Traffic Safety 101
An Introduction to Crashes

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Traffic Topics
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Overview

• Tracking Crashes
• Who is involved?
• Where do they happen?

• When do they happen?
• Why they happen?
• What is MnDOT doing?
• Questions
Tracking Crashes

• If your involved…
• Call the Police
• Fill out the Report
• Submit to Dept. of Public Safety
• Crash Database System
Tracking Crashes

- Location
- Date
- Time
- Personal Information
- Injury Severity
- Type of Crash
- Weather
- Contributing Factors
- Event List
- Vehicle Characteristics
- Lighting Condition
- Traffic Control Devices

- Narrative to include additional details
Crash Severity

K R.I.P. Killed:
Fatal Injury: An injury received in a traffic crash that results in death within thirty (30) days of the crash.

A Awful:
Incapacitating Injury - An injury, other than fatal, that prevents walking, driving, or performing other activities that were performed before the crash.

B Bloody:
Nonincapacitating Injury - An injury, other than fatal or incapacitating, that is evident at the scene. Evidence includes known symptoms.

C Complaint:
Possible Injury - Any injury that is not evident at the scene but that is claimed by the individual or suspected by the law enforce.

PD Property Damage:
A crash that involves a motor vehicle in transport on a public traffic-way and results in at least $1,000.00 in property damage.
Tracking Crashes

• Has over 100 fields to collect crash information

• This is for more than insurance…
Tracking Crashes – What do we Know?

• Every year there are over 69,000 reported crashes

• Over 350 fatal crashes ever year (2009-2013)
  – (368-421 fatalities/ year)

• 21,000+ injury crashes each year

• Nearly 1,000 serious injury crashes (1,200 + injuries)
Tracking Crashes – What do we Know?

- FATAL AND SERIOUS INJURY CRASHES

<table>
<thead>
<tr>
<th>Focus Area</th>
<th>Crashes</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane departure</td>
<td>3,225</td>
<td>46%</td>
</tr>
<tr>
<td>Intersection</td>
<td>2,951</td>
<td>42%</td>
</tr>
<tr>
<td>Unbelted occupants</td>
<td>2,572</td>
<td>36%</td>
</tr>
<tr>
<td>Impaired roadway users</td>
<td>1,567</td>
<td>22%</td>
</tr>
<tr>
<td>Younger drivers</td>
<td>1,389</td>
<td>19%</td>
</tr>
<tr>
<td>Inattentive drivers</td>
<td>1,322</td>
<td>19%</td>
</tr>
<tr>
<td>Speed</td>
<td>1,307</td>
<td>18%</td>
</tr>
<tr>
<td>Motorcyclists</td>
<td>1,247</td>
<td>18%</td>
</tr>
<tr>
<td>Older drivers</td>
<td>1,043</td>
<td>15%</td>
</tr>
<tr>
<td>Commercial vehicles</td>
<td>711</td>
<td>10%</td>
</tr>
<tr>
<td>Unlicensed drivers</td>
<td>697</td>
<td>10%</td>
</tr>
<tr>
<td>Pedestrians</td>
<td>664</td>
<td>9%</td>
</tr>
<tr>
<td>Bicyclists</td>
<td>287</td>
<td>4%</td>
</tr>
<tr>
<td>Work zones</td>
<td>105</td>
<td>1%</td>
</tr>
<tr>
<td>Trains</td>
<td>22</td>
<td>Less than 1%</td>
</tr>
</tbody>
</table>
Tracking Crashes – What do we Know?

Fatal Crashes are Different

• Most Common Crash - Rear End PDO at a Signal
  – Clear, Sunny, Mid-Day
• “Typical Fatal Crash” – Run off the Road, Rural
  – Unbelted, Intoxicated, Night-time
Tracking Crashes – What do we Know?

Fatal Crashes are Different

All Crashes

- Rear End: 11%
- Sideswipe Passing: 8%
- Run off the Road- Left Side: 18%
- Right Angle: 9%
- Run off the Road- Right Side: 5%
- Head On: 20%
- Other: 29%

Fatal Crashes

- Rear End: 1%
- Sideswipe Passing: 17%
- Run off the Road- Left Side: 14%
- Right Angle: 20%
- Run off the Road- Right Side: 19%
- Head On: 6%
- Other: 23%
Who is involved?

Crash Causation Factors

- **Roadway** (34%)
  - Road edge dropoffs
  - Intersection design
  - 3%

- **Vehicle** (12%)
  - Tire blowouts
  - Towing trailers
  - Oversize and load distribution
  - 3%

- **Driver** (93%)
  - Not wearing safety belt
  - Using alcohol
  - Driving aggressively
  - 27%

Example—Roadways are the sole contributing factor in 3% of crashes and the roadway and driver interaction is the factor in 27% of crashes.

Source: Human Factors & Highway Safety, Elizabeth Alicandri
Who is involved?

In 2013:

260 Males, and 127 females were killed
- 35 Pedestrians
- 61 Motorcyclists /Mopeds
- 6 Bicyclists

Injuries: 14,356 males and 15,955 females
Who is involved?

