

October 1991

## EPA fosters waste reduction

By Larry Mendenhall  
Editor, *Technology News*

Local agencies must rethink what they send to landfills since new hazardous waste rules from the Environmental Protection Agency took effect March 3, 1991. Many common shop wastes — like oil filters and floor dry — may now qualify as hazardous wastes under the new rules.

The new rules conform to the EPA's policy of "cradle-to-grave" liability. It simply means that whatever agency generates hazardous waste is responsible to see that it is disposed of properly and safely. That policy and the new rules actually encourage waste generators to either reduce the amount of waste they produce or to recycle some wastes like used motor oil. Reducing or recycling wastes makes it easier to comply with EPA regulations as well as reducing costs for storage, testing, and off-site hauling.

"The idea is not to generate the waste in the first place so that there isn't any liability at all," Kim Gunderson, an environmental specialist with the Iowa Waste Reduction Center (IWRC) said.

The new regulations are being enforced as Jackson County Engineer Steve DeVries discovered. The EPA made an unannounced inspection of one of Jackson County's outlying shops. The county was cited for improper disposal of oil filters and inadequate documentation about its offsite waste hauling.

"I think what happened to us can be considered both a reconnaissance and a warning," DeVries said. "The EPA is trying to assess what's out there and to make people aware that it's going to enforce those regulations."

The new regulations went into effect last March (see the article "EPA toughens hazmat rules" in the June, 1991, issue of *Technology News*.) It is part of the Resource Conservation and Recovery Act (RCRA) originally passed in 1976. RCRA was amended in 1984 to include small gen-

erators.

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Kim Gunderson (far right) of the Iowa Waste Reduction Center explains new hazardous material regulations at a waste reduction conference.

### Inside pages

- 2 A study finds signal coordination pays for small cities.
- 4 Like their human operators, computers are vulnerable to viruses, too.
- 6 Learn how to extend the life of snow plow blades in "Tips From The Field."

# Coordination benefits small cities

The benefits of coordinating traffic signal timings — saving fuel by reducing the number of stops and delays in the traffic flow — were enough for the 1989 general assembly to adopt legislation requiring all Iowa cities with four or more signals within corporate limits to coordinate those signals. This law is to take force on July 1, 1992, and several Iowa cities are working to comply.

Under the legislation, administrative rules were to be written by the Iowa Department of Transportation. Those rules exempted from the coordination requirement signals more than one-half mile apart or signals within one-half mile of each other but not along the same arterial nor within the same network of interconnecting streets. Also exempted were signals where an engineering study can document that coordination is impractical. The Iowa DOT's administrative rules say nothing about the requirement with respect to city size and traffic volume along the arterial. Some have argued that the inconvenience and cost of signal coordination is not warranted in small cities, with low traffic volumes.

The energy and travel time savings of traffic signal coordination are well documented in large cities and along arterials bearing heavy traffic. The

question remains whether the same benefits apply to smaller towns or arterials with light traffic and whether those benefits justify the cost of retiming and updating equipment. That question was the subject of a study conducted by Neal Hawkins, previously an engineering student at Iowa State University and currently a staff member with the City of Des Moines Traffic Engineering Department.

Hawkins estimates that there are 37 cities in Iowa with less than 10,000 population and with four or more traffic signals. This group of cities contain 192 signalized intersections. Out of this group, Hawkins selected Denison, Grinnell, and Knoxville for case studies.

Hawkins' assumed that the benefits of coordination would exceed the cost of upgrading equipment and timings even in cities with populations having less than 10,000 and relatively low-volume arterials. To test this assumption, he acquired existing signal timing plans, traffic volumes, and turning movements. Hawkins estimated driver delays, stops, and fuel consumption by using a microcomputer model. These same measures were then estimated with traffic signal times optimized and coordinated. The existing conditions were then

compared to the estimated coordinated signal timings to determine the savings from traffic signal coordination.

