The Use of a Comparative Travel Time (CTT) System as a New Smart Work Zone Solution

2018 National Work Zone Management Conference
Travel Times & Comparative Travel Times

I-35 Dynamic Message Sign
Waco

I-35 Comparative Travel Time Sign
Austin

I-35 Comparative Travel Time Signs
Temple and Waco
Comparative Travel Times in a Work Zone

I35 Temple, Texas

Smarter Work Zone
- Real-time
- Portable
- Automated
- Reliable

FHWA EDC-3

Equip Main Route
And Equip Alternate Route
Comparative Travel Times in a Work Zone

• Factors to consider when choosing an Alternate Route
  • Bridges
  • Maintenance Section Schedule
  • Turning Radii
  • Schools
  • Traffic Signals
Comparative Travel Times in a Work Zone

~1100 feet
Comparative Travel Times in a Work Zone

Implementation Considerations

- Locate message signs at least 2 miles upstream of decision point
- Develop comprehensive business rules
- Necessary to account for potential conflicts on alternate route, i.e. school zones, construction, signalized intersections, bridge loadings, geometry, maintenance activities, etc.
- Press Release and Public Outreach announcing the implementation
Comparative Travel Time Business Rules

Implementation Considerations

• Business Rules to activate and deactivate messages

• Business Rules’ to avoid flip-flopping messages
Comparative Travel Time Business Rules

• Business Rules to Activate Messaging
  • Rule 1: Wait until Travel Time to Destination on I35 reaches 25 mins
  • Rule 2: Travel Time on the Loop 363 to (same) Destination must be lower than 25 mins

• Business Rules to Deactivate Messaging
  • Rule 3: When I35 Travel Time Becomes Quicker than the Alternate Route, Leave the Alternate Route Displayed for 3 cycles (5 min cycles)
  • Rule 4: Once the Alternate Route is Deactivated, Alternate Route Messaging Doesn’t Resume until After 3 Cycles (5 min cycles)
Data Results Without and With CTT Activated

**June 21, 2016**
- Major Accident:
  - I-35 S3 at Central/Adams Ave, Temple (MM 301)
  - Verified: 10:56 AM
  - Cleared: 1:39 PM
- Alt. Route Messages ACTIVE: 11:01 am – 13:36 pm

**Baseline Comparison Day:**

**June 1, 2016 (Wednesday)**
- Same location & direction
- Alt. Route Messages NOT ACTIVE

**Travel Time Message**

<table>
<thead>
<tr>
<th>Time</th>
<th>I-35</th>
<th>Loop-363</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:01 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>11:02 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>11:11 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>11:16 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>11:21 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>11:26 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>11:31 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>11:41 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>11:46 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>11:51 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>11:56 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>12:01 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>12:06 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>12:11 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>12:16 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>12:21 MN</td>
<td>16 MN</td>
<td></td>
</tr>
</tbody>
</table>

**Travel Time Message**

<table>
<thead>
<tr>
<th>Time</th>
<th>I-35</th>
<th>Loop-363</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:26 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>12:31 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>12:36 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>12:41 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>12:46 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>12:51 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>13:01 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>13:06 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>13:11 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>13:16 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>13:21 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>13:26 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>13:31 MN</td>
<td>16 MN</td>
<td></td>
</tr>
<tr>
<td>13:36 MN</td>
<td>16 MN</td>
<td></td>
</tr>
</tbody>
</table>

**Loop 363**

![Graph of Loop 363](image)

**I-35**

![Graph of I-35](image)
Data Results Without and With CTT Activated

July 2, 2016 (Saturday)

- Major Accident on I-35 SB at MM 303

Comparative Travel time Messages

Baseline Comparison Day:
June 18, 2016 (Saturday)
- Same location & direction
- Same day of the week
- Alt. Route Messages NOT ACTIVE

![Graphs showing traffic comparison between Loop 363 and I-35 with and without CTT activation.](image-url)
Comparative Travel Times in a Work Zone

Lessons Learned

• Utilize dense infrastructure on alternate route
• Origin and destination points should be the same off main route
• Main route must pass threshold before suggesting alternate route
• Helpful if the CTT messages can be integrated into the statewide ITS network

Results

• Diversion does take place
• Diversion is impacted by presence/duration of incident and/or time of day
• The amount of diversion (total # of vehicles) has not been fully quantified