Diversion and Evacuation Routes Timing Development, Implementation and Applications

Presented by:

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Project Background

• History
  – Incidents on Interstate 75 requiring closures
  – Interstate 75 Freeway Management System in Manatee and Sarasota Counties
  – Implementation of Manatee County Advanced Traffic Management System (ATMS)
  – Past history of incidents on Manatee River bridges (US 41/301, Bus US 41)
  – Hurricane Evacuation Planning
Objectives

- Strategic plan for maximizing the throughput of diversion or evacuation route through traffic engineering practices
  - Traffic signal timing patterns
  - Traffic operational improvements
  - Law enforcement deployment strategies
  - Decision matrix and operations guide development
- Ease of implementation
Where Will The Traffic Go?

• Interstate 75 carries ≈100,000 vehicles per day
  – Peak hour about 10% or 10,000 vehicles per hour
• Capacity of a signalized arterial ≈ 1,900 vehicles per lane per hour of green
  – Example: 3 lanes in one direction, 60% green ≈ 3,420 vehicles per hour
• Most arterials already congested during peak periods
• No arterial roadway has capacity to carry full diversion during the heavier hours
Diversion Scenario 3
Diversion Scenario 7
Evacuation Scenarios
Timing Patterns

• For Each Diversion Scenario, 3 Timing Patterns Developed
  – Northbound
  – Southbound
  – Balanced

• For Each Evacuation Route, 2 Timing Patterns Developed
  – Minor Evacuation
  – Major Evacuation
Timing Patterns - Diversion

• Base Model (Synchro)
• Modify in TruTraffic for Diversion Conditions
  – Primary movements: add $\approx 60$ seconds of green time
  – Secondary movements: add $\approx 30$ seconds of green time
  – Progress Diversion traffic at 25 mph
• Define Patterns and FlexGroups on ATMS.now
• Field Check during Late Night
• Ready for staff to implement when needed
Timing Patterns - Evacuation

• Base Model (Synchro)

• Modify in TruTraffic for Evacuation Conditions
  – Minor Evacuation – Typical Time of Day Cycle Length with One-Way Progression at Speed Limit
  – Major Evacuation – Increased Cycle Length with One-Way Progression at Speed Limit

• Define Patterns and FlexGroups on ATMS.now

• Field Check during Late Night

• Ready for staff to implement if needed
Timing Pattern Development
Implementation Guide
Diversion Scenario 3
## Route Details

<table>
<thead>
<tr>
<th>3S</th>
<th>Flag ID (see map)</th>
<th>Location</th>
<th>Traffic Signal Control to be Implemented</th>
<th>Notes</th>
<th>3NS</th>
<th>Bi-Directional Diversion (South Direction)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>In advance of Exit 224 southbound</td>
<td>-</td>
<td>-</td>
<td>Diversion starts on southbound Interstate at Exit 224 (US 301). Advance incident signing using freeway DMS. Additional information using HAR and 511 system. If closure, FHP / FDOT to implement closure with guidance to ramp.</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>On Southbound ramp at US 301</td>
<td>27</td>
<td>220</td>
<td>27</td>
<td>Diversion route turns to right. For long term closures, add directional signing at ramp - I-75 detour to right. Favor southbound traffic coming from ramp.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>51st Ave E/19th St E</td>
<td>27</td>
<td>220</td>
<td>21</td>
<td>Favor Westbound traffic.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Ellenton Gillette Road/Leffingwell Ave</td>
<td>27</td>
<td>220</td>
<td>21</td>
<td>Favor Westbound traffic.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Harllee Packing, Inc Co. Driveway</td>
<td>27</td>
<td>220</td>
<td>21</td>
<td>Favor Westbound traffic.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>12th Ave E/Habib Blvd</td>
<td>27</td>
<td>220</td>
<td>21</td>
<td>Favor Westbound traffic.</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>6th Ave E/Shopping Center</td>
<td>27</td>
<td>220</td>
<td>21</td>
<td>Favor Westbound traffic.</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>US 41 (Tamiami Trail) northbound ramp</td>
<td>27</td>
<td>220</td>
<td>21</td>
<td>Favor Westbound traffic.</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>US 41/US 301 (Tamiami Trail) southbound ramp</td>
<td>27</td>
<td>220</td>
<td>21</td>
<td>Diversion route turns to left. Favor Westbound left turn traffic.</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>US 41/US 301 (Tamiami Trail) southbound</td>
<td>27</td>
<td>220</td>
<td>21</td>
<td>Normal merge onto mainline southbound. No action needed.</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>7th St</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Flashing beacon at intersection - yellow toward diversion route traffic. No action needed.</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Habib Blvd</td>
<td>27</td>
<td>220</td>
<td>21</td>
<td>Favor Southbound traffic.</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>SR 64/Manatee Ave</td>
<td>27</td>
<td>220</td>
<td>21</td>
<td>Favor Southbound traffic.</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>SR 64/6th Ave</td>
<td>27</td>
<td>220</td>
<td>21</td>
<td>Favor Southbound traffic.</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>9th Ave E/Martin Luther King Jr Ave</td>
<td>27</td>
<td>220</td>
<td>21</td>
<td>Favor Southbound traffic.</td>
</tr>
</tbody>
</table>
Benefits

• Ready to use timing plans with multiple scenarios

• Coordinated patterns

• Programmed in central software for easy and quick implementation

• Maximize available resources
Implementation Comparison

**Diversion and Evacuation Routes Programmed Signal Timings**

**Before vs. After Implementation**

- **Average Before:** 7 minutes
- **Average After:** 1 minute

86% decrease in average download time per intersection.
Applications

• Traffic Incident Management

• Evacuation Route Timing

• Planned/Unplanned Event Management

• Non-Recurring Congestion Management
Thank You

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