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### Acronyms in this issue

AASHTO American Association of State Highway and Transportation Officials

CTRE Center for Transportation Research and Education

FHWA Federal Highway Administration

Iowa DOT Iowa Department of Transportation

ISU Iowa State University

LTAP Local Technical Assistance Program

MUTCD Manual on Uniform Traffic Control Devices

## Ames, Bettendorf switch to LED signal lamps

A NEW signal lamp technology is helping some cities reduce the cost of energy for traffic signals by as much as 85 percent.

### What is LED?

This relatively new technology replaces incandescent lamps with small, light-emitting diodes (LEDs) that are grouped together to form red, yellow, and green lamps for traffic signals and pedestrian crossing signals.

Because 100 percent of an LED lamp’s emitted energy is visible light, an LED traffic signal lamp consumes less than 10 watts of electricity to provide the same amount of visible light provided by a 150-watt incandescent lamp. LED lamps also last up to five times longer than incandescent lamps (approximately 100,000 hours).

Decision makers must weigh the high initial purchase price of LED lamps against potential savings in energy and maintenance costs. Currently, red LED signal lamps cost about \$87; yellow lamps, about \$145; and green lamps, about \$125.

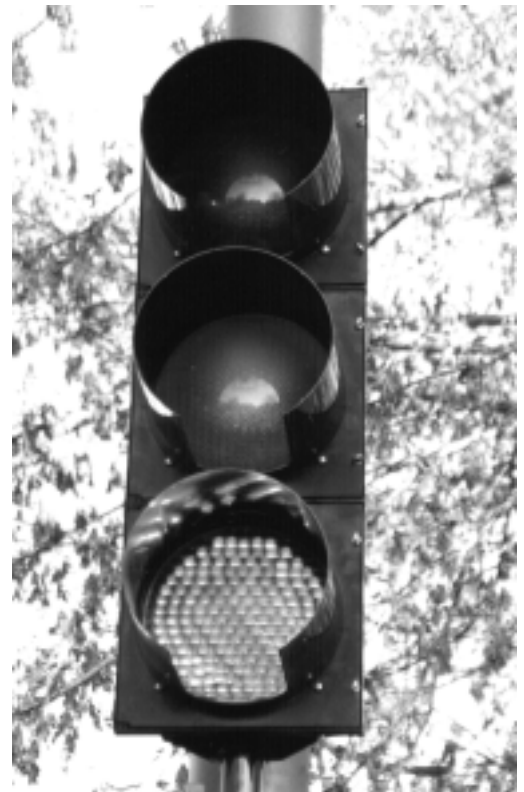
### Ames

Ken Lang, Ames city maintenance manager, has developed a system for replacing incandescent lamps with LED lamps in Ames’s 68 signalized intersections and crossings. He

- staggers the amount of lamps installed at one time to maintain the current budget while

keeping time and costs associated with signal lamp maintenance reasonably low.

*LED . . . continued on page 2*



The green LED signal lamp above in Ames uses significantly less energy to produce the same amount of light as its incandescent predecessor.

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**The mission of Iowa's LTAP:** To foster a safe, efficient, environmentally sound transportation system by improving skills and knowledge of local transportation providers through training, technical assistance, and technology transfer, thus improving the quality of life for Iowans.

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ISU Research Park  
2901 S. Loop Drive, Suite 3100  
Ames, Iowa 50010-8632  
Telephone: 515-294-8103  
Fax: 515-294-0467  
www.ctre.iastate.edu/

**Stephen J. Andrie**  
Director of CTRE  
andrie@iastate.edu

**Duane Smith**  
Director of Iowa LTAP  
desmith@iastate.edu

**Marcia Brink**  
Editor  
mbrink@iastate.edu

**Tom McDonald**  
Safety Circuit Rider  
tmcdonal@iastate.edu

**Sharon Prochnow**  
Program Coordinator  
prochnow@iastate.edu

**Brett Hansen**  
**Michele Regenold**  
Contributing Writers

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## LED . . . continued from page 1

- is replacing all red signal lamps with LED lamps over four years. The red LED lamps are the least expensive of the three colors. One red LED lamp takes about nine months to pay for itself in energy savings.
- is replacing lamps at higher energy consuming intersections first. Lower energy consuming intersections are left until last or, if scheduled for an upgrade within a few years, passed over altogether.
- is installing green LED lamps and pedestrian crossing lamps during the next few years.
- does not plan to switch to yellow LED lamps. Yellow incandescent lamps already last significantly longer than their red and green counterparts because they are "off" most of the time. Therefore, Lang believes that switching to yellow LED lamps would not be cost effective.

