Designing for the bike

The Dutch experience

City of Ede. Completely grade-separated high quality two-way bicycle paths along urban freeways. There are bikeway connections to all roads crossing the freeway.

Text and photographs by Alan Parker

LAST August I happily cycled around 10 Dutch cities on bicycle paths designed for the safety of all slow-moving vehicles. My purpose was to observe the benefits of the Dutch Bicycle Master Plan. In city after city I was impressed city by the high quality of bicycle facilities.

World leaders in road systems that constrain growth in unnecessary car use, the Dutch encourage safe and convenient use of bicycles and power assisted bicycles (PABs) on shared bikeways. Dutch seats on saddles have steadily increased in number over the last 22 years, with 28% of all trips in 1997 by bicycle.

The high level of bicycle use is not an accidental by-product of a traditional bicycle culture. It's the result of spending around 10% of the road budget on bikeways over 22 years and implementing other transport, land use and environmental policies under the first and second Dutch National Environment Policy Plans (NEPP 1 & 2).

Why the Dutch choose to ride

Dutch bikeway networks provide safe and continuous routes of finer mesh than the road network. All Dutch cities have such networks. The Dutch view is that there should be two bike routes to every destination, one of which must be "socially secure". This means well lit and designed so that it is perceived as safe, particularly by female cyclists or the elderly (C.R.O.W. 10).

Dutch road planners prefer separate one-way bike paths on each side of main roads, considering bike lanes less safe. When main roads do have bike lanes, a 50 km/h default limit applies, greatly reducing the risk of serious injury or death.

There are very few two-lane roundabouts in cities. Traffic-lights and separate bicycle crossings are preferred at intersections on multi-lane roads. High volume two-lane roundabouts are recognised as unsafe for cyclists and a few multi-lane roundabouts on high-speed roads have separate bikepaths passing under them (C.R.O.W.).

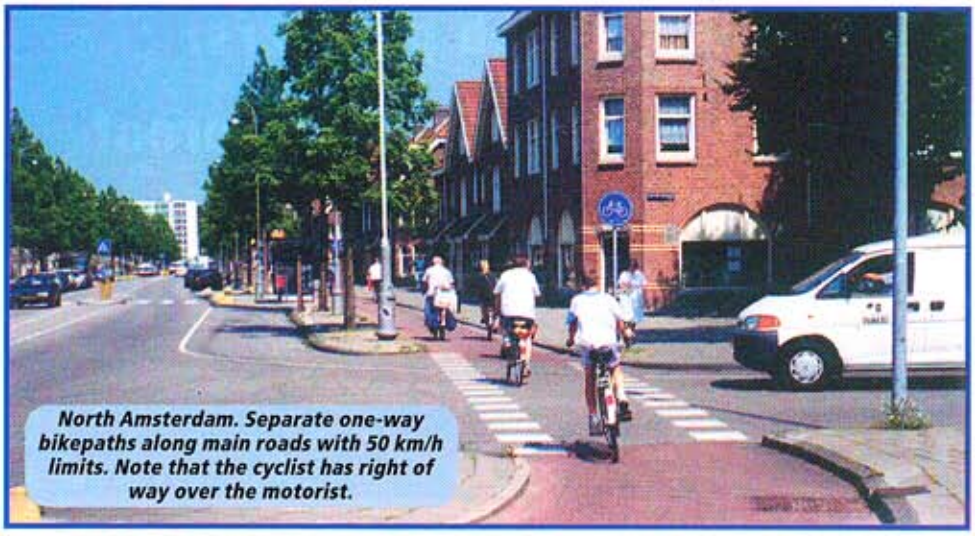
Motor traffic on the bikeways

In the Netherlands mopeds ridden by some young males are threatening and dangerous to other bikeway users. The moped is a 50 cc lightweight motorcycle fitted with pedals to comply with obsolete legislation. Unless fitted with tamper proof 30 km/h speed limiting devices, mopeds should not be on bikeways. Fortunately, moped use has declined to 20% of the 1965 level.

None of the PAB riders I saw in my three weeks displayed behavioural problems. PABs tend to be used only by older riders and mothers carrying children or shopping. They are very fuel-efficient as they have a speed limiter, the engine is only 30 cc capacity and is used only when necessary (to reach speed, in a heavy head wind or when riding uphill or loaded down with shopping or a child).

Dutch attitudes to cycling

No social stigma attaches to cycling in the Netherlands. Queen Juliana took her place at the head of bicycle rallies in the late '70s. From royalty down, most people ride even if they also drive.



North Amsterdam. Separate one-way bikepaths along main roads with 50 km/h limits. Note that the cyclist has right of way over the motorist.

City of Tilburg. Separate two-way bikepaths along one-way road, with 50 km/h limits. One-way street systems for cars in city areas can greatly reduce car use and encourage bicycle traffic if two way access is provided for bicycles.

