IMPROVED MULTI-LANE ROUNDABOUTS FOR ALL ROAD USERS

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WHY?

- Proliferation of traffic signals in many NZ cities –
  Is this the best we can do? e.g. Cologne in Germany replaced 200 traffic signals with roundabouts past several years
- Pedestrian & cyclist safety reasons often cited for installing traffic signals

Five Key Topics

- Safety comparison with traffic signals
- Pedestrian facilities for multi-lane roundabouts
- *Vertical deflection devices at multi-lane roundabouts*
- *Sightline guidelines for roundabouts*
- *Evaluating the 'turbo-roundabout' from The Netherlands*

In Conclusion

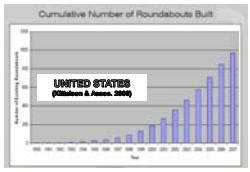
For safety reasons alone:

Roundabouts are the preferred intersection control

SAFETY:
Multi-lane roundabout versus traffic signals

Multi-lane roundabouts are safer for drivers

- Review of international literature shows roundabouts experience around 25 – 75% fewer vehicle injury crashes than signals
- Difference can depend upon geometry, speed environment, traffic volumes
- Main reason: lower collision speeds at well designed roundabouts



Multi-lane roundabouts are safer for drivers

- Auckland comparison of 40 intersections, paired sites selected by geometry and traffic volumes

- 47% fewer vehicle injury crashes at multi-lane roundabouts
- 67% fewer fatal & serious injury type

But…

- BECA crash model analysis based on more extensive nationwide data showed lesser difference, 3-leg even marginally safer for signals
- Authors believe that **poor design** is the culprit:

Rbts with no deflection suffer 8.5 X more crashes (Maycock & Hall 1984)

Pedestrians

- United Kingdom (Hall 1986, Maycock and Hall 1984)

Intersection Type	Pedestrian Injuries per Million Pedestrians
Small roundabouts	0.33
Conventional Roundabout	0.45
Dual Carriageway Roundabout	0.72
Signals at single carriageway junctions	0.67

- Swedish study comparable pedestrian risk 2-lane rbts vs signals (Brude & Larsson 2000)

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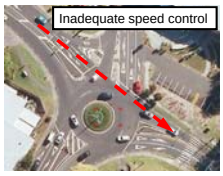
- New Zealand CAS database:

URBAN PEDESTRIAN INJURY CRASHES 2004-8	Roundabouts (1097 intersections)	Signals (1461 intersections)
Fatal Injury	0	11
Serious Injury	24	160

Safety Issues at zebra crossings



Safer zebra crossings at roundabouts

Signalised crossings at roundabouts

Why use a signalised crossing?

- SAFETY: where speeds are higher at multi-lane crossings e.g. > 20m from roundabout
- OPERATION: Use to meter heavy pedestrian movements

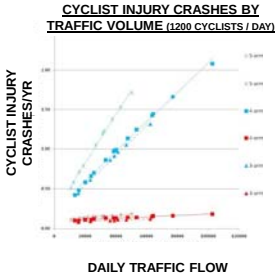
- **Set pedestrian wait times low (ideally < 30 sec)**
- **Ensure good visibility of displays**

Alternative signalised crossings

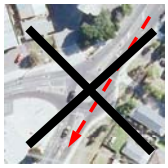
- Fixed time signals as used in NZ can experience un-necessary vehicle delays and queues (i.e. disrupt roundabout on exits)
- Flashing signal displays as used in UK & US are recommended

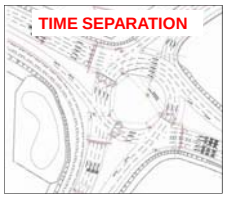
- Pedestrian detection for early walk time cut-off also an option

Cyclists



Roundabout options for on-road cyclists





Other roundabout options for cyclists

- For novice cyclists or children: **OFF ROAD PATHS**
- Or: Dutch option with cyclist priority:

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(not to mention off-peak delays, vehicle emissions, operating and maintenance costs of signals)

Key Recommendations

- NZTA adopt a **'Roundabout First'** policy
- **Better education** of engineers and safety auditors about importance of proper speed control at roundabouts
- Designers refer to the NZTA report due for publication 2011 titled: **"Improved Multi-lane Roundabout Designs for Urban Areas"**
- Also: NZTA consider legal use of part-time signals & flashing signal operation

Also looked at:

Vertical deflection devices at main road roundabouts

(e.g. speed platforms)

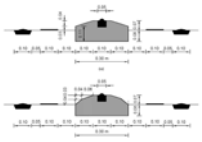



Also looked at:

Using sightlines to improve safety at roundabouts

Also looked at:

'Turbo-roundabout' from The Netherlands


Thank you