Smarter Work Zones

INTRODUCTION AND TODAY’S SPEAKERS
Today’s Speakers

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FHWA Office of Operations

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HDR
Smarter Work Zones (SWZ) Webinar Series

• This is the eighth in a series of bi-weekly SWZ webinars
• Topics based on what matters most to you!
• Previous Webinars include:
  – Webinar #1: A Comprehensive Overview of the SWZ Initiative (9/9/2015)
  – Webinar #2: Implementing Technology Application Solutions (9/29/2015)
  – Webinar #3: SWZ Corridor-Based Project Coordination (10/15/15)
  – Webinar #4: SWZ Technology Showcase – Queue Warning Systems (10/26/15)
  – Webinar #5: SWZ Program-Based Project Coordination (11/2/15)
  – Webinar #6: Technology Application Case Studies: Variable Speed Limit and Dynamic Lane Merge (11/12/15)
  – Webinar #7: Work Zone Project Coordination Guide and Examples (12/2/15)
• Recordings and materials for previous webinars are available on The National Work Zone Safety Information Clearinghouse website: https://www.workzonesafety.org/swz/webinars
• Coming Up:

<table>
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<tr>
<td>February 2016</td>
<td>2/18</td>
<td>Webinar #10: Designing ITS Systems Based on Identified Needs</td>
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Purpose of Today’s Webinar

Provide a comprehensive overview of Iowa DOT’s statewide Traffic Critical Project Program and discuss real-world examples of successful SWZ project coordination and technology application strategies in Iowa.

Topics include:

1. SWZ Project Coordination and Technology Application Initiatives
   – Show how the SWZ Project Coordination and Technology Application initiatives can be used by agencies to enhance their current work zone management practices

2. Iowa DOT Statewide Traffic Critical Project Program
   – Provide an overview of Iowa DOT’s Intelligent Work Zone efforts
   – Discuss how Technology Application Strategies have helped with Project Coordination

3. Iowa DOT Council Bluffs Interstate System Improvement project
   – Provide an overview of Iowa DOT’s Council Bluffs Interstate System Improvement
   – Discuss how the Project Coordination and Technology Application Initiatives have helped
     • Minimize conflicts
     • Optimize project schedules
     • Improve overall work zone safety and mobility in Iowa
Smarter Work Zones
SWZ 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
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 cross 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
Smarter Work Zones
IOWA DOT’S INTELLIGENT WORK ZONES ON TRAFFIC CRITICAL PROJECTS
CTRE Traffic Operations Laboratory

Mike Jackson
State Traffic Operations Engineer, Iowa DOT

Neal Hawkins, CTRE Director
Traffic Critical Projects (TCP)

- Projects that can be repeatedly or quickly lead to significant travel delays
- Multi-lane highways (interstates, freeways, expressways over 17,000 vehicles/day)
- Border Bridges
- District Inputs
TCP Program Objectives

• Focused on:
  – Improving traffic safety in work zones
  – Maintaining traffic mobility
  – Providing high quality traveler information

• TCP “Features”
  – Incorporation of traffic mitigation elements into project design
  – Intelligent Work Zones (IWZ)
  – Traffic Incident Management planning
IWZ Resources

• Statewide Traffic Operations Center (TOC)
• Existing Intelligent Transportation Systems (ITS) Devices
  – Cameras, sensors, dynamic message signs (DMS)
• ATMS Software (TransSuite)
  – “Queue Detection”
• ITS Communication Networks
• Integration of Rental (Portable ITS) Devices

Source: Iowa DOT
2014 ITS/IWZ Solutions

• Expanded monitoring
  – Portable cameras & traffic sensors
• Driver information
  – Portable DMS
• Queue detection & warning
Portable Cameras

- Axis pan-tilt-zoom
- Great within reach of ITS communications network
  - Same as permanent cameras
  - On 511ia.org
- Less useful on cellular modems
  - New cellular options
Portable Traffic Sensors

