Ministry of Transport, Public Works and Water Management

Directorate-General for Passenger Transport

The Dutch Bicycle Master Plan

Description and evaluation in an historical context

HET MASTERPLAN FIETS

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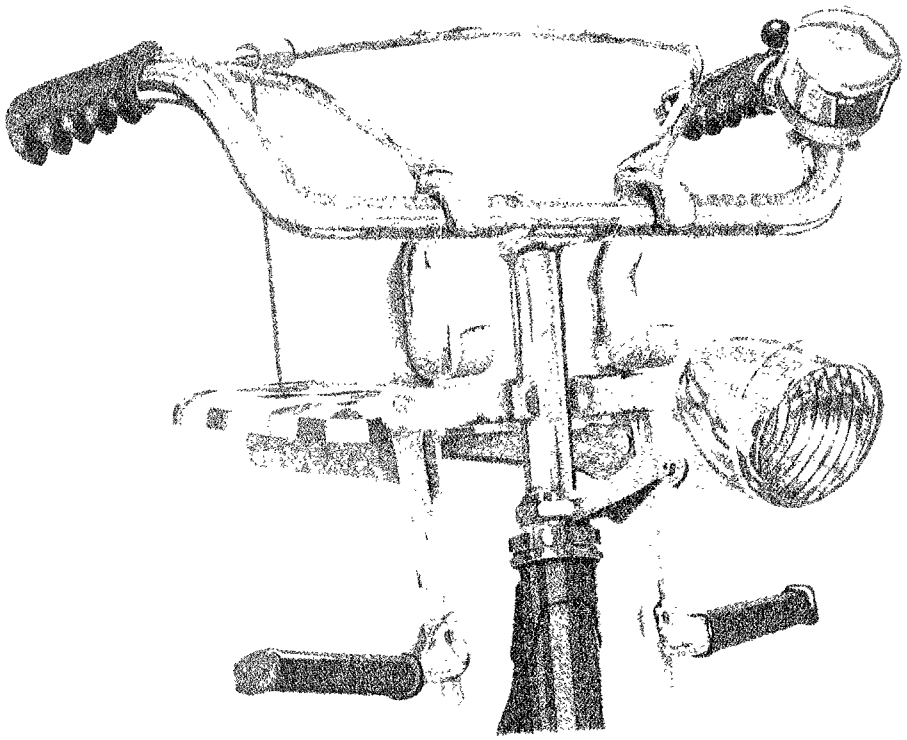


Foreword

The Bicycle Master Plan (*BMP*) established by the Dutch Ministry of Transport, Public Works and Water Management was rounded off after seven years in late 1997 with a comprehensive evaluation. This evaluation was then published in a final report, together with a description of all projects that had been carried out (*Verkeer en Waterstaat* [Ministry of Transport, Public Works and Water Management], 1998). An abridged version has been included in this publication in response to international interest in the activities of the Bicycle Master Plan project group.

Moreover, another study that has been carried out in the framework of the Bicycle Master Plan merits an English summarization. The *Stichting Historie der Techniek* (*SHT*) (Foundation for the History of Technology) has carried out a study into the history of bicycle use and bicycle policy in nine Western European cities, focussing on an historical explanation for the similarities and differences in the development of bicycle use (Albert de la Bruhèze and Veraart, 1999). This study, augmented by several other sources, fits into the framework of the specific history of Dutch bicycle use and bicycle policy which, in turn, forms the context for the development and final results of the Bicycle Master Plan.

This historical background makes it easier for the reader to understand why the Bicycle Master Plan was established. This is particularly true of Chapter 2, which covers the interesting period 1950-1990 and in which all kinds of signals can be found that point towards the 1990s. Chapter 1 covers the period 1890-1950 and is of a more anecdotal nature.

Chapter 3 describes the evaluation of the Bicycle Master Plan, subdivided into results, carry-over and effects. Recent developments in bicycle use and cyclist safety are quantitatively analyzed in Chapter 4. Finally, the question of how Dutch bicycle policy should continue is brought up for discussion in Chapter 5. After all, the completion of the Bicycle Master Plan does not necessarily bring an end to the Dutch central government's bicycle policy. This policy will naturally continue, often less explicitly and integrated more strongly into other policy. Increasingly, it will be carried out by other parties within the broad scope of transport and traffic.

A brief description of a selection of the 112 research, pilot and model projects carried out in the framework of the Bicycle Master Plan has been included, as well as an overview of international publications relevant to the Bicycle Master Plan.

Ton Welleman,
Project manager for the Bicycle Master Plan 1990-1997
Ministry of Transport, Public Works and Water Management

1 1870-1950: The advent and heyday of the bicycle

The bicycle was introduced in the Netherlands around the year 1870. Bicycle use increased quickly, relatively speaking, until the 1920s, although absolute numbers remained small. From the 1920s onwards, bicycle use increased rapidly and the bicycle was the most popular mode of transport for quite some time. We can therefore divide the period 1870-1950 into two separate periods.

The advent of the bicycle occupies centre stage in the period 1870-1920. A description of this period begins with the technical development of the bicycle as a mode of transport and the development of bicycle production in the Netherlands. Next, the scope and characteristics of the initial bicycle users in the Netherlands are discussed and, pertinent to this, changes in the purchasing price of the bicycle. The early establishment of a national organized interest group is also brought up for discussion. This account provides useful background material, though it is not directly relevant to current bicycle use and policy, due to the fact that there was only limited government policy for bicycle traffic - and most of that was primarily regulatory in nature.

