Roads Bridges Transit

Technology News

Iowa State University
Business and Engineering Extension Service

Local Transportation
Information Center

April 1989

Iowa works to meet new CDL law

City and county over-the-road equipment operators will face new licensing procedures when the state complies with the Commerical Motor Vehicle Safety Act (CMVSA) by April 1, 1992.

"The basis of the program has been the fact that there is a historical record of accidents involving large vehicles and often those accidents are caused by driver error," Iowa Department of Transportation Commerical Driver's License Coordinator Walt McDonald said. "Frankly, it's a move to get the poor driver off the road. The motto of the program is 'The pride's back inside. From now on only the best will drive.' "

The CMVSA has three major objectives. The first is to ensure that each commerical driver has only one license, to ensure that all driving offenses are reported to the state issuing the license, and to establish uniform testing and licensing standards.

City and county officials aren't quite sure how much their drivers will be affected by the CMVSA. According to Des Moines Public Works Director, John Bellizzi, what the law will require for compliance is still being studied.

McDonald agreed, saying it is too soon to predict if the new law will significantly affect county and city drivers or whether it will have any affect at all.

"The details of how the law will be constructed in Iowa aren't there yet," McDonald said. "The best way to put it is that we'll be working with the 1990 General Assembly to implement the appropriate changes in Iowa law. The target date is July 1, 1990 to have everything in place. It's a major, major undertaking tying into the database system, but we don't expect a lot of problems."

A driver will have until the federal deadline of April, 1992 to get a CDL. The applicant will have to get the license in his or her state of residence, pass a written test on the operation of a commercial vehicle, and a driving test in the type of equipment the applicant will be driving.

The CMVSA has a uniform test for all states, but there is a provision to allow state-specific questions. The three license categories are large, intermediate, and small.

Semi tractor-trailer drivers would fall into the large category. The intermediate class is for drivers of vehicles over 26,000 pounds, and the small category is for vehicles under 26,000 pounds. Drivers will have to pass a driving test in the type of vehicle they plan on driving. Separate endorsements for cargo tank vehicles, vehicles carrying hazardous materials, and vehicles carrying passengers would also have to obtained.

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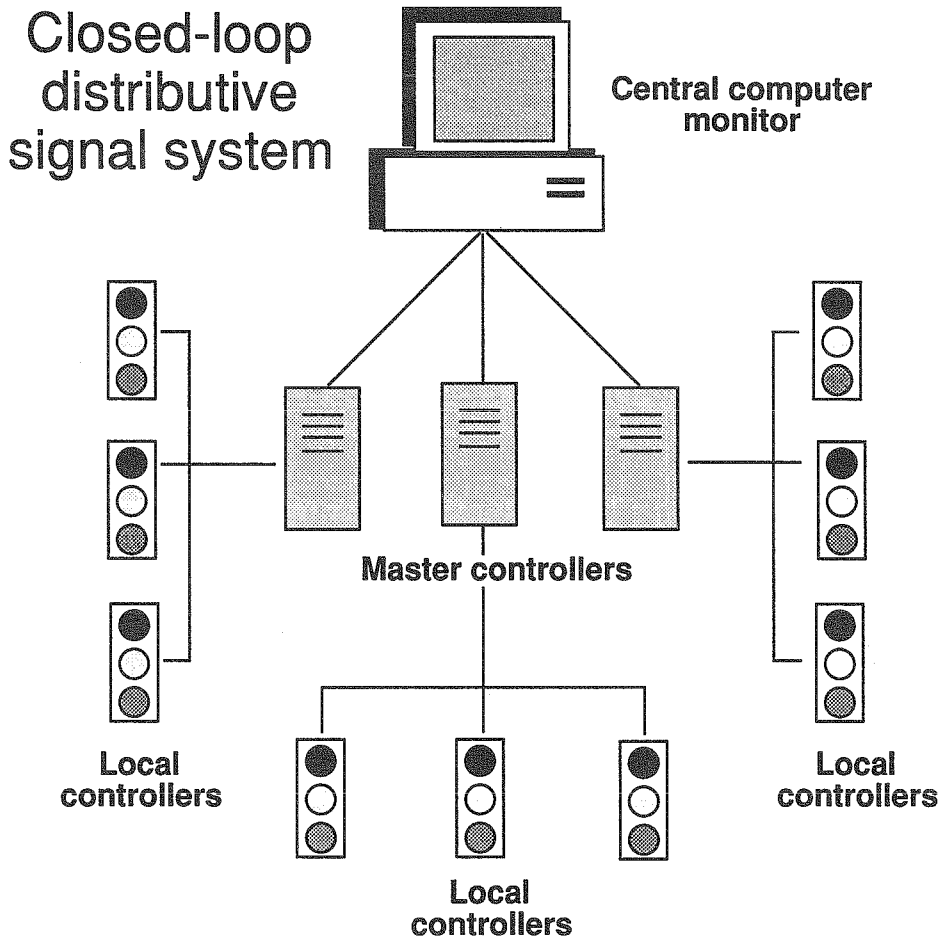
Inside pages

