Mn/DOT County Road Safety Plans

CTS Annual Research Conference

April 27 & 28, 2010

Howard Preston
Michael Barry
Loren Hill

CH2M HILL, SRF Consulting Group, P.E. Services
Agenda

- Background, Goals & Objectives
- Project Overview
  - Schedule, Participating Counties, Approach
- Safety Emphasis Areas
- Safety Strategies
- Identifying At-Risk Locations
- Examples of Projects
- Next Steps/Comments
- Questions
Minnesota’s Strategic Highway Safety Plan (SHSP)

Highlights

- Minnesota Strategic Highway Safety Plan (SHSP) is a data driven document that addresses the following issues:
  - Comprehensive: Addressed Four Safety F's
  - Systematic: Considered all roads
- Identifies a new safety performance measure: Fatal and life-changing injury crashes
- Documents a new safety goal: 400 or fewer fatalities by 2010
- Identifies a need to focus safety investments on rural areas and on local systems in order to achieve the goal
- Identifies the Critical Emphasis Areas (CEAs) and Critical Strategies
  - Driver behavior based emphasis areas
    - Unbelted vehicle occupants
    - Alcohol related
    - Speeding related
    - Young driver involved
  - Infrastructure-based emphasis areas
    - Intersection
    - Single vehicle road departure
    - Head-on and sideswipe
- Includes both Proactive & Reactive Elements

http://www.dot.state.mn.us/trafficeng/safety/shsp/index.html
Background

![Critical Emphasis Areas Graph]

**Safety Goal**
A 5% Reduction in the Number of Traffic Fatalities

- Estimated: 420
- Goal: 400

4/27-28/2010
# Roadway Segment Crash and Fatality Rates by Jurisdictional Class

<table>
<thead>
<tr>
<th>Roadway Jurisdiction Classification</th>
<th>Miles</th>
<th>Crashes</th>
<th>Fatalities</th>
<th>Crash Rate</th>
<th>Fatality Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate</td>
<td>914</td>
<td>9,689</td>
<td>43</td>
<td>0.8</td>
<td>0.3</td>
</tr>
<tr>
<td>Trunk Highway</td>
<td>10,956</td>
<td>22,583</td>
<td>196</td>
<td>1.1</td>
<td>1.0</td>
</tr>
<tr>
<td>CSAH /County Roads</td>
<td>44,997</td>
<td>22,768</td>
<td>185</td>
<td>1.6</td>
<td>1.3</td>
</tr>
<tr>
<td>City Streets</td>
<td>19,105</td>
<td>21,423</td>
<td>41</td>
<td>2.7</td>
<td>0.5</td>
</tr>
<tr>
<td>Other (Township, etc.)</td>
<td>59,387</td>
<td>2,282</td>
<td>29</td>
<td>1.9</td>
<td>2.4</td>
</tr>
<tr>
<td>State Total</td>
<td>135,359</td>
<td>78,745</td>
<td>494</td>
<td>1.4</td>
<td>0.9</td>
</tr>
</tbody>
</table>

*per million vehicle miles (MMV)*

**per 100 million vehicle miles (100 MMV)**

*Source: Minnesota Motor Vehicle Crash Facts (2006)*

## Highlights

- As a class, interstates had lower crash and fatality rates than conventional roadways. This is likely due to three factors:
  - Interstates only serve a mobility function
  - Interstates tend to have a consistently high standard of design
  - Interstates have very strict control of access
- Of the conventional roadways, Trunk Highways had the lowest crash rate and the second lowest fatality rate.
- City streets had the highest crash rate and a low fatality rate.
- County and township roads had moderately high crash rates and the highest fatality rates.
- This distribution of crashes generally supports the idea that greater numbers of crashes occur in urban areas and greater numbers of fatal crashes occur in rural areas.
- Crash rates and fatality rates by roadway jurisdiction (and for the state as a whole) are interesting, however, there is a great deal of evidence to suggest that crash rates are more a function of roadway design than who owns the road.
County Road Safety Plans

- Sponsored by...
  - Funding provided by the Minnesota Department of Transportation
  - Almost $3.5 million made available to prepare County Safety Plans for 87 counties over three years
# Safety Emphasis Areas—Greater Minnesota vs. Metro

<table>
<thead>
<tr>
<th></th>
<th>Driver Behavior Based Emphasis Areas</th>
<th>Infrastructure Based Emphasis Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Fatalities</td>
<td>Unbelted</td>
</tr>
<tr>
<td>Statewide</td>
<td>3,008</td>
<td>1,271</td>
</tr>
<tr>
<td>Greater Minnesota Districts (2001-2005 Fatalities)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Trunk Highway</td>
<td>1,089</td>
<td>476</td>
</tr>
<tr>
<td>Local Roads</td>
<td>974</td>
<td>492</td>
</tr>
<tr>
<td>Greater/Metro Districts Total</td>
<td>2,063</td>
<td>968</td>
</tr>
<tr>
<td>Metro District (2001-2005 Fatalities)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Trunk Highway</td>
<td>465</td>
<td>162</td>
</tr>
<tr>
<td>Local Roads</td>
<td>480</td>
<td>141</td>
</tr>
<tr>
<td>Metro District Total</td>
<td>945</td>
<td>303</td>
</tr>
</tbody>
</table>

Source: Minnesota Strategic Highway Safety Plan

Represents at least 3% greater than statewide average

### Highlights
- Almost 70% of the fatalities in Minnesota are in the 79 counties outside of the 8 county Minneapolis – St. Paul Metropolitan Area.
- Fatal crashes are split almost evenly between the state and local roadway systems – which results in higher fatality rates on the local system.
- In Urban areas, the primary factors associated with fatal crashes are intersections and speeding.
- In Rural areas, the primary factors associated with fatal crashes are not using safety belts, alcohol, and road departure crashes.
Goal and Objectives

- Development of County Safety Plans
  - Create county crash goal
  - Establish safety emphasis areas
  - High priority safety strategies
  - At-risk locations
  - Safety investment options

- Identify high priority safety projects, both proactive and reactive.

- Position counties to compete for safety funds
  - Highway Safety Improvement Program
  - High Risk Rural Roads Program
  - Minnesota Central Safety Funds

- Foster safety culture among county stakeholders
Schedule of Delivery

- Phase I - October 15, 2009 to mid July 2010
- Phase II - July 2010 to April 2011
- Phase III - April 2011 to January 2012
- Phase IV - January 2012 to September 2012

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>ATP 6 &amp; ATP 3</td>
</tr>
<tr>
<td>Phase 2</td>
<td>ATP 8, ATP 4, &amp; Hennepin County</td>
</tr>
<tr>
<td>Phase 3</td>
<td>ATP 7, ATP 1, Steele &amp; Chisago Counties</td>
</tr>
<tr>
<td>Phase 4</td>
<td>ATP 2 &amp; Ramsey, Scott, Anoka, Washington, Dakota, &amp; Carver Counties</td>
</tr>
</tbody>
</table>