This is followed by a description of the heyday of the bicycle in the period 1920-1950. Figures are initially given as to the extent to which bicycle traffic played a dominant role in the total mobility of the Dutch, followed by a discussion of how, at the same time, policy attention at a national level essentially focussed on the mode of transport of the future, i.e. the automobile. The national government's attention to bicycle policy remained limited and was primarily of a regulatory, and not facilitating, nature. Subsequently, the bicycle situation in four Dutch cities (Amsterdam, Eindhoven, Enschede and Heerlen/Kerkrade) is described on the basis of the *SHT* study (Albert de la Bruhèze and Veraart, 1999). These four local descriptions can especially be viewed as a kind of enlargement or accentuation of the national picture, with the dominant role of the bicycle in traffic on the one hand and the fact that bicycle traffic received only limited policy attention compared to car traffic, on the other.

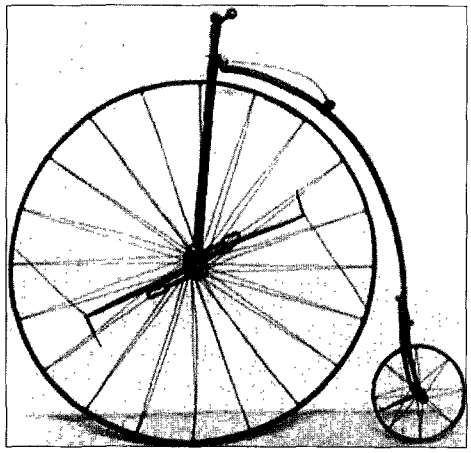
1.1 1870-1920: The advent of bicycle traffic

Technical development of the bicycle in the nineteenth century

Various "walking bicycle" models were developed simultaneously in Germany, France and England in the early nineteenth century. The German Fischer and the Frenchman Michaux applied the "pedal" technique directly on the front wheel independently of each other for the first time in the mid-nineteenth century. Michaux then brought these *vélocipèdes* into production, but domestic demand was great and this bicycle was therefore unknown outside of France until the late 1860s. From 1870 onwards, Turner imitated the Michaux bicycle for the English market. Adjustments were made, primarily for purposes of making higher speeds possible, such as enlarging the front wheel, which required an iron construction

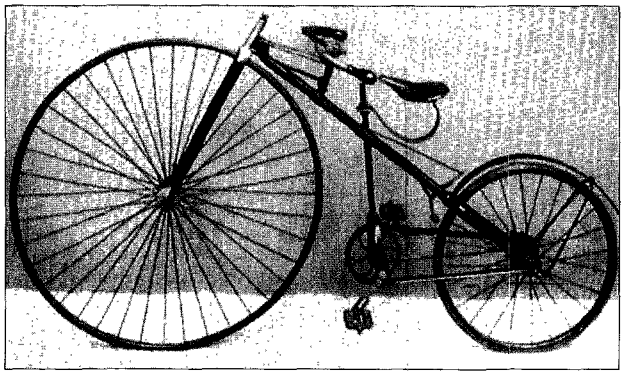
instead of the wooden one that had been customary until that time. In 1871, James Starley began producing the "Ariel", a model equipped with (massive) rubber tyres. This bicycle type was later given the generic name "ordinary" or "high bicycle" (Figure 1).

Figure 1
Starley and Hillman ‚Ariel' bicycle, 1871.



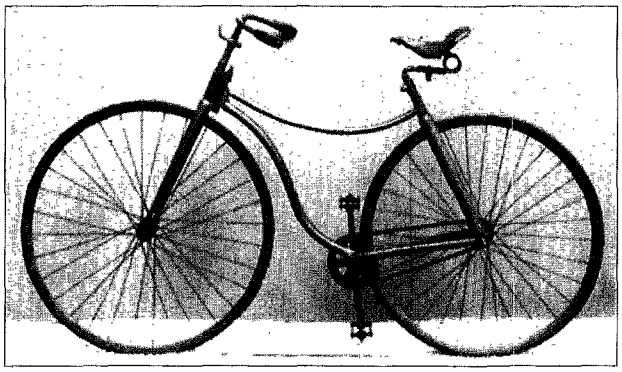
Around 1880, improvements were made to the concept of the "ordinaries" in order to reduce the risk of somersaulting and to increase the speed of the bicycle. An important invention was the "safety bicycle", which by having the chain drive on its rear wheel, increased transmission efficiency and therefore rendered the large front wheel unnecessary (Figure 2).

Figure 2
Lawson safety 'Bicyclette', 1879.



The year 1884 saw the great success of the "Rover Safety" developed by James Starley and William Sutton (Figure 3).

Figure 3
Rover Safety, 1885.



The last essential development of the bicycle in the nineteenth century concerned tyres, which were initially made of solid rubber. Two new systems improving cyclist riding comfort, the "cushion tyre" and the pneumatic tyre, appeared on the market around 1890. The cushion tyre (1889) was a hollow rubber tyre with better cushioning than the massive rubber one. The Irish veterinarian John Boyd Dunlop developed the pneumatic tyre, which needed to be pumped, and which the Frenchman Michelin also began producing.

The first bicycle factories in the Netherlands

The first bicycles that appeared in the Netherlands in 1867 were Michaux *vélocipèdes* imported from Paris. These were imitations constructed out of wood or crude iron by local forges and carriage makers. The first bicycle industry evolved rapidly from this. In 1868, J.T. Scholte, owner of a metalwork factory, began his own bicycle business, initially importing bicycles from France (from Michaux) and later manufacturing them on his own. In 1870, the Deventer smith H. Burgers also began producing wooden *vélocipèdes*, inspired by the Michaux model (Figure 4).