- Wavetronix, side-fire radar
- Same as our permanent sensors
- Traffic counts & speeds every 20 seconds

Source: Iowa DOT
Portable DMS

- Statewide TOC has controlled rentals since 2013
- Temporarily mapped using GPS in modems

Source: Iowa DOT
Intelligent Work Zone Coordination

• Statewide TOC
  – 24/7 operation
  – Camera, sensor, and DMS management
IWZ Team

- **SRF Consultants:** Writing contract and managing projects
- **Street Smart Rentals:** Statewide qualifications and cost-based IWZ device services contract
- **TransCore:** ATMS & Integration support
- **Schneider/Telvent:** Traffic Operations Center
- **InTrans:** Evaluation and analysis
Queue Detection Systems - Southbound I-35

**RED** = Portable DMS
**GREEN** = Portable Sensor

Source: Google
2014 IWZ Locations

14 Total Projects
(Planned 11, Removed 2, Added 5)
60 Sensors, 44 DMS, 6 Cameras

Source: Google
2015 Traffic Critical Projects

Red = IWZ & TIM  Orange = IWZ  Yellow = TIM

Source: Google
CTRE 2015 Evaluation (1 of 2)

- Used performance measures developed from the 2014 evaluation
- Need for real-time monitoring
- Creating online portal to see/monitor work zone

<table>
<thead>
<tr>
<th></th>
<th>Northbound</th>
<th>Southbound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Delay (Vehicle Hours)</td>
<td>58,473</td>
<td>55,917</td>
</tr>
<tr>
<td>Average Delay (Minutes/Vehicle)</td>
<td>0.38</td>
<td>0.39</td>
</tr>
<tr>
<td>Maximum Delay (Minutes)</td>
<td>15.3</td>
<td>14.7</td>
</tr>
<tr>
<td>Total Delay – when a queue is present (Vehicle Hours)</td>
<td>34,068</td>
<td>45,064</td>
</tr>
<tr>
<td>Average Delay – when a queue is present (Minutes/Vehicle)</td>
<td>3.1</td>
<td>3</td>
</tr>
<tr>
<td>% of vehicles experiencing delay &gt; 10 minutes</td>
<td>0.2%</td>
<td>0.2%</td>
</tr>
<tr>
<td>% of vehicles with delay &gt; 10 minutes in queue</td>
<td>3.4%</td>
<td>1.8%</td>
</tr>
</tbody>
</table>

Traveler Delay
Because sensors were only placed on the approaches to the work zone, the delay was calculated before the vehicle entered the work zone. Because of this, some performance measures are very low and would be higher if the delay was calculated over the entire work zone.

Travel Time Reliability
Similar to delay, no sensor data was collected through the work zone so the travel time reliability was not able to be calculated for the entire work zone.

Safety
Crash data was not available when contacting the project engineer. In 2015, a weekly summary of crash and location would be needed to determine the safety performance measures.
## CTRE 2015 Evaluation – Traffic Queueing (2 of 2)

