately, the injuries were not serious enough to result in any permanent disability to either occupant of the car.

At a subsequent trial the county concerned was alleged to be negligent and was sued for damages. The following facts were brought out at the trial:

- The vehicle driver had failed to notice the reverse turn sign located approximately 1,000 feet before the turn.
- There was no large arrow sign or advisory speed plate in use at this location.
- After leaving a primary highway in traveling to the accident location, the

driver had encountered 12 curve or turn signs in 8.7 miles of travel on loose surface roads. Advisory speed plates were in use with two of these signs. A large arrow sign was used at one location in that 8.7 miles, but it faced drivers traveling in the opposite direction.

After hearing the case, a jury awarded the two plaintiffs a total of about \$250,000. Although it is not always possible to determine why a jury decides the way it does, this jury probably was telling traffic engineers that consistency in the use of signs is of primary importance. Perhaps not using some types of warning signs is better than inconsistent usage.

R.L. Carstens, professor of civil engineering, ISU.

1984-85 extension conference calendar available

Each year the civil engineering section of ISU's Engineering Extension Service publishes a nine-month wall calendar that provides dates and information on conference offerings scheduled from September through May. The calendar also includes meetings of associations related to public works, transportation, construction, land surveying, and civil engineering.

If you did not receive a civil engineering extension calendar last year and would like to have a 1984-85 calendar, call the Info-Line. Those who received calendars last year will be sent one automatically this year. The calendars will be mailed in August.

Tested pavement mix prevents ice formation

A Pennsylvania public works director called it a "magic carpet;" to others it's known as the "iceless pavement." For Iowa's winter weary public works officials, the European developed pavement mix Verglimit® could influence their snow removal methods in the future.

The wonder material that prevents ice formation on roadways has been used to surface approximately 200 sites in the U.S. and Canada. It has been in use in Europe for nine years and was tested by New York's Department of Transportation over a five-year period. It is being manufactured in Japan and Germany. The North American distributor is PK Distributing Company of Hamilton, Ontario.

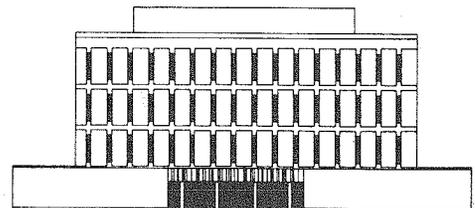
The deicing chemical is composed of flake chloride hydrolized in linseed oil and caustic soda and then mixed at the batch plant with the paving material. Only the top layer needs to contain the Verglimit preparation which, according to manufacturers, will prevent ice buildup for 10 years.

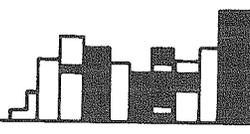
Harry Bisco, Public Works Director in Allentown, Pennsylvania thought enough of the material that he described his year-long test in the August 1983 issue of the *APWA Reporter*. After close observations of the heavily traveled Verglimit-paved city street with a 7 to 8 percent grade, he gave the material rave reviews. Despite precipitation ranging from freezing rain to a 26-inch snowfall, the street received no applications of salt or anti-skid material, yet, according to Bisco, "at no time during the winter was there any problem with vehicles starting or stopping on the surface . . . the two blocks paved with Verglimit performed as well and sometimes better than the blocks that had the chemical applied." Snow and ice do not bind to the surface, Bisco reports.

Although the mix costs about twice that of conventional surfacing material, prices are expected to go down as demand increases. Bisco suggests that it might be feasible for selective applications such as bridge decks, ramps, or dangerous intersections. He concludes: "I can

certainly say that after a year's trial, all of the claims made by the manufacturer have been verified, except the longevity . . . I think this material will be one of the best advancements in road building."

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110 Marston Hall
Iowa State University
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Phone 1-800-262-8498
Program manager—Stan Ring
Coordinator—Dave Dickinson
Editor—Teddi Barron-Penfold
Secretary—Patty Campbell
civil engineering extension





for more information

Starting Shared-Ride Taxi Services: An Operator's Guidebook Published by TRB

Contact James A. Scott, Transportation Research Board, 2101 Constitution Avenue N.W., Washington, D.C. 20418; phone 202/334-2965.

The guidebook incorporates the experiences of several operators and is designed to help potential operators understand the requirements for starting a shared-ride taxi service.

User-Side Subsidy Programs for Special Needs Transportation Prepared for UMTA by Cambridge Systematics, Inc.

Contact Theresa McTague, DTS-243, Transportation Systems Center, Cambridge, Mass. 02142; phone 617/494-2377.

A practical handbook for state and local agencies for planning and implementing short-range public transportation improvements. Provides a framework for program design, presents past experiences, and serves as a resource guide. Orientation is toward special needs transportation.

