

Traffic Safety and Cycling

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Traffic Safety and Cycling. Some lessons from history.

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1. Introduction

The cyclist conquers the street in cities where the car was dominant until recently. But how safe will it be if, after this Corona period, the cyclist has to share space again with the car? The bike is unstable and has no crumple zone. Cyclists are vulnerable when they have to share space with many fast-moving motorists. Most fatal accidents occur in those situations. And if bicycle facilities are poorly dimensioned and take insufficient account of the characteristics of bicycle and cyclists, this is a source of serious accidents, even without a car close to.

In this presentation I look back on the history of the separation between fast traffic and slow traffic. This principle was already part of CIAM's Charter and has been consistently implemented in all spatial plans in the Netherlands for many years. However, the Netherlands is currently unable to further improve safety with this strategy. Is this the dialectics of advantage or do we really need to intervene in the dominance of car traffic? Or should we look for improvements much more accurately, with in-depth research? I conclude with a perspective on the future.

2. From Neighborhood to woonerf en 30 km/h zone

During the 3rd CIAM conference in Brussels in 1930, the theme of residential areas was put on the international agenda. Housing units were to be grouped around primary schools. Howard, Garnier and others showed this in their designs. The American educator and planner Clarence Arthur Perry (1872-1944) first mentioned the principle of a residential area (neighborhood) in 1923. He saw the need to protect citizens from the danger and nuisance of cars when these were still relatively rare. According to him, neighbourhood's concept was "forced by the automobile". He was concerned with the separation of traffic types, but also with restoring social bonds in a neighborhood.¹

Lewis Mumford developed the first residential plan in 1929 for the Regional Plan of New York and its Environs.² Perry wrote the Neighborhood and Community planning study for this. There had to be a traffic-safe area around the school and the traffic system within the neighborhood had to focus primarily on pedestrian safety.³

Henry Wright and Clarence Stein applied Percy's theory in a plan for Radburn, a dormitory town near New York. Due to the crisis in 1929, only 400 houses were built. Through traffic was avoided. Primary schools were centrally located with a maximum walking distance of half a mile. The design influenced

¹ Waclaw Ostrowski, *Contemporary town planning from the origins to the Athens Charter* (Hague, Netherlands: International Federation for Housing and Planning, 1970), 112-13.

² Hans van der Cammen and Len de Klerk, *Ruimtelijke ordening: van grachtengordel tot Vindex-wijk* (Utrecht: Het Spectrum, 2003), 152.

³ *Ibid.*, 192-93.

many European urban planners.⁴ These *cul de sacs* did not become very popular in the US, but they did in the UK. And inspired Dutch planners.

In the small industrial town of Emmen, in the east of the Netherlands, was practiced what was mainly on paper elsewhere. In 1959, urban planners Niek de Boer and André de Jong designed the Angelslo district where all central facilities were located within walking distance of the houses. A separate system of walking and cycling paths was introduced. Parking had to be done at a distance from the houses. In the Emmerhout district (1965-1970) came the next innovation, the residential yard or Woonerf. The residential area was designed as a combined outside space to stay, to play and to move where traffic was secondary to the residential function. All road users used the same space (the yard). There were no separate bicycle or pedestrian paths. Children had to be able to walk and cycle safely to school.⁵ The idea of the residential area was soon introduced in other cities. Residents in Delft and Gouda redesigned existing streets and provided it with a Woonerf sign. In 1977 the Woonerf was given legal status in the Netherlands.

Because to restyle a residential area in an existing situation was expensive. New forms of safe and liveable design were sought in the Netherlands. After demonstration projects in Eindhoven and Rijswijk had demonstrated that this was effective, a regulation for 30 km/h zones was instituted and legal design conditions were provided. In particular, the speed reduction, enforced by speed humps and narrowing, had a very favourable effect on road safety for cyclists and pedestrians. With this measure, separate bicycle facilities were unnecessary. Footpaths remained necessary, in contrast to the Woonerf. Both innovations have been adopted in the road regulations of various European countries.⁶

3. The Dutch approach: Masterplan fiets en Fietsberaad

Around 1990 there was renewed interest in the bicycle in the Netherlands. In the 1970s, national money was made available for the construction of bicycle paths (outside the built-up area) for catch up reasons. And there was money for demonstration projects. But now bicycle policy has become an integral part of national mobility policy. The Second Traffic and Transport Structure Plan (SVV-2) was published on June 26, 1990.⁷ The front page of the document was significant. A car tire turned with a swing into a sunflower. This movement illustrates the change brought about by the arrival of the Brundtland report⁸. Climate policy started thirty years ago!