<table>
<thead>
<tr>
<th>Work Zone Project</th>
<th>I-35 and Iowa 5</th>
<th>I-35 Hamilton County</th>
<th>US 65 Des Moines River</th>
<th>I-80 near DeSoto</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Events</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direction</td>
<td>I-35 NB</td>
<td>I-35 NB</td>
<td>US 65 EB</td>
<td>I-80 EB</td>
</tr>
<tr>
<td>Event Threshold</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Number of Events – Total</td>
<td>16</td>
<td>209</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>Number of Events – By Direction</td>
<td>11</td>
<td>5</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>Number of Days with Events</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>8</td>
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<tr>
<td>Average Duration of each event (minutes)</td>
<td>14.1</td>
<td>23</td>
<td>28.6</td>
<td>33.4</td>
</tr>
<tr>
<td>Median Duration of each event (minutes)</td>
<td>10</td>
<td>20</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direction</td>
<td>I-35 NB</td>
<td>I-35 NB</td>
<td>US 65 EB</td>
<td>I-80 EB</td>
</tr>
<tr>
<td>Overall Average Queue Length (miles)</td>
<td>0.9</td>
<td>0.8</td>
<td>1.5</td>
<td>0.25</td>
</tr>
<tr>
<td>Average Max Queue Length of each event (miles)</td>
<td>1.0</td>
<td>1.0</td>
<td>0.8</td>
<td>0.3</td>
</tr>
<tr>
<td>Median Max Queue Length of each event (miles)</td>
<td>1</td>
<td>0.7</td>
<td>0.4</td>
<td>0.3</td>
</tr>
<tr>
<td>Overall Max Queue Length of each event (miles)</td>
<td>2.2</td>
<td>2.5</td>
<td>5.5</td>
<td>3.2</td>
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<tr>
<td>Number of Times Queue Exceeded Furthest sensor (miles)</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Percentage of queue &gt;1 mile</td>
<td>41.9%</td>
<td>26.1%</td>
<td>77.9%</td>
<td>74.3%</td>
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<tr>
<td><strong>Vehicles</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direction</td>
<td>I-35 NB</td>
<td>I-35 NB</td>
<td>US 65 EB</td>
<td>I-80 EB</td>
</tr>
<tr>
<td>Total Vehicles</td>
<td>345,152</td>
<td>330,612</td>
<td>261,577</td>
<td>860,000</td>
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<tr>
<td>Amount of Traffic encountering a queue</td>
<td>3,417</td>
<td>1,620</td>
<td>55,062</td>
<td>74,710</td>
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<tr>
<td>Percentage of traffic encountering a queue</td>
<td>0.99%</td>
<td>0.49%</td>
<td>7.2%</td>
<td>10.54%</td>
</tr>
<tr>
<td>Percentage of Time when queue present</td>
<td>0.38%</td>
<td>0.29%</td>
<td>3.10%</td>
<td>3.95%</td>
</tr>
</tbody>
</table>
Traffic Critical Work Zone Performance Reporting
OTO Support

Statewide Performance

Work Zone Performance

Quality Assurance

Source: Iowa DOT
FY16 OTO Support

- Work Zone Locations
- Performance Summary
- Exposure Performance
- Queuing Performance
- Delay Performance
- Heat Maps
- Data Completeness

Source: Iowa DOT
Performance Measures Categories

- Exposure
- Traffic queuing
- Traveler delay
## Work Zones and Related Routes (1 of 2)

<table>
<thead>
<tr>
<th>Group</th>
<th>IWZ</th>
<th>Roadway and Location Reference</th>
<th>Begin Date</th>
<th>Estimated End Date</th>
<th>Roadways</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.3</td>
<td>I-80 from Des Moines to Newton</td>
<td>4/13/2015</td>
<td>5/26/2016</td>
<td>I-80</td>
</tr>
<tr>
<td>2</td>
<td>1.2</td>
<td>I-235 in Des Moines</td>
<td>7/20/2015</td>
<td>10/30/2015</td>
<td>I-80 and I-235, I-35</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>West mix-master in Des Moines</td>
<td>6/12/2015</td>
<td>10/2/2015</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.2</td>
<td>I-80 at Alice's Road near DSM</td>
<td>3/16/2015</td>
<td>11/20/2015</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>5.1</td>
<td>I-35 at MO Border</td>
<td>6/22/2015</td>
<td>11/15/2015</td>
<td>I-35</td>
</tr>
<tr>
<td>4</td>
<td>2.2</td>
<td>I-35 near Mason City</td>
<td>4/1/2015</td>
<td>11/6/2015</td>
<td>I-35</td>
</tr>
<tr>
<td>5</td>
<td>4.1</td>
<td>I-80/29 in Council Bluffs</td>
<td>3/30/2015</td>
<td>11/25/2015</td>
<td>I-29, I-80</td>
</tr>
<tr>
<td></td>
<td>3.2</td>
<td>I-29 in Sioux City</td>
<td>3/11/2015</td>
<td>11/1/2015</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.3</td>
<td>I-29 in Sioux City</td>
<td>4/15/2015</td>
<td>11/1/2015</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>2.1</td>
<td>I-380 in Waterloo</td>
<td>5/18/2015</td>
<td>9/15/2015</td>
<td>US 20 and I-380</td>
</tr>
<tr>
<td>8</td>
<td>6.2</td>
<td>I-74 in the Quad Cities</td>
<td>4/13/2015</td>
<td>11/1/2015</td>
<td>I-74</td>
</tr>
<tr>
<td>9</td>
<td>6.3</td>
<td>I-280 in the Quad Cities</td>
<td>3/30/2015</td>
<td>11/1/2015</td>
<td>I-280</td>
</tr>
</tbody>
</table>
Work Zones and Related Routes (2 of 2)

