Smarter Work Zones

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Efficiency through technology and collaboration

U.S. Department of Transportation
Federal Highway Administration
Agenda

• Smarter Work Zones (SWZ) Overview
• SWZ State Progress and Adoption
• Available Tools
• FHWA Resources
• Questions/Discussion
SMARTER WORK ZONES
Initiatives
What are Smarter Work Zones (SWZ)?

Innovative strategies designed to optimize work zone safety and mobility

- Policies and practices used to incrementally and continuously improve WZ operations
- Tools to reduce WZ crashes and delays
- Tools to enhance WZ management strategies
Why are SWZs Important?

Play major role in reducing WZ-related injuries, fatalities, and travel delays

- **Work Zone related injuries:**
  - Over 20,000 workers injured annually
  - 47,758 injuries in 2013

- **Work Zone related fatalities:**
  - Occur every 15 hours (1.6 fatalities/day)
  - 105 worker fatalities in 2013
  - 579 traffic-related fatalities in 2013

- **Work Zone related mobility issues:**
  - 24% of non-recurring delay
  - 10% of all congestion
  - NHS capacity loss ~180mil vehicles/day

Source: VDOT
Two Identified SWZ Initiatives:

**Project Coordination**
Coordination within a single project and/or among multiple projects within a corridor, network, or region, and possibly across agency jurisdictions

**Technology Application**
Deployment of Intelligent Transportation Systems (ITS) for dynamic management of work zone traffic impacts, such as queue and speed management
Project Coordination – What is it?

Coordination within a single project and/or among multiple projects within a corridor, network, or region, and possibly across agency jurisdictions to minimize work zone traffic impacts.

Benefits:

- **For transportation agencies include:**
  - Ability to reduce and manage traffic disruptions from road work
  - Earlier identification of project impacts
  - Dynamic adjustments to schedule
  - Improved communications within and across agencies
  - Cost savings

- **From the driver’s perspective:**
  - Fewer numbers of work zones and street cuts
  - Better quality road surfaces
  - Increased customer satisfaction

Source: FHWA
SWZ Project Coordination Goals:

Goal 1

By December 2016, 25 State DOTs have incorporated work zone project coordination strategies into agency documentation and business processes.

What does this mean?

• Review of:
  o Existing PC-related policies/practices to identify strengths and weaknesses
  o Other agencies’ PC-related best practices

• Identify and implement of SWZ PC strategies

• Develop agency documentation and business processes
**SWZ Project Coordination Goals:**

### Goal 2

By December 2016, 5 State DOTs have volunteered to pilot the **Work Zone Implementation Strategies Estimator (WISE) software.**

**What does this mean?**

- Use WISE tool to optimize project schedules and analyze mitigation strategies to minimize work zone traffic impacts
- Pilot, evaluate, suggest enhancements, and demonstrate WISE’s value for work zone management
Technology Application - What is it?

Deployment of ITS for dynamic management of work zone traffic impacts, such as queue and speed management to provide actionable information to drivers and traffic managers.

Capabilities include:

- Improving driver awareness
- Providing dynamic and actionable guidance to drivers
- Enhancing tools for on-site traffic management

Source: FHWA
SWZ Technology Application Goals:

Goal 1a

By December 2016, 35 State DOTs have implemented business processes for work zone ITS technologies as identified in the Work Zone ITS Implementation Guide.

What does this mean?

- Well-documented agency policies and processes to streamline consideration and use of work zone ITS technologies to minimize traffic impacts
SWZ Technology Application Goals:

Goal 1b

By December 2016, 35 State DOTs have utilized at least one work zone ITS technology application for dynamic management of work zone impacts.

What does this mean?

• Consideration of the six step process explained in the WZ ITS implementation guide to plan and implement ITS strategies

• Identify and use ITS strategies such as speed and/or queue management on at least one project for dynamic management of work zone impacts
How can States fund these initiatives? (1 of 2)

State Transportation Innovation Councils (STIC) Incentive Program

- Funds activities which turn innovations into standard practices
- All states are eligible
- Up to $100,000 available to each STIC annually
- Can be used to fund multiple initiatives
- Use to pay consultants to develop standards, specifications, design manuals, evaluations, implementation plans, workshops, training, and more!

www.fhwa.dot.gov/stic
How can States fund these initiatives? (2 of 2)

Accelerated Innovation Deployment (AID) Demonstration Program

- Projects may be any aspect of highway transportation
- Max of $1,000,000 (up to full cost of project)
- Monitoring, assessment, and technology transfer commitments
- Current grants include ABC, high surface friction treatments, and ATMS/A.

https://www.fhwa.dot.gov/accelerating/grants/
SMARTER WORK ZONES
State Progress and Adoption
**SWZ Stages of Implementation - Project Coordination**

- **Not Implementing.** Chooses not to participate in the SWZ innovation. Not interested in pursuing the innovation under EDC.