4/27-28/2010
Phase I Participating Counties

**ATP 3**
- Benton – Robert Kozel
- Cass – David Enblom
- Crow Wing – Tim Bray
- Isanti – Richard Heilman
- Kanabec – Gregory Nikodym
- Mille Lacs – Bruce Cochran
- Morrison – Steve Backowski
- Sherburne – Rhonda Lewis
- Stearns – Mitch Anderson
- Todd – Loren Fellbaum
- Wadena – Joel Ulring
- Wright – Wayne Fingalson

**ATP 6**
- Dodge – Guy Kohlnhofer
- Fillmore – John Grindeland
- Freeborn – Sue Miller
- Goodhue – Gregory Isakson
- Houston – Brian Pogodzinski
- Mower – Mike Hanson
- Rice – Dennis Luebbe
- Wabasha – Dietrich Flesch
- Winona – David Kramer

4/27-28/2010
Project Approach – Phase I

Oct 2009

Crash Analysis

Feb 2010

Select Safety Emphasis Areas

Mar 2010

Develop Comprehensive List of Safety Strategies

Mar 2010

Safety Workshop

May 2010

Identify Safety Projects

Apr 2010

Identify Short List of Critical Strategies

July 2010

Safety Plan

Kick-off Video Conference

Review Mtg w/ Counties

- Project Programming
- Project Development
- Implementation
- Evaluation
- Refinement & Update SHSP
## Minnesota’s Safety Emphasis Areas

### Top 10 Emphasis Areas

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>Increasing Seat Belt Usage and Improving Airbag Effectiveness</td>
<td>1,351 fatalities 53% 1</td>
<td></td>
<td>1,271 52% 1</td>
<td></td>
<td>999 50% 1</td>
<td></td>
<td>150 46% 3</td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>Improving the Design and Operation of Highway Intersections</td>
<td>1,013 fatal crashes 36% 3</td>
<td></td>
<td>1,004 33% 3</td>
<td></td>
<td>929 36% 2</td>
<td></td>
<td>166 36% 1</td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>Reducing Impaired Driving</td>
<td>1,020 fatal crashes 36% 2</td>
<td></td>
<td>1,068 36% 2</td>
<td></td>
<td>878 34% 3</td>
<td></td>
<td>163 36% 2</td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>Keeping Vehicles on the Roadway (combined with Minimizing the Consequences of Leaving the Road)</td>
<td>959 fatal crashes 34% 4</td>
<td></td>
<td>965 32% 4</td>
<td></td>
<td>805 31% 4</td>
<td></td>
<td>148 33% 4</td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>Curbing Aggressive Driving</td>
<td>675 fatal crashes 24% 7</td>
<td></td>
<td>850 28% 5</td>
<td></td>
<td>704 27% 5</td>
<td></td>
<td>125 27% 5</td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>Instituting Graduated Licensing for Young Drivers</td>
<td>705 fatal crashes 25% 5</td>
<td></td>
<td>718 24% 6</td>
<td></td>
<td>569 27% 6</td>
<td></td>
<td>81 18% 8</td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>Reducing Head-On and Across-Median Crashes</td>
<td>505 fatal crashes 18% 9</td>
<td></td>
<td>611 20% 7</td>
<td></td>
<td>556 27% 7</td>
<td></td>
<td>101 22% 6</td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>Sustaining Proficiency in Older Drivers</td>
<td>594 fatal crashes 21% 8</td>
<td></td>
<td>533 18% 9</td>
<td></td>
<td>488 19% 8</td>
<td></td>
<td>95 21% 7</td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>Keeping Drivers Alert</td>
<td>681 fatal crashes 24% 6</td>
<td></td>
<td>568 19% 8</td>
<td></td>
<td>431 17% 9</td>
<td></td>
<td>74 16% 10</td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>Making Truck Travel Safer</td>
<td>379 fatal crashes 14% 10</td>
<td></td>
<td>447 15% 10</td>
<td></td>
<td>414 16% 10</td>
<td></td>
<td>80 18% 9</td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>Increasing Driver Safety Awareness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>Improving Information and Decision Support Systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Minnesota Crash Records; not including fatalities due to the I-35W Bridge collapse.
1998-2002: 2,797 fatal crashes; 3,126 fatalities; 2,572 vehicle occupant fatalities
2001-2005: 2,701 fatal crashes; 3,008 fatalities; 2,429 vehicle occupant fatalities
2004-2008: 2,358 fatal crashes; 2,573 fatalities; 1,983 vehicle occupant fatalities

4/27-28/2010
## ATP 3 & ATP 6

<table>
<thead>
<tr>
<th>Emphasis Area</th>
<th>Statewide Percentage</th>
<th>ATP 3</th>
<th>ATP 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Fatal and Serious Injury Crashes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young drivers (under 21)</td>
<td>26%</td>
<td>25% (136)</td>
<td>29% (188)</td>
</tr>
<tr>
<td>Unlicensed drivers</td>
<td>7%</td>
<td>8% (43)</td>
<td>9% (60)</td>
</tr>
<tr>
<td>Older drivers (over 64)</td>
<td>13%</td>
<td>19% (103)</td>
<td>13% (85)</td>
</tr>
<tr>
<td>Aggressive driving and speeding-related</td>
<td>22%</td>
<td>22% (123)</td>
<td>25% (164)</td>
</tr>
<tr>
<td>Drug and alcohol-related</td>
<td>25%</td>
<td>21% (114)</td>
<td>35% (231)</td>
</tr>
<tr>
<td>Inattentive, distracted, asleep drivers</td>
<td>21%</td>
<td>28% (155)</td>
<td>19% (126)</td>
</tr>
<tr>
<td>Safety awareness</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Unbelted vehicle occupants</td>
<td>27%</td>
<td>31% (174)</td>
<td>33% (217)</td>
</tr>
<tr>
<td>Special Users</td>
<td>Peckedians crashes</td>
<td>8%</td>
<td>6% (33)</td>
</tr>
<tr>
<td></td>
<td>Bicycle crashes</td>
<td>4%</td>
<td>1% (6)</td>
</tr>
<tr>
<td>Vehicles</td>
<td>Motorcycles crashes</td>
<td>14%</td>
<td>12% (64)</td>
</tr>
<tr>
<td></td>
<td>Heavy vehicle crashes</td>
<td>9%</td>
<td>13% (71)</td>
</tr>
<tr>
<td></td>
<td>Safety enhancements</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Train-vehicle collisions</td>
<td>0%</td>
<td>0% (0)</td>
</tr>
<tr>
<td>Highways</td>
<td>Road departure crashes</td>
<td>27%</td>
<td>25% (137)</td>
</tr>
<tr>
<td></td>
<td>Consequences of leaving road</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Intersection crashes</td>
<td>43%</td>
<td>42% (230)</td>
</tr>
<tr>
<td></td>
<td>Head-On and Sideswipe (opposite)</td>
<td>15%</td>
<td>18% (101)</td>
</tr>
<tr>
<td></td>
<td>Work zone crashes</td>
<td>1%</td>
<td>2% (11)</td>
</tr>
<tr>
<td>EMS Management</td>
<td>Enhancing Emergency Capabilities</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Information and decision support systems</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>More effective processes</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
### Sample of Critical Emphasis Areas

