

roads bridges transit technology

news

Local Transportation Information Center
Iowa State University Engineering Extension Service

August 1983

New pavement marking material to be demonstrated in Des Moines

A versatile and durable new pavement marking material will be demonstrated September 29 on the Des Moines freeway. The FHWA-sponsored demonstration of Epoxy Thermoplastic (ETP or Epoflex) will be hosted by the Iowa DOT.

The new pavement marking material, an epoxy resin based thermoplastic, was developed jointly by the Southwest Research Institute and the FHWA. It has been field tested throughout the country for more than two years. According to U.S. DOT and FHWA, field test results point to several superior qualities of ETP.

Depending on traffic and weather conditions, ETP lasts from two to ten times longer than traffic paint. One application of the new material has successfully survived two Minnesota winters without need for touch up work. Although initially more expensive than traditional materials, such durability makes ETP cost-effective in the long run.

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.

The material also has excellent adhesion properties. Without priming, it adheres as well as or better than other marking materials on both asphaltic concrete and portland cement concrete pavements.

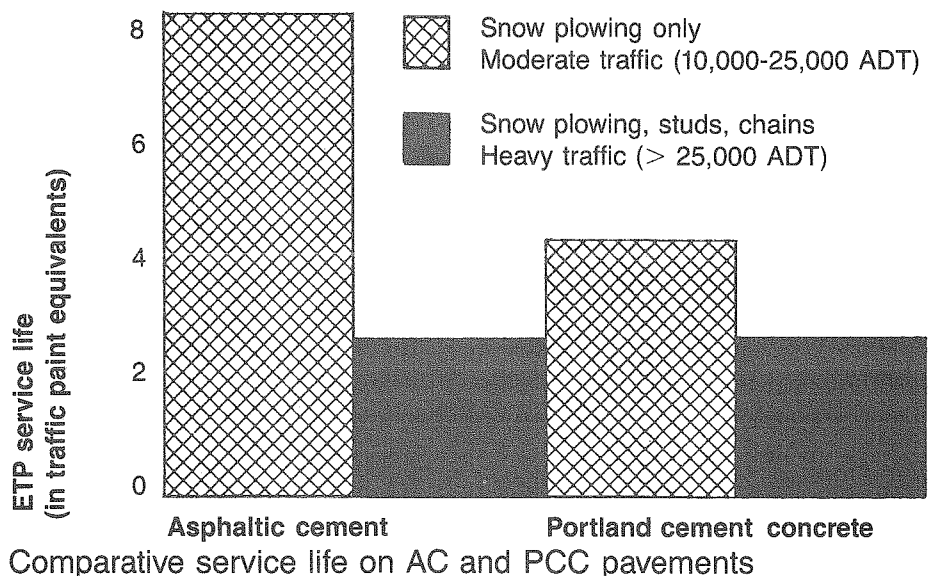
Another advantage of ETP is fast drying time. Freshly applied ETP can be exposed to traffic in five seconds. This capability allows agencies and contractors a cost savings in traffic control because no cones, traffic signs or backup vehicles for diverting traffic are necessary.

Unlike traffic paint, ETP contains no solvents or volatile components because it is a

100 percent solid material. It is virtually smokeless on application and gives off no air pollution.

ETP comes premixed from the manufacturer and can be applied with modified conventional equipment used for hot (440-460^o) applied thermoplastic. Furthermore, it can be applied at temperatures down to freezing, thus extending the striping season.

For more information about the specific location and time for the demonstration on September 29 in Des Moines, contact Vernon Marks, Iowa DOT, 515/239-1447.