- **Development Stage.** Choosing to participate in the SWZ project coordination innovation. Collecting guidance and best practices, building support with partners and stakeholders, taking training, attending Peer-to-Peer workshops, and/or developing a process necessary for implementation of SWZ project coordination.

- **Demonstration Stage.** Determined which innovation strategy(ies) to implement and is testing/piloting SWZ with respect to project coordination strategies and/or software tools.

- **Assessment Stage.** Beyond testing/piloting the SWZ Project Coordination innovation. Assessing the performance and the process for carrying out the innovation and/or making adjustments to prepare for full deployment.

- **Institutionalized.** Adopted by the State’s transportation community as standard practice and used regularly on applicable projects or within the program where appropriate.
## SWZ Stages of Implementation – Project Coordination

<table>
<thead>
<tr>
<th>Stage</th>
<th>Current (as of June 2015)</th>
<th>Planned (by Dec 2016)</th>
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</thead>
<tbody>
<tr>
<td>Development Stage</td>
<td>Alabama, Arizona, Arkansas, Iowa, Indiana, Delaware, Florida, Kansas, Maine, Massachusetts, Nebraska, Nevada, New Mexico, New York, Pennsylvania, South Dakota, Tennessee, Virgin Islands, Virginia, Wisconsin</td>
<td>Florida, Indiana, Kentucky, Nebraska, Puerto Rico, South Dakota, Virginia, Wisconsin</td>
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<td>Demonstration Stage</td>
<td>Georgia, Illinois, Kentucky, Mississippi, North Carolina, Utah, Vermont</td>
<td>Arkansas, Colorado, Delaware, Georgia, Iowa, Kansas, Mississippi, Nevada, New Mexico, Utah, Virgin Islands</td>
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<td>Assessment Stage</td>
<td>Colorado, DC, Oklahoma</td>
<td>Arizona, DC, Maine, Massachusetts, New York, North Carolina, Oklahoma, Pennsylvania, Tennessee</td>
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<td>Institutionalized</td>
<td>California, Louisiana, New Hampshire, Ohio, Oregon, Michigan, Missouri, Texas, Washington</td>
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**SWZ Stages of Implementation - Technology Application**

- **Not Implementing.** Chooses not to participate in SWZ.

- **Development Stage.** Choosing to participate in the SWZ technology application innovation. Collecting guidance and best practices, building support with partners and stakeholders, taking training, attending Peer-to-Peer workshops, and/or developing a process for implementation using the WZ ITS Imp. Guide.

- **Demonstration Stage.** Determined which innovation strategy(ies) to implement and is testing/piloting the SWZ with respect to technology applications and/or processes, using the WZ ITS Imp. Guide.

- **Assessment Stage.** Beyond testing/piloting SWZ. Assessing performance and process for carrying out the innovation and/or making adjustments to prepare for full deployment.

- **Institutionalized.** Adopted by State’s transportation community as standard practice and used regularly on applicable projects or within the program where appropriate.
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Regional Peer Exchanges (PX)

- Four regional PX workshops held between October and November 2015
- Brought together work zone practitioners from federal, state, and local transportation agencies.
- Goal to promote SWZ benefits through presentations by SMEs and discussion of state-specific applications.
- Discussed ways to improve current project coordination and technology application implementation methods

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<th>Region</th>
<th>Location</th>
<th>Dates</th>
<th>Participating States</th>
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<tr>
<td>Mid-America</td>
<td>Ankeny, IA</td>
<td>10/22-10/23/2015</td>
<td>IA, IN, KS, MN, MO, NE, OK, WI</td>
</tr>
<tr>
<td>North</td>
<td>Springfield, MA</td>
<td>10/28-10/29/2015</td>
<td>CT, DC, MA, MD, VT</td>
</tr>
<tr>
<td>South</td>
<td>Raleigh, NC</td>
<td>11/5-11/6/2015</td>
<td>AL, AR, FL, KY, NC, TN, VA, VI</td>
</tr>
<tr>
<td>West</td>
<td>Denver, CO</td>
<td>11/17-11/18/2015</td>
<td>AZ, CO, NM, NV, OR, UT, WA</td>
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</table>
• **Arizona (Maricopa County).** Cities in the Phoenix metropolitan area hold quarterly meetings to coordinate construction projects. Plans to utilize a regional database for work zone planning efforts are underway.