Closed-loop systems help handle traffic

By Mary Rose Anderson

Managing traffic in Iowa's larger communities is a complicated task which closed-looped, distributed signal systems can help simplify. These sophisticated systems allow traffic-control professionals to coordinate, monitor, and control a series of on-site traffic signals from one central location.



The illustration depicts the operation of a closed-loop, distributed system. At the bottom are a series of local intersection controllers. A series of local controllers are supervised by a master controller. The master is a special-purpose microcomputer that can change the local controllers' timing plans to match current traffic conditions. A centrally located, desktop microcomputer is used to monitor one or more masters. The central computer also can issue new timing plans to the masters, communicating through either dedicated or dial-up telephone lines.

The system is "distributed" because signal system functions are executed throughout the components of the system. Each level — intersection controller, master, and central monitor — performs a function within the system.

"Closed-loop" simply means that all functions of the system are controlled and adjusted by the system. For example, the system can choose from several predetermined timing plans the one that is most effective for the given conditions (traffic responsive). A closed-loop system has traffic responsive capabilities, other self-containing intelligent functions, two-way communication between local controllers and

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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 the Iowa Department of Transportation.

DEPARTMENT OF TRANSPORTATION IOWA

U.S. Department of Transportation
Federal Highway Administration

IOWA STATE UNIVERSITY EXTENSION

Understanding the case helps testimony

Tort Liability

By R. L. Carstens
Professor Emeritus of
Civil Engineering

We know that in most states a highway authority can be sued if a highway defect led to an accident. This represents a substantial change from a time 20 or 30 years ago when public agencies were likened in law to the king who could do no wrong.

This changing condition means that many employees of highway agencies can expect sooner or later to be called as witnesses in the resulting lawsuits. If you are faced with this situation, it is essential that you understand the elements that must be proven to sustain such claims. Only with this understanding can there be a reasonable assurance that your testimony will help lead to a fair and equitable resolution of the lawsuit.

The process that we are referring to is commonly called tort liability. A tort is a violation of a personal right guaranteed to an individual by law. It is an interference by other than a criminal act with safety, liberty, reputation or private property. The most common tort alleged in highway cases is negligence, although some cases will allege that a nuisance was created.

In order to sustain a case of this nature, the plaintiff must prove that he or she incurred some loss or damage. The loss may involve personal injury to the plaintiff or a close relative or may involve only damage to property. Obviously, it is not difficult to prove the existence of some damage to a plaintiff as a result of a highway accident.

The plaintiff must also prove that the highway agency had a duty toward the plaintiff. In Iowa, Code Sections 309.67, relating to counties, and 364.12, relating to cities, spell out in detail the duties of these authorities to the public. Other states have similar legal bases defining the duties of highway agencies.

The plaintiff must then prove that there was a breach of this duty. This is accomplished by showing that one or more defects existed in the road or street in question. The defect or defects are indicative that the highway agency was negligent or created a nuisance. There also must be a showing that the defect arose because of the action or inaction of the highway agency and not as an act of God.

When a highway accident led to the lawsuit, there must be a showing that the defect caused the accident. A highway defect need not be the only factor leading to the occurrence of an accident, but only needs to be shown as an contributing factor. The key question is whether the accident would have occurred but for the existence of the accident. If the answer is no, proximate cause has been proven. In one recent case in Iowa, the plaintiff was able to prove that a county was negligent and had created a nuisance, but failed to recover because he did not convince the jury that the defect in question was a proximate cause of the accident that led to his injuries.

Lastly, a plaintiff in an action of this type must prove that the highway agency had notice of the defect. This implies that employees of the highway agency knew that the defect existed, either from having noticed it or having been notified of its existence, or should have known of the defect. The latter situation, called constructive notice, will arise when the same or a similar defect had occurred before under a similar set of circumstances.