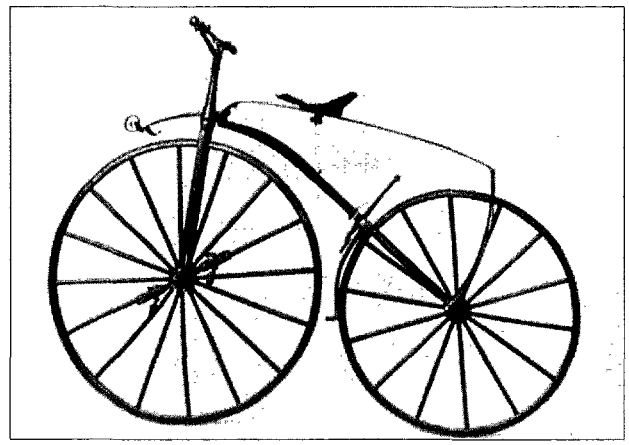


Figure 4
Michaux *Vélocipède* bicycle, 1867.

Burgers later switched to the manufacturing of steel *vélocipèdes*. Unlike the Groningen smith A. Fongers, who assembled his bicycles from ready-made imported parts (Figure 5), Burgers constructed the bicycle parts himself as much as possible, so as not to have to depend on parts supplies from abroad.

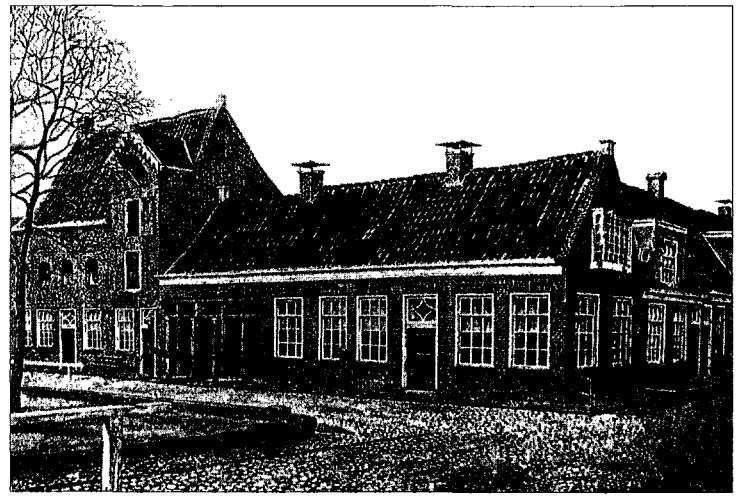


Figure 5
Fongers' forge (right) and the space he purchased for his bicycle factory (left), 1885.

In the early 1890s, the majority of bicycle models developed elsewhere could be obtained in the Netherlands. After the development of the pneumatic tyre, interest in the "Safety" also became widespread in the Netherlands. This breakthrough resulted in an increase in Dutch production. Simplex and Gazelle were among the manufacturers who began producing bicycles around 1890. C.H. Bingham established the Simplex Automatic Machine Company in 1890, which then began manufacturing bicycles in Utrecht. Post office manager Willem Kölling started a bicycle business in Dieren in 1892, which expanded so quickly that he sought collaboration with the smith Arentsen. The new model from the firm Arentsen & Kölling came onto the market under the name "Gazelle".

Bicycle industry and *RAI*

The *Rijwielindustrie* ("*RI*") (The Bicycle Industry) was an association established on December 17, 1893 in an upstairs hall of the *Haagse Koffiehuis* (a restaurant in The Hague), its primary objective being to curtail the proliferation of bicycle exhibitions, which was undesirable for manufacturers. They decided to organize their own exhibition, which subsequently took place in Amsterdam in September of 1894. In later years, exhibitions were organized for both bicycles and cars. The name of the association was changed on January 5, 1901 to *Rijwiel en Automobiel Industrie* (Bicycle and Automobile Industry), the RAI, an association of manufacturers and importers of modes of transport that exists to this day.

In spite of the advent of the Dutch bicycle industry, 85 per cent of Dutch trade in bicycles in 1895 was still from English manufacturers. The demand for bicycles increased significantly from that year onwards and, since English manufacturers were unable to meet the demand, customers began switching over to models from other countries, the American producers profiting most from this. The Dutch factories of Burgers and Fongers also expanded in 1896.

America, land of the bicycle

The bicycle industry thrived in the United States at the end of the last century. As many as ten per cent of all Americans owned a bicycle (Andric, Gavric and Simons, 1990). In 1896, 250 bicycle factories manufactured around one million bicycles, nearly half of the production worldwide that year.

Table 1
Bicycle production in several countries, 1896.

USA	1,000,000	
England	600,000	
Germany	500,000	
Other countries	200,000	(including the Netherlands: 20,000)
Total	2,300,000	

Source: *ANWB, Kampioen* (monthly magazine for members) 1897 (reported in: Veraart, 1995).

The demand for bicycles in America diminished rapidly after 1896. As a result, production declined by one-third, prices fell due to fierce competition and 35 per cent of the manufacturers went bankrupt.

In spite of the expansion of the Dutch industry, the Netherlands' share of worldwide production remained limited at less than one per cent. The annual production of the Dutch bicycle industry after 1910 amounted to 30,000 to 40,000 bicycles per year, around 30-40 per cent of the demand in the Netherlands.

Table 2
The five largest Dutch bicycle manufacturers in 1910.

	employees
Burgers, Deventer	300
Fongers, Groningen	300
Simplex, Amsterdam	200
Gazelle, Dieren	120
De Vierkleur, The Hague	100

The first cyclists and the problems they faced

Who were the Dutch cyclists during this period of development? The answer to this question is closely linked to the high price of the bicycle, which was primarily determined by production methods and numbers.

