Magic Roundabouts

Multilane roundabouts are potentially lethal for cyclists and pedestrians who would be much safer with intersections with traffic lights, says Alan Parker who believes that bicycle accidents will increase as a result of more unsafe multilane roundabouts being built.

The international experience

The first time I was clipped by a car on a roundabout was 40 years ago in the UK, commuting to my drawing office by bicycle. Even so, it did not bother me much in those days, being young, very fit and able keep up with what we would now regard as vintage cars with poor acceleration limited by a 30 mp/h speed limit. How could I possibly feel insecure? In those days most roundabouts were single lane and, like most young males, my confidence was boosted by an overdose of testosterone.

In the late sixties, living in the New Town of East Kilbride in Scotland I rode under bicycle friendly roundabouts and learnt that some road designers and planners also anticipated the safety problem that "at grade" roundabouts pose for all non-motorised users. Grade separated roundabouts were starting to be used in all the New Towns.

By 1970 Stevenage had trialled many roundabout designs and their publication "Roundabouts" written for motorists shows illustrations of grade separated installations and advises motorists to "select a low gear and adjust speed to 20 mp/h" (32 km/h) which is good indicator of appropriate roundabout speeds. The comment is also made about UK roundabouts generally "that it is rare in towns that a speed of over 25 mp/h (40 km/h) can be attained". I am arguing that 40km/h should still be the maximum design speed and with the benefit of hindsight we now know that this is one of the reasons why the road death rate per 100,000 population in Stevenage and other New Towns is now one third to one half of the national average.

Sweden has one of the safest road systems in the world. In 1975, the Swedes produced a national bikeway design manual (Report 33, 1975) which shows a separate two way bicycle path around the perimeter of a two lane roundabout. They attempted to make multilane roundabouts safe for cyclists by having a separate, two way bike path set far enough back from the roundabout to allow cars to stop. This solution (drawing 2) requires a lot of space and does not work on high volume roads.

The NCDC in Canberra recruited most of its planners from the UK (many of whom had relevant work experience with the New Town development corporations) so it should come as no surprise that Canberra has good examples of roundabouts with bicycle paths bypassing them.

Since 1965, the New Town grade separated roundabouts are the exception and not the rule. The Planning Adviser to the UK Cyclists' Touring Club (CTC) warned even experienced cyclists to avoid using roundabouts. Until the 80s, the CTC had jealously guarded cyclists' rights to use the road but by 1983 cars were much faster and traffic was much heavier and the need for some separate bicycle facilities was urgent. Too many CTC members had been killed and injured and the warning was very specific. "Roundabouts can be

A separate bikepath set back five metres from the roundabout carriageway to allow motorists to stop without blocking the bikepath. (Photograph courtesy of The Centre for Research and Contract Standardisation in Civil and Traffic Engineering.)

extremely dangerous for cyclists, at roundabouts the balance of safety may lie in the shared use of grade separated facilities." (Watkins 1983)

The following Department of Transport (DOT 1986) statement still applies today to multilane roundabouts in the UK and in Australia, "roundabouts appear to be a particular hazard for pedal cyclists: the main conflicts are between cyclists already on the roundabout and motor vehicles either entering or leaving the roundabout. No satisfactory method has been found for reducing the risk to cyclists once they have entered the circulatory system."

Fortunately for cyclists, the Netherlands provides an excellent example of what can be done. After my experiences cycling in ten Dutch cities in 1997 I am convinced that it is the home of world best practice in bicycle planning and provision. During the 90s, the Dutch have been building around 50 single lane roundabouts on main roads a year. According to the English language version of Dutch national bicycle design manual (C.R.OW. 10, 1993) they are safer for all road users including cyclists:

"As result of relatively tight dimensioning, the speed of motorised traffic on and in the vicinity of roundabouts is reduced to 30 to 35 km/h. Hereby, not only the total number of accidents but also the number of injury-related accidents is subsequently lower than at junctions. Research has shown that 16 per cent of accidents at roundabouts had serious consequences. In 25 per cent of all accidents cyclists and/or moped riders were involved. Although victims at roundabouts are also mainly cyclists and moped riders, on balance road safety is strongly improved for them too."