One of the three cities already has an interconnected system for the three intersections along its major arterial. The interconnected signal allows for coordination without upgrading the signal hardware, but the current times provided a poor progression. Retiming this system and improving the progression creates annual savings of \$12,610 and a benefit-to-cost ratio of over 17 to 1. These benefits can be created with just the cost of retiming since the system is already interconnected and requires no additional hardware.

The second city has four signalized intersections along a main highway running through town. Each signal is equipped with a time-based coordinator (a very accurate clock) so that they can be coordinated without additional hardware. As in the first case, progression is poor. Retiming can provide an annual \$155,000 travel time and energy savings when the signal system is retimed. Because the system is already capable of coordination, only retiming is re-

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# EPA regulations continued from page 1

erators of hazardous wastes and expanded the list of toxic substances from 14 to 39. The added substances are often present in many shop waste products such as oil dry, solvent, and shop rags. This qualifies many local agencies as small hazardous waste generators which must comply with EPA regulations for disposing of hazardous wastes.

Potential penalties are severe. Violators — and government agencies are not exempt — face maximum fines of \$25,000 per day per violation. Within the last several months, however, the EPA changed the formula by which it determines fines. Fines could increase the former maximum penalty by 10 to 100 times.

There are several sources that will provide local agencies with the regulations. The Iowa Waste Reduction Center (319/273-2079), funded by a portion of landfill fees, was created specifically to help small hazardous waste generators (which commonly include local agencies) comply with the new regulations. Other sources of help include the Iowa Department of Natural Resources, Air Quality and Solid Waste Protection Bureau (515/281-8690) and the Center for Industrial Research and Service at Iowa State University (515/294-3420).

Violations often cited during EPA inspections include disposing of hazardous wastes in a landfill and improper documentation. Proper documentation is particularly important when storing hazardous wastes on site.

"An agency may even be disposing of its stored wastes properly, but if it's not labeled correctly it's a violation," Gunderson said. "The waste has to be labeled with the words 'hazardous waste', the type of waste

it contains — like solvent — and the accumulation start date. The last one is critical. If there's no date on it, the EPA assumes it's been on site too long."

Documentation for companies which haul the waste away is also important. Jackson County was cited for not having copies of its waste hauler's state licenses. Local agencies need to make sure any company that hauls its waste away and the final storage site also comply with EPA regulations. The local

**"The idea is not to generate the waste in the first place so that there isn't any liability at all."**

*Kim Gunderson*

agency is still responsible for the waste even after it leaves the shop.

"The waste belongs to the agency and if someone is hauling it offsite then dumping it off in the ditch, the agency is the one that will be cleaning it up," Gunderson said.

Local agencies have several choices when deciding whether their wastes are hazardous. They can subject the waste to a Toxicity Characteristic Leaching Procedure (TCLP) test. These tests cost around \$1,000. The second choice is a thorough knowledge of the waste product. If an agency knows for sure that the waste in question contains none of the substances on the EPA's hazardous waste list nor any of four hazardous characteristics (ignitability, corrosivity, toxicity, or reactivity) then the waste can be sent to the landfill.

If the test fee is too high and the agency doesn't want to chance making a mistake on the waste's hazardous determination, the third option is to assume the waste is hazardous and treat it accordingly.

If a waste, however, can be recycled or reused then EPA waste restrictions no longer apply.

For example, used oil can be used in space heaters designed specifically to burn oil. Oil filters can be crushed or drained of the remaining oil then recycled as scrap metal. Spent solvent can be recovered through a distillation process and used again (although the still bottoms that remain must be tested before being sent to the landfill).

Agencies can further reduce the amount of waste generated by substituting alternatives that do not generate hazardous wastes. For example, instead of using floor dry, spilled oil could be absorbed by socks or pads or even a mop and bucket. The spilled oil could then be drained and used to fuel a space heater. Using that clean-up method eliminates disposing of floor dry, which may test as a hazardous waste.