A positive attitude towards cycling is necessary to stimulate bicycle use. After 1960 bicycle use in the Netherlands had fallen sharply. Fortunately, research showed that public support for bicycle use had remained high. Only 0.3% of all Dutch people considered cycling inferior.⁹ However, there were many practical obstacles to cycling. Theft of bicycles, for example, but also the inconvenience of other

⁴ Ostrowski, 114, 18-19.

⁵ Cammen and Klerk, 205-07. N.A. de Boer, "De open groene stad, een structuurplan voor Emmen," *Stedebouw en Volkshuisvesting* 40, no. 1-2 (1959): 37.

⁶ http://www.woonerfgoed.nl/int/Childstreet_files/StevenSchepel.pdf. Werkgroep Erven, "Van woonerf naar erf; voorstel voor aanpassing van de woonerfwetgeving" (Den Haag: Ministerie V&W, DVV, 1985).

⁷ Kamerstukken II, 1989-1990, 20922 nrs. 15-16

⁸ World Commission on Environment and Development, *Our Common Future* (Oxford, New York: Oxford University Press, 1987).

⁹ H.A. Katteler, W.F.de Heer, J.A.Kropman, *Het gebruik van de fiets in Nederland* (Nijmegen: ITS, 1978).

traffic and unnecessary detours. Finally, insecurity in traffic was mentioned as an obstacle to cycling. The Bicycle Master Plan focused on removing these obstacles. Research was done into the conditions for bicycle-friendly infrastructure. This was laid down in Design Guidelines.¹⁰ The experiences with the sustainable safe program were used for this. The central objective of the Bicycle Master Plan was to promote the use of bicycles in such a way that road safety would improve with the title: More and safe on the bicycle.¹¹

The choice of mixing or separating depends on the volume and speed of the car traffic. Mixing is only possible in residential areas at car traffic speeds of 30 km/h or lower and through traffic is undesirable. Outside the built-up area, it was determined that mixing is only safe at speeds of up to 60 km per hour and little local traffic. In other cases, separation is necessary. It is important to conclude that safety can only be achieved through an integrated approach. From the outset, planning must be combined with planning for use of space, mobility and infrastructure. The use of infrastructure must be in balance with the chosen form and function. Later research by the Fietsberaad added that cycling infrastructure must also be lenient. One false move was the 1990 book by English activist Mayer Hillman in which he described the risk of English school children in traffic. Helmets and fluorescent vests really do not help against that. But the risk also lies in minor design flaws. The Fietsberaad in the Netherlands therefore actively recommends measures such as limiting the number of posts on the cycle path, a better salt spreading policy in winter and fewer high curb stones along the cycle path.¹²

Atze Dijkstra, who worked as a specialist on the Dutch bicycle manual, states in his thesis that it makes a lot of sense to first look at the entire route network. Road network measures result in a substantial reduction in the number of accidents. By also looking at avoiding the number of conflicts on intersections, and not just separating on the road sections, the number of accidents is reduced.¹³

¹⁰ Werkgroep Wegwijzer Fietsvoorzieningen, *Tekenen voor de fiets* (Ede: CROW, 1993). Also published in English: *Sign up for the bike. Design manual for a cycle-friendly infrastructure*, trans. EBC Institute (Ede: CROW, 1993). in German: *Radverkehrsplanung von A bis Z. Das niederländische Planungshandbuch für fahrradfreundliche Infrastruktur*, trans. Ursula Lehner-Lierz (Ede: CROW, 1994).

¹¹ Kamerstukken II, 1990-1991, 20922, nr. 107. Ton Welleman, *Het Masterplan Fiets uit de startblokken* (Den Haag: Ministerie van V &W, 1992). A.G. Welleman, "The National bicycle policy and the role of the bicycle in the urban transport system," in *Velocity Conference* (Milano1991).

¹² Zie: <https://www.fietsberaad.nl/>. <https://www.kimnet.nl/publicaties/brochures/2020/10/12/fietsfeiten-nieuwe-inzichten>.

¹³ Atze Dijkstra, *En route to safer roads. How road structure and road classification can effect road safety*, ed. Universiteit Twente, ITC Dissertatie (Leidschendam: SWOV, 2011).

