U.S. Department of Transportation
Federal Highway Administration

2006

Priority, Market-Ready Technologies and Innovations

OPERATIONS

QuickZone

Problem: Work zones contribute to traffic delays

According to a survey released by the Federal Highway Administration (FHWA), travelers view road repairs as a major contributor to traffic delays, and believe that improvements in traffic flow, pavement conditions, and work zones can enhance driver satisfaction significantly. Despite these findings, project planners typically do not consider the soft cost of traveler delay when making decisions about project staging and duration.

The 1998 FHWA report, *Meeting the Customer's Needs for Mobility and Safety During Construction and Maintenance Operations* (FHWA-PR-98-01-A), recommended developing an easy-to-master analytical tool to quickly and flexibly estimate and quantify work zone delays in all four phases of the project development process (policy, planning, design, and operations). The result was a traffic delay estimation tool called QuickZone, which is designed for State and local traffic construction, operations, and construction planning contractors.

Putting It in Perspective

- Work zones account for nearly 24 percent of nonrecurring congestion, which translates to 482 million vehicle hours of delay per year.
- The four main causes of nonrecurring congestion are crashes, weather, work zones, and breakdowns.

Solution: Reducing work zone delays with QuickZone

What is QuickZone?
QuickZone is a traffic impact analysis tool that can be used to estimate work zone delays. For example, QuickZone allows road owners and contractors to compare the effects of doing highway work at night instead of during the day, or of diverting the traffic to different roads at various stages of construction. These effects can be estimated for periods as short as 1 hour or for the entire life of the construction project. QuickZone provides an easy-to-use, easy-to-learn tool that takes advantage of software tools that are familiar to the target user base.

How does QuickZone work?
QuickZone is an open source, Microsoft®-based application suitable for urban and interurban corridor analysis. QuickZone can:

- Quantify corridor delay resulting from capacity decreases in work zones.
- Identify delay impacts of alternative project phasing plans.
- Support tradeoff analyses between construction costs and delay costs.
- Examine the impacts of construction staging by location, time of day (peak versus off-peak), and season (summer versus winter).
- Assess travel demand measures and other delay mitigation strategies.
- Help establish work completion incentives.

QuickZone runs on a personal computer, furnishing the information in spreadsheet format. The system prompts users for the data needed to perform the necessary calculations. QuickZone can compare the traffic impacts for work zone mitigation strategies and estimate the costs to motorists in terms of delays and potential backups associated with different strategies or scenarios.

An enhanced second version of QuickZone, known as QuickZone 2.0, was released in February 2005. This new version of QuickZone adds a graphical user interface for network development, an enhanced cost analysis tool, and the capability for modeling two-way, one-lane operations.

OPERATIONS

Successful Applications: Case studies show QuickZone applications

To better understand the performance of QuickZone in mitigating congestion due to work zones and to encourage wider use of QuickZone, FHWA created a series of case studies highlighting the use of QuickZone on real-world projects. In the future, FHWA will use the case studies to better understand the issues and obstacles faced by State DOTs when considering traffic management alternatives. In addition, FHWA will use the case studies to demonstrate on how the QuickZone tool supports better planning and traffic management decisions throughout the project delivery process.

The eight sites featured in the case studies showcase a range of applications and highlight innovative modeling approaches using QuickZone across a variety of roadway facilities, including both high-volume, urban freeway applications with recurring congestion and low-volume, rural road applications where congestion is rarely a problem.

Specifically, the case studies focus on two urban freeways (Interstate 40 (I–40) in Knoxville, TN, and I–95 at the Woodrow Wilson Bridge in Maryland and Virginia), two urban arterials (Little Bras d'Or Bridge and Reeves Street in Nova Scotia, Canada), two rural roads with high average annual daily traffic (AADT) counts (roads in Yosemite and Zion National Parks), and two roads with low AADT counts (Beartooth Highway and Louis Lake Road in Wyoming).

Decreasing delay in Pennsylvania
In summer 2002, motorists on I–80 in Clarion County, PA, experienced significant delays and frustrations caused by traffic backups in highway work zones, and the Pennsylvania Department of Transportation (PENNDOT) received complaints. In response, before beginning a resurfacing project on I–80 in Butler and Clarion Counties, PENNDOT's District 10 turned to QuickZone.

QuickZone helped engineers model different work zone configurations before implementing them on the highway. Applying the software to the I–80 project, PENNDOT engineers were able to select work zone configurations and construction schedules that met project needs while minimizing impacts to the traveling public. Based on the reduced number of complaints and the length of time motorists experienced delays in the work zone, PENNDOT believes the effort was a success. "We are very pleased with the results of QuickZone modeling," said Richard H. Hogg, a PENNDOT District 10 executive. "Based on what we saw occur on the interstate last year compared to this year, the improvements for our customers, the traveling public, are significant."

Deployment Statement

QuickZone can help State and local transportation construction, operations, and planning staff, and construction contractors better perform their job by leveraging past knowledge about the impacts that different work zone phasing/scheduling and traffic management plans have on motorist delay and enabling staff and contractors to analyze possible options for an upcoming project.

Benefits

- Graphic and tabular outputs.
- User-friendly with low software and hardware operating requirements.
- Effective at reducing work zone delays.

Deployment Goal

Increase sales and the use of QuickZone 2.0 so that 20 States will be using the software on multiple projects, and 5 new States will acquire QuickZone.

Deployment Status

As of June 2004, 71 organizations had purchased 97 copies of QuickZone. FHWA estimates that there are more than 150 users of QuickZone throughout the Nation, and even more worldwide.

Additional Resources

For more information on QuickZone, visit **http://www.tfhrc.gov/its/quickzon.htm**.

To purchase QuickZone, visit **www.mctrans.ce.ufl.edu** or **http://www.kutc.ku.edu/pctrans**. The cost is $195. QuickZone 2.0 is available as a free upgrade to those who purchased QuickZone 1.0.

For more information, contact:

Deborah Curtis, FHWA Office of Operations
Phone: 202–493–3267
E-mail: deborah.curtis@fhwa.dot.gov

Tracy Scriba, FHWA Office of Operations
Phone: 202–366–0855
E-mail: tracy.scriba@fhwa.dot.gov

Daniel Grate, FHWA Resource Center
Phone: 404–562–3912
E-mail: daniel.grate@fhwa.dot.gov

To request additional copies of this publication, contact:

Carin Michel, FHWA Resource Center
Phone: 410–962–2530
Email: carin.michel@fhwa.dot.gov

TaMara McCrae, FHWA Corporate Research and Technology
Phone: 202–493–3382
Email: tamara.mccrae@fhwa.dot.gov

FHWA-HRT-06-044
HRTC-01/01-06(1M)E