



# Minimizing the Impact of Work Zones on Traffic

tech transfer summary

June 2007

## RESEARCH PROJECT TITLE

Synthesis of Practices for Mitigating the Impact of Work Zones on Traffic

## SPONSORS

Smart Work Zone Deployment Initiative, Federal Highway Administration and Midwest Transportation Consortium, U.S. DOT University Transportation Center

## PRINCIPAL INVESTIGATOR

Tom Maze  
Professor, Civil, Construction, and Environmental Engineering  
Iowa State University  
515-294-9459  
tmaze@iastate.edu

## MORE INFORMATION

[www.ctre.iastate.edu/mtc/](http://www.ctre.iastate.edu/mtc/)

**MTC**  
**Iowa State University**  
**2711 S. Loop Drive, Suite 4700**  
**Ames, IA 50010-8664**  
**515-294-8103**

The Midwest Transportation Consortium (MTC) is part of the Center for Transportation Research and Education (CTRE) at Iowa State University. The MTC is the University Transportation Centers Program regional center for Iowa, Kansas, Missouri, and Nebraska.

The sponsors of this research are not responsible for the accuracy of the information presented herein. The conclusions expressed in this publication are not necessarily those of the sponsors.

Congestion mitigation strategies can be used to minimize the impacts of work zones on traffic.

## Objectives

- Synthesize various transportation management strategies that state transportation agencies (STAs) can use to maintain acceptable levels of safety and mobility through work zones.
- Help STAs meet the requirements of the Federal Highway Administration's Work Zone Safety and Mobility Rule, 23 CFR, Part 630.

## Problem Statement

Mobility and safety through work zones has become a prominent issue in work zone planning because motorists commonly expect minimal disruption to their normal driving habits. However, work zones can create unacceptable delays and lengthy queues if not adequately managed.

To minimize traffic congestion near work zones, STAs are developing project-specific transportation management plans that are designed to maintain acceptable levels of safety and mobility through work zones. These plans rely on a variety of transportation management strategies to mitigate the impacts of work zones on traffic.

## Synthesis of Strategies

For this project, the researchers synthesized a number of frequently used transportation management strategies and many strategies that are relatively new to several agencies. A total of 23 strategies were included in the synthesis. The literature regarding each identified strategy was reviewed to detail the strategy's key components, and applicable benefits and costs in terms of reducing work zone-related congestion were noted. To further describe the identified strategies, the researchers summarized case studies that demonstrate the benefits of these strategies for projects throughout the United States and Europe.



Typical traffic control devices near work zone

## Key Findings

The strategies identified in the synthesis, grouped into five general categories, are listed in the table at right.



*Construction on Blanchette Bridge in St. Louis, Missouri*

## Implementation Benefits

This synthesis has provided a tool for STAs to use in the work zone planning stages of a project. When developing transportation management plans, a well-rounded and comprehensive group of strategies can be made to work together to mitigate work zone congestion to levels that are acceptable to motorists.

## Implementation Readiness

While the list of strategies provided in this synthesis is not comprehensive, it identifies many frequently used and relatively new but helpful strategies.



*Nighttime construction, showing glare (J.E. Bryden, 2004, Working Safely at Night)*

## Strategies identified in the synthesis

### Traffic management strategies

1. *Increased incident management and removal capabilities during construction.* Reduce the impact and duration of traffic incidents.
2. *Increased law enforcement during construction.* Reduce errant, reckless, or aggressive driving.
3. *Comprehensive ITS technologies to divert traffic or defer trips.* Inform travelers of work zone–related delays and encourage alternate routes or travel schedules.
4. *Work zone traffic simulation.* Forecast the impacts of work zones on traffic flow and congestion.
5. *Lane closure policies and guidelines.* Require policies and specifications concerning lane closures.

### Demand management strategies

1. *Improved transit lines parallel to the work zone.* Encourage motorists to travel on parallel transit lines or to use car and van pools.
2. *Improved work zone traffic information to induce travelers to better manage trips.* Raise public awareness of upcoming projects to reduce traffic through the work zone.
3. *Demand-side traffic management strategies.* Encourage motorists to change travel times, use alternate modes of transportation, or reduce trips.

### Alternative project scheduling and phasing strategies

1. *Nighttime construction.* Schedule road work during long periods of light traffic and minimize lane closures and delays during peak traffic hours.
2. *Full road closure to reduce total construction time.* Reroute all traffic and give the contractor full roadway access.
3. *Detour routes.* Design an alternate route that results in acceptable congestion and delays.
4. *Flexible project start-up dates and a focus on schedules.* Allow the contractor to select a start date that will ensure worker and material availability and avoid seasonal high-traffic periods.
5. *Rolling roadblocks.* Create gaps in traffic that allow construction crews full access to the roadway for short periods.

### Alternative design strategies to minimize life-cycle congestion costs

1. *Corridor planning.* Avoid a sequence of lane or road closures by scheduling all maintenance and construction simultaneously.
2. *Alternative materials and methods.* Use materials and methods that expedite construction time, reduce the frequency of future maintenance, and extend pavement life.
3. *Prefabrication of project segments.* Build elements of the project off-site to minimize construction-related disruptions and allow for high-quality materials.
4. *Temporary pavement and structures.* Allow traffic to stay on route through work zones and give the contractor exclusive use of the work area.
5. *Value engineering.* Review and analyze project components to identify and recommend alternatives that minimize project costs, including delay costs.

### Alternative contracting and project delivery strategies to accelerate project completion

1. *Design-build construction.* Let a contract to a single firm that performs both the final design and construction for the project.
2. *Lane rental.* Charge the contractor a fee for occupying traffic lanes.
3. *A+B and A+B+C contracting.* Assign a dollar amount to the estimated construction time and include this amount in bid packages.
4. *Incentives and disincentives.* Include incentives in the contract for early completion and/or include penalties for delays.
5. *Interim completion dates and liquidated damages.* Complete and open certain functional elements of a project before the rest of the project is completed.