Alsafe

Safety Planning Tools for Alabama MPOs

presented by
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Research Overview

- Project Objectives
- Project Outcomes
- Next Steps
Project Team

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Short-Term Safety Planning Tool Overview

1. Develop Benchmarks

2. Evaluate Crash Trends and Characteristics

3. Identify and Evaluate Focus Crash Types

4. Identify and Implement Countermeasures
Identifying and Evaluating Problems

Single-vehicle roadway departure crashes are over-represented among severe crashes: they account for **29% of severe crashes** compared to only **14% of all crashes**.
Focus Crash Types

Frequency and Severity

Crash Frequency

- Commercial Vehicles
- Bicycles
- Inattentive Drivers
- Unlicensed Drivers
- Unrestrained Occupants
- Motorcycles
- Alcohol (No Drugs)
- Alcohol and/or Other Drugs
- Older Drivers (65+)
- Young Drivers (15-25)
- Aggressive Driving
- Intersections
- Speed-Related
- Roadway Departure

Short-Range Safety Planning
Focus Crash Types (continued)

Route Type (Single-Vehicle Roadway Departure Crashes)

- Municipal: 37% of Total Crashes, 23% of Severe Crashes
- County: 35% of Total Crashes
- Federal: 11% of Total Crashes, 15% of Severe Crashes
- State: 8% of Total Crashes, 8% of Severe Crashes
- Interstate: 6% of Total Crashes, 7% of Severe Crashes
- Private Property: 2% of Total Crashes, 1% of Severe Crashes

Short-Range Safety Planning
Short-Term Safety Planning Tool

- Develop Benchmarks
  - MAP-21
  - How are we doing?

- Evaluate Characteristics
  - 5-Ws

- Identify and Evaluate Focus Crash Types
  - Geographic distribution
  - Risk Factors
  - Type

- Identify and Implement Countermeasures
Long-Range Safety Planning Tool Overview

1. Identify Long-Range Planning Scenarios
2. Use Formulas to Predict Crash Impacts of Alternatives
3. Evaluate Alternatives
4. Prioritize and Implement Projects
Model Development

- Literature Review
- Collected/organized variables for Huntsville MPO area
- Variables tested

- Roadway mileage (by type)
- VMT (by roadway type)
- V/C ratio (by roadway type)
- Speed
- Number of lanes
- Intersection and signal density
- Percent of population male
- Retail and nonretail employment density
- Median household income
- Student enrollment
Technical Process Overview

Collect
Organize
Predict
Evaluate
\[ \mu = e^{(\alpha + \beta_1X_1 + \beta_2X_2 + \cdots)} \]
### Sensitivity of Fatal and Serious Injury Crashes to Changes in Input Variables

**Key Predictor Variables:**
Posted speed, local roadway mileage, male population

<table>
<thead>
<tr>
<th>Fatal and Serious Injury Crashes (Base Prediction = 1,138)</th>
<th>Primary Road VMT</th>
<th>Posted Speed</th>
<th>Secondary Road Miles</th>
<th>Local Road Miles</th>
<th>Average Number of Lanes</th>
<th>Inters. Den.</th>
<th>Number of Signals</th>
<th>Male Pop. Percent</th>
<th>Non-Retail Emp. Density</th>
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<tr>
<td>Average</td>
<td>4,119</td>
<td>34</td>
<td>0.41</td>
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<td>3</td>
<td>110</td>
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<td>Percent Change in Input Variable and Crash Outcome</td>
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<td>4%</td>
<td>14%</td>
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# How to Use Models

## Long-Range Safety Planning

|  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|
|  | A | B | C | D | E | F | G | H | I | J |
| **1** |  |  |  |  |  |  | **Baseline Crashes (2010-2012)** | **Predicted Crashes (3-yr. period)** | **% Change** | **Change in Cost of Crashes** |
| **2** | Total Crashes |  |  |  |  |  | 29,478 | 29,199 | -0.9% | $ (7,092,380) |
| **3** | Fatal and Serious Injury Crashes |  |  |  |  |  | 1,138 | 1,201 | 5.5% | $ 15,551,186 |
| **4** | Injury Crashes |  |  |  |  |  | 3,925 | 4,077 | 0.6% | $ 14,750,342 |
| **5** | Property Damage Only Crashes |  |  |  |  |  | 24,988 | 24,698 | -1.2% | $ (3,848,940) |
| **6** |  |  |  |  |  |  |  |  |  |  |

## TAZ Details

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<td>Highway V/</td>
<td>Primary Road</td>
<td>Local Road V</td>
<td>Speed (log)</td>
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What MPOs Thought

• Short-range process is familiar – yet cautious to apply

• Long-range process looks valuable
  – Quantitatively consider safety as a prioritization factor
  – Comfortable with the relative comparison
  – Push the tool to influence investments

• Application
  – Less data is easier
  – Simpler tool is easier
Next Steps

This Project

Next Steps