4-LANE TO 3-LANE CONVERSIONS

PRESENTED TO IOWA DOT TRAFFIC SAFETY FORUM
OCTOBER 13, 2005
BY THOMAS B. STOUT, P.E.
OVERVIEW OF PRESENTATION

- Recapitulation of basic study
- Comparison of crash types
- Older/younger drivers
- Driveway density
- Single-vehicle
RECAPITULATION

- 14 sites, converted since 1993
- Studied and results for 11
RECAPITULATION

- Base study results
  - 21% reduction in crashes
  - 50% reduction in crash rate
  - 27% reduction in injury crashes
RECAPITULATION

• When to suggest a conversion
  – ADT < 20,000
  – History of left-turn related crashes
  – Significant driveway density
  – Large turning volumes
TYPES OF ANALYSES

- Traditional before and after
- Yoked pairs (comparison sites)
- Site vs. City traffic
## CRASH TYPE SUMMARY

<table>
<thead>
<tr>
<th>CITY</th>
<th>Head-On</th>
<th>Rear-End</th>
<th>Angle/Left-turn</th>
<th>Broadside</th>
<th>Sideswipe-same</th>
<th>Sideswipe - opposing</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue Grass</td>
<td>25</td>
<td>-48</td>
<td>-100</td>
<td>-50</td>
<td>-72</td>
<td>-92</td>
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<td>Des Moines</td>
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<td>10</td>
<td>-84</td>
<td>6</td>
<td>88</td>
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<td>-61</td>
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<td>Glenwood</td>
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<td>-29</td>
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<td>-35</td>
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<td>Indianola</td>
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<td>20</td>
<td>-51</td>
<td>2</td>
<td>43</td>
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<tr>
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<tr>
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<td>88</td>
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<td>-100</td>
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<tr>
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<td>25</td>
<td>-96</td>
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<td>-58</td>
<td>67</td>
<td>-100</td>
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<td></td>
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<tr>
<td>Storm Lake</td>
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<td>-60</td>
<td>-70</td>
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<tr>
<td><strong>Average</strong></td>
<td>-45</td>
<td>-29</td>
<td>-74</td>
<td>-41</td>
<td>-45</td>
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<td>-83</td>
</tr>
</tbody>
</table>
OLDER DRIVER ANALYSIS

- Age 65 and older – average of 7.4 before, 3.0 after
- Age 75 and older – average of 3.5 before, 1.6 after
YOUNGER DRIVER ANALYSIS

• Age 25 and younger – average of 30.0 before, 14.3 after
IMPACT OF DRIVEWAY DENSITY

**DRIVEWAY DENSITY VS. CHANGE IN CRASH RATE**

The relationship between driveway density and change in crash rate can be described by the equation:

\[ y = -2.0136 \ln(x) + 3.1374 \]

The coefficient of determination, \( R^2 \), for this relationship is 0.3908, indicating that 39.08% of the variation in change in crash rate can be explained by changes in driveway density. The graph illustrates this relationship with data points and a fitted line.
SINGLE VEHICLE CRASHES

- Single vehicle run-off-road crashes (small numbers in both categories)
- About 77% reduction (7.0 annual before, 1.6 after)
CONCLUSIONS

- Overall crash reduction of 21%
- Improved crash rate (27-28% reduction)
- Reduced injury numbers
- Improvements for older and younger drivers
- Driveway density a predictor of success