<table>
<thead>
<tr>
<th>Emphasis Area</th>
<th>Statewide Percentage</th>
<th>Todd County CSAH &amp; CR</th>
<th>Stearns County CSAH &amp; CR</th>
<th>Cass County CSAH &amp; CR</th>
<th>Winona County CSAH &amp; CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Fatal and Serious Injury Crashes</td>
<td>10,172</td>
<td>30</td>
<td>136</td>
<td>44</td>
<td>38</td>
</tr>
<tr>
<td>Drivers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young drivers (under 21)</td>
<td>76%</td>
<td>23% (7)</td>
<td>26% (36)</td>
<td>18% (8)</td>
<td>32% (12)</td>
</tr>
<tr>
<td>Unlicensed drivers</td>
<td>7%</td>
<td>13% (4)</td>
<td>7% (9)</td>
<td>23% (10)</td>
<td>8% (3)</td>
</tr>
<tr>
<td>Older drivers (over 64)</td>
<td>13%</td>
<td>13% (4)</td>
<td>17% (23)</td>
<td>9% (4)</td>
<td>11% (4)</td>
</tr>
<tr>
<td>Aggressive driving and speeding-related</td>
<td>22%</td>
<td>20% (6)</td>
<td>28% (38)</td>
<td>32% (14)</td>
<td>29% (11)</td>
</tr>
<tr>
<td>Drug and alcohol-related</td>
<td>25%</td>
<td>47% (14)</td>
<td>31% (42)</td>
<td>43% (19)</td>
<td>34% (13)</td>
</tr>
<tr>
<td>Inattentive, distracted, asleep drivers</td>
<td>21%</td>
<td>27% (8)</td>
<td>25% (34)</td>
<td>27% (12)</td>
<td>11% (4)</td>
</tr>
<tr>
<td>Safety awareness</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Unbentled vehicle occupants</td>
<td>27%</td>
<td>30% (9)</td>
<td>28% (38)</td>
<td>36% (16)</td>
<td>29% (11)</td>
</tr>
<tr>
<td>Special Users</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pedestrians crashes</td>
<td>8%</td>
<td>0% (0)</td>
<td>5% (7)</td>
<td>9% (4)</td>
<td>0% (0)</td>
</tr>
<tr>
<td>Bicycle crashes</td>
<td>4%</td>
<td>3% (1)</td>
<td>1% (1)</td>
<td>2% (1)</td>
<td>8% (3)</td>
</tr>
<tr>
<td>Vehicles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorcycles crashes</td>
<td>14%</td>
<td>17% (5)</td>
<td>11% (15)</td>
<td>9% (4)</td>
<td>21% (5)</td>
</tr>
<tr>
<td>Heavy vehicle crashes</td>
<td>9%</td>
<td>3% (1)</td>
<td>5% (7)</td>
<td>7% (3)</td>
<td>3% (1)</td>
</tr>
<tr>
<td>Safety enhancements</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Train-vehicle collisions</td>
<td>0%</td>
<td>0% (0)</td>
<td>0% (0)</td>
<td>2% (1)</td>
<td>0% (0)</td>
</tr>
<tr>
<td>Highways</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road departure crashes</td>
<td>27%</td>
<td>40% (12)</td>
<td>40% (55)</td>
<td>45% (20)</td>
<td>39% (15)</td>
</tr>
<tr>
<td>Consequences of leaving road</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Intersection crashes</td>
<td>43%</td>
<td>30% (9)</td>
<td>36% (49)</td>
<td>23% (10)</td>
<td>26% (10)</td>
</tr>
<tr>
<td>Head-On and Sideswipe (opposite)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>crashes</td>
<td>15%</td>
<td>3% (1)</td>
<td>12% (16)</td>
<td>14% (6)</td>
<td>13% (5)</td>
</tr>
<tr>
<td>Work zone crashes</td>
<td>1%</td>
<td>0% (0)</td>
<td>0% (0)</td>
<td>2% (1)</td>
<td>3% (1)</td>
</tr>
<tr>
<td>EMS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enhancing Emergency Capabilities</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information and decision support</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>systems</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>More effective processes</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

DPS Crash Data Records, 2004 to 2008
Top 5 Emphasis Areas by Jurisdiction

Note: Numbers are not additive, as one crash may involve a young driver at an intersection.
Greater Minnesota Crash Data Overview

Source: MnCMAT Crash Data, 2004-2008
Severe is fatal and serious injury crashes (K+A).

5 Year Crashes
165,739
5,770

State System
76,992 – 46%
2,362 – 41%

CSAH/CR
39,073 – 24%
2,242 – 39%

Rural
24,474 – 63%
1,860 – 83%

Urban
14,599 – 37%
382 – 17%

Not Inters-Related
5,271 – 36%
199 – 52%

Unknown/Other
1,880 – 13%
23 – 6%

Inters-Related
7,448 – 51%
160 – 42%

Run Off Road – 1,283 (24%), 74 (37%)
Head On – 361 (7%), 27 (14%)
Rear End – 1,315 (25%), 21 (11%)
Right Angle – 529 (10%), 18 (9%)

Animal
4,407 – 18%
74 – 4%

Not Animal
20,067 – 82%
1,786 – 96%

Inters-Related
5,938 – 30%
535 – 30%

Unknown/Other
12,627 – 63%
1,185 – 66%

Other/Unknown
2,011 – 27%
48 – 30%

Other
2,755 – 47%
248 – 46%

Signalized
249 – 4%
5 – 1%

All Way Stop
245 – 38%
19 – 4%

Thru-Stop
2,735 – 46%
263 – 49%

Run Off Road – 1,047 (38%), 93 (38%)
Right Angle – 297 (11%), 50 (20%)
Head On – 119 (4%), 26 (11%)
Left Turn – 186 (7%), 20 (8%)

Right Angle – 651 (30%), 20 (56%)
Rear End – 753 (34%), 5 (14%)
Left Turn – 361 (17%), 4 (11%)
Head On – 70 (3%), 2 (6%)

Right Angle – 1,359 (48%), 41 (59%)
Head On – 70 (3%), 7 (10%)
Left Turn – 283 (10%), 4 (6%)
Rear End – 368 (13%), 4 (6%)

Head On, SS Opp
821 – 7%
129 – 11%

Run Off Road
8,367 – 66%
790 – 67%

On Curve
284 – 35%
47 – 36%

Right Angle – 968 (35%), 145 (55%)
Run Off Road – 360 (13%), 23 (9%)
Left Turn – 183 (7%), 11 (4%)
Rear End – 287 (11%), 8 (3%)

On Curve
3,550 – 42%
399 – 51%
ATP 3 County Crash Data Overview

Source: MnCMAT Crash Data, 2003-2007
Severe is fatal and serious injury crashes (K+A).

