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Technology NEWS

Providing transportation technology transfer for Iowa's cities and counties

Iowa LTAP
Local Technical Assistance Program

Inside this issue

Iowa State University's Center for Transportation Research and Education (CTRE) is the umbrella organization for the following centers and programs:

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Center for Weather Impacts on Mobility and Safety
Construction Management & Technology
Iowa Local Technical Assistance Program
Iowa Statewide Urban Design and Specifications
Iowa Traffic Safety Data Service
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National Concrete Pavement Technology Center
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Making school zones safer

More parents choose to drive their children to school these days than ever before. As a result, many schools across Iowa are experiencing traffic and safety problems. However, not only schools are affected.

Increases in the number of trips to and from schools affect traffic on adjacent streets as well. It's been estimated that 20–25 percent of morning congestion is due to parents driving their children to school. As a result, traffic operations often break down near school zones during pick-up and drop-off times, resulting in queuing and other operational problems.

ISU associate professor of civil, construction, and environmental engineering Shauna Hallmark was especially familiar with this issue, having school-age children and observing safety problems in school zones first-hand for several years. She and graduate student Hillary Isebrands decided to conduct a study funded by the Iowa DOT Office of Traffic and Safety to identify transportation safety and operational issues at elementary and middle school sites in Iowa. They visited twenty schools in eleven Iowa school districts during the 2004–2005 school year, focusing on sixteen elementary and four middle schools. They made observations both during the morning drop-off and afternoon pick-up periods.

Researchers documented the findings of their research and recommendations for improving safety in school zones in the *Toolbox to Address Safety and Operations on School Grounds and Public Streets Adjacent to Elementary and Middle Schools in Iowa.*

School parking lots are not ready for increased vehicle volumes

More than 50 percent of students are now picked up and dropped off by private vehicles. For comparison, in 1969, 49 percent of elementary school children walked or biked to school, 36 percent rode the school bus, and only 12 percent traveled by passenger vehicle. Existing school driveways and parking lots were not designed to handle large numbers of vehicles picking up and dropping off students, either in terms of circulation or parking.

When picking up children from school, parents often compete for space with buses, bicycles, and

School zone continued on page 2

Queuing on school grounds.

Acronyms in *Technology News*

AASHTO	American Association of State Highway and Transportation Officials
APWA	American Public Works Association
CTRE	Center for Transportation Research and Education (at Iowa State University)
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
NACE	National Association of County Engineers

U.S. Department of Transportation
Federal Highway Administration

Iowa Department of Transportation

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School zone continued from page 1

pedestrians. Additionally, poorly supervised loading and unloading zones and lack of structured arrival and dismissal procedures are common at elementary schools across Iowa. Schools often don't have appropriate pavement markings and signing to help guide parents through the school zones. This all contributes to unsafe school zones.

Parents and students contribute to unsafe conditions

Parents and students also contribute to unsafe conditions in school zones. Parents drop off children randomly, double-park, speed, ignore turn restrictions, etc. Often, parents drop off children midblock, on the side of the street opposite to the school, and drive away, leaving the child to cross several lanes of traffic.

Children walking to school often ignore or don't understand traffic control so they cross streets and parking lots wherever it is convenient. They often do not check for an appropriate gap or for the right of way when crossing streets.

How can you help?

Schools can take a number of steps to improve safety in school zones, such as establishing a school transportation safety committee, ensuring teachers and/or staff supervision during arrival and dismissal periods, communicating effectively with students and parents, etc. However, traffic engineers also can help make school zones safer.

Traffic engineers can help schools develop a school route plan. This plan should be designed so that it takes advantage of existing traffic control devices, minimizes the number of crossings in major traffic roadways, maximizes the use of existing sidewalks and roadways that have wide shoulders, etc. The National Highway Traffic Safety Administration has published the Safe Routes to School toolkit (www.nhtsa.dot.gov/people/injury/pedbimot/bike/Safe-Routes-2002/) to aid communities in developing safe routes to school. This handbook can provide good guidance on how to establish a school route plan.

Traffic engineers could observe the traffic patterns, as well as behavior of parents and students, around schools and try to identify existing problems. If they notice significant problems, engineers could suggest involving law enforcement officials to help encourage driver compliance with traffic control devices and traffic laws.

