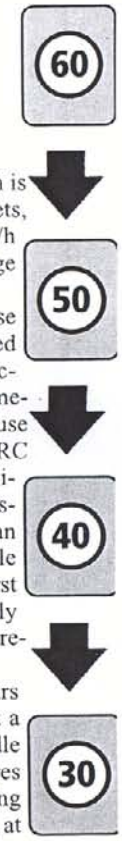
Governments too slow on lowering speeds



by ALAN PARKER

Around Australia at national and state level, recent government inquiries and reports reviewing road rules and road safety, including the review of national road rules, have all missed the opportunity for a key safety measure – the lowering of the default speed limit on residential streets from 60 km/h to 40 km/h.

EUROPEAN cycling and pedestrian organisations strongly favour reduced motor vehicle traffic speeds. The first recommendation in *Cycling towards health & safety* (1992), prepared by the British Medical Association in cooperation with the European cycling movement, is: "Measures should be taken to reduce motor vehicle speeds in urban areas."

The European Parliament in 1988 adopted a Charter of Pedestrians' Rights. Clause VI(d) states, "The pedestrian has a particular right to expect: the fixing of speed limits and modifications to the layout of roads and junctions as a way of effectively safeguarding pedestrian and bicycle traffic."

At the 1993 Velo-City conference, the international bicycle movement reached a consensus on bicycle safety policy which states: "Lowering vehicle speeds is probably the biggest single benefit to cyclists."

In Australia, the speed limit in built-up areas where no other limit is signposted is 60 km/h. This default limit is amongst the highest in the world. The European default speed limit is 50 km/h in built up areas. Where there have traditionally been high levels of bicycle use – in the Netherlands, parts of West Germany, Scandinavia and Japan – 30 km/h limits were introduced on residential streets designated local and not main roads.

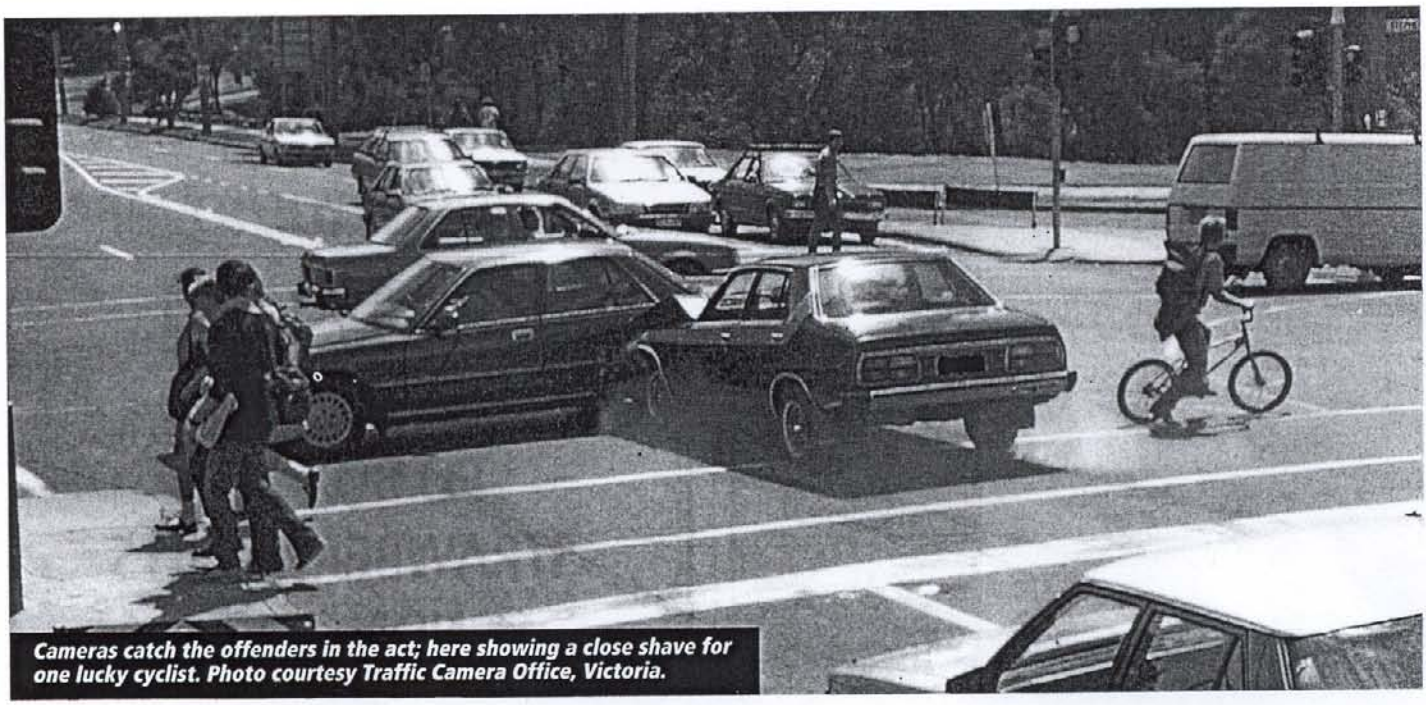
Australian built-up areas sprawl over a large area with nearly four times the length of residential streets per person as Europe and have a higher proportion of wide roads allowing higher vehicle speeds. Large north American cities which have similar road systems offer a better model for setting a default speed limit. In the USA, a 25 mph (40 km/h) limit has operated in most states since the 1930s. This default limit still applies in 1995 and the USA's low pedestrian death rate shows it has stood the test of time.