Solvent waste could be eliminated by recycling or using another method for cleaning parts such as hot soap cleaners. Another common waste, shop rags, can easily be eliminated as a waste by hiring a laundry service to provide shop rags and clean the soiled ones.

For further help with the new regulations or for innovative ways to recycle wastes, contact the agencies listed earlier.

# Viruses require precautions

Local agencies need to know how to prevent, recognize, and eliminate computer viruses, despite the fact that viruses may never infect their computers. Viruses are common enough, however, to warrant local agencies taking steps to make sure their computers remain "healthy."

The term "virus" actually applies to only one of three types of computer "bugs." Two other types are Trojan Horses and worms. Trojan Horses are seemingly innocent programs, like a game, that contain data-destroying instructions. Worms replicate themselves over a network of computers, usually destroying data as they infect each individual computer. Trojan Horses and worms are often written to specifically destroy data files. Viruses are usually more benign, merely taking up disk and RAM space. Fortunately, Trojan Horses and worms are relatively rare. The focus of this article will be on viruses; although the prevention tips that will be discussed are applicable to all computer bugs.

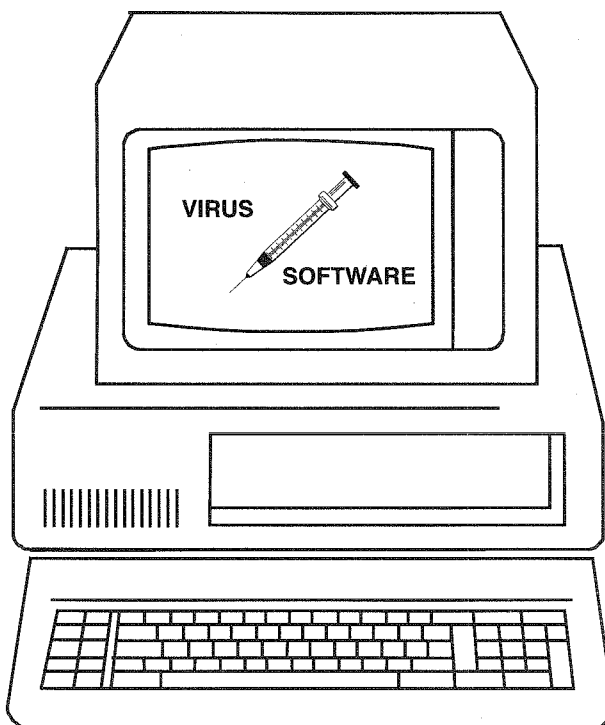
A virus is a program that attaches itself to certain files, usually application software. Running the program causes the virus to either infect other files — like those on a floppy disk or hard drive — or to execute a program of its own. That program may be nothing more harmful than that caused by the "Stone" virus. It simply flashes a message on screen that reads "This computer is stoned."

Viruses spread when programs are shared between computers, or more

## Microtechnology

By Larry Mendenhall  
Editor, *Technology News*

rarely these days, when they are downloaded from a bulletin board service (BBS) or gotten from a user's



group. An illegal copy of a legitimate program like Lotus 123™, for example, may be the culprit if it's passed between many computers. A virus-infected floppy disk will spread the virus to every computer which uses the infected disk.

Although most viruses are harmless, they have a potential for damage. It is possible for viruses to affect screen displays, slow or lock up the operating system, and even erase data. Following the five anti-virus guidelines listed here will not

guarantee that a virus will never infect a computer, but they do make infection more difficult.

1. Avoid using disks that have been passed around between many computers. When this can't be avoided, controls should be established over where the disks are circulated.

2. Place write protection tabs on floppy disks. Write protection prevents anything from being written to the floppy disk, including viruses.

3. If an individual user has to lend someone a disk, make sure it's only a backup copy. When the disk is returned, reformat it even if it was write protected.

