NOCoE
National Operations Center of Excellence

# NOCoE Best Practices: Work Zone Management

## Report #6

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# Introduction

## I. INTRODUCTION

The management of traffic during construction can be complex, requiring a balance between maintaining mobility, ensuring worker and traveler safety, and minimizing disruption to local communities. Work zone management represents a critical component of Transportation Systems Management and Operations (TSMO), emphasizing data-driven decision-making, coordination across disciplines, and proactive communication to improve performance outcomes.

This report highlights four key domains that define effective work zone management practices:

1. Smart Work Zone Technologies – leveraging intelligent systems to enhance safety, mobility, and real-time information.
2. Planning and Coordination – integrating construction, operations, and emergency management.
3. Traveler Information and Public Communication – ensuring that motorists receive timely, accurate, and actionable information.
4. Performance Measurement and Evaluation – applying data to assess outcomes, refine strategies, and inform future programs.

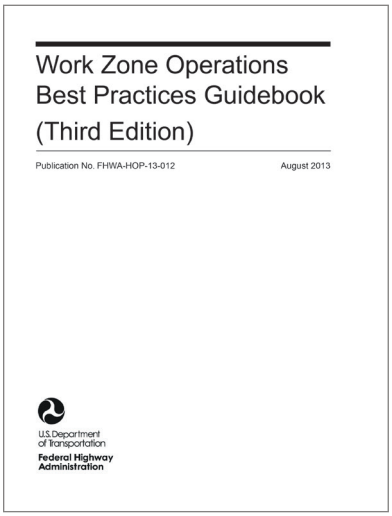
The following sections synthesize federal, state, and regional agency practices, supported by examples from NOCoE case studies and FHWA resources, to provide actionable insights for practitioners.

## II. KEY ELEMENTS OF EFFECTIVE WORK ZONE MANAGEMENT

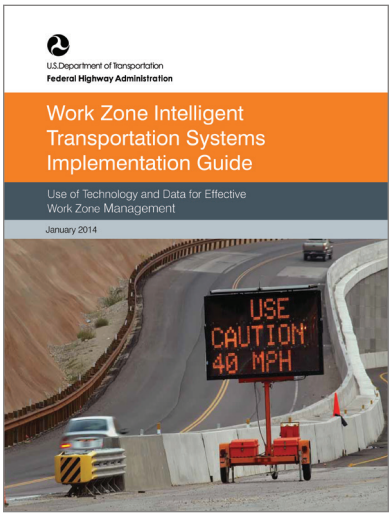
Work zone management focuses on assessing the operational, safety, and mobility impacts of roadway construction and maintenance activities. Strategies are identified and applied based on project scope, location, activity type, and expected impacts on travelers and adjacent communities.

Fundamentally, successful programs share the following attributes:

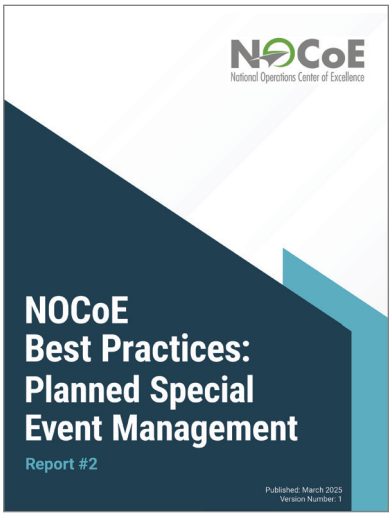
- Integration of operations and construction planning teams.
- Use of ITS and performance data to support decision-making.
- Formal coordination with local partners, first responders, and contractors.
- Emphasis on continuous monitoring and post-project evaluation.




Work Zone Related Resources – FHWA Work Zone Best Practices Guidebook, FHWA-HOP-13-012




FHWA Work Zone Traffic Management (HOP-09-006)




NOCoE Planned Special Event Management Report

## III. SMART WORK ZONE TECHNOLOGIES

### Overview

Intelligent Transportation Systems (ITS) play an increasingly central role in work zone management. These technologies improve traveler safety, reduce congestion, and provide real-time visibility into work zone conditions. Smart work zones (SWZs) are typically designed to predict and communicate travel time delay, queue lengths, or incident conditions to motorists and operations staff.