Source: Iowa DOT
An event is defined as the occurrence of speed lower than 45mph on any of the segments in the work zone.

IWZ Performance Summary

<table>
<thead>
<tr>
<th>IWZ Group and Related Roadways</th>
<th>Direction</th>
<th>Exposure ADT (1000 veh)</th>
<th>Event Number of Events</th>
<th>Event Max Duration (min)</th>
<th>Event Avg Duration (min)</th>
<th>Traffic Queue Max Length (mi)</th>
<th>Traffic Queue Avg Length (mi)</th>
<th>Traffic Queue Avg Delay (min/veh/10mi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 - 1.3 - I80</td>
<td>EB</td>
<td>202.05</td>
<td>90</td>
<td>295</td>
<td>21.39</td>
<td>7.80</td>
<td>1.21</td>
<td>0.17</td>
</tr>
<tr>
<td>Group 1 - 1.3 - I80</td>
<td>WB</td>
<td>201.76</td>
<td>178</td>
<td>395</td>
<td>21.29</td>
<td>12.46</td>
<td>1.34</td>
<td>0.40</td>
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<tr>
<td>Group 1 - 1.4 - I80</td>
<td>EB</td>
<td>391.78</td>
<td>165</td>
<td>405</td>
<td>25.76</td>
<td>6.90</td>
<td>1.20</td>
<td>0.50</td>
</tr>
<tr>
<td>Group 1 - 1.4 - I80</td>
<td>WB</td>
<td>371.57</td>
<td>92</td>
<td>440</td>
<td>21.47</td>
<td>6.90</td>
<td>0.98</td>
<td>0.37</td>
</tr>
<tr>
<td>Group 2 - 1.2 1.5 4.2 - I80/1235</td>
<td>EB</td>
<td>523.60</td>
<td>307</td>
<td>450</td>
<td>32.07</td>
<td>13.80</td>
<td>0.80</td>
<td>0.75</td>
</tr>
<tr>
<td>Group 2 - 1.2 1.5 4.2 - I80/1235</td>
<td>WB</td>
<td>627.48</td>
<td>184</td>
<td>430</td>
<td>15.71</td>
<td>13.60</td>
<td>0.97</td>
<td>0.60</td>
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<tr>
<td>Group 2 - 1.5 - I35</td>
<td>NB</td>
<td>385.43</td>
<td>21</td>
<td>245</td>
<td>27.14</td>
<td>3.80</td>
<td>1.02</td>
<td>0.08</td>
</tr>
<tr>
<td>Group 2 - 1.5 - I35</td>
<td>SB</td>
<td>388.70</td>
<td>62</td>
<td>295</td>
<td>18.23</td>
<td>3.80</td>
<td>0.81</td>
<td>0.24</td>
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<tr>
<td>Group 3 - 5.1 - I35</td>
<td>NB</td>
<td>104.60</td>
<td>41</td>
<td>20</td>
<td>5.49</td>
<td>7.10</td>
<td>1.58</td>
<td>0.23</td>
</tr>
<tr>
<td>Group 3 - 5.1 - I35</td>
<td>SB</td>
<td>113.85</td>
<td>81</td>
<td>15</td>
<td>6.17</td>
<td>11.70</td>
<td>2.12</td>
<td>0.55</td>
</tr>
<tr>
<td>Group 4 - 2.2 - I35</td>
<td>NB</td>
<td>NaN</td>
<td>NaN</td>
<td>NaN</td>
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<td>NaN</td>
<td>NaN</td>
<td>NaN</td>
</tr>
<tr>
<td>Group 4 - 2.2 - I35</td>
