

roads bridges transit technology news

Local Transportation Information Center
Iowa State University Engineering Extension Service

September 1985

Agencies providing transit services must be certified

In an attempt to increase the effectiveness of public transit service in Iowa, the DOT's Public Transit Division conducted a survey a few years ago to identify all transit activities and programs that funded public transit services.

The survey showed that a myriad of funding programs administered by separate agencies had resulted in duplication and lack of coordination among publicly funded transportation services. In general, these were human service programs that funded transportation as a support service (Headstart, Medicaid, nutrition for the elderly, etc.). Separate programs spawned separate transit systems, often operating below capacity over the same routes.

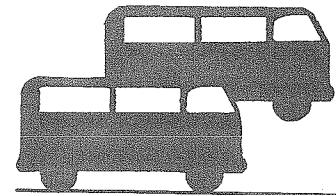
Based on the survey, the Iowa General Assembly enacted a law to eliminate the duplication. The law requires that all publicly funded transportation services be coordinated through a single administrative agency, designated by local policy officials in each community of more than 20,000 and in each of the Governor's 16 designated planning regions. The Iowa DOT was assigned the responsibility to administer the law.

Although the new law met with some success, there was no sufficient inducement for the uncoordinated transportation providers to give up their autonomy. The law needed to be strengthened if the intent of the legislation was to be enforced.

At the recommendation of the Iowa DOT, the Iowa General Assembly recently strengthened the law to prohibit the use of funds for transportation not in coordination with one of Iowa's recognized public transit systems.

The new law requires the state comptroller to withhold state funding from any agency providing publicly funded transit services not coordinated with the local urban or regional transit agency. The law also required that the Iowa attorney general seek injunctions blocking federal or local public funding for the uncoordinated transit providers. Transportation funding for these non-coordinated agencies is to be reduced by 10 percent during FY 1986. An additional 20 percent of funds will be cut the following year, an additional 30 percent during the third year, and the remaining funds in the fourth year if transit activities remain uncoordinated. Any funds thus diverted will be redistributed to eligible agencies that are coordinating their transit services.

Under the new law, the Public Transit Division was given the responsibility for determining which agencies are in compliance with the coordination requirements and which agencies would be subject to funding sanctions. The Public Transit Division has worked closely with other state agencies in formulating administrative rules under which to administer these provisions. The administrative rules establish an annual



certification process for all agencies providing transportation services. An agency can be classified as follows: **Exempt**, if its transportation needs cannot reasonably be performed by public transit systems or if its transportation services are exempt by law; **Compliant**, if it has met the requirements of the rules and has coordinated client transportation with the public transit system; and **Compliant with waiver**, if it has met the requirement of the rules but the Iowa DOT has determined that existing conditions justify a delay in the coordination.

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Signs offer a high return on investment

Part IIC of the *Manual on Uniform Traffic Control Devices (MUTCD)* covers the use of most warning signs. In this part, the *MUTCD* lists and describes only signs that "may" be used, none that "shall" or "should" be used. As a result, engineers responsible for traffic control have wide latitude in determining whether or not to use warning signs in particular situations.

While the *MUTCD* does not mandate the use of most warning signs (the railroad advance warning sign, covered by another part of the *MUTCD*, is an exception), the Iowa Supreme Court has ruled that strict conformance with the sign manual may not be good enough. In *Schmitt v. Clayton County*, the court stated the issue as follows:

We find it sufficient to note that the duty of the county is of a general nature, involving the exercise of due care under the circumstances to warn traffic of changing or dangerous road conditions.

The court further stated that compliance with the *MUTCD* is not necessarily sufficient to demonstrate reasonable care.

This issue became relevant in a lawsuit that was filed against a county in Iowa as a result of a single-vehicle accident in which six young people lost their lives. The four-wheel drive vehicle in which they were traveling at a speed of about 80 mph failed to negotiate a curve on a loose-surfaced road. After sliding 179 feet on the road and 174 feet in the ditch, their vehicle vaulted across a small stream and caught fire, incinerating the passengers. No warning signs were posted in advance of the curve.

A speed of 35 mph would be recommended on this curve. Although practices among Iowa counties vary, about 75 percent would probably use a curve warning sign at a similar location. Some counties might also use a speed advisory plate. Failure to use these

two signs became the principal issue in this lawsuit. The case eventually was resolved without trial when a high six-figure settlement was offered and accepted.

Our research has failed to demonstrate any significant correlation between the use of warning signs and safety. It has, however, shown a correlation between the use of warning signs and the amount paid in damage claims from highway accidents. Although the presence of a curve warning sign probably would not have prevented this accident, it might have saved the cost of the settlement, an amount sufficient to buy and install about 10,000 signs. Few other investments offer the potential for such high returns.