Community Transit Feasibility Handbook

Prepared by the Chester County Planning Commission (Pa.) for UMTA
Available for \$14.50 from the National Technical Information Service, Springfield Va. 22161 (PB 83-201202).

For municipal officials of towns under 50,000, this nontechnical 144-page handbook is a guide for evaluating the need for public transportation. Includes a step-by-step method of conducting a transit feasibility analysis. When initiating transit, the handbook recommends identifying the most promising ridership situation, devising a system that fits the community's needs, and starting on a modest scale.

Design of Urban Highway Drainage: The State-of-the-Art U.S. DOT/FHWA

Available free from the Info-Line (copies limited).

Engineers or technicians concerned with street design will find this book valuable for the design of runoff, street flow, inlets, and the underground system for collection and disposal of storm water. A compilation of information believed to be the most useful to the considerations of urban storm drainage.

Highway Geometrics, Interactive Graphics, and Laser Mapping Transportation Research Record #923

Available for \$13 from Transportation Research Board, National Academy of Sciences, 2101 Constitution Ave. NW, Washington, D.C.

A collection of 15 papers. Included are: Rehabilitation of existing freeway-arterial highway interchanges; Cost-effectiveness of improvements to stopping-sight-distance safety problems; Current truck escape-ramp technology; Guidelines for the design and placement of curb ramps; and Accident implications of shoulder width on two-lane roadways.

Microcomputers in Transportation: Software and Source Book Selected Readings, Vol. 1-Getting Started in Microcomputers Selected Readings, Vol. 2-Selecting a Single-user System Published by UMTA/FHWA

These three publications are available free from Microcomputer Reports, % Price Williams, 962 Wayne Ave., Suite 500, Silver Spring, MD 20910.

Magazine address correction: American City and County 6255 Barfield Road Atlanta, Georgia 30328

A monthly magazine dealing with local government issues. Subscriptions are free.

APWA Occupational Safety and Health Bibliography: Audio Visual Training Aids

Available free from APWA, 1313 E. 60th St., Chicago, Ill. 60637; phone 312/667-2200.

To assist public works supervisors in their efforts to provide a safe working environment and to avoid potential liability problems caused by unsafe conditions. An excellent safety education reference source, the bibliography includes many training aids available for free loan. Subject areas include asphalt maintenance and construction safety, chemicals, heavy equipment, highway construction, mowing, sewer maintenance safety, and traffic control safety.

conference 1 2 3calendar

SIGOP III June 7, ISU

One-day course for state and local traffic engineering personnel responsible for the development of traffic signal time plans. Topics include: data reduction, input data coding, output interpretation, and computer requirements for SIGOP III. Call the Info-Line for more information.



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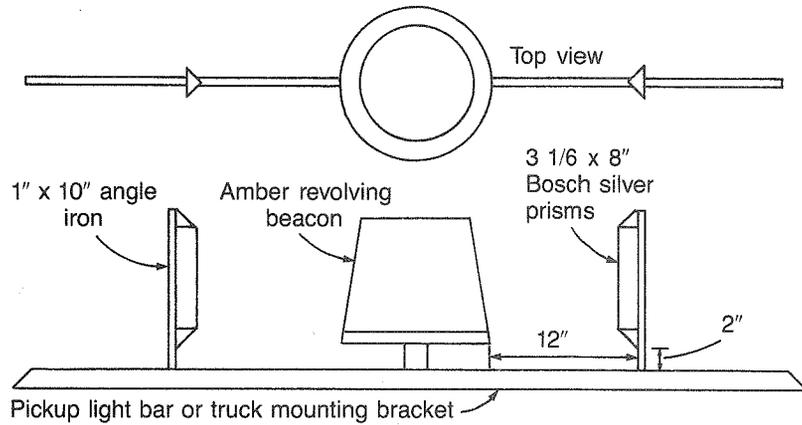
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tips from the field

Through the use of Bosch prisms, the Iowa DOT has developed a new, inexpensive method to improve the visibility of the revolving amber beacons mounted on trucks. The current set-up, used for some time, consists of mirrors mounted to the sides of the beacon to reflect the light behind the trucks. The mirrors have greatly improved the visibility of the lights but suffer from several disadvantages. They are fragile and break easily; they must be adjusted properly to provide the desired reflectance; and they reflect only to the rear of the truck. Furthermore, the mirrors cost \$11.20 per pair.

In comparison, the Bosch prisms are durable and less susceptible to breakage. They are not as sensitive to improper adjustment because the reflection from the prism covers a wider area than the reflection from the mirror. The prisms reflect both to the rear and to the front because of



Truck warning light assembly.

their V-shaped design. And, the prisms are relatively inexpensive, costing only \$1.70 per pair.

