

February 1992

Des Moines finds beacons useful in some school zones

Using flashing beacons to reduce overall vehicle speed results in only minimal reductions according to articles published in traffic engineering literature. But the City of Des Moines found satisfactory results when it used flashing beacons to control vehicle speeds in some school zones.

The results of the experiment were reported by Neal Hawkins, assistant traffic engineer with the City of Des Moines. Des Moines experimented by using oversized 25 MPH speed limit signs and flashing beacons to control speeds in school zones along 35-MPH, multi-lane roadways.

Hawkins' report was intended to supplement current thinking about how modified signs and flashing beacons can reduce speeds in certain school zones.

"We think it's important to share this kind of information," Hawkins said. "There are a lot of cities that might install flashing beacons without having any idea, one way or the other, if they help."

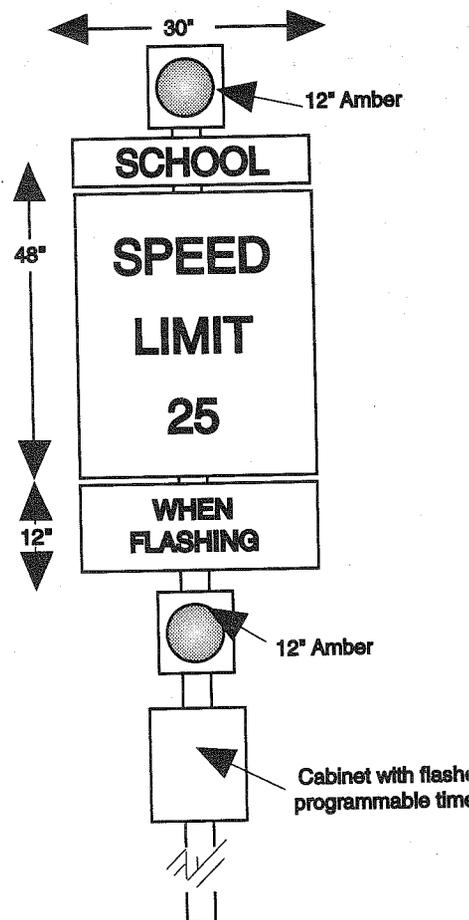
In 1974, Des Moines' city council enacted a 25 MPH speed limit in effect 24-hours a day for all road-

ways adjacent to schools. Since then, several recommendations were made to increase school zone speed limits, particularly for the 44 schools

located along heavily-traveled roadways. These recommendations lacked public acceptance and were not adopted.

A different solution was tried in 1989. New signage consisting of two 12" beacons and a 30" x 60" sign were installed. The beacons alert drivers that a 25 MPH limit is in effect. To evaluate the new signage, four improved locations and three control sites were studied. The study provided before and after speed data at one, six, and 12 month intervals for seven schools located along 35 MPH, four-lane roadways.

Following installation, the overall average speed was reduced by 9.3 percent. One year after installation the average speed maintained a seven percent reduction. The average speeds before installation and at one, six, and 12 months after installation are 31.2, 28.3, 28.8, and 29.0 MPH respectively. Before installation, the highest speeds were found in the afternoon. One year after installation, the afternoon speeds maintained an 8.8 percent reduction (2.8 MPH) and the morning speeds maintained a 5.6 percent reduction (1.7 MPH).



Signs like this one help control speed in Des Moines school zones

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MoGO program starts fourth year

Changes in the Iowa Motor Grader Operators Program will update Iowa operators with the latest technology and techniques when the program begins its fourth year later in 1992.

The MoGO program also gets a new coordinator. Fred Short, who is retired from his position as Audubon County Engineer, will coordinate MoGO activities. Ed Bigelow, the Safety Circuit Rider for the Iowa Transportation Center, will continue to develop and present safety programs.

Bigelow, who will help Short get the current season of MoGO courses started, said that this year's program will add new material about shoulder reclaimers and scarifier bits, expand the material on gravel savers, add more visual aids, and offer tips for using articulation in snow removal.

"It's not the same program that it was in 1989 or 1990," Bigelow said. "These new technologies are so different that we had to add completely new parts to the program. The counties who had the

course in '89 or '90 would do well to schedule it again."