## Best Practices

- **Real-Time Monitoring:** Systems analyze traffic flow and queue data to detect congestion and alert travelers.
- **Portable and Automated Systems:** Portable sensors and trailers allow flexibility for projects of varying scale.
- **Reliable Data Streams**: Integration with third-party data sources ensures complete coverage and reliability.

## Case Study Examples

NCDOT Work Zone Data Exchange (WZDx): Established open data standards for lane closure and restriction reporting, improving the accuracy of traveler navigation tools.

FDOT Smart Work Zone Deployment: Integrated queue detection, radar sensors, and dynamic message signs to reduce rear-end crashes by 18%.

MnDOT Weather-Responsive Management Strategies (WRMS): Applied weather and pavement condition data to adjust lane closures and improve driver advisories.

### KEY PRACTICE EXAMPLE

**Smart Work Zone Deployment:**
**A cross-agency approach integrating sensor data, connected vehicle information, and DMS messaging to enhance driver awareness and reduce conflicts.**

## IV. WORK ZONE PLANNING AND COORDINATION

### Overview

While each construction project has unique characteristics, early and consistent coordination is essential to manage overlapping projects, staging conflicts, and incident response readiness. Agencies that integrate planning with operations achieve higher efficiency and reduced traveler impact.

### Best Practices

- **Project Coordination Meetings:** Regular coordination between construction staff and Traffic Management Centers (TMCs) ensures real-time awareness of lane closures and detours.
- **Scenario-Based Planning:** Modeling potential traffic conditions during project phases allows planners to predict and mitigate conflicts.
- **Multi-Agency Collaboration:** Incorporating emergency responders, law enforcement, and local governments into planning processes ensures unified operations.

### Case Study Examples

INDOT Integrated Work Zone Planning: Indiana DOT's co-located operations teams coordinated daily with law enforcement and maintenance staff to manage lane restrictions and emergency responses.

Utah DOT Lane Closure Optimization: Use of a performance dashboard enabled data-driven lane closure scheduling, reducing traveler delay by 12%.

#### WORK ZONE COORDINATION TIP

**Establish formal weekly coordination calls between project managers, operations staff, and TMCs to ensure consistent situational awareness and updated traveler information.**

## V. TRAVELER INFORMATION AND PUBLIC COMMUNICATION

### Overview

Traveler communication is a cornerstone of effective work zone management. By providing timely and clear information, agencies can help motorists make informed travel decisions and minimize congestion.

### Best Practices

- **Consistent Messaging:** Unified agency messaging reduces confusion, particularly across regions with concurrent construction projects.
- **Multi-Channel Communication:** Integration of dynamic message signs (DMS), 511 systems, social media, and mobile apps ensures broad public reach.
- **Data Standardization:** Adoption of WZDx allows public and private sector data exchange, improving reliability across navigation platforms.

### Case Study Examples

Arizona DOT Traveler Messaging Campaign: Use of 'Know Before You Go' alerts reduced late merges and secondary incidents during weekend closures.

NCDOT Business 40 Reconstruction Program: Combined outreach, social media, and real-time DMS messages to maintain traveler confidence during a 21-month closure.

**KEY TAKEAWAY**

**Traveler trust is enhanced through consistent and transparent communication across multiple platforms, reducing last-minute decision-making and improving corridor reliability.**

## VI. PERFORMANCE MEASUREMENT AND EVALUATION

### Overview

Quantifying work zone impacts allows agencies to identify trends, justify investments, and refine strategies for future projects. Performance measurement supports continuous improvement and accountability.

### Best Practices

- **Data Collection:** Collecting delay, queue length, and crash data through both permanent and portable sensors.
- **Post-Project Assessment:** Conducting structured after-action reviews to capture lessons learned.
- **Performance Dashboards:** Aggregating statewide work zone data for public transparency and internal evaluation.

