Feasibility of Implementing International "Pedestrian Crosswalk" Laws in New Zealand

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Presentation Outline

- Road rules in New Zealand and overseas
- Research Objectives
- Crash data analysis
- Perception survey
- Delay modelling
- Conclusions
- Recommendations
New Zealand’s Pedestrian Crosswalk Laws

- In New Zealand drivers only have to give way to pedestrians at
  - Signalised pedestrian crossings
  - Zebra crossings
  - Driveways
  - Shared space zones

- But NOT unsignalised intersections
Overseas Pedestrian Crosswalk Laws

- “Vehicles do not have an automatic right of way on the road”
  - Ireland Road Safety Authority, 2013

- “… a driver must slow down when approaching an intersection and be prepared to come to a complete stop if a vehicle or pedestrian with right-of-way is approaching from another direction.”
  - Indiana Bureau of Motor Vehicles, 2013
US: Three Legal Crosswalks
Research Objectives

- Identify the effects different laws have on pedestrian **behaviour and safety**
- Determine the public’s **preferences and understanding** of law change options
- Determine the effects of rule changes on both pedestrian & motorist **delays**
- Consider the **practical aspects** of introducing a law change in New Zealand
Movements Involved in Pedestrian Crashes

- CAS Data: Jan ‘09 – Jul ‘14 (>1750 crashes)

- Overseas ped’n crash data not as detailed
Understanding of the Current Road Rules

- Online Survey (sample size = 876)
Willingness to Give Way to Pedestrians

- Yes
- Yes, with markings
- No
Potential Crosswalk Markings

- “Ladder” style most popular
Overall Willingness to Give Way to Pedestrians

- Yes
- Yes, with markings
- No

- Often by foot, rarely by car
- Often by car and foot
- Often by car, rarely by foot
Delay Modelling
Overview

- PTV Vissim 6
  - Microscopic
  - Multi-modal
- Two layouts considered
  - T intersection
  - X intersection
- Nine flow combinations
  - Max/Med/Min ped’ns
  - Max/Med/Min vehicles
# Change in Pedestrian and Vehicle Travel Time (secs/hr)

## T Intersection

<table>
<thead>
<tr>
<th>Ped time saved</th>
<th>Vehicle</th>
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<tr>
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<td>Max</td>
<td>1360</td>
<td>366</td>
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<td>432</td>
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<tr>
<td></td>
<td>Min</td>
<td>144</td>
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## X Intersection

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<td>2425</td>
<td>588</td>
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<td></td>
<td>Med</td>
<td>942</td>
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<td></td>
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<td>309</td>
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## Veh time lost

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<td>Med</td>
<td>-461</td>
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<td></td>
<td>Min</td>
<td>-1109</td>
<td>-38</td>
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Delay Modelling: Cost of Implementing Change

Using EEM Costs:

- Approx. Yearly cost
  - T Intersection = $1,979
  - X Intersection = $11,939

- 40-year life-cycle cost
  - T Intersection = $30,661
  - X Intersection = $184,975

_c.f. Cost of pedestrian fatality in 50km/h zone = $3.05 million_
Project Limitations

- Crash data
  - Unable to compare to overseas
  - Didn’t look at motor veh crashes e.g. rear-end

- Unable to estimate absolute safety effects
  - Use VISSIM conflicts as surrogate measure?

- Online Survey
  - Relying on what people say they would do
  - Response bias?

- Delay Modelling
  - Traffic behaviour assumptions in Vissim
Practical Aspects of Implementation

- All Inters’ns or just Specially Marked Ones?
  - What Crosswalk Markings to Use?
- Roundabouts?
- Required Road User Education?
- Effect on Road User “Culture”?
Use existing Zebra Xing?
Cyclist Priority at Sideroads?
Conclusions

- Safety effects unclear (esp. absolute no.s)
  - Expect that crash patterns at unsignalised intersections will become similar to those at signalised intersections

- 78% of people are already willing to give way to pedestrians

- Life-cycle delay costs of change per intersection are relatively negligible

No reason so far to dismiss a law change
Recommendations

- Further research on the possible safety effects of a law change
  - Surrogate safety modelling with Vissim?
  - Physical/Simulator trials at select sites

- A more in-depth look at the economic benefits and costs of a law change
  - Particularly with any Safety assessment

- Additional study on the effect of different types of crosswalk markings
Thank You!

- Any Questions?
Factors Contributing to Pedestrian Crashes

- Alcohol/Drugs (driver)
- Alcohol/Drugs (non-driver)
- Failed Give Way/Stop
- Poor Handling
- Poor Observation
- Poor Judgement
- Pedestrian Factors
- Road Factors
- Weather
- Other

- Signalised
- Unsignalised

- 12%
- 26%
- 46%
“Pedestrian Factors” Contributing to Ped’n Crashes

Crossing road Walking heedless of traffic Stepping out from behind vehicles Running heedless of traffic Not complying with traffic signal Miscellaneous

Signalised Unsignalised