One brand of shoulder reclaimers originated in Canada. They have been used recently in Iowa by Brad Skinner, Dallas County Engineer, and Dale White, Crawford County



Present at the Iowa-Nebraska Motor Grader Program exchange were (from left to right in the front row) Bill Bowmaster, Director of the Nebraska T² center, Lowell Richardson, Local Systems Engineer for the Iowa Department of Transportation, and Fred Short, the new coordinator for Iowa's MoGO program. In the back row from left are Al Hauser and Bob Snyder, instructors in Nebraska's program, and Doug Taggart and Alvin Jansen, instructors in Iowa's program.

Engineer. A shoulder reclaimer resembles a farmer's disc. After grass near the roadway has been mowed, the reclaimer breaks up the material that has collected near the side of

the road. It uses an auger-like motion to pull lost aggregate back onto the road.

"You don't lose aggregate to the ditch. One of our operators used it and after he got done and bladed the road it looked as if it been resurfaced with new gravel. I think it's going to be used by more and more counties," Bill Withem, a maintenance foreman in Dallas County, said.

Scarifier bits are a series of carbide-tipped teeth that attach to the moldboard. Two brands of scarifier bits use rotating teeth that loosen and roll up aggregate that has been compacted into the hard pan. These bits also make an excellent method for breaking up ice on aggregate-surfaced roads, as proven in last November's ice storms.

"Our discussions on scarifier bits will be based on actual experiences," Bigelow said. "Many counties have bought scarifier bits and the operators want to learn from each other how best to use them."

Any county engineer who has an operator interested in becoming a MoGO instructor should contact Ed Bigelow at 515/294-6384.

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The preparation of this newsletter was financed through the Technology Transfer (T²) Program. The T² Program is a nationwide effort financed jointly 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.

The opinions, findings, or recommendations expressed here are those of the Iowa Transportation Center and do not necessarily reflect the views of the Federal Highway Administration or the Iowa Department of Transportation.

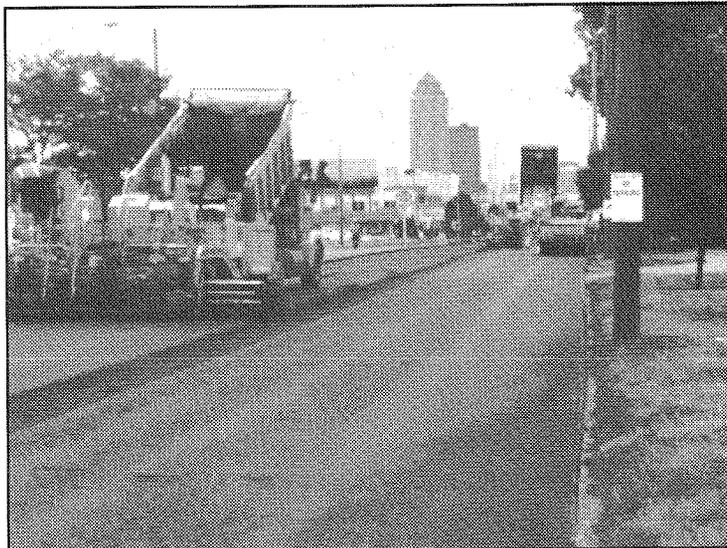


IOWA STATE UNIVERSITY
University Extension

Public works crew completes challenging repavement project

Keeping 800 miles of pavement that varies in width from 18 to 66 feet maintained and repaired means having a program almost as big. That's exactly what the City of Des Moines has in its effort to keep motorists moving efficiently and safely over the largest collection of paved roads in the state.

At the head of the program is John Bellizi, director of public works, who is especially proud of his asphalt paving program. In the past five years the city has been able to rid itself of much of the corrugation, rutting, and showing that was found throughout its bus lanes and heavily-traveled arterials. Most of the credit, though, goes to what Bellizi calls his asphalt reconstruction program.



Timing was a critical factor in the City of Des Moines' repaving of Ingersoll Avenue. Repaving was accomplished with a minimum of traffic and commercial disruption.