5 Year Crashes ATP 3
43,243
1,659

State System
20,541 – 48%
589 – 36%

CSAH/CR
12,623 – 29%
729 – 44%

Urban
4,994 – 40%
156 – 21%

Rural
7,629 – 60%
573 – 79%

Not Inters-Related
1,810 – 36%
75 – 48%

Unknown/Other
568 – 11%
6 – 4%

Inters-Related
2,616 – 53%
75 – 48%

Run Off Road – 519 (29%), 30 (40%)
Rear End – 392 (22%), 9 (12%)
Head On – 136 (8%), 8 (11%)
Right Angle – 159 (9%), 6 (8%)

Signalized
831 – 32%
15 – 20%

All Way Stop
126 – 5%
1 – 1%

Thru-Stop
853 – 32%
33 – 44%

Other/Unknown
806 – 31%
26 – 35%

Run Off Road – 300 (35%), 30 (45%)
Right Angle – 56 (7%), 5 (7%)
Rear End – 154 (18%), 1 (2%)
Left Turn – 75 (9%), 7 (10%)

Other/Unknown
417 (49%), 21 (64%)
Rear End – 128 (15%), 2 (6%)
Left Turn – 96 (11%), 2 (6%)
Head On – 22 (3%), 4 (12%)

Right Angle – 393 (39%), 59 (60%)
Run Off Road – 121 (12%), 9 (9%)
Left Turn – 91 (9%), 4 (4%)
Rear End – 97 (10%), 2 (2%)

Animal
1,581 – 21%
20 – 3%

Not Animal
6,048 – 79%
553 – 97%

Inters-Related
2,013 – 33%
173 – 31%

Unknown/Other
453 – 8%
359 – 65%

Other/Unknown
806 – 11%
67 – 39%

Thru-Stop
1,002 – 50%
98 – 56%

Head On, SS Opp
248 – 7%
42 – 12%

Run off Road
2,265 – 63%
221 – 62%

On Curve
89 – 36%
19 – 45%

Animal
20 – 3%

Not Animal
6,048 – 97%

Inters-Related
2,013 – 33%
173 – 31%

Unknown/Other
453 – 8%
359 – 65%

Other/Unknown
806 – 11%
67 – 39%

Run off Road
2,265 – 63%
221 – 62%

On Curve
89 – 36%
19 – 45%
ATP 6 County Crash Data Overview

Source: MnCMAT Crash Data, 2003-2007
Severe is fatal and serious injury crashes (K+A).

5 Year Crashes ATP 6
35,890
1,258

State System
16,571 – 46%
481 – 38%

CSAH/CR
7,509 – 21%
493 – 39%

City, Twnshp, Other
11,810 – 33%
284 – 23%

Urban
3,109 – 41%
98 – 20%

Rural
4,400 – 59%
395 – 80%

Not Inters-Related
999 – 32%
52 – 53%

Unknown/Other
495 – 16%
9 – 9%

Inters-Related
1,615 – 52%
37 – 38%

Run Off Road – 235 (24%), 24 (46%)
Rear End – 307 (31%), 5 (10%)
Head On – 57 (6%), 9 (17%)
Right Angle – 98 (10%), 4 (8%)

Signalized
627 – 39%
11 – 30%

All Way Stop
63 – 4%
5 – 13%

Thru-Stop
567 – 35%
15 – 41%

Other/Unknown
358 – 22%
6 – 16%

Right Angle – 221 (35%), 8 (73%)
Rear End – 241 (38%), 2 (18%)
Left Turn – 86 (14%), 0 (0%)
Right Turn – 3 (<1%), 1 (9%)

Run Off Road – 183 (38%), 16 (34%)
Right Angle – 48 (10%), 7 (15%)
Rear End – 66 (14%), 2 (4%)
Left Turn – 37 (8%), 8 (17%)

Other/Unknown
482 – 47%
47 – 49%

Signalized
97 – 9%
2 – 1%

All Way Stop
10 – 1%
1 – 1%

Thru-Stop
446 – 43%
47 – 49%

Right Angle – 285 (50%), 11 (73%)
Rear End – 74 (13%), 2 (13%)
Left Turn – 61 (11%), 0 (0%)

Run Off Road – 55 (12%), 5 (11%)
Rear End – 66 (14%), 2 (4%)
Left Turn – 37 (8%), 8 (17%)

Head On, SS Opp
151 – 6%
28 – 11%

On Curve
59 – 39%
13 – 46%

Run off Road
1,635 – 67%
181 – 68%

Animal
640 – 15%
97 – 25%

Not Animal
3,760 – 85%
383 – 97%

Inters-Related
1,035 – 28%
97 – 25%

Unknown/Other
302 – 8%
26 – 5%

Not Inters-Related
2,423 – 64%
266 – 70%

Right Angle – 221 (35%), 8 (73%)
Rear End – 241 (38%), 2 (18%)
Left Turn – 86 (14%), 0 (0%)
Right Turn – 3 (<1%), 1 (9%)

On Curve
895 – 55%
112 – 62%
ATP 3 County Severe Crash Numbers

Legend
23/yr (117 total) - Severe crashes on any jurisdiction
9/yr (45 total) - Severe crashes on CSAH/CR

MnCMAT Crash Data, 2003-2007
Severe=K+A
ATP 3 County Crash Data Overview

**ATP 3**
- Total Crashes: 43,126
- Severe Crashes: 1,524
- Mileage: 20,253.9
- Rate: 1.07
- Severe Rate: 3.79
- Density: 0.43
- Severe Density: 1.50

**LEGEND**
Severe Crashes = Fatal + A Severity
Rate = Total crashes per Million Vehicle Miles (MVM)
Severe Rate = Severe crashes per 100 MVM
Density = Total crashes per miles per year
Severe Density = Severe crashes per 100 miles per year

**State**
- Total Crashes: 20,243
- Severe Crashes: 554
- Mileage: 1,580.9
- Rate: 0.83
- Severe Rate: 2.28
- Density: 2.56
- Severe Density: 7.01

**County**
- Total Crashes: 12,421
- Severe Crashes: 659
- Mileage: 6,633.3
- Rate: 1.11
- Severe Rate: 5.86
- Density: 0.37
- Severe Density: 1.99

**City**
- Total Crashes: 8,575
- Severe Crashes: 180
- Mileage: 2,746.0
- Rate: 2.34
- Severe Rate: 4.92
- Density: 0.62
- Severe Density: 1.31

**Other**
- Total Crashes: 1,887
- Severe Crashes: 131
- Mileage: 9,293.6
- Rate: 1.99
- Severe Rate: 13.78
- Density: 0.04
- Severe Density: 0.28

**ATP 6**
- Total Crashes: 35,644
- Severe Crashes: 1,182
- Mileage: 13,508.9
- Rate: 1.39
- Severe Rate: 4.62
- Density: 0.53
- Severe Density: 1.75

Source: Mn/DOT TIS, 2004-2008
Rate – MVM, Density – Crashes per Mile per Year
Severe is fatal and serious injury crashes (K+A).
For the past 30 years, most safety programs have been focused on identifying locations with a high frequency or rate of crashes – Black Spots – and then reactively implementing safety improvement strategies.

The result of making Black Spots the highest priority in the safety program was to focus safety investments primarily on urban and suburban signalized intersections – the locations with the highest number of crashes. However, these Black Spot intersections were found to account for fewer than 10% of fatal crashes.

Minnesota counties average approximately 10 severe (fatal+serious injury) crashes per year on their (500 mile) system – there are virtually NO Black Spots on the county system.

Minnesota decided to include counties in the Highway Safety Improvement Program because almost one-half of our fatal crashes occur on the county system of highways – but these 190 crashes are spread across a 45,000 mile system (0.004 fatal crashes per mile). The solution requires a systematic approach.