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



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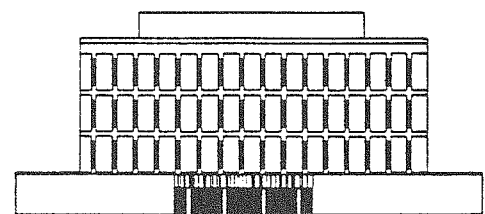
And justice for all

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civil engineering extension



tips from the field

A pickup mounted hoist is being used by the Fremont County Secondary Road Department for loading and unloading items such as oil drums, large tires on rims, and other heavy equipment parts. The hoist was developed by shop mechanic Rich Barrett, who got the idea from a magazine article describing how to construct a similar device.

The hoist consists of three main parts: a base that mounts in a pickup box, a mast, and a boom. The base is fabricated from $\frac{3}{8}$ inch steel plates and holds a 4 inch ID pipe that acts as the mast's sleeve. The base is bolted to the pickup box, and can be easily removed when not in use.

The mast is a $3\frac{1}{2}$ inch ID pipe with gussets welded to it to support the hoist jack. The boom consists of square steel tubing, and is hinged to the mast with a $\frac{3}{4}$ inch bolt supported by steel plates welded to the top of the mast. By using two different sizes of tubing (3 inch and $2\frac{1}{2}$ inch), the boom can be made with a variable length of reach. Plates are welded to the larger boom near the mast to support the ram of the jack. A plate with a hole to receive and lock in a hoisting chain is welded to the end of the smaller tubing. Both tubes are then drilled at regular intervals so that the smaller tubing can slide out for a longer boom reach. A bolt through both tubes is all that is needed to secure the boom length.

A standard three ton jack is used to raise the boom arm and the load. The boom is free to swing a full 360 degrees. The mast sleeve is

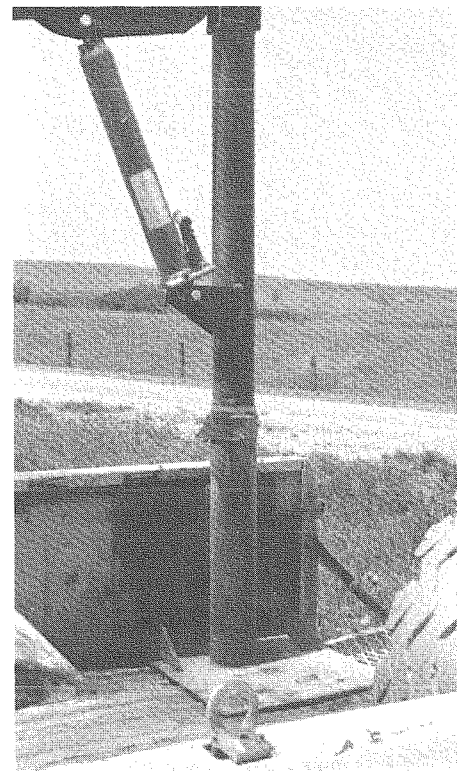


Fremont County mechanic Rich Barrett with his "homemade" pickup mounted hoist.

equipped with a grease zerk for lubrication, and a rubber collar at the joint to preclude rainwater entry.

The pickup mounted hoist can easily load and unload 1,000-pound items into and out of the pickup. It has saved manpower and backs, and would be a worthwhile addition to many equipment maintenance shops. Materials for the apparatus cost approximately \$200 including the jack. It takes an estimated eight hours to construct.

For more information contact John Moody, Local Transportation Information Center, Haber Road, Iowa State University, Ames, Iowa 50011, phone 1-800-262-8498; or Dale Miller, Fremont County Engineer, Route 2-Box 19, Sidney, Iowa 51652, phone 712-374-2613.



A zerk fitting is used to lubricate the mast and a rubber collar keeps out the rain.

Discouraging performance by geofabrics in recent tests

Research projects conducted by the Iowa Department of Transportation and several Iowa counties have shown that the use of engineering fabrics, or geofabrics, in pavements may not be as effective as originally had been hoped. Although geofabrics showed impressive results in an initial application, additional tests have not been as promising.

Geofabrics are usually made of a synthetic material that is prepared in long sheets. The fabric is designed to provide a strong binding force in a variety of situations, and the mesh-like design allows air or water, but not other materials, to pass through.

One theory that was being tested in several of the projects was the claim that applying the fabric over cracks as a "reinforcement" between the pavement and the asphalt overlay could prevent reflective cracking in the surface asphalt. The theory was that, by tying the underlying PCC slabs together with the fabric, movement would be reduced and the cracks would be stabilized.

Thus far, however, the results of these tests have been disappointing. Although the geofabrics do tend to retard the speed with which the asphalt cracks, they do not successfully prevent it from doing so.