That program was put to the test with a reconstruction project done in 1991 on Ingersoll Avenue. This project repaved 16 blocks of one of Des Moines' busiest streets. It called for Ingersoll to be milled across the full width of the pavement to a depth of two inches and resurfaced with two inches of asphalt cement concrete.

Ingersoll Avenue is a major arterial to and from downtown Des Moines and is flanked on both sides by businesses. The challenge of the project was to pave this 66-foot wide avenue full width in a way that minimized dis-

ruptions both to traffic and businesses. This was accomplished by paving on Sunday and splitting the 16-block project into two sections; one from 19th Street to 28th street and the second from 28th Street to 35th street. The two sections were milled and paved in consecutive weeks.

The bare bones of the asphalt reconstruction program consists of milling and overlay of the roadway. With the base repaired and readied, the entire road is paved quickly. A 1-1/2" or 2" mat of high quality 1/2" Type A polymerized asphalt cement concrete is placed. The pavement is paved full width where possible or along adjacent lanes when it is not.

Lower quality pavement is removed because no matter how good the overlay, it is limited by the material it covers. Fabric over non-working, longitudinal joints/cracks helps to slow their reflecting through to the surface.

Paving is done full width or in adjacent lanes within the hour. This minimizes the effect of construction joints, a possible weak point for water to seep in through the surface.

Experience has not only given Bellizi paving tricks, but also has shown him good asphalt mixes.

Bellizi's favorite asphalt mix is a 1/2" top size Type A material. This mix has minimum 65 percent crushed stone content, but 75 percent or 85 percent crush stone is preferred. The stone is graded such that 5.5 percent asphalt cement can be added, while four percent air voids are maintained. Both high strength and high skid resistant material is used where the traffic calls for it.

The first section of the Ingersoll project consisted of 35,000 square yards of milling and nearly 35,000 tons of asphalt cement concrete overlay. This required two asphalt plants and three asphalt pavers. The contractor closed the road down at 5 a.m. and started paving by 6 a.m. The asphalt pavers pulled off the project by 12:30 p.m., and traffic was back on the road by 4 p.m. The asphalt paving was completed within seven hours.

Computers can affect workers' health

Computers affect the lives of almost everybody. Only recently, however, has it been recognized that computers also may have an effect on the health of the people who use them.

People who work long hours at a computer report a variety of health problems. These might include back and muscle strain, eye strain, and general fatigue. Many of these problems may be caused by improperly designed workstations which force a computer operator into a stressful posture for long periods of time. Health problems also may be caused because computers allow their operators to work faster. While this may increase productivity, an operator who makes as many as 20,000 and 25,000 keystrokes in a work period allows little time for muscles to relax between tasks.

Frequent breaks away from the computer can help prevent these problems. Supervisors should make sure that staff members who spend most of their time operating a computer get these breaks. Frequent breaks, however, do not mean stopping work every 20 minutes. It means frequent breaks away from the computer. For example, in taking a "working" break, a computer operator could perform a different part of the job such as filing, making phone calls, or scheduling meetings.

Such breaks could be incorporated into safety policies that many local government agencies have written to keep staff members safe and healthy. Local agencies should consider checking for comfortable work stations as seriously as checking fire extinguishers or any other safety regulation. But if a safety policy is not in effect, the computer operator

Microtechnology

By Larry Mendenhall
Editor, *Technology News*

should take the responsibility for making his or her own workstation as comfortable as possible. The following suggestions are good ways to start toward comfortable work stations.

Although these guidelines can help many of the health problems connected with computer use, some problems may still appear. A physician should be consulted on any long-standing health problem.

Work station design guidelines:

Chair

1. The seat should be adjustable within a range of 16-21 inches above the floor.
2. The back rest should be adjustable both up and down and backward and forward.
3. The seat pan and back rest should be upholstered in a material that absorbs perspiration.
4. The seat pan should be able to rotate 360 degrees without a change in seat height.
5. The chair should have five legs fitted with wheels or casters.

Work Surface

1. The height of the work surface should be adjustable within the range of 26 to 30 inches from the floor.
2. The total area of the work surface should be adequate for the tasks to be routinely performed.
3. Corners on the work surface should be rounded.

4. Sufficient space should be available beneath the adjusted work surface to allow for adequate lateral and vertical movement of the legs.