A new, more systematic based analysis of Minnesota’s crash data combined with the adoption of a goal to reduce fatal crashes has led to a more comprehensive approach to safety programming – a focus on Black Spots in urban areas where there are intersections with high frequencies of crashes and a systems-based approach for rural areas where the total number of severe crashes is high but the actual number of crashes at any given location is very low.
Safety Strategies Overview NCHRP Report 500

- A series of guides to assist state and local agencies in reducing injuries and fatalities in targeted emphasis areas.
- The guides correspond to the emphasis areas outlined in the AASHTO Strategic Highway Safety Plan.
- Each guide includes a brief introduction, a general description of the problem, the strategies/countermeasures to address the problem, and a model implementation process.
Screening - Initial Strategies


The strategies will be screened using:
- Crash data,
- Effectiveness,
- Cost, and
- Input from Safety Workshop.

The Critical Strategies should have the greatest potential to significantly reduce the number of traffic fatalities in Winona County.
Example – Typical Run-Off Road Strategies

Lane Departure Crashes

Key Objectives:
Keep Vehicles in Their Lane

Key Strategies:
- Improved curve delineation
- Improved lane markings

Key Objectives:
Improve Shoulders

Key Strategies:
- Safety edge
- Paved shoulders
- Shoulder rumble strips
Example — Typical Intersection Strategies

Included Strategies:

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Change Intersection Type</th>
<th>Enhanced Signing and Delineation</th>
<th>Improve Sight Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Access X</td>
<td>4</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>Full Access Y</td>
<td>6</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Full Access</td>
<td>6</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Full Access</td>
<td>6</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Street Lighting

Dynamic Warning Signs
Safety Workshop

- Date/Time: March 10\textsuperscript{th}, 8:30AM to 3PM
- Location: Rushford Village Hall
- Agenda
  - 8:30 – Coffee and Registration
  - 9AM - Introductions
  - Background Information/Desired Outcomes
  - Breakout Sessions – Prioritize Strategies
  - 12PM – 1PM - Lunch
  - Report Back/Final Presentation
  - 2:45 – 3PM - Wrap-up
### Strategy Voting Results

#### Priority List of Signalized Intersection Safety Strategies

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Strategies</th>
<th>Voting Results</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.2 A4 — Employ signal coordination along a corridor or route</td>
<td>12</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>17.2 E — Improve driver compliance with traffic control devices</td>
<td>17</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

#### Priority List of Unsignalized Intersection Safety Strategies

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Strategies</th>
<th>Voting Results</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.1 B12 — Restrict or eliminate turning maneuvers by providing channelization or closing median openings</td>
<td>3</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>17.1 B16 — Realign intersection approaches to reduce or eliminate intersection skew</td>
<td>1</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

#### Strategy Receiving Highest Votes
- Install shoulder rumble strips
- Red-Light Enforcement
- Improved signs, markings and street lights

### Priority List of Road Departure Safety Strategies

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Strategies</th>
<th>Voting Results</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.1 A1 — Install shoulder rumble strips</td>
<td>19</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>15.1 A2 — Install edge line &quot;profile marking&quot;, edge line rumble strips or modified shoulder rumble strips on section with narrow or no paved shoulders</td>
<td>11</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>15.1 A3 — Install centerline rumble strips</td>
<td>2</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>15.1 A4 — Provide enhanced shoulder or delineation and marking for sharp curves</td>
<td>3</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>15.1 A6 — Provide enhanced pavement markings</td>
<td>7</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

### Priority List of Seat Belt Usage Safety Strategies

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Strategies</th>
<th>Voting Results</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.1 A — Maximize use of occupant restraints by all vehicle occupant</td>
<td>12</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>8.1 B — Insure that restraints, especially child and infant restraints, are properly used</td>
<td>6</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

### Priority List of Impaired/Aggressive/Young Drivers and Bicyclist Safety

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Strategies</th>
<th>Voting Results</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensuring Safer Bicycle Travel</td>
<td>Increase bicycle helmet usage</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>Prosecute Impaired Driving, Impaired Driving</td>
<td>Support diversion programs to impaired driving offenses</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Public Outreach and Awareness Campaigns</td>
<td>Conduct educational and public information campaigns against aggressive driving</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>Public Outreach and Awareness Campaigns</td>
<td>Develop parent teen driver's education presentations and handbook aimed at educating individuals on the risk of teen driving</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

4/27-28/2010
A Systematic Approach

- The average county in Minnesota includes:
  - 500 miles of county highway
  - 500 horizontal curves
  - 180 controlled intersections

- The key questions:
  - Is every element of the county system equally at risk?
  - Where to Start?
  - A new approach to safety planning

**Old Approach**
Crashes = Risk & No Crashes = No Risk

**New Approach**
No Crashes ≠ No Risk
Use surrogates of crashes (roadway and traffic characteristics) to identify risk and prioritize – the 5 ★ (or 6) Ranking System
ATP - Segments

- 12 counties uploaded to the comprehensive list
  - 4,900 total miles

- Road Departure Crashes
  - 2,643 total, 233 severe

<table>
<thead>
<tr>
<th>ATP</th>
<th>County</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Cass</td>
<td>433</td>
</tr>
<tr>
<td></td>
<td>Isanti</td>
<td>334.15</td>
</tr>
<tr>
<td></td>
<td>Todd</td>
<td>604.61</td>
</tr>
<tr>
<td></td>
<td>Sherburne</td>
<td>343.2</td>
</tr>
<tr>
<td></td>
<td>Kanabec</td>
<td>419.8</td>
</tr>
<tr>
<td></td>
<td>Mille Lacs</td>
<td>394.7</td>
</tr>
<tr>
<td></td>
<td>Crow Wing</td>
<td>550.2</td>
</tr>
<tr>
<td></td>
<td>Stearns</td>
<td>784.6</td>
</tr>
<tr>
<td></td>
<td>Wadena</td>
<td>241.3</td>
</tr>
<tr>
<td>3 Total</td>
<td></td>
<td>4005.56</td>
</tr>
<tr>
<td>6</td>
<td>Dodge</td>
<td>227</td>
</tr>
<tr>
<td></td>
<td>Winona</td>
<td>297.8</td>
</tr>
<tr>
<td></td>
<td>Mower</td>
<td>354.2</td>
</tr>
<tr>
<td>6 Total</td>
<td></td>
<td>879</td>
</tr>
<tr>
<td>Grand Total</td>
<td></td>
<td>4884.56</td>
</tr>
</tbody>
</table>
Edge Risk Assessment