Geofabrics also have been experimented with as a means to save money and materials. In a Jones County project, the fabric was incorporated into the asphalt layer in a one-to-one replacement ratio. The assumption was that the fabric would offer a tensile strength equal to or greater than that of the asphalt it replaced, thus producing a strong pavement overlay at a much lower cost. The results, however, revealed that the fabric did not have the tensile strength necessary to effectively replace the asphalt, and that it was torn when reflective cracks began to appear. (See the For More Information column in this newsletter for a description of this study's final report.)

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An example of the compliant with waiver status might be a public transit system that is unable to handle the additional volume and needs time to obtain additional vehicles and equipment, in which case a transition period is appropriate. Only those determined to be non-compliant are subject to the sanctions of the new law.

The annual certification process also includes minimum safety and quality of service standards to ensure that all transportation services are operated in a safe and responsible manner.

The Public Transit Division is now in the early stages of contacting all agencies receiving federal, state, and local funding for transportation services to notify them of the new requirements and to begin the certification review process.

Candace A. Bakke, director, Public Transit Division, Iowa DOT

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detectability and recognizability of signs such as "Merge Right," "Merge Left," and "Stop Ahead." The report concludes that the processing of a "Stop Ahead" sign by the driver's mind is never as precise nor as critically defined as the stop sign itself. Therefore, it is not crucial to the driver information in detecting a stop. Furthermore, driver decision reaction times in making a conscious decision to take a driving action based on the type of sign seen leads to the conclusion that given a choice, a sign design or combination that provides both word and symbol elements in the message is more effective in communicating with the driver. The report also determined that driver errors in recognizing signs, once a sign is detected, are lower for signs requiring stop action than those requiring the driver to either slow or move laterally. Errors in perceptual recognition operations are more likely to occur within the first 50 milliseconds of viewing time.

Upcoming events

League of Municipalities Annual Meeting

September 25-27, Cedar Rapids
Call 515-265-9961 for information.

Bridge Maintenance Training Workshop

September 30-October 4, DOT, Ames
Call 515-239-1663 for information.

ASCE-Iowa Section Annual Meeting

October 10-11, Des Moines
Call 319-393-1463 for information.

Iowa Municipal Finance Officers Workshop

October 23-25, Des Moines
Call 515-265-9961 for information.

ISBEE Fall Exams

Principles and Practice
October 25, Ames
Fundamentals
October 26, Ames and Iowa City
Call 515-281-5602 for information.

Iowa Good Roads Association Annual Meeting

November 21-22, Des Moines
Call 515-288-0572 for information.

Asphalt Paving Association of Iowa Annual Meeting and Convention

December 5-6, Des Moines
Call 515-244-3127 for information.



Transportation Info-Line

Call John Moody toll-free
1-800-262-8498

In Ames call
294-8815

**Road Surface Management
for Local Governments**

Order # DOT-I-85-06

Available free from Technology Sharing Program (I-30 MG), Office of the Assistant Secretary for Governmental Affairs, U.S. Department of Transportation, Washington, D.C. 20590.

Include a self-addressed mailing label when ordering.

This 114-page report explores the application of pavement management techniques to the needs of local governments, including the management of light-type pavements and unpaved surfaces. It includes six detailed case studies of good road surface management practices and intergovernmental cooperation. The publication also discusses some general procedures that might be used in priority setting and establishing agendas for highway maintenance or reconstruction.

**Pavement Maintenance and
Rehabilitation: Techniques
Using Asphalt**

Available from Martin Lacy, Institute of Transportation Studies, 416E McLaughlin Hall, University of California, Berkeley, California 94720; phone 415-642-3558. The price is \$12 plus postage and handling (\$1.75 for one copy, \$4.25 for 2-5 copies, \$7 for 6-10 copies).

All aspects of pavement maintenance are addressed in this 98-page report including pavement technology, asphalt as a material, pavement management systems, rehabilitation options, methods of life-cycle cost analysis, recycling procedures, specialty maintenance products, and rating methods. Four maintenance activities (crack filling, surface sealing, patching, and the use of asphalt in rigid pavement maintenance) are explained and illustrated in detail. Written in easy-to-understand language, the publication is comprehensible for readers without technical backgrounds.

**APWA Street and Highway
Maintenance Manual**

Available from the American Public Works Association, 1313 East 60th Street, Chicago, Illinois 60637-2882. The price is \$50.

An update of the APWA's 1963 guide, this 550-page manual is a valuable tool for street maintenance officials. This practical publication provides state-of-the-art information on management practices and operations. Chapters correspond to the program responsibilities of many street maintenance organizations and include forms, operating procedures, and standardized repair methods that can be photocopied for easy reference in the field.

The following are new research reports recently approved by the Iowa Highway Research Board.