The Iowa DOT plans to have the reflectors available soon through their warehouse for purchase by counties and cities. For more information contact Arlo Merritt at the Iowa DOT 515/239-1227.

If you have a piece of equipment, modification, or an innovative technique that would be beneficial to others involved with local transportation systems, please share it with us. Contact Dave Dickinson, Local Transportation Information Center, 110 Marston Hall, ISU, Ames, Iowa 50011.

Posted load limits pay off

An article in a regional FHWA newsletter reports that posting bridge load limits has paid off for a county in Montana. The county posts bridges at the load the bridge elements can handle indefinitely without incurring cumulative structural damage. This extends service life of the bridges because over stressing a member may cause incremental cumulative damage, which leads to failure.

Furthermore, posted load limits relieve the county's responsibility for accidents caused by overload, according to Bernard Lieder, who is a Minnesota county engineer and county road adviser to FHWA Region 5. "The courts are reluctant to impose liability for failure to replace or rehabilitate a deficient bridge and prefer to enforce the responsibility to give fair warning of hazard. The traveler has a right to assume unposted bridges are adequate," Lieder writes.

The Montana county has successfully recovered damages from overload accidents. When a ready-mix truck disregarded a 5-ton limit sign, an old timber bridge collapsed. Without litigation the \$9,572 replacement costs were recovered. And, when a truck crane collapsed a 9-ton posted bridge, the county

recovered costs of a bypass and the value of the bridge.

Posting bridges not only increases the useful life of bridges and helps replacement and rehabilitation planning, but it also fulfills responsibility to inform users of potential hazards and fixes liability for damages, Lieder says.



Posting load limits on bridges protects the traveling public, the county, and the bridges.

Paving fabrics useful over longitudinal joints or cracks

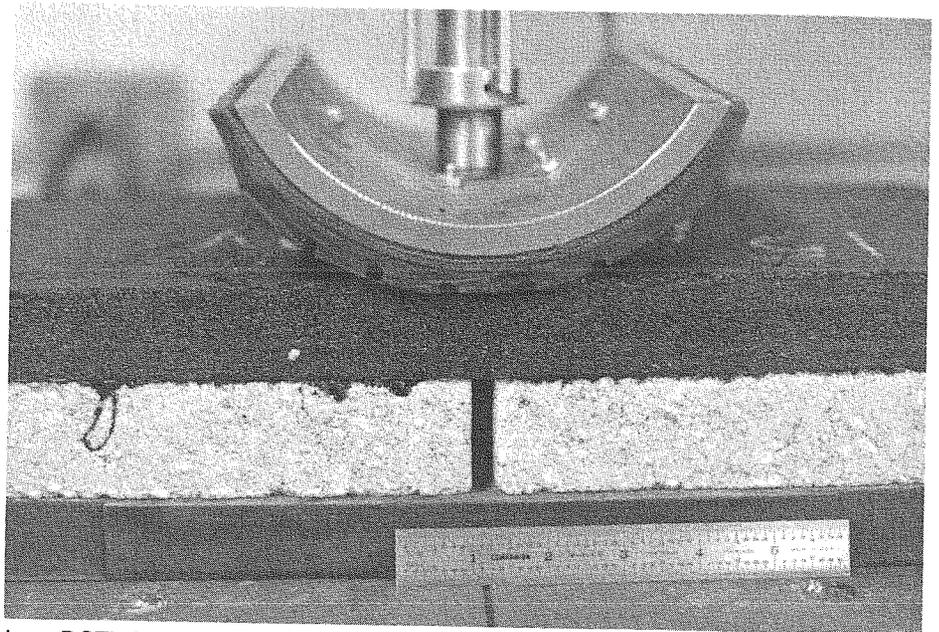
Throughout the U.S. there is increased usage of fabrics to reduce or retard reflection cracking in asphaltic concrete overlays. To establish their performance under varying conditions, considerable field testing is conducted. Cost effectiveness also is under scrutiny.

Reflection cracks in a pavement overlay are the result of and reflect the crack or joint pattern in the underlying layer. The problem is serious since the reflected cracks can cause early deterioration of an overlay, decrease its useful life, and increase maintenance costs. Despite the amount of field experimentation the problem persists.

For the success of any fabric interlayer system, it must be firmly bonded with adequate tack coat to both the overlay and the existing pavement. Reflection cracking in the overlay then develops from one of three types of movement of the underlying pavement: thermally induced, differential vertical movement at a crack or joint, or live load flexural fatigue. Because thermally induced movement is the most difficult to contain, it is the principal cause of transverse reflection cracking.