Appropriate technology: ISU studies low water stream crossings

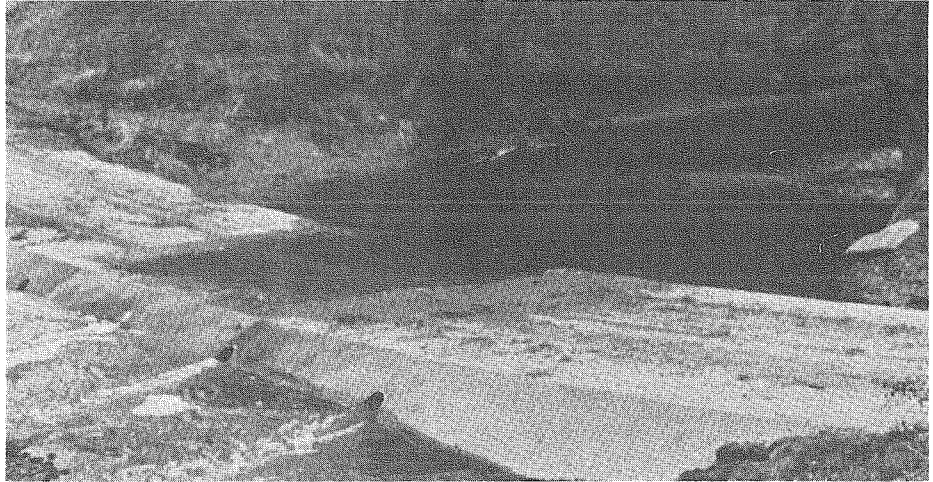
When replacing inadequate or obsolete bridges with structures of the same size, counties and cities face large capital expenditures. Such expense may be difficult to justify if the road is primitive or serves only as a farm access.

An economical alternative may be a low water stream crossing (LWSC). It could be appropriate when a crossing designed for insufficient hydraulic capacity can be closed several times a year. However, the potential liability that might be incurred from the use of LWSCs has been a deterrent to their use. Furthermore, guidelines for traffic control devices specifically for LWSCs have not been developed.

These liability and traffic control problems of low water stream crossings were addressed in an Iowa Highway Research Board study completed recently by ISU's R. L. Carstens and Richard Yun-Hao Woo.

The research concluded that although a potential exists for LWSC related accidents and liability claims, it could be reduced to within acceptable limits if adequate warning of the LWSC were used. According to the report, the potential for accidents and liability could be reduced further if vehicular usage were prevented when the road was flooded. In such conditions, says the report, the potential for liability from the use of an LWSC on an unpaved, rural road would be less than that resulting from the continuing use of an inadequate bridge.

The report also recommends that LWSCs be used only on unpaved roads and not in locations where flooding would deprive residences of emergency ground access.



LWSCs are designed so that hydraulic capacity will be insufficient a few times during a year of normal rainfall. This design concept contrasts with the practice of designing for a possible flood every 20 years.

The final report, "Liability and Traffic Control Considerations for Low Water Stream Crossings," is available from Vernon Marks, Iowa DOT, 515/239-1447.

The Iowa Highway Research Board also has funded a separate study on the design of LWSCs. This study is being conducted by ISU's Ron Rossmiller, and will be reported in Technology News when more information is available.

Geotextiles workshop set for Ames, Bettendorf

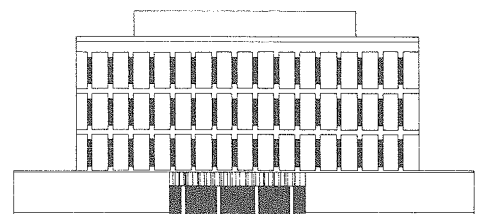
In recent years, geotextiles have been used successfully in asphalt overlays, as filters for underground drainage, for silt fences, and in many other construction applications. Although much has been written about geotextiles, many people working in transportation at the local level have requested more information.

A workshop on "Application of Geotextiles in Engineering" will be held November 9 at ISU and November 10 at Jumar's Castle Lodge in Bettendorf. The workshop will provide detailed information on the correct usage and appropriate specifications for geotextile applications. Course notes and manufacturers literature will be distributed. For more information, call the Info-Line.

Technology News is published by the Local Transportation Information Center Engineering Extension Service
110 Marston Hall
Iowa State University
Ames, Iowa 50011
Phone 1-800-262-8498

Director—Stan Ring
Coordinator—Dave Dickinson
Editor—Teddi Barron-Penfold
Secretary—Patty Campbell

civil engineering extension



Program promotes rail crossing safety

Iowa Operation Lifesaver is a multi-faceted program designed to facilitate engineering, enforcement and educational efforts to improve rail/highway safety. Coordinated through Iowa DOT, it is a cooperative program involving state and federal agencies and private organizations concerned with transportation safety.

Operation Lifesaver's educational materials include a 13 minute film, "Keep Track of Trains," brochure, bumper sticker and decal.