4. Unless the computer in use doesn't have a hard drive, avoid starting up a computer from a floppy disk. Some viruses copy themselves to a hard drive during the start up operation.

5. Backup, backup, backup. A virus-infected hard drive may have to be reformatted to remove the virus, erasing all of the data stored on it.

Perhaps the best protection against viruses — in conjunction with the five tips above — is to install virus detecting and removal software. These are application programs much like word processors or spreadsheets. Depending on the individual program, virus detectors can scan both a hard drive or a floppy disk for viruses, alert the user, and then disinfect the disk. Other programs come in pairs. One program scans for viruses, the other program then erases them. It is

important, however, to use the latest version of the program. A virus can mutate or a new one can appear that will not be recognized by an old version of detection software.

Jeff Balvanz, senior microcomputer consultant at Iowa State University, said there are many anti-virus programs available. These programs range from shareware programs available for a small fee to commercial programs that retail in the range between \$100 and \$200. Shareware is available from user groups or bulletin board services. Usually a user group will require a person wanting the programs to bring in an unformatted disk for the programs. If a computer user is sure the computer's hard disk is clean, the programs can be copied to the hard disk. But always write protect the floppy disk holding the anti-virus programs to use as a back up.

There are a few telltale signs that a virus has spread to a computer,

according to Balvanz. Those include the computer trying to read or write to disks when it shouldn't; a delay in the computer reading from the floppy disk drive, dates of executable programs changing, and files that mysteriously grow larger and larger. If a computer has any of these symptoms, it must be checked immediately for a virus. A virus will do more damage and be more difficult to remove the longer it is left in a computer.

Although the chances are that local agencies won't be infected by computer virus, precautions should be taken. If an agency's computers are clean, it should install an anti-virus program on each machine and use the program to scan disks that have been used in another computer.

### Board funds BBS

The Highway Research Advisory Board approved funding for a bulletin board for county engineers and their

staffs. It will be managed by the Iowa Transportation Center. The funding was for a three-year pilot project during which BBS services will be free of charge. The proposal came at the suggestion of the Iowa County Engineers Association's Computer Programs and Information Coordinating Committee. This committee will serve as the BBS's advisory board and set system policy.

The BBS will provide space for news bulletins, a calendar of relevant events, and a message exchange. The Iowa Department of Transportation can post bulletins or updates and provide a store of sample documents, special resolutions, maps, AUTOCAD drawings, and other items of interest.

The Iowa Transportation Center will have the BBS up and running sometime during the winter of 1992.

## Signal coordination continued from page 2

quired — providing a benefit-to-cost ratio of 159 to 1.

The third city had three signals on the main highway through town when the study was conducted. The city, however, was planning to install a signal at a fourth intersection. The existing signals were operated through pretimed controllers and two of the three were interconnected. The new signal was assumed to also be pretimed controlled. In comparison to existing timings, coordination provided motorists with \$10,000 in annual fuel and travel time savings which more than justifies adding

time-based coordinators. Including the costs of additional signal hardware and recalculating signal timings, the benefit-to-cost ratio was 1.2.

In all case studies, the arterials analyzed had peak hourly volumes of 900 vehicles or less. None of the intersections were congested, with typical volume-to-capacity ratios less than 0.5. From Hawkins' three case studies, it is clear that signal coordination and hardware upgrades to facilitate coordination are economically justified.

The first step in implementing the new law was for cities to submit a signal inventory, which were due last July. Cities wishing to find out more about the signal coordination administrative rules should contact the Office of Local Systems, Iowa Department of Transportation, 800 Lincoln Way, Ames, IA 50010. If you need more information on traffic signal retiming, contact the Iowa Transportation Center, 515/294-5642. The ITC can provide both technical and informational reports as well as videotapes on the benefits of well maintained and coordinated traffic signals.