Because the magnitudes of the thermal stresses associated with underlying transverse cracks and joints are great, they cannot be contained by most fabrics. It has not been feasible to control the three types of movement that result in reflection cracking. Therefore, attempts to prevent and, in most cases, to retard such reflection cracking with fabrics generally have not succeeded.

The reduction or delay of reflection cracking over longitudinal cracks or widening joints seems to be the most effective use of paving fabrics because thermal strains are minimized in the transverse direction. If fabric reinforcement is to be practical and/or cost effective, it must perform where longitudinal reflection cracking is measured. Most Iowa DOT primary projects that required



Iowa DOT's fatigue flexural testing machine determines the relative merits of various fabrics used under asphaltic concrete overlays.

fabric reinforcement specified a two-to four-foot-wide strip over longitudinal joints or cracks.

The principal advantage of using fabrics in distressed areas is to keep surface water out of the base. The benefits of asphalt-saturated fabrics in retarding penetration of surface water have been recognized by some agencies. It is possible to find reflection cracks in fabric reinforced overlays without rupture of the asphalt-saturated fabric. In other words, the water barrier is still intact until the crack width exceeds the strain limit of the fabric. However, it should be noted that placing a water barrier between the overlay and the cracked pavement can cause problems where surface and subsurface water is available from outside the pavement area. The use of fabric to retard penetration of water cannot replace good drainage design.

Fabrics have not proven effective in reducing reflection cracking where vertical joint movement (differential deflection) is a significant factor. Such cracking is fatigue in nature and will develop under repeated wheel loadings. The DOT's Materials Laboratory has developed a fatigue flexural testing machine to determine the cycle life of fabric reinforced asphaltic concrete test specimens. A

concrete slab with a simulated quarter-inch crack is placed on a neoprene base. It is tacked and then covered with the fabric and asphaltic concrete overlay. The test is performed by applying, and then completely releasing, a 1,000-pound load every six seconds and determining the number of loading cycles necessary for a reflection crack to develop full width on the overlay surface, over the crack in the slab. This test has been instrumental in determining the relative merits of different brands and grades of fabric.

Proper preparation of the surface is critical to the performance of fabric interlayers. All potholes and large cracks must be filled by acceptable practice. When overlaying PCC, the cracks should be filled and the slabs stabilized to minimize differential vertical movement of the slab.

The necessary amount of tack coat varies from one fabric to another. It is critical to use the proper amounts. The fabric selected needs adequate strength and elongation for effective reinforcing properties. It must be heat resistant to avoid damage from the hot mix.

**Bernie Brown, testing engineer,
Iowa DOT.**

DOT's patch mixture alternatives

In our efforts to develop a more uniform specification for standardizing our patching materials, the Iowa Department of Transportation has adopted three specifications for patch mixtures.

The same aggregate requirements are specified for all mixtures with the following gradation limits:

Sieve size	Percent passing	
	Min.	Max.
1/2	100	
3/8	90	100
No. 4	10	55
No. 8	0	20
No. 30	0	7
No. 200	0	1.5

The specifications differ only in bitumen and production procedure. Bitumen can be a standard MC-250, a HFE 2000 emulsion, or a high performance blend marketed by "Sylvax." Some central office guidelines on use of the high performance mix are given to the maintenance area supervisors who then decide upon the type of mix to use.

It has been our experience that these cleaner mixtures are more workable and perform as well if not better than some of the finer mixes we have used in the past. Also, these cleaner mixtures require considerably less bitumen than the fine mixes do.

For the 1983-84 season, our bid price per ton for patching mix delivered to the various maintenance facilities has been in the range of \$33 to \$45 for standard MC-250 mix, \$40 to \$60 for the emulsion mix, and \$80 to \$95 for the high performance mix.

For a complete copy of the paper on cold mix patching that I presented to the 1983 Asphalt Conference, call the Info-Line 1-800-262-8498.

**R.A. Shelquist, bituminous engineer,
Iowa DOT.**

Combined engineering office saves money in Burlington

An innovative arrangement between the City of Burlington and Des Moines County has streamlined engineering operations and saved the city money.

Under a 28E Agreement, the city engineering responsibilities have been placed under the county engineer. The new concept resulted from a vacancy in Burlington's city engineer position and a search by

the city for more efficient and less costly methods of handling its engineering challenges.

The partnership has been in effect for about nine months. According to Des Moines County Engineer S.J. (Whitey) Klassen, the change has been a good learning experience. "The office has had to do a better job of planning everyday operations to include the added responsibilities," Klassen says.

Klassen believes this type of arrangement offers an additional benefit to cities of Burlington's size (30,000) or smaller. "Smaller towns could benefit by having an engineer available for consultation. Consultants can be used for unusual projects at less cost to the city, and the more routine projects can be worked into a local schedule," Klassen says.



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