### Bettendorf

Bob Webster, Bettendorf city electrician, has taken a slightly different approach to replacing signal lamps. Webster

- has replaced red and green incandescent lamps with LED lamps over the past three years in Bettendorf's 38 signalized intersections.
- calculates energy savings of about \$52,000 since the switch to LED lamps. He projects that the entire \$85,000 project will pay for itself in energy savings in less than two years.
- has developed a plan to allocate money over the next five years to maintain and replace LED lamps.
- is installing yellow LED lamps because they will rarely need to be replaced.
- is installing LED lamps in pedestrian crossing lights and obsolete pedestrian signal heads during the coming year, which will save even more money in energy costs.

Webster says that installing LED lamps is relatively easy. Because Bettendorf crews installed the city's new lamps, the city received a \$40 per red lamp rebate from the utility company that supplied them.

### For more information

Contact Ken Lang in Ames, 515-239-5535, klang@city.ames.ia.us, or Bob Webster in Bettendorf, 563-344-4055, tbob48@aol.com. •

## Web-based course for 2002 roadside design

WOULD YOU like to take a professional course on AASHTO's roadside design guidelines but don't want the hassle and expense of out-of-state travel?

You can. Within 48 hours of signing up online, you can begin taking a new, web-based overview of the *2002 AASHTO Roadside Design Guide* offered by the National Highway Institute.

Completing the course will take approximately 14 hours. Take the course at your desk, at your leisure, and at your own pace; it's available 24 hours a day, 365 days a year. Earn 1.4 continuing education units for completing the course.

### Objectives

Upon completing the online course, you will be able to

- apply the clear zone concept to all classes of roadways
- recognize unsafe roadside design features and elements and make appropriate changes
- identify the need for a traffic barrier
- select, design, and install a traffic barrier
- apply safety concepts to roadside features and appurtenance selection/use in work zone
- compare alternate safety treatments and select a cost-effective design
- identify policies and practices that are inconsistent with current state-of-the-art

### Logistics

The course is free for FHWA staff. A "get-acquainted-with-web-based-training" special registration fee for state, local, and private sector personnel is \$80. (Compare this to the regular classroom fee of \$400 for two days of training, plus travel and lodging expenses.)

To register, see the NHI's website, [www.nhi.fhwa.dot.gov/](http://www.nhi.fhwa.dot.gov/), and click on the ONLINE COURSE button on the left.

### For more information

For registration or other logistical information, contact Eloise Freeman-Powell, course coordinator, 703-235-0553, [eloise.freeman@fhwa.dot.gov](mailto:eloise.freeman@fhwa.dot.gov).

For technical information about the course, contact Richard Powers, 202-366-1320, [richard.powers@fhwa.dot.gov](mailto:richard.powers@fhwa.dot.gov). •

## Remove salt and sand with *underbody wash*

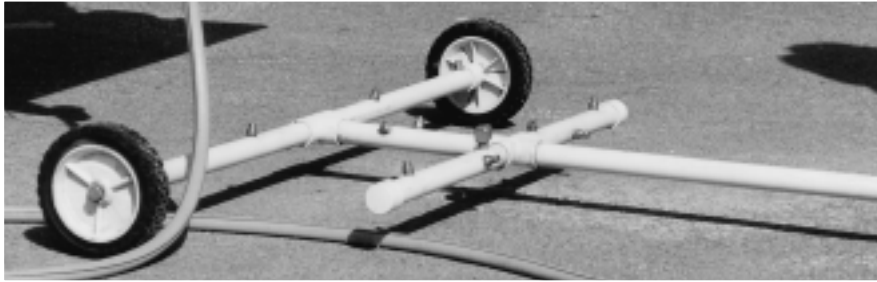
FOR A QUICK and easy way to remove salt and sand build-up from beneath snow removal vehicles and equipment, try the underbody wash. It's effective and lightweight, rolls easily under vehicles, and helps prevent corrosion and wear and tear on parts.

The underbody wash was constructed by the City of Ankeny Public Works Department staff. They built it using one-inch PVC pipe, lawnmower wheels, and pressure nozzles. The wash is 105 inches long and 48 inches wide; it has two cross tubes with 15 pressure nozzles. The nozzles are adjusted to spray in

various directions. The water pressure is generated by a gas-powered water pump.