VDT/PC

1. The support surface should have adequate depth to allow the user to adjust the screen-viewing distance.
2. The keyboard should be a separate component from the screen with a cable at least three feet in length.
3. The angle of the keyboard from the surface on which it rests should be adjustable.
4. The screen should have an anti-reflection surface.
5. The screen should have focus, brightness, and contrast controls readily adjustable and accessible to the user.

Work station design

1. The top of the screen should be no higher than eye level.
2. The face of the screen should be tilted back 10 to 20 degrees provided this does not increase glare.
3. The screen face should be about 18 inches from the user's eyes.
4. The top surface of the space bar and bottom row of keys should be about 2 1/2 inches from the top of the support work surface.
5. The seat height should be adjusted so that the upper legs are parallel with the floor and the feet are resting flat on the floor.
6. The backrest should be adjusted to firmly and comfortably support the small of the back.

Work environment

1. The level of light at the VDT work station should be slightly less than that for the general office.
2. Auxiliary work station lighting should be provided for tasks requiring higher light levels.

3. Fluorescent lights should be fitted with diffusers and parabolic louvers.

4. Windows should be covered with drapes or blinds to limit direct sunlight.

5. Walls, floors, and work station surfaces should be of flat finish and subdued colors to reduce glare.

Noise

1. Excessively noisy machines — such as some printers — in the vicinity of the work station should have sound enclosures.

2. Areas with multiple workstations should have features which minimize noise such as carpeted floors or upholstered partitions.

Location

1. Individual work stations should be physically separate from each other and from distractions such as high activity or traffic areas.

2. The amount of space allocated for work stations should be adequate for the tasks to be routinely performed.

3. The work station should contain or have adjacent to it adequate storage space for necessary work-related materials.

4. The work station should be located near electrical outlets to avoid the use of extension cords.

Job content

Even in situations where the work station has been ideally designed, individuals using VDT's for considerable portions of their work time may still be subject to various physical stresses related to VDT use. Such stresses can be minimized by incorporating periodic alternative-task breaks into the work schedule. Alternative tasks should involve physical movement on the part of the user

and should, to the extent possible, be less visually demanding than VDT use.

Vision

Many visual problems associated with using VDT's can be traced directly to poor eye care. Uncorrected or improperly corrected vision problems are more likely to cause visual fatigue. For these reasons, all VDT users should have periodic eye examinations to ensure that any vision problems are discovered and promptly corrected.

Other physical conditions

As is true of many physically demanding tasks, prolonged VDT usage can cause certain pre-existing health conditions to worsen. This may be particularly true for various muscle problems. Individuals with such problems should consult with their physicians regarding limitations to be placed on their usage of VDT's.

Flashing beacons continued from page one

The signs were changed to eliminate an unreasonable speed limit in sections of heavily-traveled roadways, to make enforcement easier, and to reduce vehicle speeds in school zones. The results showed the new signs produced a statistically significant reduction in vehicle speeds. The reductions in miles per hour, however, are considered to be marginal.

"If we have a problem in a specific location, now we can ask the police to go out and enforce the speed limit," Hawkins said. "Our studies show that people tend to slow down when they see children and we use that as an advantage. The flashing

beacons inform drivers that children may be present and that provides a motivation to reduce speed."

Despite average speed reductions of less than 10 percent, the city believes the new signage is appropriate and beneficial for the following reasons: 1) setting a lower speed limit for the specific hours when children come and go from school makes sense to motorists, improves sign credibility, and makes enforcement easier; 2) flashing beacons give motorists positive information as to when they must slow down, especially when there are schools with different starting and dismissal times;

and 3) the city is receiving positive feedback from parents, school representatives, police, and the public concerning the use of flashing beacons. The police think that the signage has more effect on speeds than measured in this study, according to Hawkins.

Overall, the City of Des Moines is pleased by the public's awareness of the new signs although it wouldn't use them in any other situation. The city believes that this type of signage in a school zone — despite the cost and limited application — is an improvement over the previous condition.