The Bicycle Federation of Australia has advocated a 40 km/h default limit since 1979, as do many road safety experts. The conclusions of the SA study on urban speed limits (USLAG 1994) concludes, "Ideally a general urban speed limit of 40 km/h is the most appropriate for local streets, but at this stage a limit of 40 km/h could be seen as too drastic a change for the present regime."

Slowing traffic is important because a 10 km/h reduction in travel speed results produces a far greater reduction in the speed of impact and sometimes there is no collision at all because the motorist can stop in time (NHMRC 1994). The relationship between initial vehicle speeds and stopping distance is shown on graph 1. From an initial speed of 80 km/h a vehicle would travel 45 metres during the first 10 km/h decrease in speed but only one metre during the last 10 km/h reduction before it stops.

Shown is the example of two cars travelling side by side at the instant a child cyclist rides out into the middle of the road a little more than 40 metres ahead of them. If one car is travelling at 50 km/h and the other overtaking at 60 km/h, the slower car will be able to stop but the faster car will hit the child at 44 km/h.

The large difference in impact speed is because the braking distance is proportional to the square of the initial speed. It is estimated (NHMRC 1994) that a 10 km/h reduction of vehicle speeds in 60 km/h travel zones would result in a 48% reduc-

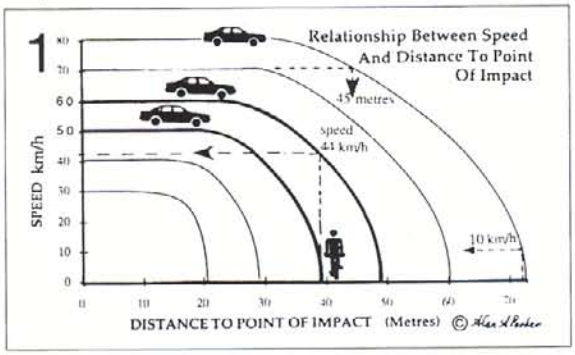


Cameras catch the offenders in the act; here showing a close shave for one lucky cyclist. Photo courtesy Traffic Camera Office, Victoria.

tion in fatal collisions with pedestrians.

In those countries where motor vehicle travel speeds are, on average, 10 km/h less on main roads and 20 km/h less on residential streets than in Australia, cycling is far less stressful and much safer. It is no coincidence to find 30% of all trips being made by bicycle and it is not surprising that in the Netherlands there are 10% more female bicycle users than men (Pravetz 1992).

All over Europe the road toll is being reduced and cycling made safer. Without compulsory helmet wearing, cycling is much safer in the Netherlands now than 20 years ago and still safer than in Australia (Graph 2). Graph 3 shows that the Netherlands is safer for all road users, including pedestrians, than Australia and always has been.



In the last 20 years, road fatalities have been nearly halved. The way to cut the road toll further is to reduce vehicle speeds in urban areas. In the 12 months, October '93 to September '94, there were 1,955 road deaths in Australia, including 384 pedestrians, 167 motorcycle riders and 55 cyclists (3%). In addition around 40,000 road accident victims were admitted to hospital with injuries and of these 7,500 (19%) were cyclists. The long term objective should be to reduce that number by 1,000 or so as adult usage doubles or even triples.