The program also promotes communication with citizens. Through phoned or written reports, citizens can notify DOT of rail crossing problems. Such reports may include the location of an unsafe crossing or malfunctioning signal, a request for installation of a crossing sign or signal, or information about frequently blocked crossings.

In addition, Operation Lifesaver program representatives may be scheduled to discuss rail safety considerations with citizen groups.

According to Iowa Operation Lifesaver Coordinator Betty Baird, local highway authorities can be instrumental in bringing these educational efforts into their communities. The program welcomes the ideas and assistance of local citizens, businesses and government officials.

For more information about this vital safety program contact Betty Baird, Iowa DOT, Office of Safety Programs, Lucas Bldg., Des Moines, Iowa 50319; phone 515/281-8478.

Maintenance personnel at Iowa DOT have developed a useful piece of equipment. It is a pushcart used for transporting a plate tamper between pavement patches. The pushcart eliminates the need for loading the plate tamper on a truck.

The cart is constructed of an angle iron and pipe frame mounted on two small wheels. It could easily be manufactured in your shop or by a local welding shop.

If you would like more detailed information about the tamper push cart, call the Info-Line.

If you have a piece of equipment, modification or an innovative technique that would be bene-

tips from the field

ficial 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.

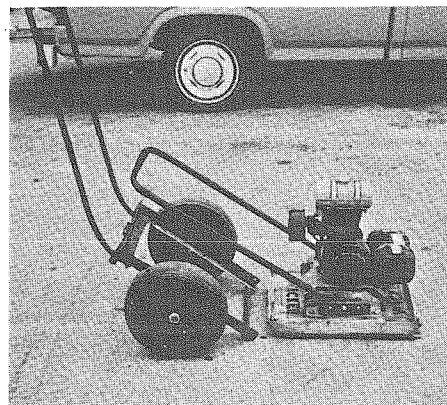


Plate tamper pushcart

Info-Line Update

The Local Transportation Information Center staff now has some experience answering Info-Line calls. It is hoped that requests for publications or reference sources have been and will continue to be handled relatively quickly. However, requests requiring the services of a resource specialist may require considerable time and effort. It is anticipated that a specialist will contact callers as soon as possible to discuss complicated requests and to develop a time schedule for additional assistance.

Keep in mind that the Info-Line does not provide "consulting" services. A request requiring the amount of time and expertise traditionally associated with consulting firms probably is of a magnitude

not suitable for the Local Transportation Information Center. The Center will, however, help assess the problem and refer an agency or association who can recommend appropriate consultants. —Stan Ring, Director

the crack if the crack is filled during cool temperatures.

This type of crack sealing with liquid emulsion may need to be repeated two or three times on an annual basis to adequately seal the crack the full depth of the pavement. After the crack is well filled, the surface can then be more permanently treated with a high joint sealant with cold weather elasticity to stretch and compress as the pavement structure moves.

The longevity of asphalt pavements is directly related to the quality of construction and the quality of maintenance. Filling and sealing cracks of all sizes must be a regular part of a street and highway maintenance program if we are to expect maximum longevity. Repeated fog seals, seal coats, and crack cleaning are the important parts of this program. —Robert Samuelson
Iowa DOT



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for more information

The FHWA recently published a new **audio-visual directory** of films, slide/tape presentations and videotape programs available on a free loan basis through their Ames division office. Subjects include traffic control, surface maintenance, bridge deck construction, concrete mixes, construction safety and many others. The directory is available free from the Local Transportation Information Center. Call the Info-Line to request a copy.

An **Infrastructure Information Kit** is available free of charge to ASCE members and to others interested in communicating the problems facing the nation's public facilities and the essential role of the civil engineer. The kit includes materials useful as handouts or in meetings, speeches or other presentations to civic and business groups.

Contact: ASCE-Iowa Section or Nance E. Berson, Field Services, ASCE, 345 E. 47th St., New York, New York 10017; phone 212/705-7207.