In the Netherlands, as a general rule, multilane roundabouts all have grade separated bicycle paths and they clearly recognise that they are dangerous for cyclists because the errant motorist can cut across the motor lanes and speed through a roundabout. In practice, the Dutch have developed some interesting single lane roundabout designs which are much safer for cyclists but they oppose in principle even having a narrow second lane for bicycles because it allows motorists to travel at higher speeds.

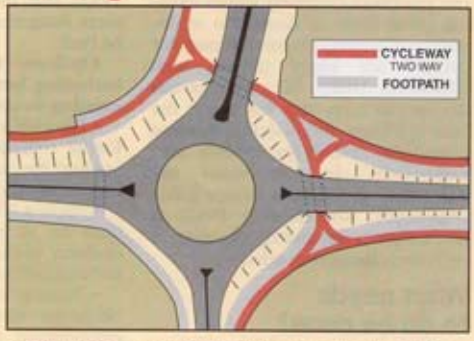
The road test

Having ridden a bicycle recently around Dutch, British and Australian roundabouts that are not grade separated it seems to me that there is a spectrum of designs between the extremes of what is safe or unsafe for cyclists in different road speed and traffic volume environments. For example, the Dutch do use single lane roundabouts with an unprotected bike on the outside but mostly at sub-arterial intersections where traffic volumes are low. However the cycle lane surface stands out in red and my observation was that Dutch motorists were slow and courteous road users.

At the safe end of the spectrum of roundabout designs there are the Dutch single lane "tight" roundabouts with a low design speed and protected bikepaths around them within 50 km/h default limits on the approach roads. At the unsafe end of the spectrum there are the British and Australian multilane roundabouts which have high design speeds, no separate facility for cyclists and at best a 60 km/h default limit on the approach roads.

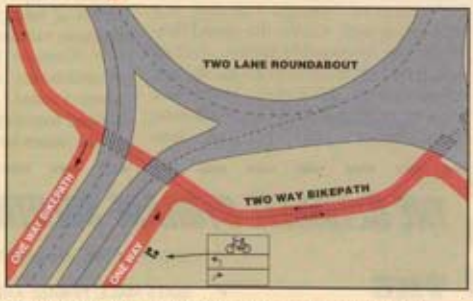
continued p66

Drawing 1



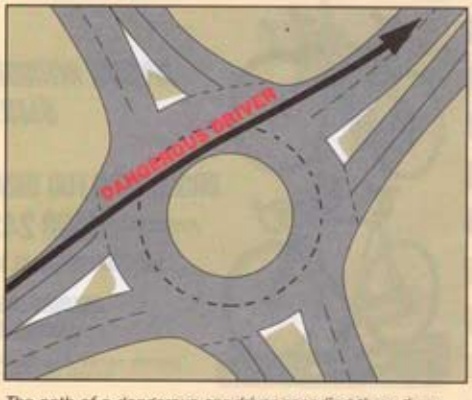
Grade separated roundabout with a separate cyclepath and footpath. Stevenage New Town cycleway. (Claxton 1968).

Drawing 2



Swedish two lane roundabout (drive on the left) and separate cyclepath. Source: national bike way design manual (Cykeln rapport 33, 1975).

Drawing 3



The path of a dangerous car driver speeding through an Australian two lane roundabout.

Even with law abiding and courteous motorists travelling within existing speed limits at Australian multilane roundabouts the injuries rates for cyclists are likely to be high (Robinson 1998). When dangerous drivers can drive very fast across the lane markings roundabouts become potentially lethal for cyclists and pedestrians. In this sense the Australian roundabout design guide (Austroads: Roundabouts 1993) is more than being merely obsolete; it represents dangerous advice.