An Australian study (NHMRC 1994) of 176 fatal collisions with pedestrians in the Adelaide area used data from major European studies to develop a computer model of the accident/injury effects of theoretical changes to the speed limit. The NHMRC study estimated how different traffic and impact speeds could have increased or reduced injuries to the 176 victims studied. As 85% of these pedestrian fatalities occurred on main roads, the principal conclusion of that study supports a reduction of the speed of main road traffic in urban areas.

Most adult bicycle and pedestrian accidents occur on main roads, but child road accidents are mostly on residential streets. Accident data from South Australia (USLAG 1994) in 1990-93 for roads with a speed limit of 60 km/h or lower shows that 61% of pedestrian casualties, 69% of 8 to 12 year old cyclist casualties and 77% of under-8 cyclist casualties occurred on local roads. Similar data is available from Victoria, demonstrating a clear child safety problem on residential streets.

Australia's longest-running 40 km/h speed limit trial was begun in December 1991 and is still underway. At the conclusion of the main Unley trial, mean speeds across the trial area were a little under 40 km/h and 85th percentile speeds were a little under 50 km/h. Most significant of all, the trend for the largest speed reductions was in the streets that initially had the highest speeds. Surveys of speeds and community opinions one year after the end of the main trial have revealed the development of a "lower speed culture", in which people are choosing to drive at lower speeds without enforcement. Resident opinion remains strongly in favour of the 40 km/h speed limit and the local community perceives a high safety and amenity benefit (USLAG 1994).

Europeans reduce main road speeds

Swiss and Danish studies show the benefits of reducing 60 km/h limits on main roads to 50 km/h. These studies involve many hundreds of pedestrian accidents. Though there are no data specifically for cyclists, they can be assumed to be as vulnerable as pedestrians in order to draw conclusions about the safety of all non-motorised users.

A study (Walz et al, 1983) investigated reducing the speed limit from 60 km/h to 50 km/h on main roads in Zurich. A study of 945 accidents concluded that the number of pedestrian accidents was greatly reduced. Another finding was that speed is a critical factor in determining the severity of the injuries. This study yielded very detailed information about the kind and extent of injuries sustained and the decreasing probability of survival with increasing speed, as represented on graph 4.

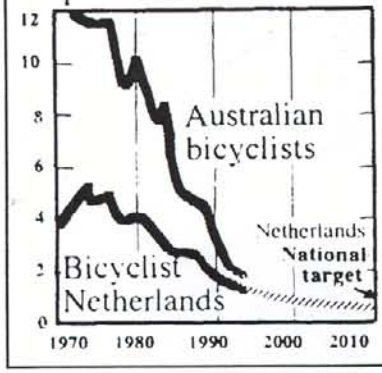
In Denmark in 1985 the general urban speed limit was dropped from 60 km/h to 50 km/h. The number of road fatalities was reduced by 24% and injury crashes by 9% (USLAG 1994). A multiple regression analysis of accident data from 22 countries predicted that the change in speed limits would produce a possible reduction in road fatalities of 28%.

A Swedish study (Nilsson 1992) of 50 speed limit changes derived an empirical relationship known as the "fourth power rule". That is, a change in average speed will change the occurrence of fatal crashes in relation to the fourth power of the speeds. Nilsson also predicts serious injury as varying according to the third power rule and minor injuries according to the second. For example a 5% drop in average speeds would produce a 19% reduction in the number of fatal crashes ($0.95^4=0.81$). If we assume Nilsson's rules apply in Australia, a 5% drop in average speed in local areas would prevent 50 fatal crashes, 500 serious injury crashes and 1350 minor injury crashes a year. Based on these figures, I estimate an average yearly saving of over $140 million.

10 km/h speed reduction = 48% fewer deaths

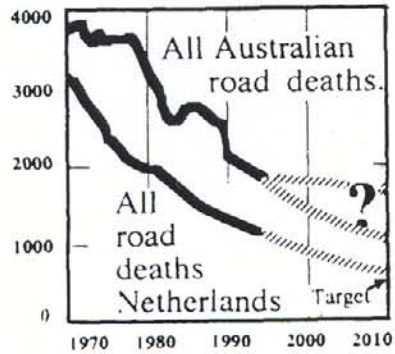
GRAPH 2

BICYCLIST KILLED per 100 million km's



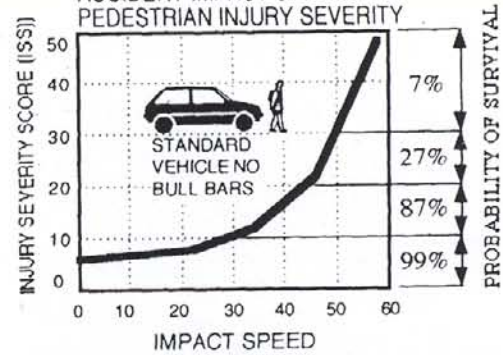
GRAPH 3

COMPARISON OF ROAD FATALITIES.