For more information about the underbody wash, contact Dennis Guillaume, 515-965-6481. •

*Editor's note: The "underbody wash" is one of several winning innovations from the "Better Mousetrap" competition at the Iowa Maintenance Training Expo in September 2002. In each issue of Technology News we will highlight one of the winners. For information about other winning "mousetraps," see CTRE's website: [www.ctre.iastate.edu/](http://www.ctre.iastate.edu/) ("Popular Links").*



The underbody wash was demonstrated by Dennis Guillaume, City of Ankeny, at the Iowa Maintenance Training Expo in September 2002.

### LTAP Advisory Board

The people listed below help guide and direct the policies and activities of Iowa's Local Technical Assistance Program (LTAP). Contact any of the advisory board members to comment, make suggestions, or ask questions about any aspect of LTAP.

Saleem Baig  
Local Systems  
Iowa DOT  
Telephone: 515-239-1051

Gary Fox  
Traffic and  
Transportation Director  
City of Des Moines  
Telephone: 515-283-4973

John Goode  
Monroe County Engineer  
Telephone: 641-932-7123

Neil Guess  
Howard R. Green Company  
Telephone: 515-278-2913

Bret Hodne  
City of West Des Moines  
515-222-3475

Susan Klekar  
Iowa Division, FHWA  
Telephone: 515-233-7302

Wally Mook  
Director of Public Works  
City of Bettendorf  
Telephone: 319-344-4128

Tom Parham  
Local Systems  
Iowa DOT  
Telephone: 515-239-1256

Bob Sperry  
Story County Engineer  
Telephone: 515-515-382-7355

Wade Weiss  
Greene County Engineer  
Telephone: 515-386-5650



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*Editor's note: This article was adapted from information provided to the LTAP community by Greg Schertz, safety engineer, FHWA.*

## Draft retroreflectivity standards for signs in 2003

THE FHWA is developing guidelines for minimum road sign and pavement marking retroreflectivity levels and methods of evaluating those levels. Draft rulemaking should be available for comment in 2003. During this process, the FHWA is addressing concerns raised by state and local agencies and industry.

### What's the issue?

Nearly half of all traffic fatalities occur between dusk and dawn, when traffic is relatively light. One reason is that, at night, drivers rely almost solely on road signs and pavement markings to maintain their position, because other cues visible during the day (guardrails, textured shoulders, roadside vegetation, etc.) are swallowed up in darkness.

To maximize safety for nighttime drivers, the MUTCD therefore requires that road signs and pavement markings be retroreflective (see sidebar) or illuminated.

Because retroreflective materials gradually deteriorate and signs become dirty, road departments must regularly inspect and evaluate the night-

time visibility of traffic control devices (TCDs). However, there are currently no standards regarding minimum levels of retroreflectivity for TCDs or methods for evaluating/measuring it.

### What's the process?

To develop such standards, the FHWA is collecting information from three sources:

- The Texas Transportation Institute (TTI) is completing research regarding minimum retroreflective values for nighttime visibility of signs. The values will address current vehicle and headlight types, sign sheeting technology, and the needs of aging drivers.
- A research summary report is also being prepared by TTI on minimum retroreflectivity levels for pavement markings.
- The FHWA has conducted four national workshops in which representatives of state and local agencies, industry, and LTAP centers

helped develop options for implementing minimum retroreflectivity levels. Several Iowans attended some of these workshops.

The two reports and the transportation community's recommendations will be distributed to the AASHTO Retroreflectivity Task Force for review, and draft rulemaking for minimum retroreflectivity standards for signs will begin soon. (Minimum standards for markings will be developed later.) Iowa's public agencies should monitor this process and be prepared to review and provide comments on the proposed rule.

The FHWA plans to offer special training to local agencies for implementing the minimum retroreflectivity standards for signs. Your Iowa LTAP will provide information about training as soon as it's available.

### Concerns of the transportation community

Significant issues raised by state and local agencies and industry and being addressed by the FHWA include the following:

- Agencies are concerned that they will be required to measure the retroreflectivity of all signs, increasing their sign maintenance costs. (The FHWA believes an affordable process can be developed that allows alternative methods for evaluating nighttime sign visibility.)
- Some agencies are concerned that including minimum retroreflectivity values in the MUTCD will increase their exposure to tort liability. (The FHWA believes a standard without actual numerical values can be placed in the MUTCD.)
- Industry is concerned about the validity of 1993 research that developed possible minimum values. (The TTI research addresses current vehicle characteristics and older drivers.)