<td>SB</td>
<td>NaN</td>
<td>NaN</td>
<td>NaN</td>
<td>NaN</td>
<td>NaN</td>
<td>NaN</td>
<td>NaN</td>
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<tr>
<td>Group 5 - 4.1 - I29</td>
<td>NB</td>
<td>217.98</td>
<td>209</td>
<td>103</td>
<td>12.15</td>
<td>4.90</td>
<td>0.60</td>
<td>0.86</td>
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<tr>
<td>Group 5 - 4.1 - I29</td>
<td>SB</td>
<td>236.09</td>
<td>392</td>
<td>275</td>
<td>33.44</td>
<td>3.10</td>
<td>0.65</td>
<td>0.88</td>
</tr>
<tr>
<td>Group 5 - 4.1 - I80</td>
<td>EB</td>
<td>301.33</td>
<td>55</td>
<td>85</td>
<td>12.00</td>
<td>1.40</td>
<td>0.44</td>
<td>0.35</td>
</tr>
<tr>
<td>Group 5 - 4.1 - I80</td>
<td>WB</td>
<td>514.22</td>
<td>100</td>
<td>60</td>
<td>9.30</td>
<td>2.10</td>
<td>0.37</td>
<td>0.35</td>
</tr>
<tr>
<td>Group 6 - 3.1 3.2 3.3 - 129</td>
<td>NB</td>
<td>234.80</td>
<td>381</td>
<td>660</td>
<td>22.35</td>
<td>10.70</td>
<td>0.88</td>
<td>1.80</td>
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<tr>
<td>Group 6 - 3.1 3.2 3.3 - 129</td>
<td>SB</td>
<td>272.21</td>
<td>679</td>
<td>670</td>
<td>35.50</td>
<td>3.60</td>
<td>0.68</td>
<td>0.30</td>
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<tr>
<td>Group 6 - 3.1 3.2 3.3 - US20</td>
<td>EB</td>
<td>123.29</td>
<td>51</td>
<td>555</td>
<td>50.29</td>
<td>3.60</td>
<td>0.68</td>
<td>0.30</td>
</tr>
<tr>
<td>Group 6 - 3.1 3.2 3.3 - US20</td>
<td>WB</td>
<td>126.43</td>
<td>25</td>
<td>550</td>
<td>58.40</td>
<td>2.90</td>
<td>1.02</td>
<td>0.22</td>
</tr>
<tr>
<td>Group 7 - 2.1 - us20/I380</td>
<td>WB</td>
<td>163.32</td>
<td>84</td>
<td>455</td>
<td>20.89</td>
<td>5.60</td>
<td>0.77</td>
<td>0.18</td>
</tr>
<tr>
<td>Group 7 - 2.1 - us20/I380</td>
<td>EB</td>
<td>170.59</td>
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<td>SB</td>
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<td>306</td>
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<td>602</td>
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<td>68</td>
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<td>465</td>
<td>9.75</td>
<td>7.40</td>
<td>1.51</td>
<td>1.43</td>
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</table>

* All calculations are made assuming the provided sensor data is correct.
Bi-weekly Reports

Source: Iowa DOT
Daily Reports

Data Completeness

![Data Completeness Chart]

Daily Heat Map

![Daily Heat Map]