GRAPH 4

ACCIDENT IMPACT SPEEDS & PEDESTRIAN INJURY SEVERITY



DATA SOURCE. WALZ et al 1983. Speed Limit Reduction from 60 to 50km/h and Pedestrian Injuries. In : 27th Stapp Car Crash Conference Proceedings . Oct. 17-19th; San Diego (CA)

FIGURE 5

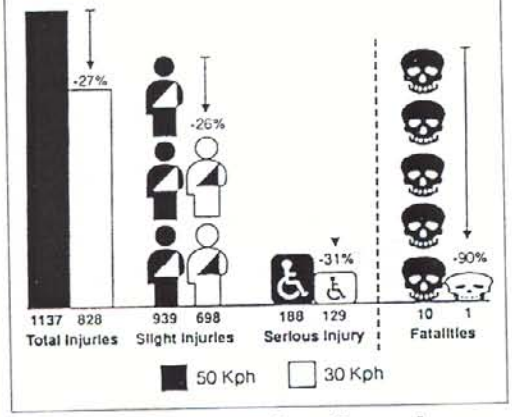


FIGURE 6

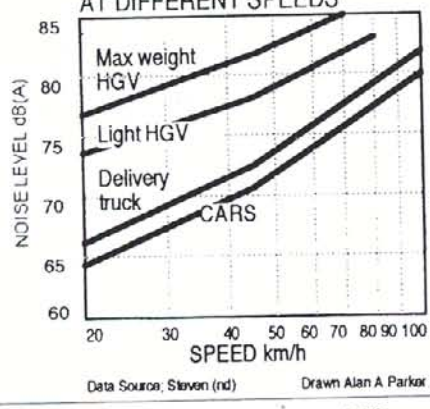
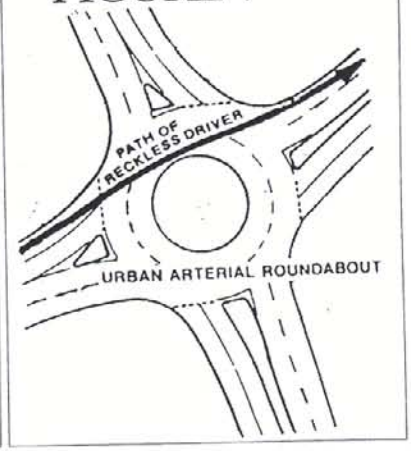


FIGURE 7



30 km/h limits on local roads

In the Netherlands, Scandinavia, Japan and parts of West Germany a 30 km/h limit applies on residential streets and shopping streets. In West Germany, there has been a dramatic reduction in accident costs associated with 30 km/h zones. In Nippes the cost of accidents went down 63% and in Agnesviertal the reduction was 58% (Whitelegg 1993). Recently Hamburg successfully introduced 30 km/h limits in residential areas and local shopping precincts. A before-and-after study (Whitelegg 1993) showed a massive safety improvement (figure 5).

In some West German cities, where speed reductions have formed part of a comprehensive attack on car use, before and after noise and pollution levels have been measured. The relationship between noise and speed is shown in figure 6 for different types of vehicles.

New technology can raise cyclist, pedestrian safety

Speed cameras have been an important factor in Victoria having its lowest fatal road toll in 30 years. There is much room for extending the use of this technology. Given a more radical approach to modifying driver behaviour using demerit schemes, within a few years road behaviour should improve even more. The recent use of automatic speed detection cameras shows great potential for ensuring compliance with existing speed limits and reduced speed limits.

The Victorian demerit scheme since 1991 has been so effective that the state average for vehicles detected by speed cameras exceeding existing speed limits has dropped from 12.2% in July 1991 to 3.54% in July 1994 (VPRSC 1994).

The new laser speed gun being used in Victoria, which is not subject to interference by nearby vehicles, will provide the police with a superb tool for both regular and random speed checks. Future widespread availability of the guns will make it much easier to issue infringement notices.