Clearly differentiated production was the case in trend-setting England as far back as the 1880s. Small companies delivered specialized products to the larger bicycle factories, which then assembled the bicycles. The production process in the Netherlands was more labour-intensive than in England because, for all intents and purposes, there was no delivery of specialized parts. But because labour costs were lower in the Netherlands, the Dutch bicycles could be offered at prices that were comparable to the English ones.

Table 3
Bicycle prices in guilders for the "Ordinary" model.

Samuels (NL), 1887	100-150
Imported bicycle from England, 1887	100-200
Burgers (NL), 1889	90-150
Imported bicycle from England, 1889	60-132

Source: H. Burgers price list and *Kampioen* (reported in Veraart, 1995).

The bicycle continued to be a true luxury item in the Netherlands until at least 1890. Prices, which started at 40 guilders and ran to 350 guilders, were far too high for the average skilled labourer in the big cities, whose disposable income was less than two guilders per week. The first cyclists therefore constituted a small elite group that had the time and money to buy a *vélocipède*. Others were able to get acquainted at fairs with the *vélocipèdes*, which became steadily more popular among the growing middle class in the big cities.

The well-to-do caused quite a stir with their *vélocipèdes*. This new phenomenon was not generally met with great enthusiasm, certainly in the countryside. The cows were in a state, the horses ran wild and the villagers preferred to see the cyclist going rather than coming. Not surprisingly, many a cyclist was also besieged by opponents of the bicycle (*ANWB*, 1983):

> "Somewhere between Diemerbrug and Amsterdam my front wheel was hit with such a heavy chunk of coal that it broke. It was then flung by with savage force by some brute at a barge that was sailing past. I was just grateful that this faithful adherent of traditional ways didn't hit my head!"

Some regions, including the areas surrounding Delft and Staphorst, were notorious for such hostilities for years on end.

The aggressive behaviour of the rural population prompted cyclists to join together into cycling clubs. *Immer Weiter*, the first Dutch cycling club, was established in Deventer back in 1871. Its objective was defined in the bylaws as follows:

> "Firstly, to increase and enhance the joy of *vélocipède* riding by means of working together in unison. Secondly, to prevent abuse which could otherwise have unfavourable consequences for *vélocipède* riders."

These "abuses" referred to not only assaults on cyclists by opponents but also to the cyclists themselves, who ran into people from time to time or did not dismount when carriages approached and therefore upset the horses, causing them to run wild.

After the formation of *Immer Weiter* in Deventer, similar clubs were established in other municipalities. In 1883, two chairpersons of a *vélocipède* club conceived a plan for establishing a common *vélocipède* club for the Netherlands, such as also happened in England, France, Germany and various other countries. An invitation was sent to all clubs for the inaugural meeting of the *Nederlandsche Vélocipède Bond* (Dutch *Vélocipède* Union) (NVB) on July 1, 1883 in Utrecht. The *NVB*, whose name changed to the *Algemene Nederlandsche Wielrijders Bond* (General Dutch Cyclist Union) (*ANWB*) in 1885, became an important promoter of Dutch cycling interests. The most important tasks of the *ANWB* initially consisted of propaganda activities, protecting the interests of tourists and stimulating road improvement.

The first bicycle storage facilities

In spring of 1887, a café owner in the city of Schijndel in Brabant came up with the idea to erect a bicycle stand where his guests could park their bicycles. He referred to it with a sign with the inscription "*velocipède* station", an idea that was later imitated by scores of other café owners.

The first guarded bicycle storage facility was opened on May 1, 1895 at the chic *Kurhaus* seaside resort hotel in Scheveningen near The Hague. It was an initiative of short-lived duration, as the business closed again three days later because, so the story goes, the guard preferred to lie on the beach than to guard bicycles. The parking facility was re-opened on the 15th of June 1896 with an "expert bicycle repairman" on duty.

(Written in a letter from W.J. Simons to A. Guit, June 30, 1988)

Gradual increase in bicycle use

From the 1890s onwards, the bicycle became more than simply a toy for the well-to-do. Exact cyclist figures are lacking, but it is possible nonetheless to deduce the increasing popularity from the increase in the number of *ANWB* members (Table 4).

Table 4
Number of *ANWB* members as of August 1.

1888	1,983
1891	3,260
1894	4,551
1897	15,493

Source: *Kampioen* 1897.

A clearer picture of the number of bicycles can be obtained from tax data, starting in 1899. In this year, there were 94,370 bicycles (1 bicycle for every 53 inhabitants) and, by 1906, this number had grown to 324,748 (1 bicycle for every 17 inhabitants).

Bicycle ownership was promoted after 1900 due to considerably cheaper production in England and Germany. Dutch bicycle manufacturers expanded their product range with cheaper models out of sheer necessity. Around 1910, the least expensive Dutch bicycles cost 55 to 70 guilders. At that time, 60 per cent of skilled labourers' disposable income was spent on food and 40 per cent on other items. This 40 per cent amounted to 300-400 guilders per year. The bicycle had therefore become within reach of more people. This could also be seen from the total number of bicycles in the Netherlands, which had reached around 435,000 by 1908. The number of cyclists continued to increase, in relation to the population, to 1 of every 13 inhabitants in 1908 and 1 of every 10 inhabitants in 1912. As a result, bicycle traffic dominated the street scene (not taking pedestrians into account) (Table 5).

Table 5
Traffic share percentages; averages for the Netherlands, 1908 and 1916 (in percentages).

	1908	1916
Motor vehicles	1	4
Motorcycles	1	2
Bicycles	62	75
Hand carts, wheelbarrows, etc.	8	4
Other vehicles	27	15

Source: Rijkswaterstaat (Directorate-General of Public Works and Water Management), *Public works report* 1917.

