Bicycle Lanes at Roundabouts

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Client: Austroads
Tony Barton presented in 2011 at Bike Futures on the ‘two schools of thought’
- Cyclists take the lane at roundabouts, or
- Bicycle lanes at roundabouts should provide separation

Austroads guidance allows for bicycle lanes

Some jurisdictions do not favour bicycle lanes
Caveat

• There are some strongly held opinions within the profession
  – for and against bicycle lanes
• When research does not directly measure crash rates, critics possibly unconvinced
  – Our research did not undertake before / after studies on crash rates
• More before / after research is needed of roundabouts that undergo change
Research brief

• Objective evidence of the effectiveness of on-road bicycle lanes
  – Near roundabouts, and
  – On roundabouts

• Support formation of Austroads policy and design guidance
  – Aim is for this to be included in future revision of Austroads guides
Method

1. Review literature and crash data
2. Identify measures of effectiveness
   – Which quantifiable items will inform research?
3. Undertake fieldwork
4. Analyse data
5. Report on findings
Literature review

Radial
- Minimises speed
- Maximises safety
- Used in continental Europe

Tangential
- Encourages speed
- Maximises efficiency
- Used by English-speaking nations

Fundamental difference in design philosophy
Crash analysis

- Entering motorist failing to give way to circulating cyclists most common
- Strong evidence that cycling to the left within roundabouts is detrimental to safety

Diagram:
- Sideswipe on roundabout 10%
- Entering motor vehicles vs. circulating cyclists 68%
- Exiting motor vehicles vs. circulating cyclists 9%
- Cyclist crossing as pedestrian 8%
- Other types 5%
• Operating speeds and crash rates (for all users) are related
  – If we reduce speeds sufficiently, the discussion about cycle lanes would be moot
• Increasing roundabout size and speed = cyclists increasingly struggle to cope
Lateral tracking

• One of the measures of effectiveness
• 1183 measurements of cyclists proceeding straight ahead
  – How cyclists track through roundabouts varies hugely between sites (median distance 34%-78% at different roundabouts)
  – Where bicycle lanes are present, only a minority use them (10%-42%)
Lateral tracking – before / after

- Before / after study at one site shows significant change in lateral tracking:
  - Truncation of bicycle lane from limit line
  - 10 m before
  - 20 m after
Lateral tracking

• Truncation of bicycle lane from holding line
  – before 10 m
  – after 20 m
Recommendation – geometry

• Achieve equitable speeds between cyclists and motorists
  (equitable = cyclists and drivers travelling at similar speeds)
  – Vertical deflection
  – Horizontal deflection
  – Restrict visibility
  – Consider radial design philosophy
    (Europe → lower speeds)
Recommendation – lane sharing

• Where equitable speeds are achieved, encourage lane sharing
  – Shared lane markings
  – Advanced stop boxes
  – Truncated bicycle lanes
Recommendation – no bicycle lanes

• Avoid bicycle lanes at **low speed** roundabouts
  – Strong evidence that cycling to the left within roundabouts is detrimental to safety
  – Aim should be to achieve equitable speeds that enables lane sharing
  – Truncate cycle lanes on roundabout approaches (around 20 m behind hold line)
Recommendation – bike paths

• Where equitable speeds cannot be achieved, consider bike paths
  – Need to provide good LOS even during peak traffic times
  – Could be at grade or grade separation
  – Likely that some cyclists will still use circulating lanes, so design should allow for this
Recommendation – bicycle lanes (?)

• Are there options at higher speed roundabouts?
  – Where off-road provision not viable
  – Where off-road provision has poor LOS
  – Lane sharing not acceptable to many cyclists where speeds are high
  – Use cycle lanes with ‘reinforcement’ (colour, audio-tactile lines, physical separators)
  – Paucity of evidence for this (either pos or neg)
Most important learning

• Negotiation speed is the crucial issue
  – Increases safety for every roundabout user
• Radial (European) design philosophy is based on speed reduction
• When speeds are low, the question of bicycle lanes doesn’t arise
  – Lane sharing is possible
Project status

• Draft report has been out for stakeholder consultation
• Publication planned for 2013
Discussion & thank you

• Questions please

• Thank you for listening

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