At main road crossings, where routes of bikes and cars intersect, motorists are more courteous to cyclists than in the UK where I grew up and very much more courteous than in Australia where I live now.

Dutch motorists in general accept a new road law which states that "in an accident it is cars that kill not cyclists" and compensates cyclists accordingly. They also respect the universal 30 km/h limit on local streets where cars and bikes are not separated.

Most Dutch cities have carefully preserved medieval historic cores. Pedestrians and cyclists have priority and Dutch motorists leave their cars behind to go there. Most have chosen to give up their car parking rights to create car-free areas. Instead of car parks, guarded underground bicycle parking facilities below historic city squares offer secure parking for 500 to 1000 bicycles.

Dutch bikeways 1890 to 1975

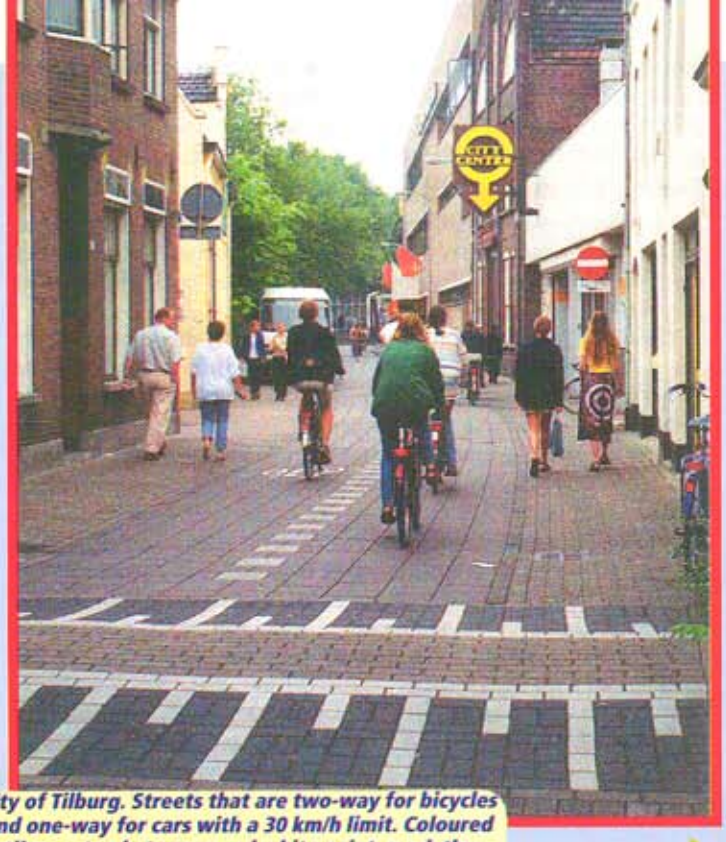
As the urban population of the world is growing by approximately one million people each week, it is important to understand how and why the Dutch bicycle-friendly road system evolved and why it is so successful.

The Dutch planning response to the needs of cyclists goes back 50 years, and cycling goes back 100. The Dutch started cycling in the late 1890s on single-speed safety bicycles – in a flat country, cycling was very easy, even without multiple gears.

Up to the 1940s, cyclists had no need of bikeway networks. The road system served and, from earliest times, constrained four-wheeled traffic while presenting short cuts for cyclists. Bicycles could be carried by the smallest boat using the transport network of canals and rivers. Ferries carried bicyclists across large rivers at a small fraction of the cost for a coach and horses or a car. Cyclists used towpaths and took short cuts over the thousands of waterway locks, bridges and weirs, most of which were neither wide nor strong enough for carriages or cars.

With post-war austerity and very few cars, cycling's popularity persisted in the 1950s. In 1960, there were still millions of bicycles on

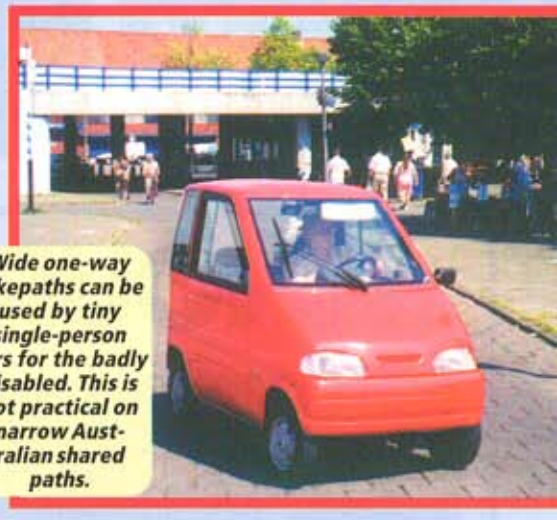
The Hague. By making car parking unnecessary, bikepaths help protect a wilderness area and beach. As well as informal parking along the path, bicycle compounds for hundreds of bicycles are just back from the beach.