### For more information

Visit the FHWA retroreflectivity website, <http://safety.fhwa.dot.gov/programs/retroref.htm>, or e-mail [greg.schertz@fhwa.dot.gov](mailto:greg.schertz@fhwa.dot.gov) or [peter.hatzi@fhwa.dot.gov](mailto:peter.hatzi@fhwa.dot.gov). Or contact Tom McDonald, Iowa's safety circuit rider, 515-294-6384, [tmcdonal@iastate.edu](mailto:tmcdonal@iastate.edu).

An informative FHWA slide presentation can be found at [www.fhwa.dot.gov/safety/fourthlevel/retrstat42202.htm](http://www.fhwa.dot.gov/safety/fourthlevel/retrstat42202.htm). •

## What's the "retro" in retroreflectivity?

Retroreflectivity is the property of a material that returns or reflects light back toward its source.

At night, light from vehicle headlamps shines on signs and pavement markings. A traffic control device's (TCD's) perceived brightness is directly related to the amount of light that is reflected from it into the driver's eyes. If the TCD is made of retroreflective materials, it reflects light back toward the headlamps, which are close to the driver's eyes.

## “Vital” strategies for highway safety

THE FHWA’s new, short-term (three to five years) business strategy—Vital Few—focuses attention and resources on three critical areas: highway safety, environmental stewardship and streamlining, and congestion mitigation.

### Putting safety first

“First and foremost of the Vital Few is the safety of our nation’s highway system,” says Mary Peters, FHWA administrator. “We still lose far too many lives to crashes—more than 40,000 persons . . . every year—on the nation’s highway system.”

The success of the Vital Few initiative will be measured by lives saved.

### Vital Few challenges

FHWA is committed to reducing highway fatalities by 10 percent by 2007. However, the Vital Few initiative faces a hefty challenge:

Even though death rates have been decreasing (while vehicle miles traveled have been increasing), the reduction of highway fatality and injury rates in recent years has hit a “plateau.” The figures below illustrate the leveling out of highway deaths and injuries.

Many of the efforts that could turn those numbers down again require more accurate data on fatalities and injuries, particularly on their location and cause. A key component in moving beyond the highway fatality plateau is improving the collection and

analysis of safety data and the linkage of information to other key roadway data.

### Vital Few strategies

Vital Few focuses on three crash types that represent about 38, 20, and percent of all roadway fatalities, respectively:

- single-vehicle, run-off-the-road crashes
- intersection crashes
- bicycle/pedestrian crashes

#### *Single-vehicle, run-off-the-road crashes.*

Major FHWA strategies include

- improving pavement skid resistance
- increasing the visibility of signs and pavement markings
- increasing the use of rumble strips where appropriate
- upgrading roadside safety hardware (e.g., guardrail, crash barriers)
- improving design practices
- mitigating effects of utility poles and other roadside hazards

*Intersections.* Significant efforts include

- reducing red-light-running
- conducting road safety audits
- improving intersection design
- developing “intelligent” technologies with potential to address intersection crashes

*Pedestrian/bicycle safety.* Vital Few strategies focus on

- integrating pedestrian and bicyclist issues in facility planning and design
- providing engineering and ITS approaches to increase the safety of bicyclists and pedestrians
- accelerating the deployment of effective processes, tools, and technologies

### Iowa’s strategies

Nationally, the highest fatality rates occur on two-lane and rural roads. The fatality rate on rural local roads is more than three times the rural interstate fatality rate and six times the

urban interstate rate. These statistics are sobering in Iowa, where most lane miles are two-lane and rural.

Single-vehicle, run-off-the-road crashes accounted for nearly 60 percent (15,905) of two-lane road fatalities in 2000 alone. Many of these fatalities were due to over-turns or striking roadside obstacles such as trees or poles.

The FHWA, Iowa Division, is focusing on engineering improvements that include

- adding milled-in rumble strips and paved shoulders on selected roadways
- placing brighter and more durable pavement markings
- redesigning intersections and retiming traffic signals
- installing roundabouts at certain appropriate locations

Iowa’s law enforcement agencies will play a major role as well. Traffic violations like passing in restricted zones, failure to yield right-of-way at intersections, failure to yield to pedestrians, driving while impaired by alcohol or drugs, and not wearing seat belts are major contributing factors to the types of crashes described above.