Returning streets to people

In Australia five out of six urban bicycle trips are less than 5 km. Around 800 million

kilometres are cycled on Australian residential streets, access roads and shopping streets (INSTAT 1998) and could increase to one billion km in the next few years. Four-fifths of all urban cycle trips are on roads today; I estimate that, even if a continuous bikeway network was complete in all capital cities, around 70% of the network would still be on-road – i.e. on bikelanes, widened kerb lanes, sealed shoulders on main roads, and on traffic-calmed residential streets. Lower motor vehicle speeds have an important role in reducing cyclist stress on developing bikeway networks.

The priority given to motorists on residential streets over others is inequitable. Interaction between neighbours, children playing and riding bikes, strolling, standing and sitting is responsible for 90% of the time that people spend on the street (Gehi 1980). Coming and going by car takes up only 3% of time. Residential streets are where most of the trips people make that are never measured in transport surveys take place. The case for a 40 km/h limit is based on the vision of a desirable bicycle-friendly street environment suitable for the range of activities locals engage in. This is how to encourage walking and cycling for short trips that would otherwise be done by car.

40 km/h in multi-lane roundabouts?

Around 60% of bicycle accidents are at intersections: main road intersections are six times more dangerous than residential street intersections. Traffic-lighted intersections are safer for cyclists and pedestrians than multi-lane roundabouts. In the UK, cyclist accident rates at multi-lane roundabouts are 15 times those for cars and 2 to 3 times those for cyclists at traffic signals. (Allot & Lomax 1991)

A greater awareness of the serious safety problems for cyclists is needed. The introduction of a 40 km/h limit on all roundabouts and the installation of speed cameras on all existing roundabouts is recommended. This should make it possible on many new roundabouts to tighten lane widths and mark out bikelanes as recommended in the Austroads Guidelines on providing for bicycles. Speed cameras would pay for themselves in accident reduction savings as well as reducing cycling stress on roundabouts.

A default 40 km/h speed limit that would apply to all residential streets and to multi-lane roundabouts could be introduced as soon as 1996, if coupled with an initial enforcement and education campaign by all state police forces. When bicycle helmet wearing laws were introduced State and Federal funds were used for back up media campaigns and to subsidise helmet wearing. A one-off federal government purchase of additional laser speed guns for state police forces and federal government funded media programs would go a long way in establishing public compliance with a 40 km/h limit.

References

Allot & Lomax, 1991, Cyclists and roundabouts – a review of the literature. A report for the Cyclists' Touring Club (UK)

AUSTROADS, 1994, Guide to Traffic Engineering Practice; Bicycles. Part 14.

Gehl, J., 1980, The residential street environment. *Built Environment.* Volume 6. Part 1.

INSTAT, 1986, Day-to-day travel in Australia 1985-86. Federal Office of Road Safety publication CREW.

Nilsson, 1992, The relationship between speed and safety, calculation method. Cited in USLAG 1994. (below)

NHMRC, 1994, Vehicle Travel Speeds and the Incidence of Fatal Pedestrian Collisions, Volume 1. NHMRC Road Accident Research Unit, University of Adelaide for the Federal Office of Road Safety. CR 146.

Parker, A. A., 1993, Rights of passage: Bridges, freeways and cycling. **Cyclist**, April-May 1993.

Pravetz, J., 1992, A Review of Bicycle Policy and Planning Developments in Western Europe and North America- A Literature search. A report for the Office of Transport Policy and Planning Government of South Australia. Page 5.

Preston, B., 1990, The safety of walking and cycling in different countries, from The greening of urban transport, edited by Rodney Tolley, Belhaven Press.

TRRL, 1986, Pedal cyclists at roundabouts by R.E. Layfield and G.Maycock, Transport and Road Research Laboratory. Traffic Engineering and Control, pages 343-349.

USLAG, 1994, The general urban speed limit for South Australia. Urban Speeds Limit Advisory Group. A Report to the Minister for Transport.

VPRSC 1984, Inquiry into the Demerit Points Scheme, Victorian Parliamentary Road Safety Committee.

WALZ et al, 1983, Speed limit reduction from 60 to 50km/h and pedestrian injuries. In : 27th Stapp Car Crash Conference Proceedings, Oct. 17-19; San Diego, Ca.

Whitelegg, J., 1993, Transport for a Sustainable Future; The Case for Europe, Bellhaven Press.