City of Tilburg. Streets that are two-way for bicycles and one-way for cars with a 30 km/h limit. Coloured tiles, not ugly tarmac and white paint, mark the speed hump and bikeway centre markings.

City of Leeuwarden. Shared bicycle/pedestrian streets with no car traffic or car traffic limited to certain hours – a common facility in all cities.

City of Tilburg. Separate traffic-lighted bicycle crossings on main roads. Not shown are the duplicate mini traffic lights with small red, amber and green lights at head height for the convenience of cyclists and pedestrians.



Wide one-way bikepaths can be used by tiny single-person cars for the badly disabled. This is not practical on narrow Australian shared paths.

Bicycle/car mixed traffic streets in 30 km/h residential zones with signs and speed limiting devices at the entrance

Single-lane roundabouts with bike lanes protected by concrete kerbs, to slow cars entering to 35 km/h. Cars must give way to cyclists on entry and exit. Note that one-way bikepaths join the roundbout bike lane.

City of Tilburg. Special shortcuts for cyclists. Many minor road crossings over the ubiquitous canals are closed to cars. Note the highly reflective bollards.

the roads and a million or so cyclists who had switched to mopeds. However, conditions in the kerbside lane were becoming more hazardous with increasing numbers of cars going a little faster each year.

As in other countries during the '60s and early '70s, the Dutch Government gave priority to car travel. The bikeways which had been introduced since the '40s were not maintained or were replaced by motor traffic lanes. Bicycle use plummeted from 20 billion km in 1950 to 9 billion km in the early 1970s.

The 1973 oil crisis hit the Dutch economy hard as the Arab oil embargo cut off petrol supplies and locked up shipping in Rotterdam, Europe's greatest port. With no petrol to run cars, millions of old two-wheelers were recalled to service to take people to work. It is scarcely surprising that, in 1975, plans were made to make Dutch cities less oil-dependent. Henceforth bikepaths had a high priority in transport funding.

All new roads built since 1975 have bikeways and Dutch cities have been made much safer for cyclists. For 20 years the bicycle component of the road budget has been around 10% and the death rate for all road users had fallen in 1996 to 30% of what it was in 1978.

Despite steadily increasing car ownership, bicycle travel has increased from 10 billion km in 1975 to 12.5 billion km in 1996, helping slow the increase in car use. In the Netherlands, not only do many more people in general ride bikes but slightly more women use bicycles as a practical form of transport. In the wealthy provincial town of Groningen, 55% of all trips are by bicycle and only 30% by car.

Dutch National Environment Plan, 1989 to 2010

One third of the Netherlands has been reclaimed from the sea and sits precariously behind huge man-made dikes. The national airport is three metres below the level of the North Sea. Little wonder that the threat of global warming and sea level rises is taken very seriously. This reinforces the funding commitment to bicycling.

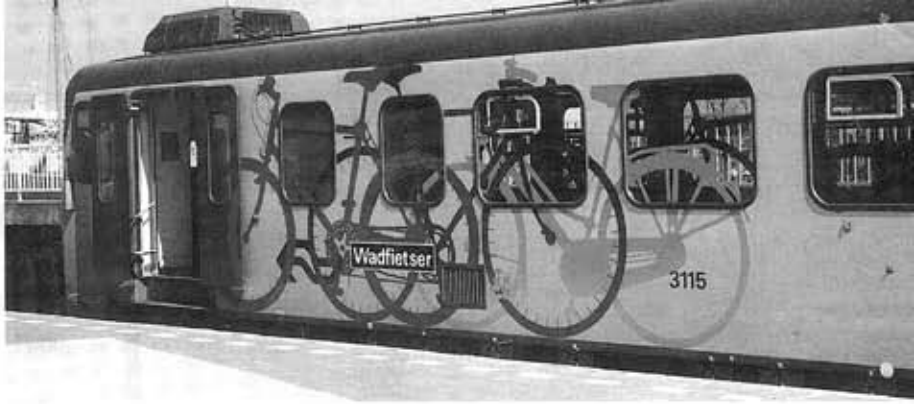
In 1989, under the first National Environment Policy Plan (NEPP 1), car use and the provision of car parking was discouraged, bicycling, walking and public transport were encouraged and 30 km/h speed limits were introduced on residential streets.

From 1990, $A1.2 billion was spent over six years implementing the Dutch Bicycle Master Plan (Welleman, 1995), mostly by upgrading existing bikeways to a high standard, building new bikeways and providing secure bicycle parking at rail stations. That's a lot of funding for a country of 17 million people (a little less than Australia's population). The closeness of population sizes of the two countries make cost comparisons simple.