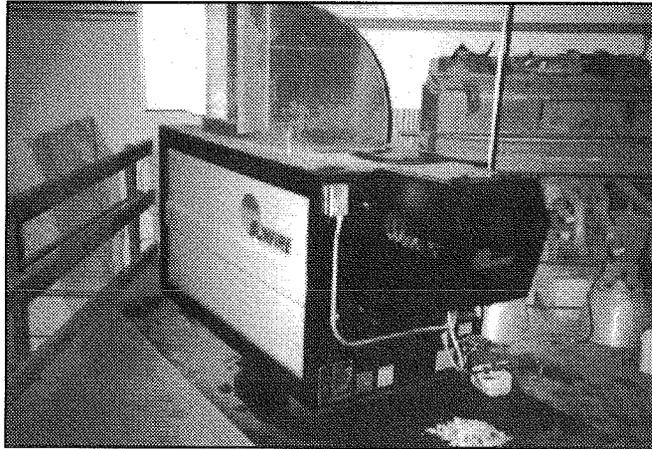
Tips From The Field

Waste oil furnaces keep shops warm

Local agencies may skip making a hazardous determination on their waste oil and still be in compliance with Environmental Protection Agency regulations by using a furnace specifically designed to burn waste oil.

Waste oil may be classified as a hazardous waste under new EPA regulations that went into effect in the spring of 1991. Local agencies are responsible for determining if their waste oil (or any other waste material) is hazardous as defined by the new regulations. (For more information on these new EPA regulations, see the June and October 1991 issues of *Technology News*.) Stiff penalties are possible if hazardous waste materials are not stored or disposed of according to the new regulations.

Waste-oil furnaces use oil drained from vehicles as fuel. EPA regulations regarding storage and disposal do not apply to waste oil used in this fashion. Using waste oil as heating fuel also fits in nicely with the EPA's goal of reducing the amount of waste generated.



Using waste-oil furnaces to heat maintenance shops has a big advantage — it recycles used motor vehicle oil without paying a third party to dispose of it and without violating hazardous waste regulations.

There are cost advantages for local agencies as well. These furnaces can replace an agency's current heating system, which may be kept as a back-up should waste oil fuel run out. They also let local agencies act as their own waste-oil recyclers, saving third-party disposal costs.

Some regulations, of course, do apply to waste-oil furnaces. They can't be rated at more than .5 million BTU per hour, they have to be vented to

the outside, and they must burn oil generated in the shop where it's housed or brought in from homeowners who change the oil in their own cars. Waste oil from other shops cannot be transported to the shop with the furnace. Kristine Spackman, an environmental specialist with the Iowa Department of Natural Resources, said that waste-oil furnaces do not need an air quality construction permit for most parts of Iowa. The exceptions may be in Polk and Linn Counties. Those counties have set different air quality standards. For

more information about installing waste-oil furnaces in those counties call the Linn County Health Department (319/398-3551) or the Polk County Air Pollution Control Program (515/286-2263).

Some shops in Tama, Marion, and Benton counties use waste oil heaters. More information about waste oil heaters and where they may be purchased can be obtained by talking to the engineer's office in these counties.

No joke! Drivers need CDL by April 1

Local agency personnel have until April 2, 1992, to get their Commercial Drivers License (CDL). The CDL is required for anyone who drives a vehicle with a gross vehicle weight of over 26,000 pounds, hauls hazard-

ous wastes, or passenger vehicles designed for 16 or more passengers.

Drivers that need a CDL must pass a written and driving test. Training programs are available through local community colleges or trucking associations.

Sharon Green, CDL Coordinator for the Iowa Department of Transportation, said 75 to 80 percent of the people taking the test are passing. For more information about CDLs, call Green's office, 515/237-3144.

For More Information

The videotapes and publications listed in this column are available on a loan basis by contacting **John H. Moody, Iowa State University, Iowa Transportation Center, 194 Town Engineering, Ames, Iowa 50011** or by calling **515/294-9481** Monday, Wednesday, and Friday mornings.