• **Colorado DOT.** Regional level project coordination using a defined process. Includes coordination groups consisting of traffic, corridor coalition, trucking industry and utility representatives and media liaisons. Has authority to change work zone strategies.

• **District of Columbia DOT.** Agency uses a citywide TMP and work zone project management system that tracks and analyzes all work zones and special events over a five year period. Tool includes work zone tracking, traffic analysis, and a citywide TMP document that summarizes the results.

• **Massachusetts DOT.** Metro Boston district, weekly coordination meetings held with construction, maintenance, and communications staff to discuss lane closures and identified efficiencies. District conducts its own traffic studies and determines the ideal work zone set-up.
• **Michigan DOT.** *Systematic tracking process* established in response to delays on I-94 resulting from multiple work zones. Tracks mobility impacts along an entire corridor, and determines whether the *cause of delays* is incident or work-zone related. Established a *statewide goal* to ensure that all stakeholders are working towards the same objectives.

• **Oregon DOT.** Institutionalized *process for implementing TMPs* along heavily-used corridors. Determines *potential project delay* to provide advanced notice of potential mobility impacts. Has a *mobility coordinator* who oversees project coordination at the state level, as well as a *mobility subcommittee* that includes regional traffic managers.

• **Washington State WSDOT.** Each *region has its own process* for project coordination, which is made publicly available. WSDOT arranges *weekly meetings* at the regional level to bring together project engineers. Public information officer produces *weekly report for media*. WSDOT credits a lot of its success in project coordination to its media interaction, as well as public alerts.
PX Highlights - Technology Applications (1 of 2)

- **Iowa DOT.** Traffic Critical Projects (TCP) program addresses safety and mobility challenges within work zones. Identifies **key work zones requiring an enhanced TMP**, with components such as work zone ITS, limited construction hours, night work, lane rental contracting mechanisms, and Traffic Incident Management (TIM) plans.

- **Indiana DOT.** Variety of technology applications to monitor work zone performance. Uses **enhanced traffic data** on Interstates to **monitor speeds in real time**. Doppler devices utilized in select work zones. Data monitored at TMC and messages deployed on DMS. Use of **crash statistics map** to compare accidents along a road segment before and after a work zone.

- **Massachusetts MassDOT.** SWZ design standards drafted to assist in determining when ITS application is needed. **Scoring system** is envisioned to aid in the assessment. **Draft SOPs** developed for contractors to better set requirements for deployment, operation, and maintenance. Plans include establishment of **ConOps** on use of SWZ, requirements for data warehousing, and development of dashboard.
• **Minnesota DOT (St. Paul).** Deployed downstream speed notifications on DMS for high profile work zone. DMS connected to TMC which monitors speed and controls messages. Utilizes an active zipper merge process in metro districts and is increasingly doing so in rural areas. Signage on rural interstates provide expected trip times based on traffic conditions.

• **Missouri DOT.** Smart Work Zone Deployment Initiative includes measuring work zone delay in real time on each roadway segment within a work zone. Missouri determines acceptable level of delay and once reached, a warning message is sent. MoDOT conducts weekly calls between districts and central office to discuss project status, and quarterly work zone delay statistics are reported.

• **North Carolina DOT.** Utilizes portable traffic monitoring devices to evaluate performance of manual flagging operations on two-lane rural roads. Stations measure wait time at the flagger station. Daily and overall average scores are determined for each project, and a mobility performance rating is assigned.

• **Utah DOT.** Utilizes regulatory speed limit signs with electronic numeric displays in work zones to address queuing, speed deviation, and speed enforcement. Speed limit is lowered depending on the type of work occurring and the normal speed limit on that facility.
SMARTER WORK ZONES

Available Tools
Project Coordination Tool (1 of 2)

Work Zone Implementation Strategies Estimator (WISE)

• Developed under the SHRP2 R11 project

• Proactively reduces WZ impacts:
  o Effective project coordination upfront in planning/programming
  o Carrying coordination through to project planning/design decisions

• Made up of two modules:
  o Planning Module
  o Operation Module
A grant to pilot the WISE tool was awarded to four states:

- California – Association of Monterey Bay Area Gov’ts MPO
- Florida – MetroPlan Orlando MPO
- Maryland DOT
- Tennessee DOT