4. How do things stand after 50 years of road safety policy?

How do things stand now after 50 years of road safety policy?¹⁴ We see the number of fatalities among cyclists decreasing steadily up to the year 2010. But after that there has been no progress for 10 years (Figure 1, red line). The risk of cyclists (casualties per kilometre travelled) also fell sharply from its peak around 1975 (Figure 1, green line). Around 1975, the Netherlands became active with a policy for a safe environment, cycle paths and 30-kilometre zones. But the risk has also not improved in the past 10 to 15 years. If we compare the safety gains in bicycle traffic with other modes of transport, it is remarkable that cyclists, along with motorcyclists and truck drivers, get off badly. Fortunately, the greatest gain has been achieved with pedestrians. Probably because the policy for safe residential areas has been successful there. Passengers of cars have also benefited greatly from the improvement in safety. Much profit has been made there by making the vehicle itself safe. Fatal accidents involving moped riders have also decreased sharply. An important part can be explained by the sharp decrease in the use of mopeds. The risk per kilometre travelled is high and is comparable to that of motorcyclists.

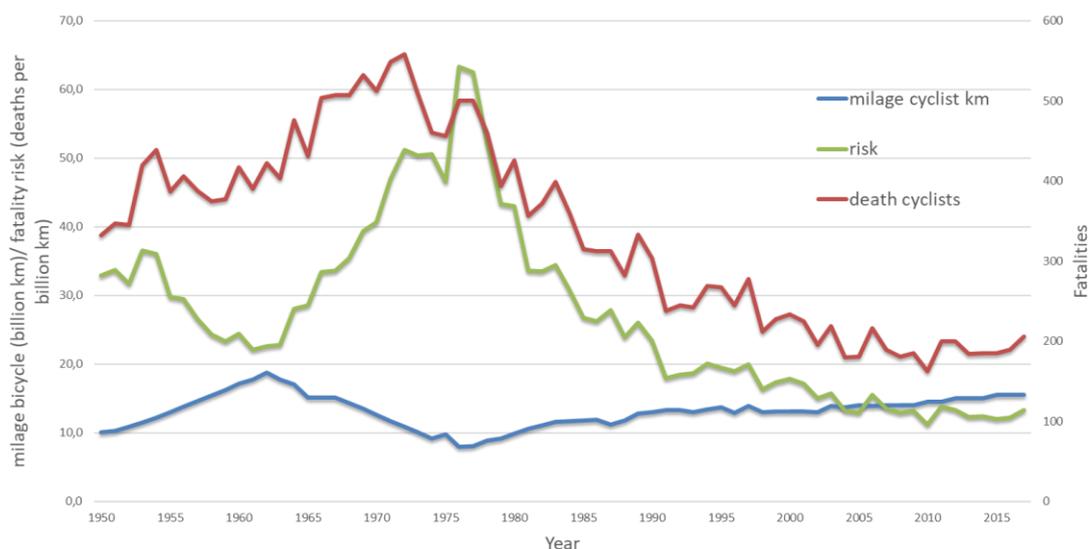


Figure 1: Risk and fatalities Bicyclists in Netherlands (1950-2019) (source SWOV/ CBS)

A remarkable change can be seen in the composition of the number of cyclists killed in traffic. In 1972 the Association Stop de Kindermoord (stop the children's murder) was founded. That was not for nothing. Many schoolchildren were then victims of a bicycle accident. Fortunately, we now see a big gain in safety there. That is good news. But at the bottom of the bar chart are the cyclists with the highest ages. It can be seen that in 2018 more than 60% of cyclists killed in traffic will be 60 years or older. This share has increased significantly in recent years. This can partly be explained by the increased mobility. Older people remain active in our society for longer and they remain mobile into old age. But apparently our infrastructure is not adequately equipped for older cyclists. And they are, of course, more vulnerable. While younger cyclists sustain less serious injuries in a collision, the outcome is often more serious for the elderly. Older cyclists have more difficulty with complex

¹⁴ Hway-liem Oei, "De onveiligheid van fietsers en bromfietsers in cijfers. Een overzicht en analyse vervaardigd in het kader van het Masterplan Fiets," (Leidschendam: SWOV, 1991). Voor actuele cijfers: Statline van CBS.