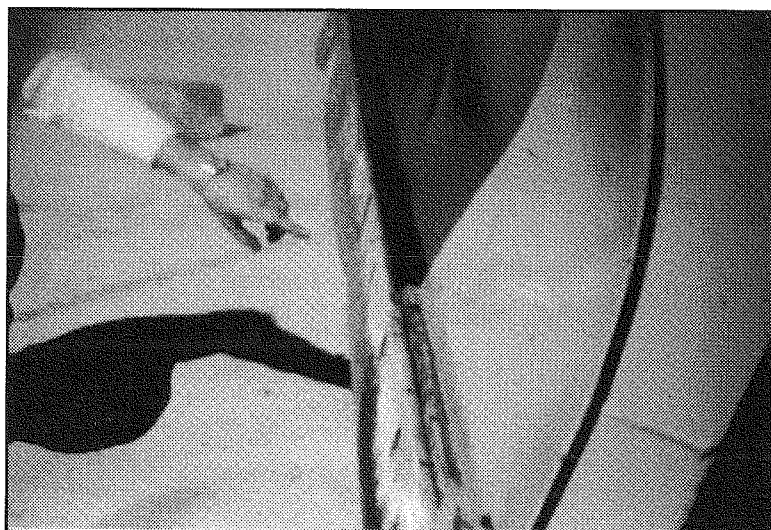
## Tips From The Field

### Carbide tips extend blade life

Installing carbide tips on the edges of snowplow blades can save a substantial amount in labor and maintenance expense.

The photo shows how a three-piece carbide blade is installed on a standard snowplow blade. The City of Clive has used carbide tips in this fashion for the last 10 years.

"We've found that the carbide tip, in combination with the front blade, is giving us between three and four years of service," Clive Director of Public Works Willard Wray said. "It should be noted that these plows are running directly on concrete with no



**Carbide tips can extend the life of snow plow blades.**

wheels or skids behind the blades. On the same trucks 10 years ago we were changing blades approximately four times per season. At that rate

Contact Willard Wray, City of Clive Public Works Director, 8505 Harbach Blvd., Clive IA 50053 or phone 515/223-6230.

we're seeing a payback at just a little over a year at today's prices for carbide tips."

Wray said his department welds the nuts to the bolts that hold the carbide tip in place.

"This solves the problem of bolts becoming loose and falling off due to vibration," Wray said. "When you finally replace the blades, you can cut away the old bolts and replace them with new and still be cost effective."

### Innovations wanted for spring conference

Innovative ideas for road and bridge construction are needed for the Showcase of Innovative Construction Methods and Technologies for Roads and Bridges conference slated for June 11 and 12, 1992, at the Hilton Plaza Inn in Kansas City, MO.

The conference will focus on new and innovative ideas for construction, reconstruction, or rehabilitation of roads and bridges. Concurrent open forum sessions will include such topics as public relations, bituminous paving, environmental issues, struc-

tures, concrete paving, construction management, grading, safety, and signs, signals, and lighting.

Engineers or their staff members are invited to submit their innovative design concepts, construction methods, services, materials, or new equipment. All topics will be considered by a selection committee. Finalists will be asked to offer a presentation that is educational and practical. Approximately 40 exhibit spaces are available to display either concepts for products.

Submit presentations to Dean Testa, Kansas Department of Transportation, 915 Harrison, Topeka, KS, 66612 or phone 913/296-3576. Submit exhibit proposals to Gary Chullino, Missouri Highway and Transportation Department, P.O. Box 270, Jefferson City, MO. 65102 or phone 314/751-2806.

More information will be sent when proposals are submitted. Final deadline is December 15, 1991.