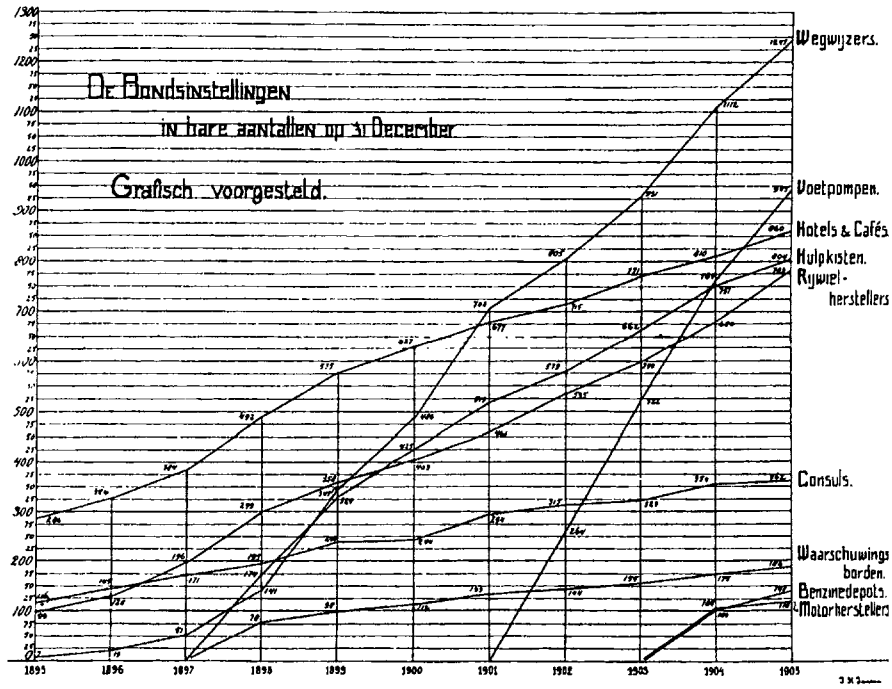
As bicycle use rose, so did the number of *ANWB* members and, with that, the scope of the Bond's activities, which then primarily focussed on developing numerous facilities for cyclists (Figure 6).

Figure 6
Expansion of *ANWB* activities for tourism purposes, 1895-1905.

ANWB establishments by numbers on December 31,

depicted in a graph.

Signposts
Foot-pumps
Hotels & Cafés
Service boxes
Bicycle repairmen
Local representatives
Warning signs
Fuel depots
Motorcycle repairmen



Source: *Eigen Haard*, 1906, p. 304

Stimulating road improvement and construction was an important task for the Bond. The *ANWB* did not endeavour to construct the roads themselves, but rather tried to induce others to do so, partly due to costs. One of the initial projects carried out in co-operation with the authorities concerned a bicycle path along a portion of the Breda-Tilburg

cobblestone road (and state highway). Between 1899 and 1902, an experiment was carried out using a bicycle path built over a 1400-metre stretch. The roadway was widened to six metres with two paved bicycle paths "lying even with the roadway" on both sides (Figure 7).

Figure 7
The construction of the Breda-Tilburg state bicycle path using a flattening roller, 1902.

Several bicycle paths were constructed with an *ANWB* subsidy, in particular in the southern province of Brabant during the first few years after 1900. Throughout the entire country numerous recreational bicycle paths (separate from the roadway) were constructed by "bicycle path associations" set up for this purpose (Ploeger, 1990).

Government policy and bicycle traffic: regulations and taxation

The initial involvement of the central government in bicycle traffic concerned taxation. The bicycle was included in the "wealth tax", a tax on luxury items, in 1899. Protests from the *RAI* and *ANWB* proved in vain. In later years, the *ANWB* campaigned increasingly against the bicycle tax, as, after all, it was becoming more difficult to argue that the bicycle was a luxury item. In 1919, this protest finally had results: the House changed the wealth tax law and rescinded the bicycle tax.

Shortly after the introduction of the bicycle tax, the central government also began financing infrastructure facilities for bicycle traffic, though only sparsely. Due to the increase in bicycle traffic, local authorities were, at first, practically forced to contribute to the construction or improvement of local roads. A modest amount of 3,000 guilders of the national budget was allocated for the first time in 1901 for the construction of bicycle paths (Ploeger, 1990).

The automobile appeared on Dutch roads in the late 1890s. Like the bicycle, it was initially considered primarily a sport and recreational toy for the well-to-do. Car traffic also experienced much resistance from the population in the beginning. Although the car played very little role in economic life until the First World War, the inconvenience it caused was reason enough for government interference during this early period. This inconvenience mostly referred to dust being blown about and the noise and dangerous situations generated

by the automobile. As a result, the Motor and Bicycle Act went into effect in 1906. Thanks to an *ANWB* petition, among other things, bicycles were also included under the Act, whose regulations applied to all roads, including provincial and municipal ones. A number of rules of conduct, among other things, were laid down in the law for the use of bicycle paths, in addition to requirements which the various modes of transport needed to meet. Bicycles needed to be equipped with a "properly functioning steering mechanism", a bell (a horn or trumpet sufficed until 1906), at least one properly working brake and, when used after dark, a "lantern".

Bicycle theft: a problem back in 1918

In the neutral Netherlands during the First World War, scarcity of rubber and rubber tyres led to a large increase in bicycle theft. F.W.N. Hugenholtz called for attention to this problem in the Lower House in 1918. He objected to people simply leaving their bicycles on the street without any kind of supervision, an indifference that was facilitated by the ease of insuring against theft for a small fee. Hugenholtz pleaded for obligatory bicycle numbering and registering, though the Minister of Justice did not think much of his idea. When asked for their opinion, the *ANWB* stated that they, too, were not very optimistic, as a numbering system would simply demand too great a monitoring effort.
The Minister believed more in tackling the negligent behaviour of the public. The police in Den Helder, a city in the northern part of the country, began removing unattended bicycles and cyclists were even given tickets for leaving behind their property "on public roads and not under continuous surveillance by an individual authorized for that purpose". The Minister wanted to bring this possibility to the attention of other municipalities (Veraart, 1995 and Verburg, 1998).