### Case Study Examples

Idaho DOT Performance Measures Dashboard: Displays live work zone mobility and safety metrics, providing decision-makers with actionable insights.

Missouri DOT Winter Operations Dashboard: Integrates work zone and weather data to assess operational efficiency and resource allocation.

Purdue Mobility Research Partnership: Connected vehicle data used to quantify delay and travel time reliability through active work zones.

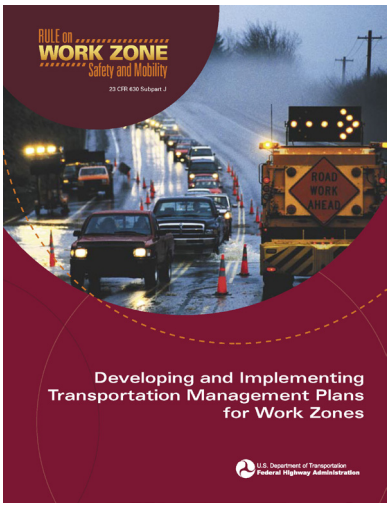
### KEY PRACTICE EXAMPLE

**Performance Dashboards:**
**Data visualization tools help agencies benchmark performance, identify improvement areas, and communicate value to leadership and the public.**

## VII. IMPLEMENTATION GUIDANCE

Effective work zone management relies on a structured, scalable approach to integrate planning, operations, and evaluation activities. Agencies can follow a phased implementation framework that includes:

1. Assessment: Identify existing capabilities, data availability, and coordination mechanisms.
2. Integration: Incorporate TSMO principles into project development and design processes.
3. Deployment: Implement ITS and communication tools that match project size and complexity.
4. Evaluation: Use post-construction assessments and performance data to inform updates to policy and training.




Implementation Resource: FHWA-HOP-05-066: Developing and Implementing TSMO Plans for Work Zones

## VIII. CHALLENGES AND CONSIDERATIONS

While advances in technology and coordination continue to improve outcomes, several challenges persist:

- **Staffing Constraints:** Limited personnel can restrict real-time monitoring and analysis capabilities.
- **Data Integration:** Inconsistent data standards between agencies can hinder information sharing.
- **Funding Limitations:** Budgetary constraints may limit ITS deployment or long-term maintenance.
- **Change Management:** Sustaining collaboration between design, operations, and communications requires cultural commitment across departments.

### FUTURE OPPORTUNITIES

**Emerging technologies such as connected work zones, AI-based queue prediction, and vehicle-to-everything (V2X) data integration are expected to enhance safety and reliability further.**

## IX. CONCLUSION

Work zone management is a core function of modern TSMO practice, linking construction and maintenance activities with real-time operations and performance monitoring. The best practices outlined in this report demonstrate that through data, coordination, and communication, agencies can significantly reduce delays, enhance safety, and improve traveler confidence.

By applying these lessons and leveraging national resources through NOCoE and FHWA, practitioners can continue to advance work zone management as a model for integrated, performance-based transportation operations.

## X. REFERENCES & ENDNOTES


1. FHWA-HOP-13-012. Work Zone Best Practices Guidebook. 2013.
2. FHWA-HOP-05-066. Developing and Implementing TSMO Plans for Work Zones. 2005.
3. FHWA-HOP-14-007. Mitigating Work Zone Safety and Mobility Challenges through ITS. 2014.
4. FHWA-HOP-10-013. Traffic Incident Management Handbook. 2010.
5. TRB NCHRP Report 945. Strategies for Work Zone Transportation Management Plans. 2020.
6. NOCoE Case Study: Better Work Zone Information for Drivers.
7. NOCoE Case Study: Business 40 Tow and Recovery Program.
8. FHWA-HOP-20-051. Leveraging Road Weather Data for Performance Dashboards. 2020.
9. Idaho DOT. Performance Measures Dashboard. 2020.
10. Missouri DOT. Winter Operations Dashboard. 2023.