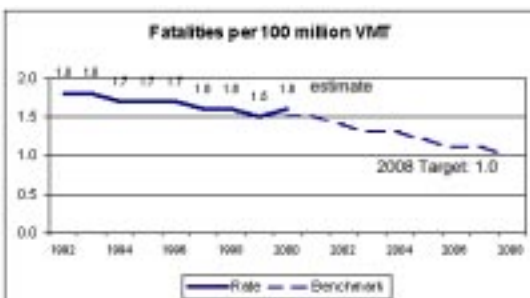
### Resources for Iowans

The Iowa Safety Management System’s new Toolbox of Highway Safety Strategies describes dozens of practical strategies for improving safety in Iowa jurisdictions. The Toolbox is online, [www.iowasms.org/toolbox.htm](http://www.iowasms.org/toolbox.htm). Copies are still available; contact Mary Stahlhut, Iowa DOT, 515-239-1169, [mary.stahlhut@dot.state.ia.us](mailto:mary.stahlhut@dot.state.ia.us).

For assistance locating and interpreting Iowa crash data and other safety information, contact the Iowa Traffic Safety Data Service, housed at ISU’s Center for Transportation Research and Education, 515-292-5004, [itsds@iastate.edu](mailto:itsds@iastate.edu).

### For more information

For details about the implications of FHWA’s Vital Few initiatives for local agencies, contact Jerry Roche, safety engineer, FHWA, Iowa Division, 515-233-7323, [Jerry.Roche@fhwa.dot.gov](mailto:Jerry.Roche@fhwa.dot.gov). •



## 0.08 or 0.10? Iowa's legal blood alcohol concentration (BAC) limit

IN THE LAST 10 or 15 years, stricter "operating while intoxicated" (OWI) laws and enforcement have helped reduce alcohol-related traffic injuries and fatalities significantly in Iowa (see related article). However, coupling these measures with the lower legal BAC limit recommended by the federal government (0.08 percent instead of Iowa's current 0.10 percent) could help reduce the numbers even more, according to studies by the National Highway Traffic Safety Administration (NHTSA) and others.

In the most recent evaluation of 0.08 percent BAC limits (*Journal of Safety Research 2002*), an Illinois study researched the effect of the state's 1997 reduction of legal BAC limit from 0.10 to 0.08 percent. The study found that the reduction in BAC limit was associated with a 13.7 percent decline in the number of drinking drivers involved in fatal crashes.

### Iowa's BAC bill

For several years, the Iowa Department of Public Safety (DPS) has supported a bill to lower Iowa's legal BAC limit for drivers from 0.10 to 0.08 percent. In 2001 the state senate passed the bill (48-1); the state house of representatives declined to debate the issue.

The bill has broad support. It has been part of both former Governor Branstad's and Governor Vilsack's legislative agendas. Many organizations, including those in medical professions, emergency response, insurance, law enforcement, prosecution, substance abuse, victim services, counseling,

and safety education, support it. Polls have also shown broad citizen support.

Some groups and individuals, however, see the bill as an attempt by the federal government to regulate state policy. The federal government awards grants for safety programs to states that have adopted the 0.08 percent BAC limit. (Currently 34 states have reduced their legal BAC limits to 0.08 percent.)

In addition, some groups in the alcoholic beverage and hospitality industries, as well as those philosophically opposed to lowering the current 0.10 percent BAC limit, also oppose the bill.

The bill will be introduced again during the 2002 legislative session, and the Iowa DPS will continue to work with supportive groups and individuals to educate Iowans about the lifesaving aspects of lowering the legal BAC limit to 0.08 percent.

### For more information

For information about Iowa's 0.08 percent BAC limit bill, contact the Iowa DPS, 515-281-5261, or visit its website, [www.state.ia.us/government/dps](http://www.state.ia.us/government/dps).

The Illinois study, by Robert B. Voas et al., can be found in the *Journal of Safety Research*, Vol. 33 (2002), pp.73-80. See also a summary of a NHTSA study by Dr. Robert Apsler et al., [www.nhtsa.dot.gov/people/injury/alcohol/limit.08/Klein08/KleinExc.html](http://www.nhtsa.dot.gov/people/injury/alcohol/limit.08/Klein08/KleinExc.html).