Road improvement for 20 passing cars per day

The Minister of Public Works and Water Management C. Lely let it be known in January of 1899 that, in response to the increase in motorized traffic, the narrowing of roadways must stop. Lely continued to press this point, even after becoming a Member of Parliament in 1901. He argued in December of 1906 that it was necessary to recognize the car as the mode of transport of the future, certainly if it were to become faster and cheaper. In view of that picture of the future, he believed that widening roads and releasing budgets for this to be inevitable, though he did not receive much support for his ideas in the House. Minister Kraus of Public Works and Water Management began a study into road conditions for the purposes of determining what would need to take place in order to obtain a "network of suitable major roadways for automobile traffic". This study was not completed until the summer of 1908. The new Minister J.G.S. Bevers stated that, "it appears that in the majority of provinces, automobile traffic is not of the kind of nature which warrants the widening of state highways". The figures supported him. An average of 20 cars per day was counted at each observation point on the state highways in the first traffic count, in 1910. At the busiest points, only 60 to 90 cars passed per day (Ligtermoet, 1990).

1.2 1920-1950: The bicycle as a means of mass transport

The change in the picture after 1920 was twofold. Bicycle use increased explosively, the bicycle becoming the most popular mode of transport for the Dutch, and the government developed a traffic policy. This policy was not so much a facilitation of the most popular mode of transport, but as an early sense of the necessary facilities for the car, the transportation mode of the future. A description of the situation in four Dutch cities, which follows at the end of this section, clearly illustrates the tension between the situation on the street and traffic policy.

Massive bicycle use

Road traffic made a definitive breakthrough in the period between the two World Wars and government interest increased. Bus transportation had been developed during the First World War and primarily competed with the train and not with the bicycle. Starting with the Amsterdam-Rotterdam railway line (1847), numerous railways were constructed in the Netherlands, primarily after 1860. In 1880, the railway network had already reached a length of 2,000 km with all major cities being connected. The necessary interurban tramlines were added later on. The number of train passengers fell, however, between 1913 and 1938 by eight million to 47.8 million.

From the mid-1920s, car traffic grew at a rapidly increasing rate due to the lower price of the car as a result of growing mass production. By 1930, there were nearly 68,000 passenger cars in the Netherlands, and although the depression in the 1930s caused the increase in motorized traffic to decline, by 1939 the number of passenger cars had reached 100,000. This development, however, was insignificant compared to the increase in the number of bicycles (Table 6).

Table 6
Number of bicycles and passenger cars in the Netherlands, 1924-1940.

	Bicycles	Passenger cars
1924	1,800,000	
1930	2,700,000	68,000
1937	3,500,000	91,000
1939		100,000
1940	4,000,000	

By 1940 the bicycle had become common place, with an average of 1 bicycle for every 2 inhabitants in 1940. As the average annual wages were around 2,100 guilders, the prices of the cheaper Dutch bicycles in particular (Fongers and Gazelle: 50-70 guilders) were no longer an obstacle to ownership as early as 1930. Dutch production had risen significantly in the meantime. Burgers, the largest bicycle factory, produced around 100,000 bicycles in 1931. In the 1930s, the total Dutch bicycle industry produced around 400,000 bicycles per year (Andric, Gavric and Simons, 1990) and countless types of carts and wagons disappeared from the urban traffic scene. Cyclists dominated, as did pedestrians, with a few passenger cars or trucks interspersed here and there.

The bicycle as a genuine mode of transport in numerous countries

The Netherlands and Denmark, presently considered in the western world as "bicycle countries", had the same reputation back in 1930. Nevertheless, other countries also counted considerable numbers of cyclists, even the mountainous Switzerland (Schacht, 1933).

Table 7
Vehicle ownership in various countries, 1928.

	Number of inhabitants	
	per bicycle	per car (passenger cars and trucks together)
The Netherlands	3.25	208
Sweden	3.90	9
Denmark	4.75	71
Belgium	5.10	121
Switzerland	5.40	126
Germany	5.80	245
France	6.00	71
England	7.10	60
Italy	13.40	450
USA	70.00	6

The streets were becoming more and more crowded. The average traffic intensity (excluding pedestrians) increased sixfold between 1916 and 1938 and the speed and numbers of traffic participants in the various categories continued to diverge (Table 8). This development primarily manifested itself on the main roads.

Table 8
Traffic share percentages on national main roads; averages for the Netherlands, 1923-1932 (in percentages).

	1923	1926	1929	1932
Cars	11	22	28	39
Motorcycles	5	4	4	5
Bicycles	74	66	64	54
Hand carts, wheelbarrow, etc.	2	2	1	0
Other vehicles	8	6	3	2

Source: Rijkswaterstaat, *Reports on traffic observations*, 1929, 1932.

The increasing differences in speed and numbers were responsible for a significant rise in the number of traffic accidents. In 1934 there were 744 traffic deaths, a third of which involved a cyclist.