"This changing condition means that many employees of highway agencies can expect sooner or later to be called as witnesses in the resulting lawsuits. If you are faced with this situation, it is essential that you understand the elements that must be proven to sustain such claims."

The response of a highway agency to these allegations will be directed to showing that the accident occurred in spite of the fact that the highway agency and its employees acted with reasonable care. A highway agency is not required to guarantee safety on the roads or streets under its jurisdiction. It only is required to keep its roads in a reasonably safe condition for the reasonable and prudent driver. Your testimony as a witness in this type of lawsuit should be completely truthful, but you need to be mindful of what the opposing sides are trying to prove.

Center sponsors pavement management course

Microtechnology

By Tom Maze
Program Manager

The American Association of State Highway and Transportation Officials (AASHTO) has defined pavement management as, ". . . the effective and efficient directing of the various activities involved in providing and sustaining pavements in a condition acceptable to the traveling public at the least life cycle cost." Although AASHTO's definition sounds appealing, the mechanics of pavement management are clearly complex.

Managing pavement requires factual knowledge of each segment of the pavement network, objective assessment of the maintenance and restoration needs of each segment, and the allocation of limited resources to competing maintenance and restoration projects. Clearly, the number of variables becomes mind boggling.

Pavement management is an excellent application for computers because of the many complex variables involved.

All highway agencies use some kind of system to manage pavements. Pavement management is an excellent application for computers because of the many complex variables involved. Several computerized pavement management systems are available either within the public domain or sold commercially. Further, there are several documented examples of local governments saving costs while improving pavement conditions through the use of computerized pavement management systems.

To assist local Iowa governments in computerizing the pavement management process, the Local Transportation Information Center is supporting a simple-to-use computerized pavement management system. The system uses a Lotus 123™ spreadsheet on IBM and compatible microcomputers. The system considers portland cement concrete (PCC) pavements, asphaltic cement concrete pavements (ACC), shoulders and unpaved roads.

The system takes advantage of Lotus 123™ macros to conduct its data processing. A macro directs Lotus 123™ to automatically execute a number of steps in a single command. The steps could be done without using macros, but would require inputting many repetitive commands individually.

Lotus 123™ is used because it is a popular program and many are already familiar with its operation. By using Lotus 123™, the user operates in a much more forgiving and friendly environment than that of most application software written in computer programming languages, like FORTRAN or Basic.

The system requires that the user first divide the highway network into sections. Each section is then evaluated for distress. For example, distress on PCC pavements include cracking, joint faulting, joint spalling, etc. Each distress is evaluated by severity (low, medium or high severity) and extent of the distress (usually the percent of the surface covered by the distress).

Based upon the distress observed at each section, the system suggests a treatment, ranging from normal maintenance to reconstruction. The treatments for each level of severity and extent may be defined by the user. The system also estimates the cost for the selected treatment according to user-defined unit costs. The cost estimating facilitates the development of maintenance and restoration budgets.

The system also has the capability to rank the need for maintenance or restoration of each section. This is done by assigning a score to each distress, or combination of distresses, where the section in the worst condition receives the highest rank. The rank is called a deduct because the section rank is subtracted from a perfect score of 100. Sections with more distress would have lower scores.

The section's score is the pavement priority index. The computer system will list the conditions and their pavement priority index to allow the user to identify which problems require attention first.

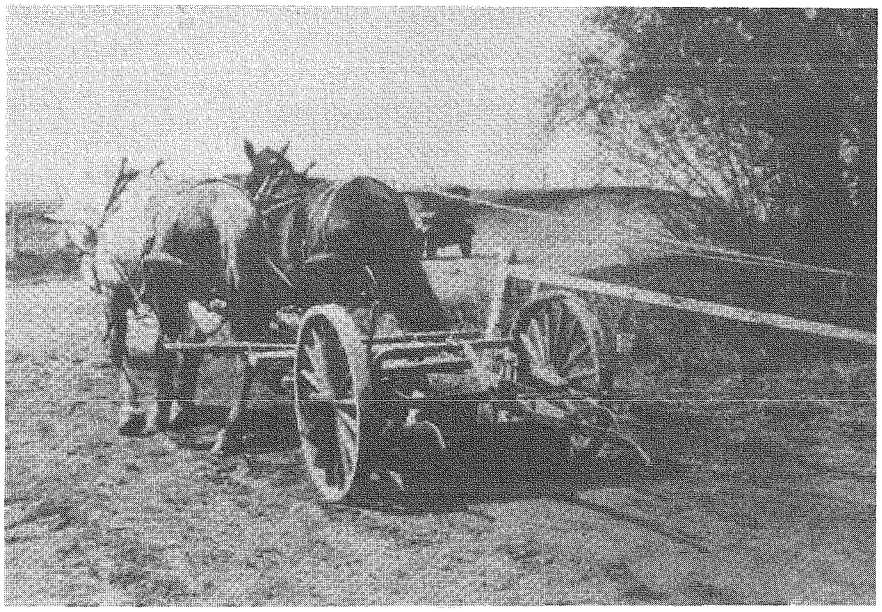
The first training program on the new system will be offered on May 17 and 18. Attendees will receive hands-on instruction on the use of the system and the collection of pavement evaluation data. Class size is limited to permit all users to operate the software. For more information, see the Conference Calendar on page 8.

