Intelligent Work Zones on Traffic Critical Projects

National Rural ITS Conference
Snowbird, Utah
August 10-12, 2015
Tim Simodynes, ITS Engineer
Four Main Causes of Delay

• Recurring Congestion
• Weather
• Traffic Incidents
• Construction
2014 Traffic Critical Projects

• Projects that can repeatedly or quickly lead to significant travel delays

• Freeways over 17,000 vehicles/day

• Border Bridges

• Focused on deploying ITS –
  “Intelligent Work Zones”
2014 Resources

- Statewide TOC
- Existing ITS Devices:
  - Cameras, Sensors, DMS
- TransSuite Software
  - “Queue Detection”
- ITS Communication Networks
- Integration of Rental Devices
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
Portable DMS

- TOC has controlled Rentals since 2013
- Tried Mapping using GPS in modems
Intelligent Work Zone Coordination

Statewide Traffic Operations Center (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: Eval. & Analysis
Queue Detection Systems
Southbound I-35

RED = Portable DMS
GREEN = Portable Sensor

Work Zone

SLOW TRAFFIC AHEAD
STOPPED TRAFFIC AHEAD
Traffic Signal Preemption

Council Bluffs
Iowa: 3 Million People
9 “Metro” Areas (50,000+ pop.)

- Des Moines
- Ames
- Cedar Rapids
- Quad Cities
- Waterloo
- Sioux City
- Council Bluffs/Omaha
- Dubuque
- Iowa City
2014 IWZ Locations

14 Total Projects
(Planned 11, Removed 2, Added 5)
60 Sensors, 44 DMS, 6 Cameras
2014 IWZ Successes

• Flexibility of Statewide IWZ Contract

• Sensor Data Tracking
# Sensor Data Tracking Spreadsheet

![Sensor Data Tracking Spreadsheet Image]
2014 IWZ Successes

• Flexible Statewide IWZ Contract

• Sensor Data Tracking

• Integration
  • Permanent vs. Portable; Owned vs. Rental
  • Cameras & DMS on 511ia.org
2014 IWZ Lessons

• MANY steps required for success
  • Planning with Construction
  • Technical Details
    • Deployment, Communications, Integration, System verification, Sensor calibration (speeds & volumes), Sensor monitoring
  • Queue detection systems
    • Logic development, implementation, verification, monitoring, revising
  • Communication among ALL stakeholders (there are many)

• Document Process, Roles and Responsibilities
Long Range Goal for Traffic Critical Projects (TCP)

*Design and Stage construction and maintenance projects that will have minimal impact on traffic, while still being economical to construct. Have plans in place to minimize the effects of incidents.*

2015, 2016 & 2017 projects

Define Roles & Procedures
Traffic Critical Project Selection

• “Traffic Critical Network”
  • Expressways over 17,000 veh/day

• Projects that **will** impact Traffic

• Projects where an incident could have severe traffic impacts

• Iowa DOT District Input
2015 Traffic Critical Project Treatments

Intelligent Work Zone deployments

- and/or -

Traffic Incident Management planning (T.I.M.)

- and/or -

Work Time Restrictions
Traffic Incident Management (TIM) Plans

• Metro-wide Plans for detours, DMS messaging, emergency contacts, etc.

• Written based on input from Engineering, Enforcement, Emergency Responders

• Expert TIM consultants used to coordinate meetings and prepare plans
TIM Planning on TCPs

• Reinforce Relationships among Engineering, Enforcement, Emergency Responders

• Share information and awareness

• Have contingency plans in place
TIM Planning on 2015 TCPs

- 20 Projects need TIM work
  - 8 New TIM plans
  - 12 TIM plan updates
- 21+ more projects with “TIM Awareness”
New for 2015
Traffic Critical Projects – Internal Tracking Web Page
https://sites.google.com/site/iowatcp/
New for 2015

