GIS-based Statewide Roadway and Area Risk Assessment Tool

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College Station, Texas
Overview

✓ The Concept

✓ The Process
  – Defining a Common Geography
  – Calculating Relative Area Crash Risk Metrics
  – Creating a Composite Ranking

✓ Statewide Area Risk Examples
The Concept

To compare crash risks for a commonly identifiable geography relative to:

- Population Size
- Vehicle-Miles Travel (VMT)
- High & Very High Risk VMT
Commonly Identifiable Geography
Area Risk Relative to Population Size

Fatal & Incapacitating Injuries per 1,000 inhabitants

RAC (Trauma Service Area Code)

K & A Crashes per 1,000 Inhabitants

- 0.00 - 2.32
- 2.33 - 11.22
- 11.23 - 20.13
- 20.14 - 29.03
- 29.04 - 148.15

Range: 0 - 150
Mean: 6.8
Standard Deviation: 8.9

0 25 50 100 Miles
Roadway Risk Assessment

TxDOT RHiNo 2013

102,271 on-system road segments
Crashes Assigned

2010-2014 Crashes Assigned to Roadway Segments
## Traffic Volume Ranges Defined

<table>
<thead>
<tr>
<th>Area Type</th>
<th>Functional Class</th>
<th>Volume Ranges (ADT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td><strong>Urban</strong></td>
<td>Freeways</td>
<td>&lt;75,000</td>
</tr>
<tr>
<td></td>
<td>Arterials</td>
<td>&lt;25,000</td>
</tr>
<tr>
<td></td>
<td>Collectors</td>
<td>&lt;5,000</td>
</tr>
<tr>
<td></td>
<td>Local*</td>
<td>0 – 20,000</td>
</tr>
<tr>
<td><strong>Rural</strong></td>
<td>Freeways</td>
<td>&lt;30,000</td>
</tr>
<tr>
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* Only one volume group.
Traffic Volume Ranges Defined

Crashes per Mile vs. Traffic Volume (ADT) for Rural Freeways

Inflection points where the relationship changes.
Crash Risk Categories Assigned

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Crash Risk Categories Assigned

Cumulative Percent of Segment vs. Crash Rate for Medium Traffic Volume Rural Freeways

- Low
- Moderate
- High
- Very High

Inflection points where the relationship changes.
Roadway Risk Assessment

All 20 combinations of:
- Area Types
- Functional Classes
- Volume Ranges

Statewide Crash Risk Assessment

- Very High
- High
- Moderate
- Low

Independent School District
Area Risk Relative to VMT

Fatal & Incapacitating Injuries per 10,000 VMT

K & A Crashes per 10,000 VMT
- Blue: 0.00 - 0.08
- Light Blue: 0.09 - 0.95
- Yellow: 0.96 - 1.82
- Orange: 1.83 - 2.69
- Red: 2.69 - 9.95

Range: 0 - 9.9
Mean: 1.4
Standard Deviation: 0.87

0 25 50 100 Miles
Area Risk Relative to High & Very High Risk VMT

Percent High & Very High Risk VMT of Total VMT

RAC (Trauma Service Area Code)

Percent High & Very High Crash Risk VMT of All VMT
- 0.00 - 8.50
- 8.51 - 21.37
- 21.38 - 34.24
- 34.25 - 47.11
- 47.12 - 100

Range: 0 - 100
Mean: 15
Standard Deviation: 13

0 25 50 100 Miles
Ranked #1 for Highest Risk
## Composite Ranking

<table>
<thead>
<tr>
<th>KA per 1K Po.</th>
<th>KA per 10K Po.</th>
<th>% High &amp; Very High</th>
<th>Sum of Rankings</th>
<th>Composite Ranking</th>
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<tbody>
<tr>
<td>45</td>
<td>3</td>
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<td>9</td>
<td>99</td>
<td>4</td>
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<tr>
<td>9</td>
<td>1</td>
<td>101</td>
<td>111</td>
<td>5</td>
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<td>51</td>
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<td>7</td>
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<td>8</td>
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<tr>
<td>96</td>
<td>6</td>
<td>122</td>
<td>224</td>
<td>9</td>
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<td>152</td>
<td>10</td>
<td>66</td>
<td>228</td>
<td>10</td>
</tr>
</tbody>
</table>

Ordered Least-to-Greatest

Ranked

- Medina Independent School District
- Three Way Independent School District
- Leveretts Chapel Independent School District
- Hunt Independent School District
- Leakey Independent School District
- Utopia Independent School District
- Lueders-Avoca Independent School District
- Richards Independent School District
- Ramirez Common School District
- Coldspring-Oakhurst Consolidated Independent..
Top 10 ISDs

RAC (Trauma Service Area Code)

ISD Ranking - Top 10
1. Medina Independent School District - RAC P
2. Three Way Independent School District - RAC E
3. Leverett's Chapel Independent School District - RAC G
5. Leakey Independent School District - RAC P
6. Utopia Independent School District - RAC P
7. Lueders-Avoca Independent School District - RAC D
8. Richards Independent School District - RAC N and Q
Roadway Crash Risk Assessment

Statewide Crash Risk Assessment
- Very High
- High
- Moderate
- Low
- (off-system)
Fatal & Incapacitating Injuries