The Urban Mass Transportation Administration has prepared a guidebook for transit agencies and metropolitan planning organizations that provides **technical guidance for planning fixed-route services for handicapped persons**. Each of seven key planning areas is discussed in a separate chapter. They are: citizen participation, vehicle procurement and facility improvements, service planning and operations, maintenance, training, marketing, monitoring, and evaluation. The guidebook includes sample forms and training materials as well as lists of information sources. Single copies free. Write: Technology Sharing Program, Office of the Secretary of

Transportation, U.S. DOT, Washington, D.C. 20590. Request "Planning for the Phase-In of Fixed Route Accessible Buses." Include a self-addressed mailing label.

Pavement Patching Guidelines provides how-to recommendations for both hot mix and cold mix materials. This FHWA manual describes techniques of constructing permanent patches for hot and cold mix and a temporary patch using a cold mix. Patching of flexible, rigid, and composite pavements is discussed. Techniques include use of bituminous and portland cement patching materials. Pavement distress and causes are indexed to the recommended repair procedures. A valuable resource for those concerned with street and road maintenance. Well illustrated, 72 pages. Available free from the Local Transportation Information Center. Call the Info-Line to request a copy.

FHWA and U.S. DOT have published a **two-volume technology sharing report, Synthesis of Safety Research Related to Traffic Control and Roadway Elements**. It provides public officials, highway administrators, engineers and researchers with factual research findings on the safety effects of specific design and control features. The research summaries cover 17 subjects including intersections, on-street parking, roadway lighting, railroad/highway crossings, bicycle ways, speed zoning and control, one-way streets, and pavement surfaces. This comprehensive reference source is available free from the Local Transportation Information Center. Call the Info-Line to request a copy.

Asphalt pavement failure can be avoided

Officials responsible for maintaining asphalt streets and highways face a severe test. Although our extensive system of streets and highways must be maintained to carry increasingly heavy loads, the user is becoming more concerned about the amount of taxes paid to fund the system. The answer is to upgrade maintenance programs and switch from stop gap measures to a long-term maintenance plan that is directed to extending pavement service life.

From crack to pothole

Most failures in asphalt surfaces begin with a minor crack or series of cracks. These cracks can progress to secondary cracking and depressions or bumps which increase impact loading; and then progress further to potholes and total failure. Proper crack maintenance can minimize or prevent many of these failures.

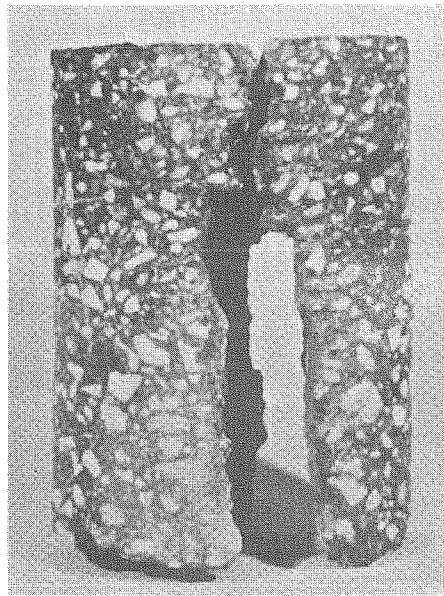
Cracks in asphalt surfaces are a result of fatigue, thermal expansion and contraction, and weathering.

Weathering, fatigue cracks

The first signs of weathering or fatigue cracks may be a mere shadow of moisture when the pavement surface dries following a rain. Unless these cracks are treated immediately, they will progress by raveling (due to frost and repeated wheel loads) until spalls develop. These will deepen and lead to the ponding of water that will penetrate the pavement, soak up the base and eventually cause pavement failure.

Thermal cracks

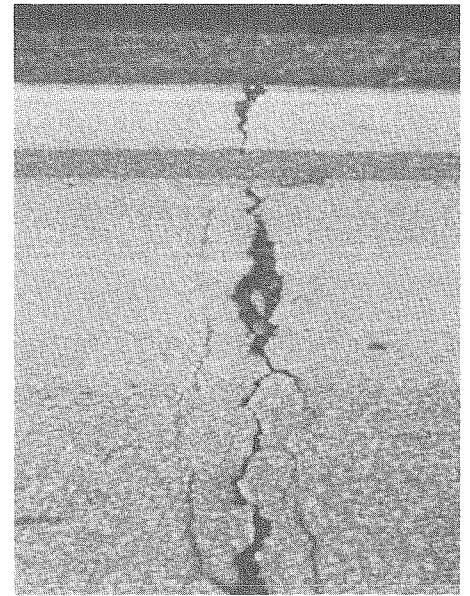
Thermal cracks develop as temperatures cause expansion and contraction of the pave-