1 – Good Edge, Good Clear Zone

2 – No Edge, Good Clear Zone

3 – No Edge, No Clear Zone
## Winona County Segment Prioritization

**Winona County**

**Rural Segment Prioritization**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Corridor</th>
<th>Route</th>
<th>#</th>
<th>Start</th>
<th>End</th>
<th>Length</th>
<th>ADT Range</th>
<th>RD Density</th>
<th>RD Rate</th>
<th>Curve Critical Radius Density</th>
<th>Edge Risk</th>
<th>Totals</th>
<th>Tiebreakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12.04</td>
<td>CSAH 12</td>
<td>1</td>
<td>CR 101</td>
<td>2.5</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0.32</td>
</tr>
<tr>
<td>2</td>
<td>3.01</td>
<td>CSAH 3</td>
<td>2</td>
<td>US 61</td>
<td>4.3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.23</td>
</tr>
<tr>
<td>3</td>
<td>23.01</td>
<td>CSAH 23</td>
<td>3</td>
<td>US 14</td>
<td>5.2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.21</td>
</tr>
<tr>
<td>4</td>
<td>25.03</td>
<td>CSAH 25</td>
<td>4</td>
<td>US 61</td>
<td>13.2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.18</td>
</tr>
<tr>
<td>5</td>
<td>8.01</td>
<td>CSAH 8</td>
<td>5</td>
<td>CSAH 11</td>
<td>3.8</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.21</td>
</tr>
<tr>
<td>6</td>
<td>20.02</td>
<td>CSAH 20</td>
<td>6</td>
<td>US 14</td>
<td>2.9</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.15</td>
</tr>
<tr>
<td>7</td>
<td>17.01</td>
<td>CSAH 17</td>
<td>7</td>
<td>CSAH 12</td>
<td>2.2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.15</td>
</tr>
<tr>
<td>8</td>
<td>101.01</td>
<td>CR 101</td>
<td>8</td>
<td>Start</td>
<td>1.2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0.33</td>
</tr>
<tr>
<td>9</td>
<td>11.01</td>
<td>CSAH 11</td>
<td>9</td>
<td>CR 103</td>
<td>1.8</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0.11</td>
</tr>
<tr>
<td>10</td>
<td>5.01</td>
<td>CSAH 5</td>
<td>10</td>
<td>CSAH 12</td>
<td>5.7</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.21</td>
</tr>
<tr>
<td>11</td>
<td>30.01</td>
<td>CSAH 30</td>
<td>11</td>
<td>CSAH 31</td>
<td>6.5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.15</td>
</tr>
<tr>
<td>12</td>
<td>19.01</td>
<td>CSAH 19</td>
<td>12</td>
<td>begin pavement</td>
<td>4.1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.15</td>
</tr>
<tr>
<td>13</td>
<td>1.01</td>
<td>CSAH 1</td>
<td>13</td>
<td>CSAH 12</td>
<td>6.9</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.12</td>
</tr>
<tr>
<td>14</td>
<td>43.01</td>
<td>CSAH 43</td>
<td>14</td>
<td>CSAH 6</td>
<td>1.9</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.53</td>
</tr>
<tr>
<td>15</td>
<td>26.01</td>
<td>CSAH 26</td>
<td>15</td>
<td>CSAH 6</td>
<td>4.5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.27</td>
</tr>
<tr>
<td>16</td>
<td>7.01</td>
<td>CSAH 7</td>
<td>16</td>
<td>CSAH 12</td>
<td>4.5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0.09</td>
</tr>
<tr>
<td>17</td>
<td>17.02</td>
<td>CSAH 17</td>
<td>17</td>
<td>CSAH 12</td>
<td>6.0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.43</td>
</tr>
<tr>
<td>18</td>
<td>105.01</td>
<td>CR 105</td>
<td>18</td>
<td>Start Paved</td>
<td>2.3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.17</td>
</tr>
<tr>
<td>19</td>
<td>25.01</td>
<td>CSAH 25</td>
<td>19</td>
<td>CSAH 12</td>
<td>9.3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.11</td>
</tr>
<tr>
<td>20</td>
<td>15.02</td>
<td>CSAH 15</td>
<td>20</td>
<td>CSAH 17 in Witoka</td>
<td>8.0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.08</td>
</tr>
<tr>
<td>21</td>
<td>21.01</td>
<td>CSAH 21</td>
<td>21</td>
<td>MN 43</td>
<td>5.5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.47</td>
</tr>
<tr>
<td>22</td>
<td>12.02</td>
<td>CSAH 12</td>
<td>22</td>
<td>MN 43</td>
<td>4.3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.37</td>
</tr>
<tr>
<td>23</td>
<td>29.01</td>
<td>CSAH 29</td>
<td>23</td>
<td>CSAH 6</td>
<td>5.2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.12</td>
</tr>
<tr>
<td>24</td>
<td>7.02</td>
<td>CSAH 7</td>
<td>24</td>
<td>Pickwick</td>
<td>2.0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0.20</td>
</tr>
<tr>
<td>25</td>
<td>9.01</td>
<td>CSAH 9</td>
<td>25</td>
<td>Cedar Church Rd</td>
<td>5.8</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0.03</td>
</tr>
<tr>
<td>26</td>
<td>16.01</td>
<td>CSAH 16</td>
<td>26</td>
<td>Houston Co Line South</td>
<td>5.3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.11</td>
</tr>
<tr>
<td>27</td>
<td>114.01</td>
<td>CR 114</td>
<td>27</td>
<td>CSAH 25</td>
<td>7.4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.08</td>
</tr>
</tbody>
</table>

- Is Winona County’s entire system at-risk?
  - No – about 1/3 of their system
Cass County Segments

- CSAH 7 segment Project Form
## Cass County Segments

<table>
<thead>
<tr>
<th>Segments</th>
<th>Length</th>
<th>Paving Length</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>7 46.0 miles</td>
<td>-</td>
<td>$138,000</td>
</tr>
<tr>
<td>Year 2</td>
<td>3 15.9 miles</td>
<td>3.4 miles</td>
<td>$172,020</td>
</tr>
<tr>
<td>Year 3</td>
<td>3 15.8 miles</td>
<td>1.6 miles</td>
<td>$106,600</td>
</tr>
<tr>
<td>Total</td>
<td>13 77.7 miles</td>
<td></td>
<td>$416,620</td>
</tr>
</tbody>
</table>

### Project Summary
- **Total 13 Projects – $416,620**
  - Rumble Strip/StripE – 11 segments
  - Split -- Rumble Strip/StripE and 2’ Shoulder Pave/RS/Safety Wedge – 2 segments
ATP Curves

- 11 counties uploaded to the comprehensive list
  - 3,207 total curves
  - 2609 (81%) curves with no crashes
- Crashes
  - 881 total, 94 severe crashes
  - 2 curves with multiple fatal crashes (5 years)
  - 0.05 crashes/curve/year
  - 0.006 severe crashes/curve/year

<table>
<thead>
<tr>
<th>ATP</th>
<th>County</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Cass</td>
<td>583</td>
</tr>
<tr>
<td></td>
<td>Isanti</td>
<td>287</td>
</tr>
<tr>
<td></td>
<td>Sherburne</td>
<td>227</td>
</tr>
<tr>
<td></td>
<td>Todd</td>
<td>357</td>
</tr>
<tr>
<td></td>
<td>Mille Lacs</td>
<td>233</td>
</tr>
<tr>
<td></td>
<td>Kanabec</td>
<td>115</td>
</tr>
<tr>
<td></td>
<td>Stearns</td>
<td>303</td>
</tr>
<tr>
<td></td>
<td>Wadena</td>
<td>103</td>
</tr>
<tr>
<td></td>
<td>3 Total</td>
<td>2508</td>
</tr>
<tr>
<td>6</td>
<td>Dodge</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>Winona</td>
<td>503</td>
</tr>
<tr>
<td></td>
<td>Mower</td>
<td>106</td>
</tr>
<tr>
<td></td>
<td>6 Total</td>
<td>699</td>
</tr>
<tr>
<td></td>
<td>Grand Total</td>
<td>3207</td>
</tr>
</tbody>
</table>
Horizontal Curves