Strengthening of Existing Single-Span, Steel-Beam, Concrete-Deck Bridges

For more information, contact F. W. Klaiber, Department of Civil Engineering, 424 Town, ISU, Ames, Iowa 50011.

Phase III of this project involves development of a design methodology for the practicing engineer to use in the design of a post-tension strengthening system for concrete deck, steel I-beam bridges. The research project also included reanalysis of two bridges that had been strengthened two years ago. The strengthened bridges were retested to determine changes in their behavior, any decrease in the post-tensioning force originally applied, and the existence of end restraint. This report continues Phase I of the same project.

Asphalt Emulsions for Highway Construction in Dubuque County

For more information, contact Kevin Jones, Office of Materials, Iowa DOT, Ames, Iowa 50010; 515-239-1382. Asphalt emulsions were used to construct an asphalt emulsion bound

secondary road in Dubuque County. Three nonwoven engineering fabrics were incorporated into the project along with five different bituminous materials and seven different aggregates. The emulsion treated macadam base beneath an asphaltic wearing surface yielded a higher structural rating than the plain macadam beneath the comparable asphaltic concrete surface. The performance of the engineering fabric between the subgrade and the macadam base could not be determined using the nondestructive tests conducted. Other conclusions and discussion of the project are included in the final report.

Reducing the Problem of Transverse Cracking in Full-Depth Asphalt Cement Concrete Pavements

For more information, contact Vernon Marks, Research Engineer, Iowa DOT, Ames, Iowa; 515-239-1447.

Several combinations of full-depth ACC pavement were constructed by the Iowa DOT on Highway 64 in Jones and Jackson Counties. Two designs with one layer of engineering fabric were placed in 500-foot long repetitive sections. The thickness of the asphalt treated base was reduced from 9 inches to 8 inches where the fabric was used. The results indicate that engineering fabric does not prevent transverse cracking of asphalt cement concrete and fabric tended to retard the occurrence of transverse cracking but did not contribute significantly to the structural capability of the asphaltic concrete pavement.

Perception and Interpretation of Advanced Warning Signs on County Roads

For more information, contact Kenneth A. Brewer, Department of Civil Engineering, 378 Town, ISU, Ames, Iowa 50011.

In an addendum to an earlier report on the same project, researchers conducted further analysis on the

conference calendar

Signalized Intersection Capacity Short Course

October 15-16, Omaha

Offered by the Nebraska Department of Roads and the University of Nebraska-Lincoln, this course will deal with analysis procedures called for in the new *Highway Capacity Manual*. The registration fee (including lunch October 15) is \$65. Contact Bill Bowmaster, 205 Nebraska Center for Continuing Education, 33rd and Holdrege Streets, Lincoln, Neb. 68583-0929; phone 402-472-2844.

For additional information on the following ISU conferences, call the Info-Line.

APWA Iowa Snow Conference

October 9, ISU

For those who deal with snow and ice control removal in urban and rural areas, this conference will address the following topics: snow and ice control policies, snow removal operations, minimizing liability, handling complaints, and planning a "roadeo." An extensive exhibit area will feature up-to-date equipment and materials. The fee is \$20.

Management for First-line Supervisors

November 6, Mason City

For supervisors who have not undergone formal managerial training, this practical workshop offers skills for effective communications, motivating workers, and organizing work loads.

Fundamentals of Pavement Management

November 12, ISU

Topics will include making a street and road condition inventory, evaluating needs and priorities, and preparing a perioding rehabilitation plan.

Maintaining Granular Surfaced Roads

November 18, Atlantic

November 19, Storm Lake

Sessions include materials selection, blading operations, equipment application determination, operator practices, and how to reduce potential for tort liability.

ASCE Transportation Conference

November 22, ISU

Sessions will cover various aspects of planning, safety, design, construction, maintenance, and operation practices.

County Engineers Conference

December 3-5, ISU

Informative continuing education

courses conducted during this conference are planned specifically for county engineers and technicians. Association and agency updates and a manufacturers' exhibit area also are included.

The following course is sponsored by the Portland Cement Association, and will be held at the PCA's Cement and Concrete Center in Skokie, Illinois. For more information contact: Registrar, Educational Services Department, Portland Cement Association, 5420 Old Orchard Road, Skokie, Illinois 60077; phone 312-966-6200.

Basic Concrete and Related Field Practice Course

November 11-15, Skokie, Illinois

Designed to enhance product knowledge of ready mix producers, contractors, inspection and testing organizations, material suppliers, sales firms, and governmental agencies, this five-day class will cover materials and principles of quality concrete and construction. In lab sessions, mix design problems will be solved and verified with test specimens, and finishing practices will be demonstrated. A special session will cover the mixing and transporting of ready mixed concrete. The cost is \$900.



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