Analysis of Intersection Crashes in the City of San Antonio and State of Texas

Qasim Adegbite, Graduate Student
Hatim Sharif, PhD, PE
Samer Dessouky, PhD, PE, F.ASCE

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The University of Texas at San Antonio™
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Gregory Reininger, Rebecca Pacini, Bianca Thorpe & Trish Wallace
Motivation

• Collaborating effort between UTSA, USDOT University Transportation Center, City of San Antonio and TxDOT

• Outreach to UTSA students regarding Vision Zero initiative

• Raising the public awareness of intersections fatalities and severe-injury crashes in SA and State of Texas
Work Plan

- Perform data analysis and mapping crashes
- Identify risk factors
- Allocate hot-spot Intersections
- Identify and implement counter-measures
- Perform pre- and post-crash analysis
Data Sources (2013-2017)

Texas CRIS and FARS

Traffic data (ADT, VMT, etc.) using Traffic Count Database System (TCDS)
Intersection Hot Spots (2015)

Based on Crash rate

Based on Crash Frequency
### Intersection crashes by collision type

<table>
<thead>
<tr>
<th>Collision</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angle - Both Going Straight</td>
<td>23.5%</td>
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<tr>
<td>Opposite Direction - One Straight-one Left Turn</td>
<td>16.3%</td>
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<tr>
<td>Same Direction - One Straight-one Stopped</td>
<td>15.9%</td>
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<tr>
<td>One Moving Vehicle - Vehicle Going Straight</td>
<td>8.5%</td>
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<tr>
<td>Angle - One Straight-one Left Turn</td>
<td>6.1%</td>
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<tr>
<td>Same Direction - Both Going Straight-rear End</td>
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<tr>
<td>Same Direction - One Straight-one Left Turn</td>
<td>4.4%</td>
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<tr>
<td>Same Direction - Both Going Straight-sideswipe</td>
<td>4.3%</td>
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<tr>
<td>Angle - One Straight-one Right Turn</td>
<td>2.6%</td>
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</tbody>
</table>

**Age and Gender**

- **Female**
- **Male**

**Contribution factors**

- FAILED TO YIELD...
- UNSAFE SPEED
- DISREGARD TURN...
- BACKED WITHOUT...
- TURNED...
- FAILED TO STOP AT...
- FAILED TO YIELD...
- TURNED WHEN...
- FAILED TO...
- DISREGARD STOP...
- DRIVER INATTENTION

**Age Distribution**

- <15
- 15-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65-74
- 75+
Intersection crashes by hour (2013 – 2017)

NO OF CRASHES

HOURLY DISTRIBUTION

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
0 1000 2000 3000 4000 5000 6000 7000

7-8 AM

5 PM

1098 1670 1698 3325 3414 1359 1098 1670 1698 3325 3414

2650 2987 3475 4194 4493 4823 5244 5818 6236 5362

2395 1872 2936 2821 2395 1872 2936 2821 2395 1872
Crash Severity Distribution (2013 and 2017)

No of Crashes

Not Injured: 46541
Possible Injury: 16822
Non-Incapacitating Injury: 6694
Unknown: 2096
Incapacitating Injury: 1447
Killed: 155

Crash Severity
Young and senior drivers (2013-2017)

Collectively they account for:
- 30,429 crashes (12.3% of total crashes)
- 100 fatal crashes (12.8%)
- 576 serious injury (14.4%)
Driving while intoxicated (2013-2017)

- DWI accounts for 6,104 crashes (2.45% of total crashes)
- DWI Accounts for 67 fatal crashes (8.7%) and 273 serious injury crashes (6.8%)

Speeding accounts for 3,193 crashes (1.29%), 83 fatal crashes (10.8%) and 137 serious injury crashes (3.4%)

Lane departure accounts for 18,903 crashes (7.6%), 160 fatal crashes (20.8%) and 451 serious injury crashes (11.2%)
Identify hot-spot intersections using CRIS

<table>
<thead>
<tr>
<th>Int. Type</th>
<th>HWY</th>
<th>Total ADT</th>
<th>Mean ADT</th>
<th>crash rate</th>
<th>crash count</th>
<th>crash rate sever</th>
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Pre- and Post analysis of US 77 and FM 485, Cameron, TX

The intersection was a 2-way stop control on FM 425 only prior to 2013. It was then upgraded to an LED stop signs at FM 425 only and in 2015 it was converted to 4-way LED stop control.
Pre- and Post analysis of FM 665 and FM 70, Alice, TX

The intersection was upgraded after 2011 from 2-way stop control at FM 665 to 4-way stop control
Vision Zero – Raising awareness and spreading the word

Engineering and Evaluation: Crash Data Analysis

Education:
TCI engineers and urban planners gave seminars and talks to UTSA undergraduate (Jr. and Sr.) and graduate students on Vision Zero initiative.
Students Engagement

Engage UG students in case studies to analyze SA intersections and get accustomed to real life traffic and safety problems.
Advanced Research

Exploring rainfall impacts on the crash risk on Texas roadways

57% increase in crashes due to adverse weather conditions (Precipitation)

Investigating the Interaction between Precipitation and Motor Vehicles Crash Risk on Texas Roadways (Application of Big-data)