Germany occupied the Netherlands from May, 1940 until May, 1945. Bicycle use declined considerably during the occupation, mainly as a result of an increasing shortage of bicycle tyres, which became a rationed item as early as March, 1941. Anyone wanting a new tyre needed to turn in the old one and demonstrate that he lived at least 5 km from his place of employment and needed the bicycle in order to cover that distance on a daily basis. There were therefore fewer bicycles seen on the larger roads, 55 per cent fewer in late 1943 than three years previously (De Jong, 1995). Apart from that, the period of occupation brought on an enactment which remains in force to this day. Because the Germans found the large number of cyclists in the Netherlands to be bothersome, they introduced a distinction between "fast" traffic and "slow" traffic into the right-of-way rules. Only recently was the decision made to abolish this rule, so that, starting in 2000 or 2001, the cyclist from the right will once again have the right-of-way at an intersection of equal roads.

Requisitioning of bicycles

The shortage of modes of transport increased during the occupation (1940-1945) because the Germans, who experienced great difficulties with transporting goods and troops, requisitioned vehicles on a regular basis, including inland craft, trains, trucks and passenger cars as well as bicycles. In July of 1942 alone, 50,000 men's bicycles needed to be made available by the population within two weeks. Bicycle storage facilities at stations and in residential areas were emptied in the big cities for this purpose, insofar as the inhabitants had not already done so themselves. This action by the Germans stirred up bad blood and was considered "massive bicycle theft". The following was later read in a monthly report by a high German serviceman: "The Dutchman, who is practically born on a bicycle, views the seizing of his bicycle to be nearly the worst thing that could even happen to him" and "no other German enactment has called up such bitterness in all ranks of society as this one" (De Jong, 1995).

Partly due to the difficult economic situation following World War II, the pre-war traffic pattern continued for several years. The 1947 census shows that, of all commuters, 52 per cent travelled by bicycle and five per cent by car. The remainder went by public transport. The term "commuters" is understood to mean the working population employed outside of the place of residence, therefore referring to the longer journeys by definition.

Early emphasis on the car in national traffic policy

The dominant role of the bicycle in the traffic scene of the 1920s and 1930s was not evident in the national traffic policy. In 1923, there were 30,936 cars in the Netherlands, 36,714 motorcycles and two million bicycles - in other words, thirty times more bicycles than motor vehicles. Nonetheless, the government's attention primarily focussed on infrastructure for car traffic. The pressure placed on the government to improve or construct main roads became greater following the establishment in 1919 of the *Vereeniging Het Nederlandsche Wegencongres* (The Dutch Road Congress Association) (*NWC*), chiefly stimulated by the *ANWB* and the Royal Institute of Engineers. The Directorate-General of Public Works and Water Management engineers also participated in the Association's "executive committee".

***Rijkswaterstaat* (Directorate-General of Public Works and Water Management)**

Established in 1798, the Rijkswaterstaat was responsible for constructing and administering roads, railways and waterways of national interest and for protecting the country against water. In recent years, water quality control has been added to the list of tasks. The Rijkswaterstaat fell under several ministries during its two centuries of existence, but has been under the Ministry of Transport, Public Works and Water Management (hereinafter called the Ministry of Transport) since 1947.

An *NWC* committee concluded in 1924 that the necessary road improvements could be financed from revenue yielded from a road tax. Following long deliberations, the Minister of Public Works and Water Management adopted this proposal and, in 1928, the "Road Tax Act" went into effect, the revenues of which were to be deposited into a "Road Fund". Furthermore, the Directorate-General of Public Works and Water Management was given the order to set up a "State Road Plan" which was to indicate the improvements to be made

on 92 different roads in the next five years in addition to the construction of 51 new stretches of road and 12 bridges.

The 1930s saw the heyday of road construction. In the second Road Plan of 1932, a total budget of 100 million guilders was allocated for the first five years, giving a start to the systematic approach to road construction. The Rijkswaterstaat's road expenditures rose from 17 million guilders in 1930 to 23 million in 1935 to 70 million in 1939 and 1940. These expenditures were also a result of the depression, the government having resolved in 1934 to combat unemployment with a "labour expansion" programme. The work projects eligible for this programme chiefly involved road improvement, though road construction also received financial support from the "Labour Fund".

Once the second State Road Plan was underway, a new lobby of the *NWC*, among others, began to push for the construction of a road network intended solely for car traffic. The Rijkswaterstaat concurred and set up the Motorway Plan, a network consisting of eleven connections, which was adopted by the Minister in June of 1936.

Integral traffic policy in the 1930s was as difficult then as it is now

The Road Fund's expenditures exceeded the revenues from the outset. The Rijkswaterstaat also contended with great losses made by the railways. A resolution was therefore made in 1934 to abolish the Road Fund and to include the road budget in a Traffic Fund in which all expenditures for railways, tramlines, waterways, airways and roads would be joined together in order to be able to weigh out the expenditures. The Rijkswaterstaat intended the Traffic Fund to actively co-ordinate the policy, the basic principles of which were the following:

- Traffic should be considered as a coherent whole;
- The development of private (road) traffic may not lead to the railways being left with only unprofitable lines;
- Bus company monopolies are prohibited.

Co-ordinating traffic policy, however, turned out to be a cumbersome task. In 1937, the Lower House observed, and the Minister acknowledged wholeheartedly, that there did not exist so much as an initiative for co-ordinated policy. This continued to remain true: the Traffic Fund was simply the sum of the various entries for railways, tramlines, waterways and roads.

Director-General Harmsen of the Rijkswaterstaat stated the following in 1949 about the co-ordination objective of the Traffic Fund: "No one has ever been able to understand what the content of this objective meant in reality".

Government attention to cyclists: as a source of taxation

While much energy was being expended on facilities for the car traffic of the future, attention to bicycle traffic was limited, and any existing attention was primarily negative. In September, 1923, the Finance Minister concluded that due to the economic crisis treasury funds were low and new, extra taxes were needed. One of these was to be a new bicycle tax imposed on bicycles ridden on public roads. From then on, bicycles would need to be furnished with tags, which could be obtained for a tax of three guilders. Opposition to the proposed law was universal, however.