It is also important to make sure that traffic control on school grounds is consistent with traffic control on streets. The message that traffic engineers intend to send should be clear to the drivers. Additional signing installed along the roadways, such as NO STOPPING, STANDING, or PARKING signs, could help traffic circulation in school zones, as long as people understand how to interpret the signs.

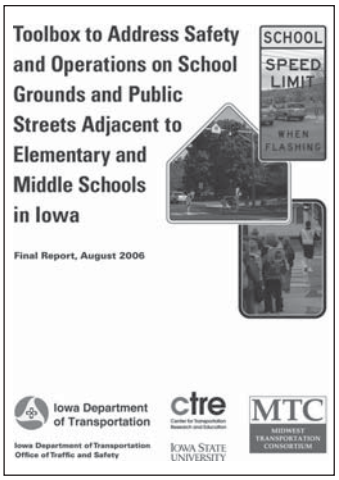
For more information

See the report, *Toolbox to Address Safety and Operations on School grounds and Public Streets Adjacent to Elementary and Middle Schools in Iowa,* on CTRE's website, www.ctre.iastate.edu/reports/school_zone.pdf. If you have specific questions, contact Shauna Hallmark, 515-294-5249, shallmar@iastate.edu. ■

Parents encourage unsafe behavior by selecting poor pick-up location mid-block on a major collector.

About the school zone toolbox

- It was written for school officials, traffic engineers, law enforcement officials, parents, and others involved in managing traffic operations and safety around school zones.
- The authors discuss the current situation at 20 elementary and middle schools in Iowa, list typical problems that schools have, highlight good practices, and suggest possible changes, solutions, and enhancements.
- Two chapters are devoted to discussion of common transportation safety issues and solutions, both on-site and on-street. Activity that occurs on the school grounds, or on-site, is typically the responsibility of the school. Activity that occurs on public streets, or on-street, is typically the responsibility of traffic engineers and local law enforcement. ■



Iowa's first high-performance steel bridge

Des Moines' East 12th Street Bridge over I-235 may offer a glimpse into the future of bridge design and maintenance in Iowa. The new span not only marks the first bridge constructed in Iowa using high-performance steel (HPS) girders, but also features a structural health monitoring (SHM) system that provides remote, continuous data on the bridge's condition.

Both innovations—the HPS girders and the SHM system—have the potential to increase life spans and reduce life-cycle costs for many of Iowa's 25,000 bridges. About 7,000 bridges in Iowa, roughly one in four, have been classified as functionally obsolete, structurally deficient, or both. Most of these require repair or replacement.

The advantage of high-performance steel

The advantage of using HPS lies in its unique alloy, which lends HPS greater weldability, weathering capabilities, and fracture toughness than conventional structural steel. These properties can reduce the frequency and cost of maintenance and extend the useful life of a bridge. Already, numerous bridges throughout the United States have been built using HPS girders, and many have been constructed economically.

Though HPS costs roughly twice as much per pound as conventional steel, HPS reinforcement reduces the amount of steel required and allows faster and more efficient construction and maintenance. The net savings are estimated to be between 10 and 15 percent.

Structural health monitoring

Traditional SHM has relied on manual inspections to determine repair or replacement schedules. However, the East 12th Street Bridge crosses heavily trafficked I-235. The bridge's girders are also largely inaccessible to inspection personnel.

To skirt these data gathering difficulties, Terry Wipf and his research team from ISU's Bridge Engineering Center (BEC) designed a remote, continuous SHM system. The new system was built using off-the-shelf technologies, making its design accessible to local agencies. Using remote bridge sensors, a live video feed of the bridge, and a wireless internet connection, inspection personnel can determine the bridge's structural health without setting foot near the structure. A website displaying the bridge performance data is available, www.bec.iastate.edu/structural_health/e12thst_dsm.cfm.

Benefits

According to the SHM system, the East 12th Street Bridge is performing well. The SHM system itself experienced a few setbacks early on, but it has provided a baseline image of the bridge. This image can then be used to gauge bridge performance over time.

For more information

The project report, *Remote Continuous Evaluation of a Bridge Constructed Using High-Performance Steel*, and a technology transfer summary are available at the BEC's website, www.bec.iastate.edu/research/detail.cfm?projectID=560. If you have specific questions, contact Terry Wipf, 515-294-6979, tfwipf@iastate.edu. ■

Graduate student Derek Hemphill prepares the bridge for continuous remote monitoring.