ment. These cracks generally penetrate full thickness of the pavement. Thermal cracks less than one-quarter inch wide may not be visible at legal highway speeds but they will allow large quantities of moisture to enter the surface and penetrate the base. Moisture entering the small cracks will freeze and expand, fracturing the asphalt pavement structure. Repeated axle loads over this saturated and fractured area will cause the free moisture to flush the asphalt cement and fines from the mix and carry it away leaving voids. These voids will cause secondary cracking on the surface and dips over the cracks.

Stop moisture penetration

The excess moisture that flows through the pavement, saturating the base and subgrade causes frost heaves in the winter and instability following rains. The moisture works like a cancer, destroying the structure needed to support the loads. This moisture must be kept out of pavements.



This improperly sealed transverse joint has allowed moisture to penetrate. Deterioration of surrounding pavement is due to freeze-thaw cycles and the pumping action caused by wheel loadings. Note the well sealed longitudinal joint which does not show the same deterioration.

Early signs of weathering or fatigue cracks are a sign that surface maintenance is needed. A minimum treatment would be skin patching the smaller areas or fog sealing the entire pavement surface. In some cases where this type of stress is progressing rapidly, a seal coat may be appropriate. The purpose is to fill these small shallow cracks and seal them off before moisture can penetrate the surface and cause further damage.

Clean, fill, and seal

Thermal cracking also must be sealed to prevent moisture from entering the crack. These cracks should be sealed when they first appear. Filling the crack with a liquid bituminous material such as an emulsion can be best accomplished after the crack has been thoroughly cleaned with high pressure water and/or high pressure air. This will allow the liquid material to flow deep into

conference 28 29 30 1 2 3 calendar 4 5 6

Summary of Census Information and Uses Training Course

Aug. 29, DOT, Ames

For managers and supervisors of the urban planning processes.

Topics: explanation of the Urban Transportation Planning Package including its development, data collection process and structure; how to use the data in transportation planning models; structure of the data tape; planning local data needs to take advantage of the 1990 census. 9 a.m. to 4 p.m., no charge. Call 515/239-1669 to register.

Iowa Snow Conference

Oct. 7, ISU

Topics: improved techniques for plowing, sanding, chemical use, and drift control. Management ideas for scheduling and routing. New equipment update. An important conference for those involved with snow control and removal. Sponsored by the Local Transportation Information Center, the APWA, and Iowa organizations concerned with snow control. Call the Info-Line to request registration information.

Iowa Traffic Control and Safety Conference

Oct. 13-14, Cedar Rapids

Topics: flashing traffic signals, seat belt use, drunk driving, accidents, tort liability, urban highway design, personal stress. Exhibits. Co-sponsored by the Iowa Traffic Control and Safety Association. Call the Info-Line to request registration information.

ASCE Transportation Conference

Oct. 26, ISU

Topics: updates on planning, safety, design, construction, maintenance and operation practices for highways, rail, air, and water facilities. Co-sponsored by ASCE, presented by Engineering Extension Service. Call the Info-Line to request registration information.

Planning for Urban Drainage

Nov. 7, ISU

Topics: stormwater management, on-site and watershed level planning of facilities, impact, methodologies, data needs. Call the Info-Line to request registration information.

Geotextiles in Engineering

Nov. 9, ISU

Nov. 10, Bettendorf

Topics: design, analysis and specifications for geotextile applications. Extensive course notes provided. Call the Info-Line to request registration information.

Street Maintenance for Small Communities

Nov. 11, Ankeny

Topics: maintenance of concrete and asphalt streets. Detailed course notes provided. Co-sponsored by the APWA-Iowa section. For registration information call the Info-Line.

Iowa Good Roads Association Annual Meeting

Nov. 17-18, Cedar Rapids

Topics: road repair funding needs, relationships between state and federal road funding, ideas for providing state funding, discussion of the constant dollar plan for stabilizing fuel tax on gasoline and diesel. For registration information, contact Chet Sloan, IGRA, 418 Empire Bldg., Des Moines, Iowa 50309; 515/288-0572.



engineering extension service
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