Horse power started Iowa roads

Many miles of this nation's roads were formed virtually by hand. The slip scraper and the wheeled scraper pulled by two horses were the basic grading equipment of most township trustees. Many of Iowa's 90,000 miles of rural roads were opened and rough graded by this method.

Past Roads

By Dr. Stanley Ring

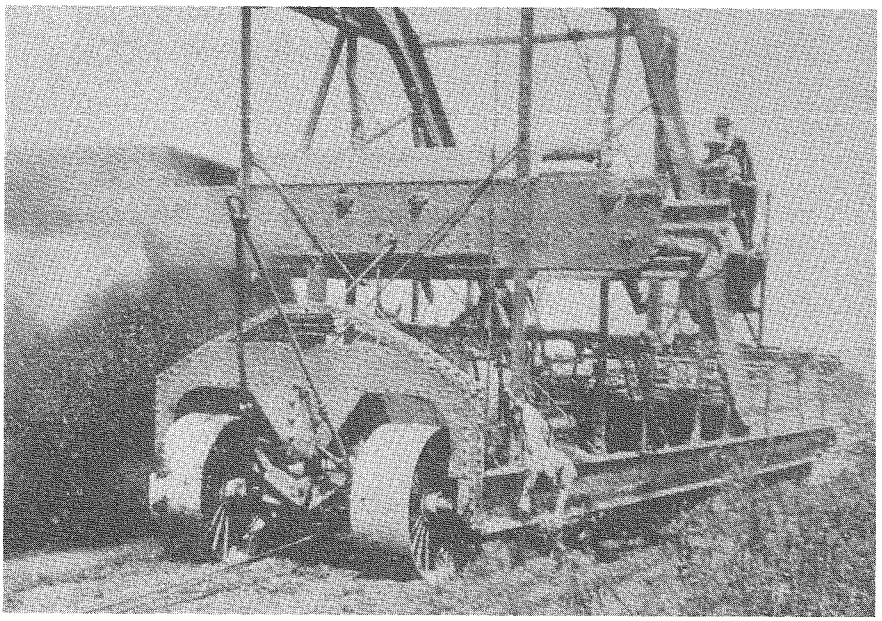


Many Iowa roads were graded by teams of horses

An innovative machine was developed by a Mr. L.C. Ward of Alden, Iowa, in later years that was unique and probably the only one of its kind. A steam engine in front pulled the machine forward forcing five huge plows to tear up up the soil.

A yard and one half shovel raised the loose dirt to a hopper and then onto a movable belt. The dirt was dumped into horse-drawn wagons which were filled at the rate of one every 40 seconds.

Ward contracted with Hardin County to move 82,000 cubic yards of dirt at $0.18 per cubic yard in 1916.



Ward's steam-powered grader may have been unique

New CDL law **continued from page 1**

To accomplish the first of its three objectives, the CMVSA has established a Commercial Driver's License Information System (CDLIS) in Plano, Texas. The CDLIS is a computer database that will have a record of every commerical license issued and any violations attached to that license. Before a state can issue a commerical driver's license it must check with the CDLIS to make sure the applicant is not already licensed in another state. That process will prevent drivers from spreading violations or suspensions over several licenses and will ensure all driving convictions are reported to the state issuing the license.