Tool and documentation available at [http://www.trb.org/Main/Blurbs/168143.aspx](http://www.trb.org/Main/Blurbs/168143.aspx)
• In the final phase of development, scheduled for public download in early 2016
• Organized by the five steps for achieving project coordination:
  – Step 1: Establishing the Project Coordination Vision
  – Step 2: Developing Details of How Coordination will Occur
  – Step 3: Educating and Informing Personnel and Stakeholders
  – Step 4: Implementing the Project Coordination Process
  – Step 5: Refining the Process
Work Zone ITS Implementation Guide

• Provides guidance on implementing ITS in work zones to assist public agencies, design and construction firms, and industry stakeholders

• Presented through a 6-Step Systems Engineering Approach to WZ ITS implementation

SWZ Interactive Toolkit Available!

**Resources Include:**

- **Webinars:** links to all SWZ webinar materials presented to-date, and a list of upcoming webinars with registration information

- **Peer Exchanges:** Bring in experts from across the country that have implemented SWZ to learn about their successes, challenges, and lessons learned

- **Workshops:** Obtain focused outreach and training on particular SWZ topics from experts

- **Training Resources:** a variety of web-based and in-person resources are available to assist agencies in developing and implementing SWZ

- **Outreach Materials:** Fact sheets, presentations, case studies, guidance documents, and evaluation studies available to assist agencies

For these resources and much more visit: [https://www.workzonesafety.org/SWZ/main](https://www.workzonesafety.org/SWZ/main)

Source: FHWA
SWZ Webinar Series

Webinars Conducted To-Date:

- **Webinar #1:** A Comprehensive Overview of the SWZ Initiative (9/9/2015)
- **Webinar #2:** Implementing TA Solutions (9/29/2015)
- **Webinar #3:** SWZ Corridor-Based PC (10/15/15)
- **Webinar #4:** SWZ Technology Showcase – Queue Waming Systems (10/26/15)
- **Webinar #5:** SWZ Program-Based PC (11/2/15)
- **Webinar #6:** TA Case Studies: VSL and Dynamic Lane Merge (11/12/15)
- **Webinar #7:** Work Zone PC Guide and Examples (12/2/15)
- **Webinar #8:** Integrating PC & TA: Iowa DOT (12/15/15)

Webinars Planned:

- **Webinar #9:** TA Strategies: Performance Measures and System Health Monitoring
  - Jan 21, 2016, 1:00-2:30pm EST
- **Webinar #10:** Designing ITS Systems Based on Identified Needs
  - Feb 18, 2016, 1:00-2:30pm EST

Stayed tuned for more webinars!

Visit the SWZ Interactive Toolkit Website for webinar materials and registration information: [https://www.workzonesafety.org/swz/webinars](https://www.workzonesafety.org/swz/webinars)
Peer Exchange and Training Opportunities

• **Peer Exchanges** - FHWA is providing in-person and virtual peer exchange opportunities.
  - Matched to a leading SWZ state peer conducting similar SWZ activities based on identified requesting state needs

• **Training** - FHWA is providing 1 to 2 day, in-person training workshops across the country to interested state agencies.
  - Customized to address state’s focus areas
  - Facilitated by leading SWZ practitioners and experts

For opportunities to participate in or host a peer exchange and/or training session contact the FHWA Work Zone Team at jawad.paracha@dot.gov
Field Demonstration Opportunities

• **Field Demonstrations** – FHWA is providing opportunities for interested transportation agency stakeholders to travel to and learn about successful SWZ implementation locations.
  
  – Paired to a successful SWZ implementer in order to learn more and help decide how and to what extent to deploy SWZ within their state.

For opportunities to **participate in or host** a field demonstration **contact** the FHWA Work Zone Team at **jawad.paracha@dot.gov**
Outreach Materials

Numerous outreach materials are available for print and distribution on the SWZ Interactive Toolkit website!

- Fact Sheets
- Case Studies
- Presentations
- Guidance Documents
- Evaluation Studies
- Deployment Bid Specifications
- Deployment Plans
## Additional Resources: Project Coordination

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<tr>
<td>FHWA</td>
<td>FHWA Work Zone Mobility and Safety Program – Project Coordination</td>
<td><a href="http://www.ops.fhwa.dot.gov/wz/construction/crp/index.htm">http://www.ops.fhwa.dot.gov/wz/construction/crp/index.htm</a></td>
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Questions and Comments
SWZ Points of Contact

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