Innovative Safety Projects that Maximize Funding

Nathan Vatter, P.E.
Fatalities in Tennessee

Figure 9 - Fatalities Percent of Total by Contributing Factor (2008-2012)
Safety Initiatives and Projects

- Lane Reconfiguration
  - Chapman Highway (Rural Road Diet/ Lane Reduction)

- Interstate
  - Weaving
  - Bottlenecks
  - Drainage

- Road Safety Audits vs. Spot Safety Projects
  - Types of Projects
  - Safety benefits

- Limitation of Safety Funding
  - Leverage Funding
  - Partnering with locals
  - Selling your projects
• Begins in Knoxville terminates in Sevierville, 24-miles
• Through 3 counties, the route has 5 different State Routes designations
• Varies from urban 5-Lane to rural multilane
• Before Interstate 40 was built, Chapman Highway was the Gateway to the Smoky Mountains
Proposed lane reconfiguration:
4 lane undivided to 3 lane with center turn lane and passing lanes
Tittsworth Springs and Rogers Road to Whites School Road
Sevier County

Upcoming Projects
Chapman Highway - Existing Conditions

- (4) Narrow lanes (10.5 feet wide)
- Limited Shoulders (2 to 4 feet)
- No buffer between opposing traffic
- Speed Limit 55 mph
- Significant Vertical and Horizontal Curves
- Challenging Topography with rock banks and steep slopes

7.2 mile long section
From 2006 – 2015, there were
14 Fatal Crashes
48 Incapacitating Injury Crashes
198 Other Injury Crashes
685 Total Crashes
38% Severe Crashes
### Who's in the news?

<table>
<thead>
<tr>
<th>Metro Area</th>
<th>Metro Area Population</th>
<th>World Rank</th>
<th>US Rank</th>
<th>AM Delay</th>
<th>PM Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chattanooga</td>
<td>547,776</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Knoxville</td>
<td>851,715</td>
<td>174/174</td>
<td>71/71</td>
<td>12%</td>
<td>22%</td>
</tr>
<tr>
<td>Memphis</td>
<td>1,341,746</td>
<td>142/174</td>
<td>41/71</td>
<td>22%</td>
<td>34%</td>
</tr>
<tr>
<td>Nashville</td>
<td>1,757,912</td>
<td>105/174</td>
<td>19/71</td>
<td>22%</td>
<td>61%</td>
</tr>
</tbody>
</table>
NOTES
1. Extend existing solid white line separating the I-640 traffic from I-40 west
   (length approximately 1,000 ft.) should be 12" wide with snowplowable on either side.
2. Install 3 sets of straight arrows (6 total) in right two lanes symmetrically for guidance that these lanes continue for an extended distance.
I-40 Crash Analysis

Number of Crashes

- Median Barrier: East 15, West 24
- Wet Conditions: East 35, West 11
- Hit barrier when wet: East 21, West 0
- Sedan: East 4, West 4
- Tractor Trailer: East 0, West 0
- Pickup Truck: East 2, West 2
- Utility Truck: East 1, West 1
- Other: East 0, West 0

Crash Factors
I-40 Downtown Knoxville

West

TO SOUTH

40

75

Nashville

Chattanooga

EXIT 386B

129

Airport Smoky Mts

½ MILE

EXIT 387

62

17th Street

Western Ave

Chattanooga

17th Street
I-40 Downtown Knoxville Video Before (From I-40 West)
I-40 Downtown Knoxville Video After (From I-275 South to I-40 West)
Please note that:

- Black-colored horizontal lines refer to locations of the detector stations working on a specific day.

- Congestion might be caused by recurrent demand fluctuation or non-recurrent traffic incident(s).
- Black-colored horizontal lines refer to detector stations
- White horizontal lines refer to influence area
- UT prepared 18 maps, (10 hours each)
- Credit to Dr. Lee Han, Mr. Bumjoon Bae and Brandon Whetsel
Before & After
Friday in September (Labor Day Weekend)

Before
9-4-2015

After
9-2-2016

Credit to Dr. Lee Han, Mr. Bumjoon Bae and Brandon Whetsel
Before & After

Wednesday in September (After Labor day)

Before
9-9-2015

After
9-7-2016

Credit to Dr. Lee Han, Mr. Bumjoon Bae and Brandon Whetsel
Campbell County I-75 - Drainage

A/C Ratio = 0.59

<table>
<thead>
<tr>
<th>Injury Crash</th>
<th>12 Other Injury Crash</th>
</tr>
</thead>
</table>

Interstate 75, Campbell County
Section from Rarity Mountain Rd to KY Border

A/C Ratio = 0.59

Wet Weather Crashes
Spot Safety Projects

- Projects
  - Signalization
  - Geometric improvements
  - Flashing Beacons
  - Other safety improvements

- SSP 2012
  - Total Number of Project: 20
  - Cost: $ 6,373,605

- SSP 2013
  - Total Number of Projects: 20
  - Cost: $ 9,255,322

- SSP 2014
  - Total Number of Projects: 17
  - Cost: $8,928,100

- SSP 2015
  - Total Number of Projects: 18
  - Cost: $8,407,500
Road Safety Audits

- Locations determined by Headquarters Safety Office
- A road safety audit is performed on the selected stretch of roadway
- Typically low cost solutions
  - Signs
  - Pavement Markings
  - Snowplowable Retroreflective Pavement Markers
  - Delineators
  - Guardrail
- Usually several are bundled together for better price
Benefits to Safety Projects

- 40 completed RSARs since 2011
- 21% Crash Reduction

- 50 completed SSPs since 2012
- 30% Crash Reduction

Need more funding for more projects!
Wrong Way Initiative

- In 2013, the Knoxville area experienced 4 fatal head-on wrong way type crashes on the interstate system.
- Various low-cost countermeasures were researched, and new wrong-way arrow standards were created.
- Additionally, Knoxville will be the test location (Summit Hill @ James White Parkway) for an active wrong-way detection system.

**Diagram:**
- 13 Bi-directional red and white SPMS
- Wrong way pavement arrow with snowplowable pavement markers to be used on single-lane ramps only
- 14 Mono-directional red one-directional SPMS
- Wrong way arrow using snowplowable pavement markers to be used on multi-lane ramps only
Limitation of Safety Funds

• Submittals have become more competitive as less safety funding becomes available.

In order to combat the limitation of Safety Funds, we have begun:

– Prioritizing projects by various factors
– Partnering with local jurisdictions for remaining funding on our turn ins
– Using TDOT Maintenance forces, we have built 5 turn lanes and performed the resurfacing from a Ramp Queue.
Thank you

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