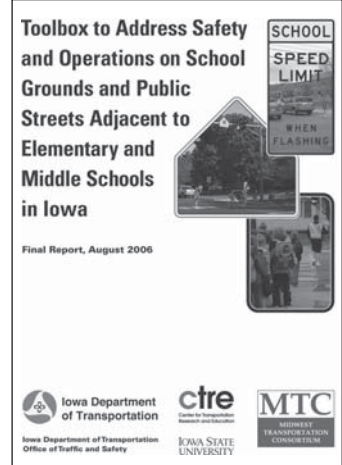


## About the school zone toolbox

- 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](http://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](http://www.bec.iastate.edu/research/detail.cfm?projectID=560). If you have specific questions, contact Terry Wipf, 515-294-6979, [tfwipf@iastate.edu](mailto:tfwipf@iastate.edu). ■



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