What needs to do be done?

In Australia we don't have a 50 km/h default limit on main roads, nor are we ever likely to as it was rejected in the proposed new Australian road rules. A 40 km/h residential speed limit was proposed by the Bicycle Federation of Australia but that was rejected as well. Given the speed limits for the foreseeable future, cyclists would be better off with traffic lighted intersections. However, there are ways of making the existing multilane roundabouts safer for all non motorised users (Allott and Lomax 1993). and there is no reason why more dangerous roundabouts should be built.

Options for future action, including better detail design, at existing roundabouts

- Develop a safety audit procedure for all roundabouts that takes into account the present and future safety requirements of non-motorised users.
- Apply a 40 km/h maximum speed limit to all roundabouts and any roadway within a 50 metre radius of the roundabout.
- Regular surveillance of motorist behaviour with speed cameras and enforcement of a 40 km/h default speed limit (just as there is on traffic lighted intersections for the 60 km/h default limit).
- Speed reducing bumps on the approach lane to the roundabout (not speed humps but the regularly spaced series of bumps used to slow cars on freeway exit lanes in the UK).
- Convert low volume two lane roundabouts into one lane roundabouts and provide a protected shared footway in what was previously the outer lane.
- Build shared footways connected to pedestrian actuated crossings with a zig zag offset refuge (Strathclyde Roads 1995) so that the pedestrian crossing markings are near the entrance to the roundabout and set back an additional 10 metres at the exit lane.
- Put in under or overpasses

Options to be considered at new roundabouts

- Mandatory provision of tunnels under all new multilane roundabouts in urban areas or in locations that will be future urban areas so the option of providing fully finished grade separated shared footways at reasonable cost always exists.
- Mandatory provision of protected shared footways on all multila roundabouts in rural areas.
- Tight design of lane widths and islands on multilane lane roundabouts, so that most motorists (85th percentile) choose to enter or exit the circulatory at no more than 40 to 45 km/h
- Tight design of lane widths and the centre island on single lane roundabouts so that motorists cannot safely enter or exit the circulatory at more than 30 to 35 km/h with the provision of protected shared footways.

References

Allott and Lomax 1991. "Cyclists and Roundabouts: a review of the literature" February 1991, Cyclists' Touring Club, Surrey, UK.

Allott and Lomax 1993. "Cyclists and Roundabouts: a review of the literature 1993 update report", Cyclists' Touring Club, Surrey, UK.

Claxton E.C.1968. "The Future of the Bicycle i Modern Society", Journal of the Royal Society o Arts, January 1968.

C.R.O.W. 10, 1993."Record 10. Sign up for the Bike: Design manual for a cycle-friendly infrastructure." Centre for Research and Contract Standardisation, Ede, The Netherlands.

C.R.O.W. 79, 1993. "Pubication 79 Rotondes" Centre for Research and Contract Standardisation, Ede, The Netherlands.

DOT 1986. "Local Transport Note 1/86, Cyclists at Road Crossings and Junctions", Department of Transport, The Welsh Office, August 1986.

F.O.R.S. 1988, "Day-To-day Travel in Australia 1985-86, Report CR 69", Prepared by INSTAT Australia Pty Ltd, for the Federal Office of Road Safety.

Layfield and Maycock, 1986. "Pedal-cyclists at roundabouts", Traffic Engineering + Control, June 1966.

Report 33, 1975. "Cykeln statens planverk rapport nr 33 del 1", Swedish cycleway design manual, Uppsala Sweden 1975.

Robinson, 1998. "Accidents at Roundabouts in NSW."

Strathclydes Roads, 1995. "Healthy Transport: a guide to cycling and walking in Strathclyde", page 45, published by Strathclyde Regional Council, Glasgow, December 1995.

Watkins, S.M. 1983."Shared use facilities the cyclists perspective." Cyclists' Touring Club, Memorandum dated 2/3/83.