## 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.**

**Snow Conferences — 1989 Nebraska** Information in this 24-page booklet come from a variety sources including an article by Iowa State University professor Stan Ring. **Request #751**

**Controlling Drifting Snow** This report by Stan Ring points out the proper methods to be followed in locating and erecting snow fences for the best protection. It contains a number of diagrams illustrating snow drift shapes caused by both solid and porous snow fences. **Request #718**

**The Hole Story (1989 Edition) —** This 14-page pamphlet deals with the causes of potholes and the importance of repairing them

correctly the first time. It also goes into the economic impact of potholes, taking into account age, increased traffic, inflation, and deferred maintenance. **Request #15**

**Heavy Equipment Operation ('10-tape series)**  
**Parts 1 and 2 also available**  
**Part 3 Loader Operation, three tapes** The first tape deals with the daily checks that need to be made on a loader before and during startup, while operating, and when shutting down. The second tape deals specifically with startup, basic maneuvering, and shutdown with a particular emphasis on safety. The third tape covers the techniques of using a loader for stockpiling and loading. **Running time first tape 11:00 Request #32C-1; Running time second tape 11:00, Request #32C-2; Running time third tape 9:00, Request #32C-3**

**Part 4 Motor Grader Operation, four tapes** The first tape explains motor grader basics such as startup procedures and shutdown. The second tape deals with blade positions and maneuvering and the third tape covers six basic steps in performing common motor grader

tasks. **Running time first tape 18:30, Request #32D-1; Running time second tape 17:30, Request #32D-2; Running time third tape 18:00, Request #32D-3**

**Safety Restoration During Snow Removal Guidelines** This videotape ranks and discusses hazards involved with snow removal operations. Although the videotape uses many still photographs, they are accompanied by a comprehensive commentary. A 95-page publication of the same title is available under index # 763. **Running time 25:24; Request #166V**

**White Gold** This videotape from the University of New Hampshire deals with planning, policy making, and snow removal operations. The tape is intended to be used as a planning tool. **Running time 25:00; Request #31V**

**Snow Plow Driving with Automatic Transmissions** This videotape discusses the principles of operating snow plows, especially those with automatic transmissions. **Running time 14:00; Request #88V**

### 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.

	Title	Index No.	No. of Copies
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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.

## Conference Calendar

### **ASCE Transportation Conference November 6, Iowa State University**

The American Society of Civil Engineers-Iowa Section co-sponsors this annual conference to address engineering topics related to the design, construction, operation, and maintenance of transportation systems. Contact Deb Schmidt 515/294-5961

### **Better Concrete Conference/Architects and Engineers Nov. 7, Iowa State University**

Discover up-to-date facts about dynamic changes in concrete application. Informative sessions are offered for architects, engineers, developers, manufacturers, and suppliers. Contact Connie Middleton 515/294-6229.

**Equipment Purchasing, Replacement and Specifications (Vehicle Fleet Management Series) November 19 at Ames; November 21 at Cedar Rapids** This one-day workshop is intended for city and county vehicle fleet management personnel and is suitable for lead mechanics,

shop foremen, equipment supervisors, and managers. Contact Carol Seifert 515/294-1400

### **Annual County Engineers Conference December 3-5, Iowa State University**

Informative continuing education courses conducted during this conference are planned specifically for county engineers and technicians. The conference also features more than 30 exhibits from manufacturers and suppliers. Contact Connie Middleton 515/294-6229.

### **Iowa DOT Specifications Update Conference Dec. 11, Iowa State University**

Contractors and consultants will have the opportunity to view recent changes in Iowa DOT specifications. Contact Connie Middleton 515/294-6229.

### **Aggregates in Transportation January 9, Iowa State University**

Engineers, contractors, and aggregate producers will learn ways to understand the problems each faces in

providing a quality product for public transportation. Contact Connie Middleton 515/294-6229.

### **Asphalt Paving Conference January 28, Iowa State University**

Innovations in design, construction, and operation of asphalt highway and runway surfaces is the topic of this conference. Presentations will include quality control, mix design, equipment specifications, construction procedures, and maintenance techniques. Contact Connie Middleton 515/294-6229.

### **And justice for all**

Appointment, promotion, admission, and programs of extension at Iowa State University are administered 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.

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