2013 Fatalities, by Age Group and Gender

- Age 0-9
- Age 10-19
- Age 20-29
- Age 30-39
- Age 40-49
- Age 50-59
- Age 60-69
- Age > 70

Female
Male
Where do they happen?

Fatal Crashes by System Classification

- TOWNSHIP, 89, 5%
- MUNICIPAL, 165, 9%
- COUNTY, 707, 39%
- INTERSTATE, 120, 7%
- US ROUTES, 283, 16%
- MN ROUTES, 407, 23%
- OTHER, 14, 1%
## Where do they happen?

<table>
<thead>
<tr>
<th>Miles</th>
<th>System %</th>
<th>Traffic %</th>
<th>Fatal Crashes %</th>
</tr>
</thead>
<tbody>
<tr>
<td>913</td>
<td>0.6%</td>
<td>22%</td>
<td>7%</td>
</tr>
<tr>
<td>3,217</td>
<td>2.2%</td>
<td>16%</td>
<td>16%</td>
</tr>
<tr>
<td>7,638</td>
<td>5.3%</td>
<td>20%</td>
<td>23%</td>
</tr>
<tr>
<td>11,768</td>
<td>8.1%</td>
<td>58%</td>
<td>46%</td>
</tr>
</tbody>
</table>
Where do they happen?

- 67% occur in rural areas
- 40% occur at intersections

Reviewing 13,000+ intersections:

Only 14 had more than 1 fatal crash!
Where do they happen?

~ 25% occur on horizontal curves
- 63% occur on two-lane two-way roadways

Reviewing 19,000 curves:
Only 5 had more than 1 fatal crash!
When do they happen?

Fatal Crashes, by Month (2009-2013)

January: 94
February: 103
March: 104
April: 122
May: 165
June: 173
July: 208
August: 175
September: 194
October: 182
November: 146
December: 119
When do they happen?

<table>
<thead>
<tr>
<th>Day of Week</th>
<th>Fatal Crashes (2009-2013)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday</td>
<td>232</td>
</tr>
<tr>
<td>Monday</td>
<td>238</td>
</tr>
<tr>
<td>Tuesday</td>
<td>227</td>
</tr>
<tr>
<td>Wednesday</td>
<td>215</td>
</tr>
<tr>
<td>Thursday</td>
<td>258</td>
</tr>
<tr>
<td>Friday</td>
<td>293</td>
</tr>
<tr>
<td>Saturday</td>
<td>322</td>
</tr>
</tbody>
</table>
When do they happen?

Fatal Crashes, by Time of Day (2009-2013)

- Midnight-3am: 157
- 3am - 6am: 108
- 6am-9am: 227
- 9am - 12pm: 196
- 12pm-3pm: 296
- 3pm-6pm: 343
- 6pm-9pm: 257
- 9pm-Midnight: 201
Crash Causation Factors

**Driver 92%**
- Impairment
- Aggressive
- Inattentive
- Improperly belted
- Unsafe maneuver

**Vehicle 9%**
- Oversized load
- Tire blowouts
- Equipment defects

**Roadway 34%**
- Work zone
- Adverse road surface
- Train crossing
- Fixed objects

Why do they happen?
- Human Behavior is a huge part
  - Distraction/Inattention
- Alcohol
- Seat Belts
- Speeding/Aggressive Driving
- Experience
Why do they happen?

- Roadway Environment
  - Weather
  - Clear Zones
  - Intersections
  - Lighting/Visibility
Why do they happen?

- Vehicles
  - Tire Blowouts
  - Poor vehicle maintenance
  - Heavy Commercial Vehicles
  - Motorcyclists
What is MnDOT doing?

Reactive Projects
- Black Spots
- More Expensive
- Longer planning/design process
What is MnDOT doing?
Reactive Projects
What is MnDOT doing?

Proactive Projects

- Systemic
- Low Cost / High Benefit
- Short implementation
- Deploy across wide area (statewide)
What is MnDOT doing?

Proactive Projects

Rural:

- Rumble Strips
- Intersection Lighting
- Chevrons on Curves
- Enhanced Signing
What is MnDOT doing?
What is MnDOT doing?

Proactive Projects

Urban:

- Road Diets
- Signal Improvements
- Medians
- Pedestrian Countdown timers
What is MnDOT doing?

Road Diet
Before

After
What is MnDOT doing?

Confirmation Lights

Pedestrian Countdown Timers
What is MnDOT doing?

Curb “Bump-outs”

Pedestrian Friendly Streets
What is MnDOT doing?

So why Proactive?

Example:

On Rural Two Lane Highways
(US, MN, CSAH, CR)

325 fatalities in Run off the Road crashes
What is MnDOT doing?

So why Proactive?

These 325 fatalities are spread out

Nearly 50,000 miles of roadway

No Black Spots, Highly Random

0.0012 fatal crashes/year/mile
What is MnDOT doing?

So why Proactive?

Looking at individual segments

  -> Not a huge issue

Looking statewide

  -> HUGE ISSUE!
What is MnDOT doing?

Rumble Strips: $3,000 mile: 20-40% reduction

Chevrons: $3,500/ curve: 25-50% reduction

Intersection Lighting:

$10-15,000/ intersection: 25-40% reduction