Interstate 40 Resurfacing and Operations Improvements

From Interstate 275 to US 129
Knoxville Area
I-40 between I-275 and US 129
Urban Bottleneck
I-40 between I-275 and US 129

Legend

Westbound Crash Severity
- Incap Injury (5)
- Non-Incap Injury (32)
- Prop Damage (over) (132)
- Prop Damage (under) (2)

Eastbound Crash Severity
- Fatal (1)
- Incap Injury (5)
- Non-Incap Injury (20)

Before

<table>
<thead>
<tr>
<th></th>
<th>10 Year</th>
<th>3 Year</th>
<th>1 Year</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Westbound</td>
<td>Eastbound</td>
<td>Westbound</td>
</tr>
<tr>
<td>Total Crashes</td>
<td>373</td>
<td>311</td>
<td>176</td>
</tr>
<tr>
<td>Percent by Direction</td>
<td>55%</td>
<td>45%</td>
<td>67%</td>
</tr>
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</table>
Wooden Walls?
Before: I-40/I-275 to 17th Street

Minimum lane changes needed:
2 lane changes needed to exit on 17th Street
Minimum lane changes needed:
1 lane change needed to exit on US 129
Before: I-40/I-275 to 17th Street

Total Conflict Points: 23

Not to scale
I-40 Downtown Knoxville – Signing Plan
Minimum lane changes needed:
1 lane change needed to exit on 17th Street
After: I-40/I-275 to US 129, Alcoa Highway

Minimum lane changes needed:
0 lane changes needed to exit on US 129

Not to scale
After: I-40/I-275 to 17th Street

Total Conflict Points: 16

Not to scale
Open-Graded Friction Course, OGFC

- Reduces spray and surface water
- Increases friction
- Shorter pavement lifespan

Traditional Pavement

OGFC
Post Construction Photographs
I-40 Downtown Knoxville - Flythrough

2015 - Before

2017 - After
Measuring Effectiveness
RDS Speed Data

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).
• 12 Horizontal lines from RDS data

• University of TN prepared 21 maps
  • 10 hours each

• Thanks to Dr. Lee Han, Mr. Bumjoon Bae and Mr. Brandon Whetsel
Measuring Effectiveness
I-40 between I-275 and US 129

Wednesday (September 2015 vs January 2017)

2015 - Before

Papermill

17th Street

2017 - After

Affected area saw less congestion

8 AM  2 PM  6 PM

Measuring Effectiveness
I-40 between I-275 and US 129

Wednesday (September 2015 vs January 2017)

2015 - Before

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17th Street

2017 - After

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Project Summary

- **Time** - Less than 1 year from conception to construction

- **Cost** - $2,022,939.90 for paving & $100,000 for signs

- **Wet Weather Crashes**
  - Open Graded Friction Course

- **Simplified Decision Making**
  - Improved Guide Signs
  - Pavement Shields
  - Option Lanes – Longer Time for Decision

- **Improving Interchange**
  - Reducing Conflicts & Lane Changes
  - Option Lanes
  - Changed without Widening

<table>
<thead>
<tr>
<th>Study Period</th>
<th>Westbound Crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yearly Average</td>
</tr>
<tr>
<td>After 2 Years</td>
<td>43.0</td>
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<tr>
<td>Before 3 Years</td>
<td>58.7</td>
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</table>
Thank you