Source: Iowa DOT
Real-time Monitoring

Source: Iowa DOT/INRIX
Locating Queues

Source: Iowa DOT/INRIX
Monitoring Alerts

Alert Viewer

Time Range: 15:19 - 16:29

Source: Iowa DOT/INRIX
Future of TCP in Iowa

- Evaluate effectiveness of each strategy
- Expand to other forms of IWZ
- Provide information by project type
For more information:

Mike Jackson
Iowa DOT
michael.Jackson@dot.iowa.gov

Neal Hawkins
CTRE
hawkins@iastate.edu
Smarter Work Zones
COUNCIL BLUFFS INTERSTATE SYSTEM RECONSTRUCTION: KEEPING TRAFFIC MOVING
Program Overview

Source: Iowa DOT
Plan View - Dual Divided System

I-29 Southbound
Full Access to:
- 29
- 80
- 80

24th Street
Access to:
- Mid America Center
- Bluffs Run Casino

South Expressway
Access to:
- Indian Creek
- Western Historic Trails Center

I-80 Westbound
Full Access to:
- 29
- 80
- 80

I-80 Eastbound
Full Access to:
- 29
- 80
- 80

I-29 Northbound
Full Access to:
- 29
- 80
- 80

Legend:
- Freeway On/Off Ramp
- Local Road
- Local Freeway
- Express Freeway

Source: Iowa DOT
Dual Divided System Cross-Section

Source: Iowa DOT
Current and Future Projects

[Map showing various road projects in Council Bluffs, with labels for each project and their construction or completion dates.]

Source: Iowa DOT
Federal Register: Work Zone Safety and Mobility (23 CFR PART 630)

- Each State shall implement a policy for the systematic consideration and management of work zone impacts on all Federal-aid highway projects
  - Significant projects require a Transportation Management Plan
Transportation Management Plan

• Why you see what you see in the Traffic Control Plans and Contract Documents
  – Goals and Objectives
  – Traffic Control Plan
  – Traffic Operations Plan
    • Intelligent Work Zones
    • Traffic Incident Management
  – Public Information Plan

Source: Iowa DOT
Goals and Objectives

• Safety of the traveling public and construction workers
• Efficient traffic flow along the interstate
• Minimize impacts to local access within the project area

Source: Iowa DOT
Traffic Control Plan

Lane Widths
2 Lanes of Traffic

Taper Rates

Chute Design

Source: Iowa DOT
Traffic Operations Plan

• Operational Analysis (TransModeler)
  – Incentives / Disincentives
  – Iterative Design Process
  – Identifying IWZ Needs

• Signal Timing Modifications
  – Closures
  – Construction Planning

Source: Iowa DOT
Intelligent Transportation System

Source: Iowa DOT
Portable ITS Devices/Intelligent Work Zones

Source: Iowa DOT
Future IWZ Applications

• Trucks entering freeway

Source: Iowa DOT
Traffic Monitoring

- Work Restrictions (based on sensor data)

### Table

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<tr>
<th>Date</th>
<th>Weekday</th>
<th>Time</th>
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<td>0900</td>
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<td>Moderate</td>
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<td>1200</td>
<td>High</td>
<td>120</td>
<td>70</td>
<td>High</td>
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<tr>
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<td>1500</td>
<td>Very High</td>
<td>200</td>
<td>85</td>
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<td>0000</td>
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<td>20</td>
<td>30</td>
<td>Low</td>
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</table>

Source: Iowa DOT
Work Restrictions – Traffic Control Plan

- Short duration full interstate closures allowed daily from 12am-4am for bridge demolition and beam placement.
- Short duration closures of Harry Langdon Boulevard will be allowed daily from 10pm-6am for bridge beam placement.
- Ramp closures allowed daily from 10pm-6am or in accordance with the plans.
- Shoulder closures allowed from 6pm-6am and 9am-3pm.

