Overview

Background

Measuring gateway treatment effectiveness

Findings

Conclusion
Scale of the problem

- Speed has been identified as a major factor in the occurrence and severity of road crashes, particularly on high speed rural roads.
- Crucial to rural speed management is the point between high speed rural roads and built-up areas (transition zone) as it is generally associated with inadvertent speeding.
- Speed reduction methods within the transition zone include advanced warning, buffer zones, rural-urban thresholds or gateways and vehicle activated devices.
Background: what is a gateway treatment

- Gateways were identified as a possible speed management measure at transition zones in an Austroads research on effective speed management measures for rural roads (Austroads ST1426).
- They are used to clearly define a change in the road use or function and bring about a change in driver behaviour.
- Treatments include the use of lighting, signage, lane narrowings, surface markings, median treatments and vegetation.
Background: sign only gateways

Masterton gateway photo courtesy of Gary Veith, ARRB Group
Background: pinch point gateways
Background: Why gateway treatments?

• Need for a comprehensive evaluation on gateway effectiveness in Australia or New Zealand.
• Evaluation was a collaborative effort with New Zealand Transport Agency.
• Study was aimed at:
  – Measuring the overall effect of gateways on crashes
  – Checking if the effectiveness differed for the sign only and pinch point gateways
  – Measuring differences in effectiveness by gateway layout and features
• Study was designed as a non-equivalent retrospective quasi-experiment.
Measuring gateway treatment effectiveness

**Step 1**
Identifying comparison sites and verifying treatment sites

**Step 2**
Crash data

**Step 3**
Analysis process

**Step 4**
Statistical analysis and effectiveness measures
Results presentation

Crash reduction factor (CRF):
CRFs represent the expected percentage reduction in crashes after implementing safety countermeasures. Negative CRFs indicate net increases while positive ones indicate net reductions in crashes.

Crash modification factor (CMF):
CMFs show the relative change in crash frequencies due to safety countermeasure implementation. A CMF above 1 indicates a net increase in crashes while below 1 indicates a reduction.
### Findings: overall results

<table>
<thead>
<tr>
<th>Severity</th>
<th>CRF</th>
<th>CMF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatal and serious</td>
<td>23%</td>
<td>0.77</td>
</tr>
<tr>
<td>Fatal</td>
<td>-79%</td>
<td>1.79</td>
</tr>
<tr>
<td>Serious</td>
<td>32%</td>
<td>0.68</td>
</tr>
<tr>
<td>Minor</td>
<td>27%</td>
<td>0.73</td>
</tr>
<tr>
<td>Overall</td>
<td>26%</td>
<td>0.74</td>
</tr>
</tbody>
</table>

All results in **bold** are statistically significant
# Findings: by gateway type

<table>
<thead>
<tr>
<th>Gateway type</th>
<th>Severity</th>
<th>CRF</th>
<th>CMF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sign only</td>
<td>Fatal</td>
<td>-35%</td>
<td>1.35</td>
</tr>
<tr>
<td></td>
<td>Serious</td>
<td>-66%</td>
<td>1.66</td>
</tr>
<tr>
<td></td>
<td>Minor</td>
<td>9%</td>
<td>0.91</td>
</tr>
<tr>
<td></td>
<td>Fatal and serious</td>
<td>-16%</td>
<td>1.16</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>-3%</td>
<td>1.03</td>
</tr>
<tr>
<td>Pinch point</td>
<td>Fatal</td>
<td>-106%</td>
<td>2.06</td>
</tr>
<tr>
<td></td>
<td>Serious</td>
<td>51%</td>
<td>0.49</td>
</tr>
<tr>
<td></td>
<td>Minor</td>
<td>33%</td>
<td>0.67</td>
</tr>
<tr>
<td></td>
<td>Fatal and serious</td>
<td>41%</td>
<td>0.59</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>35%</td>
<td>0.65</td>
</tr>
</tbody>
</table>

All results in **bold** are statistically significant
Findings: Pinch point gateway features

Flush median and solid island CRF 38%; CMF 0.62

Flush median and hatched edges CRF 28%; CMF 0.72

Results are statistically significant
Findings: speed zone and gateway type

Sign only:
100-70 km/h transition
• CRF -12%; CMF 1.12
100-50 km/h transition
• CRF -1%; CMF 1.01

Pinch point gateway:
100-70 km/h transition
• CRF 53%; CMF 0.47
100-50 km/h transition
• CRF 2%; CMF 0.98

All results in **bold** are statistically significant
Findings: by gateway and crash type

- Main interest from this sub-analysis were pedestrian and speed-related movements

<table>
<thead>
<tr>
<th>Gateway Type</th>
<th>Head-on Crashes</th>
<th>Run-off-road Crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sign only gateway</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head-on crashes</td>
<td><strong>CRF: 62%</strong></td>
<td><strong>CRF: 46%</strong></td>
</tr>
<tr>
<td>CMF: 0.38</td>
<td>CMF: 0.54</td>
<td></td>
</tr>
<tr>
<td><strong>Pinch point gateway</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Run-off-road rashes</td>
<td><strong>CRF: 4%</strong></td>
<td><strong>CRF: 72%</strong></td>
</tr>
<tr>
<td>CMF: 0.96</td>
<td>CMF: 0.28</td>
<td></td>
</tr>
</tbody>
</table>

All results in **bold** are statistically significant.
Conclusion

• Gateways are effective in lowering crashes (26% net reduction)
• Pinch point more effective than sign only gateways (35% net crash reduction)
• Pinch point effectiveness varies by gateway features
• Pinch point gateways are effective in lowering crashes, particularly pedestrian related crashes at 100-70 km/h transition zones.
Questions?

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