Traffic Critical Projects – Internal Tracking Web Page

https://sites.google.com/site/iowatcp/

<table>
<thead>
<tr>
<th>TCP ID</th>
<th>PIN</th>
<th>Project Number</th>
<th>County</th>
<th>Route</th>
<th>Location Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>10-77-003-020</td>
<td>IM-035-3(189)-08-77</td>
<td>Polk</td>
<td>35/66</td>
<td>Bridge over Des Moines River 1.6 Miles E. Of IA 28</td>
</tr>
<tr>
<td>1.2</td>
<td>13-77-009-020-01</td>
<td>IM-035-3(189)-08-77</td>
<td>Polk</td>
<td>236</td>
<td>from SW Mx to 31st Street</td>
</tr>
<tr>
<td>1.3</td>
<td>13-77-009-020-01</td>
<td>IM-035-3(189)-08-77</td>
<td>Jasper</td>
<td>80</td>
<td>W of Co Rd 341 to IA 117 (EB &amp; WB Shoulders)</td>
</tr>
<tr>
<td>1.4</td>
<td>94-77-300-180</td>
<td>IM-035-3(189)-08-77</td>
<td>Polk</td>
<td>80</td>
<td>80/66 Interchange Reconstruction</td>
</tr>
<tr>
<td>1.5</td>
<td>13-77-235-030</td>
<td>IM-035-3(189)-08-77</td>
<td>Polk</td>
<td>80</td>
<td>80 Flyover to join 35 closed for Joint Repair</td>
</tr>
<tr>
<td>1.6</td>
<td>96-77-003-020</td>
<td>IM-035-3(189)-08-77</td>
<td>Polk/Story/Hamilton</td>
<td>35</td>
<td>From I-80 N to Wright Co. Line</td>
</tr>
<tr>
<td>1.7</td>
<td>04-77-800-030</td>
<td>IM-035-3(189)-08-77</td>
<td>Polk</td>
<td>80</td>
<td>From The West 1-35/80/235 Interchange E. To Jasper Co. Line</td>
</tr>
<tr>
<td>1.8</td>
<td>04-77-800-030</td>
<td>IM-035-3(189)-08-77</td>
<td>Polk</td>
<td>80</td>
<td>From The West 1-35/80/235 Interchange E. To Jasper Co. Line</td>
</tr>
<tr>
<td>1.9</td>
<td>04-77-800-030</td>
<td>IM-035-3(189)-08-77</td>
<td>Polk</td>
<td>80</td>
<td>From The West 1-35/80/235 Interchange E. To Jasper Co. Line</td>
</tr>
<tr>
<td>1.10</td>
<td>11-77-300-010</td>
<td>IM-035-3(189)-08-77</td>
<td>Polk</td>
<td>80</td>
<td>From The West 1-35/80/235 Interchange E. To Jasper Co. Line</td>
</tr>
<tr>
<td>1.11</td>
<td>12-77-300-010</td>
<td>IM-035-3(189)-08-77</td>
<td>Black Hawk</td>
<td>380</td>
<td>Bridge over Cedar River/Streets/R.R. Approx. 0.4 Mile S. Of U</td>
</tr>
<tr>
<td>2.2</td>
<td>14-77-003-020</td>
<td>IM-035-3(189)-08-77</td>
<td>Hamilton</td>
<td>35</td>
<td>Co Rd. D20 N to The Minnesota State Line (Various Locations)</td>
</tr>
<tr>
<td>2.2</td>
<td>96-77-003-010</td>
<td>IM-035-3(189)-08-77</td>
<td>Franklin</td>
<td>35</td>
<td>From Hamilton Co. Line N to Minnesota State Line</td>
</tr>
<tr>
<td>2.3</td>
<td>96-77-003-010</td>
<td>IM-035-3(189)-08-77</td>
<td>Franklin</td>
<td>35</td>
<td>From Hamilton Co. Line N to Minnesota State Line</td>
</tr>
<tr>
<td>2.4</td>
<td>03-77-003-010-01</td>
<td>IM-035-3(189)-08-77</td>
<td>Woodbury</td>
<td>29</td>
<td>From 0.5 Mile S. Of Sergeant Bluff N. To Harbor Dr. Outfall, St.</td>
</tr>
<tr>
<td>2.5</td>
<td>03-77-003-010-01</td>
<td>IM-035-3(189)-08-77</td>
<td>Woodbury</td>
<td>29</td>
<td>From 0.5 Mile S. Of Sergeant Bluff N. To Harbor Dr. Outfall, St.</td>
</tr>
<tr>
<td>2.6</td>
<td>03-77-003-010-01</td>
<td>IM-035-3(189)-08-77</td>
<td>Woodbury</td>
<td>29</td>
<td>From 0.5 Mile S. Of Sergeant Bluff N. To Harbor Dr. Outfall, St.</td>
</tr>
</tbody>
</table>

Links:
- TCP Org Chart
- Project Contacts
- IWZ System Diagrams
- Definitions of Terms
- Future TCP Planning
New for 2015

Extra Traffic Sensors for...

• Analysis of Non-IWZ projects
  • Speeds and Volumes

• Future Projects
  • Seasonal, Daily and Hourly Traffic Counts & Classifications
Rural Camera Options

- Cellular Modem Communications Options
  - Provide Video while Managing Data Usage
- Q-Vision
  - Recorded Clips
  - Live 5-minutes max.
- Live View
  - ?

New for 2015
New for 2015

Additional IWZ Technologies

• Portable DMS with Radar Detection
New for 2015

Additional IWZ Technologies

- Speed Feedback Trailers
New for 2015

Additional IWZ Technologies

TRUCKS ENTERING WHEN FLASHING

Automated Trucks Entering Warning
Program Funding

• IWZ Contract Funding Source
  • 2014 – $1.4 million in ITS budget
  • 2015 – Use construction project funds for IWZ
2015 Intelligent WZ on TCP

• 19 IWZ Projects Identified Initially
• February District Visits; April Projects Started
• Expanded to 26 projects
2015 Intelligent WZ on TCP

• Improved TOC monitoring and email alerts

• Weekly IWZ Team Confr. Calls
2015 Traffic Critical Projects

Red = IWZ & TIM  Orange = IWZ  Yellow = TIM
Future of TCP in Iowa

• Evaluate effectiveness of each strategy

• Further define roles and responsibilities
Future of TCP in Iowa

• Institutionalize the Practice from Planning to Design to Construction

• Replace (and vastly expand) current Federal Transportation Management Plan (TMP) requirements
Questions

Tim Simodynes, P.E.
ITS Engineer
Office of Traffic Operations

tim.simodynes@dot.iowa.gov
515.239.1606