Source: Iowa DOT
Traffic Management – Lane Closure Coordination

Source: Iowa DOT/Google
Traffic Monitoring and Performance: Salander

Source: Iowa DOT/Salander
Traffic Monitoring: Salander (1 of 3)

Traffic Impacts in the past week

<table>
<thead>
<tr>
<th>Title</th>
<th>Time</th>
<th>Location</th>
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<tbody>
<tr>
<td>1 left lane blocked</td>
<td>Mon Sep 1, 2014 04:16 PM(20 min)</td>
<td>I-80 WB at S 13th St in Council Bluffs</td>
</tr>
<tr>
<td>2 reopened to traffic</td>
<td>Mon Sep 1, 2014 04:36 PM(16 min)</td>
<td>I-80 WB at S 13th St in Council Bluffs</td>
</tr>
<tr>
<td>3 Delay on IACB-I29-I80-WB</td>
<td>Mon Sep 1, 2014 03:50 PM(48 min)</td>
<td>I-80 WB from mile 3.7 to 2.3</td>
</tr>
<tr>
<td>4 blocked</td>
<td>Sun Aug 31, 2014 03:59 AM(132 min)</td>
<td>I-80 EB mile 4.9</td>
</tr>
<tr>
<td>5 Delay on IACB-I80-2-EB</td>
<td>Sun Aug 31, 2014 05:52 AM(6 min)</td>
<td>I-80 EB from mile 4.5 to 8.8</td>
</tr>
</tbody>
</table>

Source: Iowa DOT/Salander
Traffic Monitoring: Salander (2 of 2)

Source: Iowa DOT/Salander
Traffic Monitoring: Performance

- Daily Travel Time: I-29 NB / I-80 WB

Source: Iowa DOT
Traffic Monitoring: Performance

• Crash information
  – Weekly reports from Council Bluffs Police Department
  – Iowa State Patrol Reports Online

Source: Iowa DOT
Traffic Incident Management (TIM; 1 of 2)

- Revise TIM diversion plans for construction
- DMS message sets established for diversion routes
- Monthly stakeholder meetings
- Incident debrief – Inrix data, ITS data, Salander summaries and cameras
Traffic Incident Management (TIM; 2 of 2)

Source: Iowa DOT
For More Information

Mike Jackson, Iowa DOT
(515) 239-1192
michael.jackson@dot.iowa.gov

Tara Kramer, HDR
(402) 399-1322
tara.kramer@hdrinc.com
Smarter Work Zones

FHWA RESOURCES
SWZ Interactive Toolkit Available!

https://www.workzonesafety.org/SWZ/main

Source: FHWA
## Other Resources – Project Coordination

| FHWA                                      | • FHWA Work Zone Mobility and Safety Program – Project Coordination  
|                                           | • FHWA Work Zone Mobility and Safety Program – Peer-to-Peer Program  
| TRB SHRP2                                  | • WISE Software Users Guide  
| NCHRP                                     | • NCHRP Synthesis 413: Techniques for Effective Highway Construction Projects in Congested Urban Areas  
| Others                                    | • Highway Construction Coordination to Minimize Traffic Impacts  
| WSDOT Example Documents                   | • Data Sharing Agreement between Washington State DOT and Seattle DOT  
|                                           | • Washington State DOT Memorandum of Understanding – Construction Traffic Coordination and Mitigation  

## Other Resources – Technology Application

<table>
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<th>FHWA</th>
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Thanks for joining us!

• **Upcoming Events**
  – **Webinar #9**: Technology Application Strategies: Performance Measures and System Health Monitoring
    • Thursday, January 21, 2016, 1:00-2:30pm EST
  – **Webinar #10**: Designing ITS Systems Based on Identified Needs
    • Thursday, February 18, 2016, 1:00-2:30pm EST
  – Check The National Work Zone Safety Information Clearinghouse website for updates [https://www.workzonesafety.org/SWZ/main](https://www.workzonesafety.org/SWZ/main)

• **Questions or Comments?**
  – Jawad Paracha (FHWA Operations, WZ Team)
    [Jawad.Paracha@dot.gov](mailto:Jawad.Paracha@dot.gov)