Highlights

- A number of previously published research reports have identified horizontal curves as at-risk elements of rural road systems, however, the degree of risk was not quantified.
- A recent report prepared by the Texas Transportation Institute (FHWA/ TX-07/0-5439-1) related actual crash rates on rural roads to the radius of curvature. The results of this research indicates that the crash rate on curves with radii greater than 2,500 feet is approximately equal to the crash rate on tangent sections.
- On curves with radii of 1,000 feet, the crash rate is twice the rate on tangents and curves; curves with radii of 500 feet have crash rates eight times higher than on tangents.
- A number of safety studies that were focused on local, rural systems in Minnesota have found road departure crashes are overrepresented on horizontal curves - 40 to 50% of the road departure crashes in the selected counties occurred on curves, and curves made up less than 10% of the county's system.
- The same studies also documented that over 60% of the horizontal curves on the county system have radii less than 1,000 feet - from a system perspective, these curves are more at risk.

Source: Texas Transportation Institute (FHWA/ TX-07/0-5439-1)
Roadside Safety Strategies (3 of 6)
Curve-Related Roadway Departure

- Approximately 50% to 60% of roadway departure crashes are curve related
- Are all curves equally at-risk?
  - No

- Ranked based on Checkmark system
  - 5 ★ System:
    - ADT Range
    - Radius Range
    - Severe Crash on curve
    - Intersection on curve
    - Visual Trap on curve

Approximately 50% to 60% of roadway departure crashes are curve related.
## Curve-Related Roadway Departure

### Summary of the high priority curves prioritization includes:
- 23 curves received 3, 4 or 5 stars (240 total)
  - 1 received 5 ★s
  - 6 received 4 ★s
  - 16 received 3 ★s
- 10% of all curves
- 18 different corridor segments across the county

<table>
<thead>
<tr>
<th>Corridor</th>
<th>Segment</th>
<th>Description</th>
<th>Curve</th>
<th>Corridor Weighted ADT</th>
<th>K</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>PDO</th>
<th>Severe RoR K</th>
<th>A</th>
<th>Radius</th>
<th>Length Curve</th>
<th>Intersection on Curve</th>
<th>Chevrons</th>
<th>Visual Trap</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>CSAH 3</td>
<td>Mower Co - CSAH 6</td>
<td>1</td>
<td>295</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>800</td>
<td>1,250</td>
<td>Yes</td>
<td>xx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>CSAH 4</td>
<td>CSAH 5 - CSAH 22</td>
<td>6</td>
<td>3,075</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1,150</td>
<td>1,875</td>
<td>Yes</td>
<td>xx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>CSAH 8</td>
<td>CSAH 6 - CSAH 35</td>
<td>3</td>
<td>1,150</td>
<td>None</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1,150</td>
<td>1,050</td>
<td>Yes</td>
<td>Yes</td>
<td>xxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>CSAH 11</td>
<td>CSAH 36 - CSAH 2</td>
<td>2</td>
<td>1,500</td>
<td>None</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>900</td>
<td>725</td>
<td>Yes</td>
<td>Yes</td>
<td>xxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>CSAH 2</td>
<td>36th Ave NE - TH 42</td>
<td>4</td>
<td>3,200</td>
<td>None</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1,050</td>
<td>1,500</td>
<td>Yes</td>
<td>Yes</td>
<td>xxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>CR 133</td>
<td>55th St NW - CSAH 14</td>
<td>6</td>
<td>1,600</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>800</td>
<td>1,100</td>
<td>Yes</td>
<td>xxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>CSAH 3</td>
<td>CSAH 14 - CSAH 13</td>
<td>9</td>
<td>1,200</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>800</td>
<td>500</td>
<td>Yes</td>
<td>xxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>CSAH 12</td>
<td>US 52 - US 63</td>
<td>2</td>
<td>3,650</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1,000</td>
<td>725</td>
<td>Yes</td>
<td>xxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>CSAH 5</td>
<td>Byron City Limits - Dodge Co (CSA 17)</td>
<td>5</td>
<td>2,150</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1,100</td>
<td>1,025</td>
<td>Yes</td>
<td>xxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>CSAH 34</td>
<td>US 14 - CSAH 3</td>
<td>3</td>
<td>2,100</td>
<td>None</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1,150</td>
<td>325</td>
<td>Yes</td>
<td>Yes</td>
<td>xxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>CSAH 3</td>
<td>CSAH 6 - CSAH 4</td>
<td>5</td>
<td>1,000</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>850</td>
<td>1,350</td>
<td>Yes</td>
<td>xxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>CSAH 6</td>
<td>CSAH 3 - US 63</td>
<td>6</td>
<td>1,150</td>
<td>None</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>850</td>
<td>1,250</td>
<td>Yes</td>
<td>Yes</td>
<td>xxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>CSAH 10</td>
<td>Chatfield City Limits - I-90</td>
<td>4</td>
<td>450</td>
<td>None</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>800</td>
<td>1,250</td>
<td>Yes</td>
<td>Yes</td>
<td>xxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>63</td>
<td>CSAH 25</td>
<td>CSAH 3 - CSAH 22</td>
<td>1</td>
<td>1,900</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1,050</td>
<td>975</td>
<td>Yes</td>
<td>xxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>64</td>
<td>CSAH 23</td>
<td>CSAH 19 - TH 42</td>
<td>4</td>
<td>295</td>
<td>None</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>800</td>
<td>1,250</td>
<td>Yes</td>
<td>Yes</td>
<td>xxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>CR 143</td>
<td>CSAH 11 - CSAH 19</td>
<td>3</td>
<td>350</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1,000</td>
<td>375</td>
<td>Yes</td>
<td>xxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>71</td>
<td>CSAH 16</td>
<td>CSAH 1 - US 52</td>
<td>3</td>
<td>400</td>
<td>None</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>850</td>
<td>1,275</td>
<td>Yes</td>
<td>Yes</td>
<td>xxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75</td>
<td>CSAH 18</td>
<td>CSAH 12 - Wabasha Co</td>
<td>4</td>
<td>1,200</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1,300</td>
<td>600</td>
<td>Yes</td>
<td>xxx</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4/27-28/2010
Cass County Curves

• Project Summary
  - Total 168 Projects – $554,400
    • Year 1 – 70 high priority curves - $231,000
    • Year 2 – 49 proximity curves - $161,700
    • Year 3 – 49 proximity curves - $161,700
  • Chevrons – 168 priority curves/568 curves
ATP - Intersections

- 14 counties uploaded to the comprehensive list
- 2,595 total intersections
  - Multiple Severe Crashes: 40
  - Multiple Fatal Crashes (2 in 5 years): 6
- 7,360 total crashes
- 310 severe crashes
- 0.56 crashes/intersection/year
- 0.02 severe/intersection/year