AASHTO Guidelines for Pavement Management Systems This booklet describes the characteristics of a pavement management system (PMS), the various components of a PMS which are required to develop and implement it, and how the products of a PMS system can be used as a strategic planning tool for management and pavement engineering. **For loan only — Request #770**

ATSSA - Guide for Work Area Traffic Control This booklet was prepared by Russell M. Lewis, Ph.D, for the American Traffic Safety Services Association. It discusses and illustrates signs, channeling devices, barriers, taper lengths, device spacing, pavement markings, lighting devices, work zone operation, and a number of typical applications. **May be kept, supply limited — Request #35**

AASHTO Guide for Selecting, Locating, and Designing Traffic Barriers This 322-page guide presents a synthesis of current information on traffic barrier systems. It includes structural and placement data. Criteria on these elements are summarized for each of the four basic barrier types. **Loan only — Request #6**

Blistering in Asphalt Pavements — Causes and Cures The National Asphalt Pavement Association published this booklet which discusses the six different causes of blistering in asphalt pavements. A table summarizes these causes and recommended solutions. Cannot be copied. **For loan only — Request \$699**

Snow Fighters — Quiet Patriots This Minnesota Department of Transportation videotape describes the mission of a snowplow operator, stressing responsibilities, communications, and tools. It compares rural and urban snowplow operations and defines such terms as passable, widening, and clean-up. **Running time 17:00; Request #106V**

Chain Saw Safety (Asplundh) This videotape features a step-by-step review of how to operate a chain saw. It includes invaluable safety tips, start up, and shutdown procedures. **Running time: 11:00; Request #258V**

Professional Tree Care Safety This videotape demonstrates how to safely operate aerial lifts, chain saws, brush clippers, and other hand and power equipment used for tree trimming and cutting. An abbreviated version, featuring primarily chain saw operation and safety, is also available. **Full version running time: 28:00; Request #260V; Abbreviated version running time: 5:30; Request #260AB**

Idea Store #6 This videotape by the Pennsylvania Department of Transportation covers a number of innovative ideas including the "Adopt a Highway" program, proper signs, locked cages for temporary warning lights, erosion control and others. It also includes names and addresses of people or local agencies that may be of assistance in these and other areas. **Running time: 17:00; Request #257V**

Publication order form

To obtain the materials listed from the ITC, return this form to the Iowa Transportation Center, Iowa State University, Extension to Communities, 194 Town Engineering, Ames, IA, 50011.

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Please send a complete listing of all publications from your office.

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Conference Calendar

APWA Public Works Conference March 5-6, Iowa State University
Topics of current interest related to the technical and managerial aspects of public works will be discussed by consultants, suppliers, manufacturers, and public works officials. Contact Deb Schmidt 515/294-5961.

Management for Street and Road Maintenance Supervisors March 17 — Storm Lake; March 18 — Council Bluffs This one-day seminar covers basic supervisory and management techniques, which will assist the supervisor in planning, directing, and motivating. Numerous videotaped experiences and case studies will be utilized. The seminar is designed for city, county, and state transportation personnel, as well as other public works employees who are in a first-level supervisory position. Contact Connie Middleton 515/294-6229.

Vehicle Fleet Management: Preventive Maintenance March 25 —

Creston; March 26 — Mason City
This one-day workshop is intended for city and county vehicle fleet management personnel. The material is suitable for lead mechanics, shop supervisors, equipment supervisors and managers. Methods and management approaches for developing a systematic preventive maintenance program will be presented. Contact Deb Schmidt 515/294-5961.

Construction Inspectors' Workshop March 31 — Des Moines Area Community College (Ankeny); April 2 — Southeast Community College (Burlington)
Construction inspectors will learn about construction record keeping, barricading, and marking for a safe work zone, sewer and water line testing procedures, portland cement concrete paving inspections, asphaltic concrete inspections, and public relations tips that reassures citizens that their money is being spent wisely. Contact Deb Schmidt 515/294-5961.

APWA — 1992 Mid-America Conference and Exhibition Show, Park Place Hotel, Kansas City, Mo., April 1-3 Contact Beryl Shults, 816/923-2058.

**Vehicle Fleet Maintenance: Garage Waste Management-Iowa Waste Reduction Center April 7 — Dav-
enport, April 9 — Fort Dodge** Contact Deb Schmidt 515/294-5961.

National Road and Street Maintenance Conference: Product and Equipment Display, Las Vegas, Nevada, May 5-7 Contact the Center for Local Government Technology, 405/744-6049

And justice for all

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