In 1996, NEPP2 was released. Its most important feature is the way individual measures reinforce one another to integrate environment, transport and land-use policy at national, provincial and local levels.

Recent and planned investment in NEPP1 and NEPP2 will deliver a number of bicycle-related initiatives to increase rail patronage. Better bicycle access to stations, secure bicycle storage and special provisions for carrying bicycles on trains are contributing to the goal of increasing patronage by 15% by 2010. Implementation is ahead of

The entire lower deck of special double-decker express train carriages is for bicycle storage. These are used in summer on trains to and from Belgium as many people leave their cars at home but like to take their bikes.



The Netherlands Railways do a wonderful job of decorating some carriages that carry bicycles All trains have special compartments for bicycles, wheel chairs and the like.

schedule and patronage has surpassed expectations. I was most impressed by the seamless connectivity of public transport.

NEPP's objectives are that:

"Vehicles must be as clean, quiet, safe and economical as possible. The choice of mode for passenger transport must result in the lowest possible energy consumption and least possible pollution.

"The locations where people live shop,work and spend their leisure time will be coordinated in such a way that the need to travel is minimised."

NEPP takes a three-step approach to reducing pollution from traffic; (i) improving technical vehicle standards; (ii) reducing "auto-mobility", and (iii) instigating urban traffic measures.

The second step includes policies for reducing car use, aiming to shift people from cars to public transport for the longer journeys, and to cycling and walking for the shorter ones. It also targets improvements in freight transport.

The most recent NEPP development is ensuring that increasing demand for housing is accommodated by urban consolidation to eliminate urban sprawl between cities. NEPP will tighten up physical planning policy to ensure as well that businesses which are labour intensive, or amenities which attract numerous visitors, will not be located at places which are not well served by public transport. The policy is to put the "right business in the right place". Outer-urban supermarkets accessed by car are no longer built. Universities are not built as the low-rise, spread-out institutions we see in Australia, conveniently accessible only by car; instead they are compact multi-storey campuses built alongside rail lines – if there is no local station, they build one.

The Dutch national car parking manual (C.R.O.W. 1994) is compatible with NEPP policy. It states unambiguously on page 1:

"A co-ordinated car parking policy is directed to restricting car use. The aim is to encourage selective car use so as to make a favourable contribution to accessibility and the living environment by reducing car mobility which reduces congestion while at the same time stimulates alternative modes of transport. It also plays a part in the sharing of scarce space".

Without the NEPP (and the Dutch Bicycle Master Plan) it was expected that car kilometres would increase by 72% over the period 1986 to 2010. With the NEPP this increase will be lowered to 48%, a worthwhile reduction but still a long way from sustainable. It serves to illustrate what a difficult task lies ahead of all motorised countries in reducing greenhouse gas emissions.

Special bicycle ramps on the stairs at all Dutch stations make it easy to wheel bicycles up and down between platforms.

Dutch bicycle-friendly new-town planning

My Dutch trip was a chance to experience firsthand the difference between "new towns" in the Netherlands and the UK. On a previous trip I had visited five UK new towns with bicycle networks.

Use of the bicycle networks is much lower in the UK than in both existing Dutch cities and Dutch new towns. The difference is the UK's lack, up until 1995, of supporting transport policies and town planning guidelines to constrain the overuse of cars.

The later English new towns were supposed to be better planned and Britain's car-oriented town planners regard Milton Keynes as a great achievement. Having cycled there and found it to be primarily built for cars, I disagree. Its planners have not understood as the Dutch do that the problem with investing in roads and creating car dependent new towns is that the demand for road space is insatiable.

There is no concept in Milton Keynes of saving space by compact urban form and road design and reduced parking. Bikepaths go up and down steep ramps to cross the freeway-style main roads, very few cyclists use them and many destinations are beyond convenient walking distance. Main road intersections extend over wide seas of grass and landscaped spaces which nobody can use. The main shopping centres are set in the middle of large and very full car parks.

By contrast, the Dutch new town of Almere was built like an older European town – with lots of shortcuts for cyclists and pedestrians, friendly pedestrian-only streets and malls and far less car parking. Almere has twice the overall density of urban dwellings yet the people of Almere have just as much usable space as they have in Milton Keynes.

Only 6% of trips are by bicycle and 18% walking in Milton Keynes, but 28% of trips are by bicycle and 20% walking in Almere. In Milton Keynes 59% of trips are by car but only 35% of trips are by car in Almere. Both have 17% of trips by public transport. (Roberts 1992)

Dutch bicycle planning shows that if cyclists are given their own rights of way and priority in transport planning, the elegant simplicity of riding a bicycle is still popular after many years of motorisation. Together with other constraints on car use, it is a proven way for tomorrow's cities to become less dependent on oil, have cleaner air, less costly transport, and a reduced road death rate.

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