To learn about legislators' perspectives on 0.08 percent BAC limit or to provide your input about this issue, contact your elected state official, [www.state.ia.us/government/official.htm](http://www.state.ia.us/government/official.htm). •

### Sobering facts:

### alcohol-related injuries and fatalities

*(Italicized items indicate reductions in alcohol-related traffic crashes, injuries, and/or fatalities in Iowa.)*

#### U.S. injuries

- Each year at least 300,000 persons are injured annually in police-reported alcohol-related traffic crashes.

#### Iowa injuries

- *Iowa alcohol-related traffic injuries totaled 2,443 in 2000, down 38 percent since 1990.*
- During 2000, about 30 percent of all people injured in alcohol-related crashes in Iowa were between 14 and 25 years old.

#### U.S. fatalities

- Traffic fatalities are the leading cause of death among persons 1-34 years old, and alcohol is the leading cause of traffic fatalities by an overwhelming margin.
- Nationally, over 16,600 people were killed in alcohol-related traffic crashes during 2001. Nearly 40 percent of all traffic deaths in the United States are alcohol-related.
- The over 16,600 people killed in alcohol-related crashes during 2001 represent an average of one alcohol-related fatality every 32 minutes.

## Reducing alcohol-related crashes in Iowa: Successful initiatives

IOWA'S operating-while-intoxicated (OWI) laws and enforcement have become stronger during the last 20 years. According to the Iowa Department of Public Safety (DPS), studies indicate that various OWI sanctions, strictly enforced, enhance each other and contribute to Iowa's overall decline in alcohol-related fatalities. Iowa statistics support such a conclusion.

### Administrative license revocation (ALR)

Iowa's implied consent law enacted in 1964 gives police officers the authority to revoke a driver's license immediately if the motorist refuses a breath, blood, or urine test. A 1982 amendment to the law extends this authority to situations in which a driver fails a chemical test.

ALR laws provide "faster, surer, and more effective penalties to OWI offenders," according to an Iowa DPS spokesperson. The Iowa DOT administers the ALR process.

### OWI penalties

During the last 10 years, Iowa has enacted stricter OWI penalties. First-time offense penalties include

- a minimum of 48 hours in jail,
- up to \$1,000 fine or community service, and
- revocation of driver's license for a minimum of 180 days.

First-time offenders can apply for a temporary driving permit after 30 days; however, if the permit is granted, they are restricted to driving vehicles with an ignition interlock device (a breath alcohol analysis device that controls ignition operation).

Second-offense penalties include

- a minimum of seven days in jail,
- a \$1,500 to \$5,000 fine, and
- license revocation for a year.

Second-time offenders can apply for a temporary driving permit after 90 days. If the permit is granted, they are restricted to driving vehicles with an ignition interlock device.

Any subsequent offense is considered a felony punishable by a minimum of 30 days in jail and a fine up to \$7,500. Offenders' driver's licenses are revoked for a minimum of one year. (Temporary permit may be issued after one year.)

### Zero tolerance

In 1995 Iowa enacted a "zero-tolerance" law for drivers under age 21. First-time offenders in this age group with a blood alcohol concentration level as low as 0.02 percent lose their licenses for 60 days to a year. This is not a criminal offense.

### Other factors

In Iowa, combining strong, cooperative law enforcement with public information and education, along with an increase in citizens' health concerns, has had a "sobering" effect on drinking and driving.

### For more information

For information about OWI penalties, contact the Iowa DPS, 515-281-5261, or visit its website, [www.state.ia.us/government/dps](http://www.state.ia.us/government/dps). Or contact the Iowa DOT's Office of Driver Services, 515-237-3153. Also, see the Code of Iowa (Section 321J). •

### Iowa fatalities

- *The number of Iowa alcohol-related traffic fatalities in 1996 through 2000 represents the lowest five years on record. For the year 2000, the percent of Iowa traffic fatalities that were alcohol-related was the second lowest in the nation.*
- *During 2000, 112 alcohol-related traffic deaths were reported in Iowa, down 15 percent from the 1999 total of 132.*
- During 2001, there were 118 alcohol-related traffic deaths, up 5 percent from the 2000 total of 112.

