Overview of Systemic Approach to Safety

Example: Fatal Crash Locations

Source: NHTSA (https://cdan.nhtsa.gov/stis.html#)
Example: Major Fatal Crash Types in Washington by FHWA Focus Area

<table>
<thead>
<tr>
<th>Crash Type</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
</tr>
<tr>
<td>Roadway Departure</td>
<td>243</td>
<td>60%</td>
<td>247</td>
<td>62%</td>
</tr>
<tr>
<td>Pedestrian/Bicycle</td>
<td>87</td>
<td>22%</td>
<td>60</td>
<td>15%</td>
</tr>
<tr>
<td>Intersection</td>
<td>98</td>
<td>24%</td>
<td>110</td>
<td>27%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>403</td>
<td></td>
<td>401</td>
<td></td>
</tr>
</tbody>
</table>


Systemic Safety Project Selection

1. Systemic Process
2. Balance Funds
3. Evaluate Effectiveness

FHWA's Systemic Safety Tool

Element 1
Systemic Safety Planning Process

Systemic Safety Planning Process

- Identify Focus Crash Types and Risk Factors
- Screen and Prioritize Candidate Locations
- Select Countermeasures
- Prioritize Projects

Step 1
Step 2
Step 3
Step 4
Systemic Safety Planning Process

• Step 1: Identify...
  – Focus Crash Types
  – Focus Facility Types
  – Risk Factors

What we mean by “focus crash type”

Crash type representing greatest number of severe crashes across roadway system...
... provides greatest potential to reduce fatalities and severe injuries

• Road Departure
• Intersection
• Pedestrian
• Speeding
Task 1: Select Focus Crash Types

- Systemwide analysis
- Strategic Safety Plans
- Regional and jurisdictional analyses
  - May differ from statewide needs

### Fatal and Severe Injury Crashes (2007-2011)

<table>
<thead>
<tr>
<th>Emphasis Area</th>
<th>Statewide 114,592 mi</th>
<th>Percent by Jurisdiction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Fatal/Serious Injury</td>
<td>100% 63,443</td>
<td>100%</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>19% 11,786</td>
<td>19%</td>
</tr>
<tr>
<td>Bicycle</td>
<td>5% 3,390</td>
<td>5%</td>
</tr>
<tr>
<td>Heavy Vehicle</td>
<td>5% 3,123</td>
<td>5%</td>
</tr>
<tr>
<td>Road Departure</td>
<td>26% 16,668</td>
<td>26%</td>
</tr>
<tr>
<td>Intersection</td>
<td>41% 25,791</td>
<td>41%</td>
</tr>
<tr>
<td>Head-on and Sideswipe</td>
<td>5% 3,071</td>
<td>5%</td>
</tr>
</tbody>
</table>
What we mean by “focus facility”
Facility type where focus crash type most frequently occurs
- Rural, Two-Lane Highways
- Urban, Signalized Intersections
- Horizontal Curves
- Rural, Thru-STOP Intersections

Task 2: Select Focus Facilities
5 years, Severe Roadway Departure
State System 4,400 crashes
Rural 2,500 crashes
Urban 1,900 crashes
Undivided 2,100
Divided 875

1 Lane 1
2 Lanes 2,090
3 Lanes 35
4 Lanes 35

< = 25 mph 7
30-35 mph 163
40-50 mph 281
55+ mph 1,637
Unknown 2
What we mean by “risk factor”

Characteristics associated with locations where targeted crash types occur

• Volume
• Alignment
• Intersection Control
• Presence of Shoulders

Potential Risk Factors

Roadway features:

• Lane width
• Shoulder width / type
• Median width / type
• Horizontal curvature
• Pavement condition / friction
• Roadside features
  – Sideslope design
  – Clear zone
• Driveway density
Potential Risk Factors

Intersection features:
- Traffic control
- Turn lanes
- Skew angle
- Sight distance
- Presence of horizontal curve
- Railroad crossing
- Type of development (e.g., commercial)

Potential Risk Factors

Pedestrian-related features:
- Traffic control
- Sidewalk presence
- Crosswalk presence
- Crossing distance
- Adjacent land uses
- Lighting
Potential Risk Factors

Other general features:
• Traffic volume
• Speed
  – Posted, operating

Descriptive Statistics Analysis

Potential Risk Factors for Rural Lane Departure Crashes

Presence of Potential Risk Factor

- Percent of System With Potential Risk Factor
- Percent of Severe Lane Departure Crashes Where Potential Risk Factor is Present
Descriptive Statistics Analysis

Data Sources

- Crash data
  - Law enforcement
  - State or local database
  - FARS
- Roadway data
  - State or local database
  - Video logs
  - Online aerial imagery
  - Windshield surveys
- Exposure data (AADT)
  - State or local database
  - Traffic counts

Where do these data come from in your jurisdiction?
Reasons for Systemic

Systemic Approach to Safety

*Using Risk to Drive Action*

Source: [https://safety.fhwa.dot.gov/systemic/](https://safety.fhwa.dot.gov/systemic/)
**Tool Demo**

### County Roads

<table>
<thead>
<tr>
<th>24 Fatal and Serious Injury, Roadway Departure Crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intersection</strong></td>
</tr>
<tr>
<td>4 (17%)</td>
</tr>
</tbody>
</table>

#### Curve

- **Day**: 1 (12%)
  - Wet: 0 (0%)
  - Dry: 1 (100%)
- **Night**: 7 (88%)
  - Wet: 1 (14%)
  - Dry: 6 (86%)

#### Tangent

- **Day**: 10 (84%)
  - Wet: 2 (20%)
  - Dry: 8 (80%)
- **Night**: 2 (16%)
  - Wet: 0 (0%)
  - Dry: 2 (100%)
### County Roads

**24 Fatal and Serious Injury, Roadway Departure Crashes**

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Non-Intersection</th>
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<tr>
<td>4 (17%)</td>
<td>20 (83%)</td>
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<table>
<thead>
<tr>
<th>Curve</th>
<th>Tangent</th>
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<td>12 (60%)</td>
<td>8 (40%)</td>
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<table>
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<th>Night</th>
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<tr>
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<table>
<thead>
<tr>
<th>Wet</th>
<th>Dry</th>
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<td>2 (20%)</td>
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