situations than young people. They lose their balance more quickly, their sense of hearing deteriorates and they are less able to look back. SWOV states that infrastructure, which takes better account of this function reduction, can contribute to a reduction in the accident involvement of the elderly. The measures must of course be aimed at the accident types that are most common among the elderly: accidents when turning left and when crossing the road. Actions must lead to a decreasing complexity of the operate task. This will lead to fewer errors among the elderly, but other road users will also benefit.¹⁵

year age	1970	1980	1989	2000	2010	2018
0-11	113	65	35	19	7	6
12-17	75	61	39	23	10	9
18-29	27	44	34	20	10	12
30-39	12	18	8	19	5	9
40-49	19	21	26	15	11	12
50-59	48	28	31	23	16	30
60-74	150	96	81	60	44	58
75+	68	93	79	55	59	92
totaal	512	426	333	234	162	228

Figure 2: Bicyclist fatalities by age The Netherland 1970-2018 (source SWOV)

5. Future

With the recommendations for safe infrastructure, I am already focusing a bit on the future. This requires attention to man-machine-road interaction. Not only do they separate laterally with cycle paths, but in general ensure fewer encounters between cyclists and motorized traffic. Speed reduction and car-free streets are often a much better strategy. Moreover, bicycle paths are not inherently safe either. Many bicycle accidents with serious injuries are the result of poor or poorly maintained infrastructure. Investing in better cycling infrastructure and expanding the 30 km zones can result in 115 deaths and 3850 fewer serious injuries, according to Agenda 2.0 of the Fietsersbond and Tour de Force.¹⁶

But it is important to thoroughly examine our knowledge of accidents and their causes. We now run circles with often outdated research. Now that fewer accidents are occurring and they are registered worse, in-depth investigation is necessary. These are strategies that have made air travel the safest form of transport. The number of fatalities annually in Dutch traffic is more than in total air traffic worldwide. A good example is the approach taken by the province of Friesland and Utrecht, where

¹⁵ <https://www.swov.nl/feiten-cijfers/fact/ouderen-welke-maatregelen-kunnen-de-verkeersveiligheid-van-ouderen-verbeteren>. Ch. Goldenbeld, *Ongevallen van oudere fietsers in 1991* (Leidschendam: SWOV, 1992). D.A.M. Twisk and M.P. Hagenzieker, *Feitelijk en beoogd fietsgedrag in relatie tot veiligheid* (Leidschendam: SWOV, 1993).

¹⁶ <https://www.fietsberaad.nl/tour-de-force/home>.

data from ambulances and hospitals are linked to police data. It led to a quick insight into both system problems and local imperfections.¹⁷

Then the car. It is strange that the concept of the self-driving car only looks at the benefits for the motorist. Why only give parking assistance! The technology of self-driving cars offers opportunities to become truly road-safe for cyclists and pedestrians. But then the technology must be used for road safety instead of moving to level 5 as quickly as possible.

So blind spot protection, intelligent speed adaptation (ISA), lane keeping. Starting in residential areas (30 km/h areas). When I asked our national project manager for automatic vehicles a few years ago what exactly was the purpose of the project, it was quiet for a while. Then came the curious answer: give people without a driver's license mobility.

Already around the turn of the century, successful trials were conducted in a residential area in Tilburg.¹⁸ Much to the surprise, there was great support for ISA in their own neighborhood! Modern cars know via GPS exactly whether they are in a residential area, already have the information about the speed regime on board and the operation of the speed pedal is no longer using a mechanical cable, but is controlled electronically. Many requirements for cars are set by the European Commission, but car manufacturers form a large lobby. With increasing bicycle use in European cities, this should generate new lobbying forces.

I conclude with a personal advice. I have passed the risky age of 60 for a while. Looking back does indeed become more difficult and hearing deteriorates. That's why I like this wing mirror just fine. Watch out in traffic, look to the future in research and sometimes look back!

¹⁷ <https://www.verkeerskunde.nl/42020ongevalregistratie>. Karin Klein Wolt et al., "SEH- en ambulancedata openen wereld aan ongevals-informatie," *Verkeerskunde* 71, no. 4 (oktober) (2020): 14-15.

¹⁸ [https://www.swov.nl/publicatie/intelligente-snelheidsadaptatie-isa#:~:text=Intelligente%20snelheidsadaptatie%20\(ISA\)%20kan%20op,geluids%2D%20of%20lichtsignalen%3B%20%2D%20het](https://www.swov.nl/publicatie/intelligente-snelheidsadaptatie-isa#:~:text=Intelligente%20snelheidsadaptatie%20(ISA)%20kan%20op,geluids%2D%20of%20lichtsignalen%3B%20%2D%20het)

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