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Tips From The Field

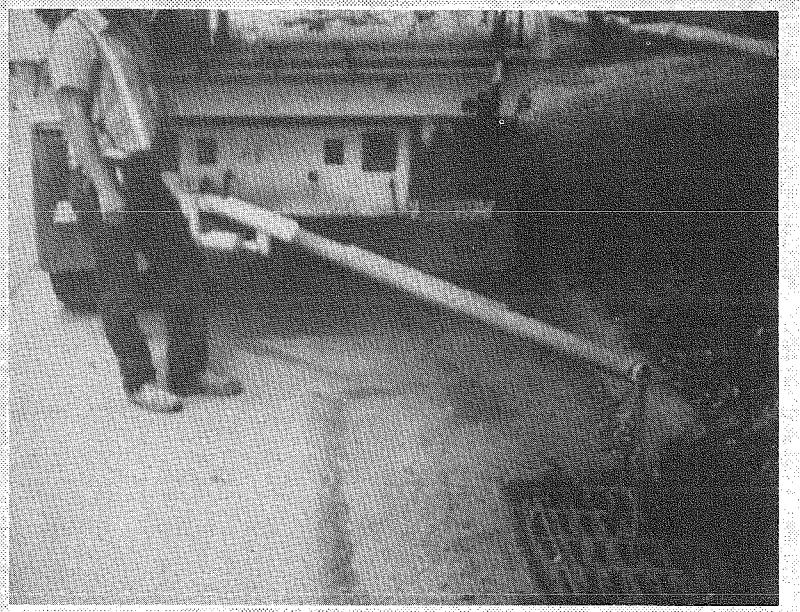
Hydraulic arm takes the load off

Because of its flat terrain, Ankeny is forced to spend a lot of time maintaining its storm sewers.

That means Public Works employees must lift a lot of storm sewer covers. To make that job easier, city employees have devised a vacuum truck with a hydraulic arm that makes working with the covers easier (see photo at right).

The employees have mounted a hydraulic cylinder on the back of the vacuum truck with an adjustable arm to remove and replace the lid. Once lifted, the arm swings easily to the right or left, making it easier to move the cover.

For more information, contact Dick Ash, City of Ankeny Public Works Director, 515-964-5500.



No more aching backs for Ankeny Public Works employees. This hydraulic arm makes moving storm sewer covers easy.

Closed-loop systems continued from page 2

the master, and two-way communication between the masters and the central monitor.

Closed-loop systems allow traffic control professionals to make program modifications suggested by changing traffic demands and flow patterns. The central computer gathers data from system traffic detectors and computes reports on traffic. These reports may be used by the traffic control professional to adjust traffic signal timing plans and to measure the performance of the system. The system itself can use the traffic flow data in the traffic responsive mode to select the most appropriate predetermined timing plan.

A closed-loop, distributed system's ability to select automatically the most efficient timing plan is just one of several benefits motorists receive. The operating agency has the benefit of being able to monitor the system from the central office. For example, the computer can easily identify technical malfunctions and some of their causes. Technicians then know what equipment and spare parts to bring to the malfunctioning signal. During off-duty hours, traffic control professionals can monitor the system's functions through dial-up communications and a portable computer.

Close-loop, distributed systems are generally more expensive than time-based coordinated systems (see the December 1988 issue of Technology News) and interconnected master systems (see the February 1989 issue of Technology News). The expense is simply related to the cost of more intelligent equipment and the additional communication costs. The added costs are often more than off-set by the benefits of improved monitoring flexibility and the ability to select efficient operation for current conditions.

For More Information

The following publications and videos are available through the Local Transportation Information Center. Please complete the order form below. Some items are only available on a "loan" basis and must be returned.

"Using Electricity to Save Bridge Decks" By Richard C. Ransom, City Engineer for the City of Cedar Rapids, Iowa, and Marvin G. Houg, Project Engineer for the Howard R. Green Company of Cedar Rapids. This eight-page bulletin deals with a project involving the repair of two bridges in Cedar Rapids with emphasis on repairing the existing deck, doing it economically and quickly, and making it last. Request index #254.

"Guide to Safety Features for Local Roads and Streets" This guide is intended to be associated with a training course to provide local transportation agency personnel with important information related to highway safety features intended for use on roads and streets in rural and small urban areas. Request index #79.

"Culvert Inspection Manual" This manual provides guidelines for the inspection and evaluation of existing culverts. It is a "stand alone" supplement to the Bridge Inspector's Training Manual". Information is provided on personnel qualifications and equipment and safety procedures required for conducting culvert inspections. Request index #202.