<table>
<thead>
<tr>
<th>ATP</th>
<th>County</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Cass</td>
<td>225</td>
</tr>
<tr>
<td></td>
<td>Crow Wing</td>
<td>190</td>
</tr>
<tr>
<td></td>
<td>Isanti</td>
<td>179</td>
</tr>
<tr>
<td></td>
<td>Kanabec</td>
<td>206</td>
</tr>
<tr>
<td></td>
<td>Mille Lacs</td>
<td>186</td>
</tr>
<tr>
<td></td>
<td>Stearns</td>
<td>388</td>
</tr>
<tr>
<td></td>
<td>Todd</td>
<td>210</td>
</tr>
<tr>
<td></td>
<td>Wadena</td>
<td>138</td>
</tr>
<tr>
<td>3 Total</td>
<td></td>
<td>1722</td>
</tr>
</tbody>
</table>

| 6   | Dodge      | 135   |
|     | Freeborn   | 254   |
|     | Goodhue    | 145   |
|     | Houston    | 67    |
|     | Mower      | 160   |
|     | Winona     | 112   |
| 6 Total |           | 873   |
| Grand Total |     | 2595  |
# Rating System

<table>
<thead>
<tr>
<th>County Highway Intersections</th>
<th>Geometry</th>
<th>Volume</th>
<th>Proximity</th>
<th>Commercial Development</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Skew</td>
<td>On/Near Curve</td>
<td>ADT Ratio</td>
<td>previous STOP sign</td>
</tr>
<tr>
<td>Intersection 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Intersection 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Intersection 3</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Intersection 4</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Intersection 5</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Intersection 6</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Intersection 7</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Intersection 8</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

4/27-28/2010
# Application of Proactive Methodology

## Winona County
### Rural Intersection Prioritization

<table>
<thead>
<tr>
<th>Rank</th>
<th>Int #</th>
<th>Sys</th>
<th>#</th>
<th>Intersection Description</th>
<th>Skew</th>
<th>On/Near Curve</th>
<th>Development</th>
<th>RR Xing</th>
<th>Previous STOP (&gt;5mi)</th>
<th>Total Crashes</th>
<th>Ratio (Min/Maj)</th>
<th>Priority</th>
<th>Crash Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12.06</td>
<td>CSAH</td>
<td>12</td>
<td>MNTH-76 RT</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
<td>$ 91,000</td>
</tr>
<tr>
<td>2</td>
<td>29.01</td>
<td>CSAH</td>
<td>29</td>
<td>CR-109 RT, CSAH-29 TURNS LT</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
<td>$ 182,000</td>
</tr>
<tr>
<td>3</td>
<td>21.01</td>
<td>CSAH</td>
<td>21</td>
<td>MNTH-43 X-ING, T-130 BHD</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
<td>$ 175,000</td>
</tr>
<tr>
<td>4</td>
<td>5.01</td>
<td>CSAH</td>
<td>5</td>
<td>CSAH-8 LT</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>5</td>
<td>11.03</td>
<td>CSAH</td>
<td>11</td>
<td>CSAH-12 X-ING</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
<td>$ 12,000</td>
</tr>
<tr>
<td>6</td>
<td>12.07</td>
<td>CSAH</td>
<td>12</td>
<td>CR-104 RT</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>7</td>
<td>39.02</td>
<td>CSAH</td>
<td>39</td>
<td>CR-119 AHD, CSAH-39 TURNS LT</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
<td>$ 836,000</td>
</tr>
<tr>
<td>8</td>
<td>6.04</td>
<td>CSAH</td>
<td>6</td>
<td>CSAH-33 X-ING ENTER FREMOFT</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
<td>$ 503,000</td>
</tr>
<tr>
<td>9</td>
<td>21.02</td>
<td>CSAH</td>
<td>21</td>
<td>CSAH-44 RT</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>10</td>
<td>12.03</td>
<td>CSAH</td>
<td>12</td>
<td>MNTH-43 X-ING</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>11</td>
<td>39.03</td>
<td>CSAH</td>
<td>39</td>
<td>MNTH-74 X-ING (NORTH)</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>12</td>
<td>20.01</td>
<td>CSAH</td>
<td>20</td>
<td>CSAH-27 LT &amp; BHD T-560 RT</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>13</td>
<td>6.01</td>
<td>CSAH</td>
<td>6</td>
<td>MNTH-74 X-ING</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>14</td>
<td>30.02</td>
<td>CSAH</td>
<td>30</td>
<td>CSAH-31 X-ING</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>15</td>
<td>120.02</td>
<td>CNTY</td>
<td>120</td>
<td>USTH-14 X-ING, T-322 AHD east</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>16</td>
<td>6.03</td>
<td>CSAH</td>
<td>6</td>
<td>CSAH-35 LT CR-113 RT</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>17</td>
<td>25.01</td>
<td>CSAH</td>
<td>25</td>
<td>CR-102 RT</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>18</td>
<td>25.03</td>
<td>CSAH</td>
<td>25</td>
<td>CR-106 AHD, CSAH-25 CURVES</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>19</td>
<td>1.01</td>
<td>CSAH</td>
<td>1</td>
<td>CSAH-12 X-ING</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>20</td>
<td>6.05</td>
<td>CSAH</td>
<td>6</td>
<td>T-549 LT CSAH-29 RT &amp; AHD</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>21</td>
<td>7.01</td>
<td>CSAH</td>
<td>7</td>
<td>CSAH-12 X-ING</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>22</td>
<td>30.01</td>
<td>CSAH</td>
<td>30</td>
<td>MNTH-74 X-ING</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>23</td>
<td>6.02</td>
<td>CSAH</td>
<td>6</td>
<td>CSAH-43 RT</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>24</td>
<td>12.05</td>
<td>CSAH</td>
<td>12</td>
<td>CSAH-17 RT</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>25</td>
<td>39.01</td>
<td>CSAH</td>
<td>39</td>
<td>MNTH-74 X-ING, T-100 BHD (SOI)</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
<tr>
<td>26</td>
<td>12.01</td>
<td>CSAH</td>
<td>12</td>
<td>CSAH-25 LT &amp; BHD</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>!*****</td>
</tr>
</tbody>
</table>

4/27-28/2010
Winona County Intersections

- No. Rural Thru-Stop Intersections: 71
- Prioritization:
  - CH/TH – 7
  - CH/CH – 13
  - CH/Other – 2

<table>
<thead>
<tr>
<th>#</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>5</td>
<td>7%</td>
</tr>
<tr>
<td>16</td>
<td>23%</td>
</tr>
<tr>
<td>27</td>
<td>38%</td>
</tr>
<tr>
<td>18</td>
<td>25%</td>
</tr>
<tr>
<td>4</td>
<td>6%</td>
</tr>
<tr>
<td>71</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Considered for projects*
Winona County Intersections

- Project Summary
  - Total $556,100
    - Year 1 - 8 intersections - $137,100
    - Year 2 - 7 intersections - $288,500
    - Year 3 - 7 intersections - $130,500

  - Signs and Markings – 22 intersections
  - Street Lights – 19 intersections
  - Directional Median – 1 intersection
Next Steps

- Phase I
  - May - Identify Safety Projects in each county
  - July – Deliver Safety Plans

- Phase II
  - July 2010 thru April 2011

- Phase III
  - April 2011 thru January 2012

- Phase IV
  - January 2012 thru September 2012