- Nearly 30 percent of all victims who died in alcohol-related crashes in Iowa from 1990 to 2000 were 25 years old or younger.
- Drivers 16–25 years old represent only 16 percent of all registered drivers in Iowa, but they comprise nearly 30 percent of all drinking drivers who were involved in fatal crashes during 1992–2000.

These statistics were adapted from information on the Iowa Department of Public Safety's website, [www.state.ia.us/government/dps/gtab/gtsft\\_3](http://www.state.ia.us/government/dps/gtab/gtsft_3), and NHTSA's website, [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov).

## From 350 to fewer than 100 crashes per year

The Office of Rail Transportation (ORT) at the Iowa DOT attributes the significant reduction in highway-rail crossing accidents over the past 25 years to three E's: engineering, enforcement, and education.

### Engineering

Warning signals have advanced in technology and availability. There are more signalized crossings than there were 25 years ago and fewer rail lines.

### Enforcement

With advances in technology, rail-crossings are more reliable (e.g., fewer instances of flashing lights when no train is present). Therefore, law enforcement is in a better position to enforce violations at rail crossings like going around a lowered rail gate.

### Education

ORT has taken part in educating and training students about rail crossing safety through a federal program called Operation Lifesaver.

For more information about Operation Lifesaver, visit its website at [www.oli.org](http://www.oli.org), or contact Jaraine Mohs, 1636 Reagan Drive, Ames, IA 50010, [iowa4ol@aol.com](mailto:iowa4ol@aol.com).

## Funding is available to improve highway rail crossing safety

IN THE LAST 25 years, Iowa has reduced at-grade, highway-rail crossing crashes from about 350 a year to fewer than 100 (see sidebar). Still, in 2000 the state ranked ninth in the nation for number of fatalities and fourteenth for number of injuries from such crashes.

As part of its safety efforts, the FHWA allocates about four million dollars annually to the Iowa DOT to help the state's transportation agencies and rail companies improve crossings where crashes are most likely to occur.

James Gibson, rail crossing safety fund manager for the Iowa DOT's Office of Rail Transportation (ORT), urges local agencies and railroad companies to apply for funds to upgrade potentially dangerous crossings.

*"Communities can't receive help if they don't apply."*

—Peggy Baer  
Rail Transportation Director  
Iowa DOT

If your upgrade application is approved, the ORT will fund 90 percent of the cost of approved improvements.

### Apply for 2004 upgrade monies

This is a good time of year to apply, before winter road maintenance and spring road projects usurp "unessential" paperwork.

The ORT recently sent county and city road engineers, mayors, and clerks current data about at-grade crossings in their jurisdictions. The data include a predicted accident ratio for each crossing based on crash histories and many other factors.

Any crossing with at least 0.075 predicted accident ratio (a "priority-one" crossing) is automatically a top candidate for upgrade funding.

To date, the ORT has received upgrade applications for only a few of the state's 61 priority-one crossings, so funds have been awarded to many non-priority-one crossings. According to Gibson, "Only three or four projects out of the 31 we are currently funding have an accident average that gives them priority one."

"Communities can't receive help if they don't apply," says Peggy Baer, Iowa DOT rail transportation director.

Each fall, cities and counties receive current data about at-grade crossings in their jurisdictions, including predicted accident ratios.

### How to apply

Railroad companies are responsible for engineering and constructing railroad crossings and must follow the upgrading regulations outlined in Chapter 8 of the MUTCD. Once local agencies have identified crossings for possible upgrades, they need to work closely with rail companies that own the crossings.

To apply for crossing safety upgrade monies, follow these steps:

1. Evaluate the site carefully to determine what factors—obstacles, road quality, etc.—will influence upgrade design. Meet with railroad owners to develop upgrade plans.
2. Work with the railroad to determine how your agency and the company will split the 10 percent of project cost that would not be covered by an ORT award.
3. Contact the ORT to receive an application. Both the railroad and the local agency must sign the completed application. **Return it to ORT before August 1, 2003.**

### For more information

For more information about highway-rail crossing safety, including the upgrade application process, contact the ORT, 515-239-1140, [www.iowarail.com](http://www.iowarail.com).

Section G4.1 of *Iowa Traffic Control Devices and Pavement Markings: A Manual for Cities and Counties* highlights requirements from the MUTCD. The manual is online, <http://www.ctre.iastate.edu/pubs/itcd/index.htm>, or contact Tom McDonald, 515-294-6384, [tmcdonal@iastate.edu](mailto:tmcdonal@iastate.edu), for more information. •