"How Vehicle Loads Affect Pavement Performance" Published by the Colorado Transportation Information Center. This bulletin acknowledges the three elements which cause road deterioration: traffic loads, environment and aging. Considerable detail is given to "traffic loads" which is the only element over which there is any control. The bulletin discusses pavement fatigue, effects of wheel loads, number of axles, number of tires, pavement base, pavement thickness and changing seasons as items to receive consideration in the rate of deterioration of pavements. Request index #568.

"How Pavements Are Affected By Axle Loads" This tape illustrates the variation in fatigue damage as loading, number of axles and pavement thickness vary. It then goes about relating these variations to maintenance costs and pavement life. Information provided is based on tests conducted in Minnesota. Running time - 16 minutes. Request Index #103.

"Surface Condition Rating System" This tape contains information which explains the various degrees of deterioration and acknowledges that deterioration may come about by wear and/or weather. A numerical rating is established for the different degrees of wear. Running time - 30 minutes. Request Index #102.

"Pavement Mixture Design" This tape, narrated by Dr. Richard Smith of Virginia at the Thirty-second Annual Pavement Conference in Minnesota, illustrates the various types of pavement deterioration and surface rutting which would promote hydroplaning. Dr. Smith discusses the probable causes of such conditions and how a proper mix design might eliminate the problems. Running time - 76 minutes. Request Index #99.

"New Directions in Sign Management" This tape, produced by ATSSA, shows how damaged signs can be a prime cause of highway accidents. Running time -16 minutes, 30 seconds. Request Index #97.

Publication order form

To obtain the materials listed as available from the Local Transportation Information Center, return this form to the Local Local Transportation Information Center, Iowa State University Extension, EES Building Haber Road, Ames, IA 50011.

	Title	Index No.	No. of Copies
Name _____	_____		
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___**Please send a complete listing of all publications from your office.**

___**Please send a complete listing of all audio visual materials available**

CDL law

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The federal government is mandating the program by tying the implementation of the program to federal highway construction funds. If a state fails to meet the 1992 deadline there will be a five percent penalty deducted from construction funds. The second year, a 10 percent penalty will be deducted.

"The penalty in federal construction funds is not just applied to interstate or federal highways, but to secondary and urban roads as well," McDonald said. "So counties and municipalities have a vested interest that the state complies with the law."

Although Iowa drivers have until 1990 to get their CDLs, some states have already complied with the CMVSA. A California driver was the first to get a CDL and is registered in the CDLIS in Texas.

And justice for all

Appointment, promotion, admission, and programs of extension at Iowa State University are administered equally to all without regard to race, color, creed, sex, national origin, disability, or age. Call the Affirmative Action Office at 515/294-7612 to report discrimination.

Conference Calendar

Understanding Intersection Traffic Control: A Workshop for Elected and Appointed Officials
May 1, Fairfield, city hall
May 2, Ames, city hall
May 3, Cedar Rapids, city hall
May 8, Mason City, city hall
May 9, Decorah, city hall
May 30, Storm Lake, city hall
May 31, Atlantic, city hall
The purpose of this workshop is to provide elected and appointed officials with a fundamental understanding of the purpose for intersection control, warrants for intersection, and traffic engineering terminology and techniques. Contact Jan Graham 515/294-8082.

13th Annual Spring Iowa Traffic Control and Safety Conference May 18, Scheman Building, Iowa State University
The spring meeting includes presentations on the 0.5 percent Iowa Road Use Tax for Safety Funding and a presentation on the new Local Transportation Information Center's Safety Circuit Rider. Contact Jo Sedore 515/294-4817.

Community Transportation Expo 89 June 20-23, St. Louis, Missouri
Contact Community Transportation Reporter 1-800-527-8279.

ITE District 4 Annual Meeting, June 14-16, Madison, Wisconsin
Contact Kenneth Graham 414/359-2300.

Iowa Public Transit Association Annual Meeting, June 7-9, Cedar Rapids
Contact Bev Venturini 515/223-0165.

APWA International Congress, September 23-28, Orlando, Florida
Contact APWA 312/667-2200.

Semi-Annual Meeting of the Asphalt Recycling and Reclaiming Association, September 14-20, San Diego, Calif.
Call 301/267-0023 for more information.

Passenger Assistance Techniques, July 31-Aug. 3 and Advance Rural and Specialized Transit Management August 14-18, Milwaukee, Wisconsin.
Contact Chris Alaspa, 414/229-4422.

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