Figure 8
Cyclists at the beginning of the Leidsestraat, Amsterdam, 1924. Photograph placed in *Panorama* as evidence of the character of the people's mode of transport as a protest against Minister Colijn's bicycle tax.

The *ANWB* felt that the annual three-guilder-per-bicycle tariff was much too high. They pleaded for a differentiation in the amount according to income and the value of the bicycle (the price of a good bicycle was anywhere between 70 and 150 guilders). This same opposition arose in the House, resulting in an article eventually being added to the bill with an exemption for "heads of families who need the bicycle for their profession or business and have not paid or will not have to pay income tax for the current year ". These cyclists received free tax tags with a punched hole in them, but were not allowed to use their bicycles on Sundays. Incidentally, the Germans abolished the bicycle tax in 1941.

Once the bicycle tax had been introduced and there existed a Road Fund that needed to be filled, the next step was obvious. In fact, the Road Tax imposed on cars was supposed to be used to fill the fund, but the vehicle fleet turned out to be too small to yield enough revenue for the ambitious road construction plans. It was therefore not long before the entire bicycle tax revenue went to the Road Fund instead of the general fund. In 1927, cyclists contributed as much money to the Road Fund as did motor vehicle owners.

Bicycle paths, however, were also financed from the Road Fund. In 1932, there were approximately 1,400 km of bicycle paths constructed from the Road Plan. But the costs involved in constructing these paths were not proportional to the total costs of renovating the road network. Moreover, bicycle paths along the state highways were primarily constructed in favour of car traffic. The minutes of the first Road Congress organized by the *NWC* in 1920 recorded that it was a misunderstanding to believe that the construction of bicycle paths was only intended to benefit cyclists:

> "After all, the construction of bicycle paths along the larger roads relieves traffic along these roads of an extremely bothersome element: the cyclist."

Four Dutch cities: an enlargement of the national picture

The bicycle was by far the major mode of transport in the 1930s in Dutch cities such as Amsterdam, Enschede, Eindhoven and Heerlen/Kerkrade. The car and public transport played little to no role, contrary to other Western European cities. There was only limited policy attention to bicycle traffic in Eindhoven, Enschede and Heerlen/Kerkrade during the 1930s, though this was not true of Amsterdam, where positive attention to bicycle traffic was evident in the spatial and traffic policy as early as the 1930s.

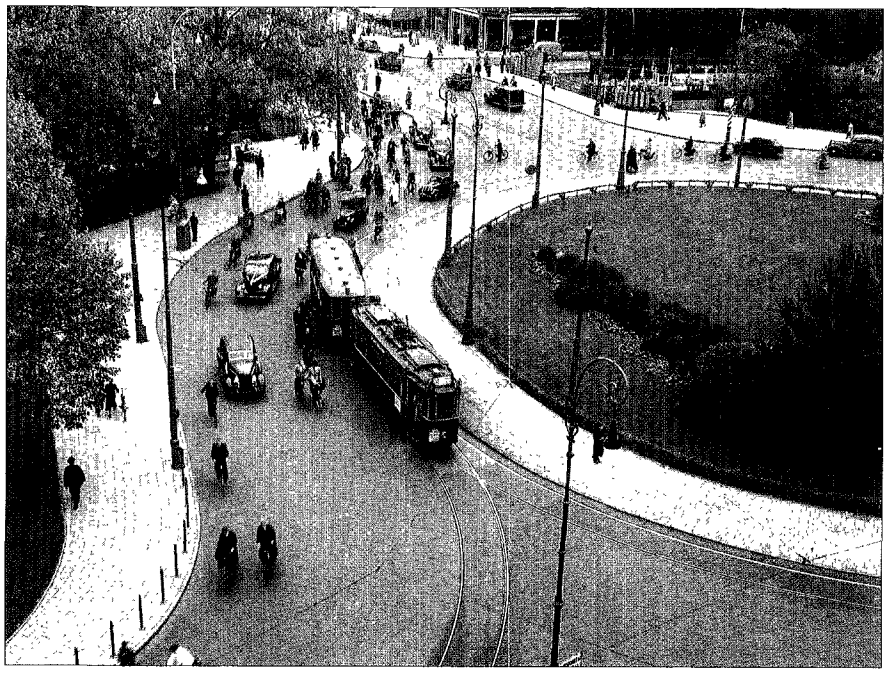
Amsterdam, 1928.

Amsterdam: bicycle-friendly urban development

The inhabitants of Amsterdam numbered around 530,000 in 1900 and around 706,000 in 1924. Busy commuter traffic on narrow radial roads led to traffic congestion as early as the 1920s and 1930s. Until the 1960s, commuter traffic consisted largely of pedestrians and cyclists and, to a lesser extent, tram and train passengers. The minor role of public transport was due to the compact semi-circular shape of the city centre, within which distances were short.

A Traffic Committee was established in 1922 at the request of the city council for purposes of improving the traffic situation and traffic safety. This Traffic Committee was faced with the dilemma of wanting to maintain the cultural historical character of Amsterdam while trying to adapt the city to the demands of "modern motorized traffic". The city therefore developed a plan for modifying and improving the existing roads. This plan turned out to have a great deal of influence on the spatial planning of Amsterdam, such as that set out in the urban development plan of 1935, considered to be the most well-known attempt at designing a "bicycle city". It consisted of a clear-cut vision in which residential and work locations would be planned in such a way that the maximum cycling distance would require less than 30 minutes at a speed of 15 km per hour (Ploeger, 1991). The execution of this ambitious plan, however, went sluggishly, only a minor portion being realized by 1940 and another minor portion in the 1950s.

Amsterdam, 1938.



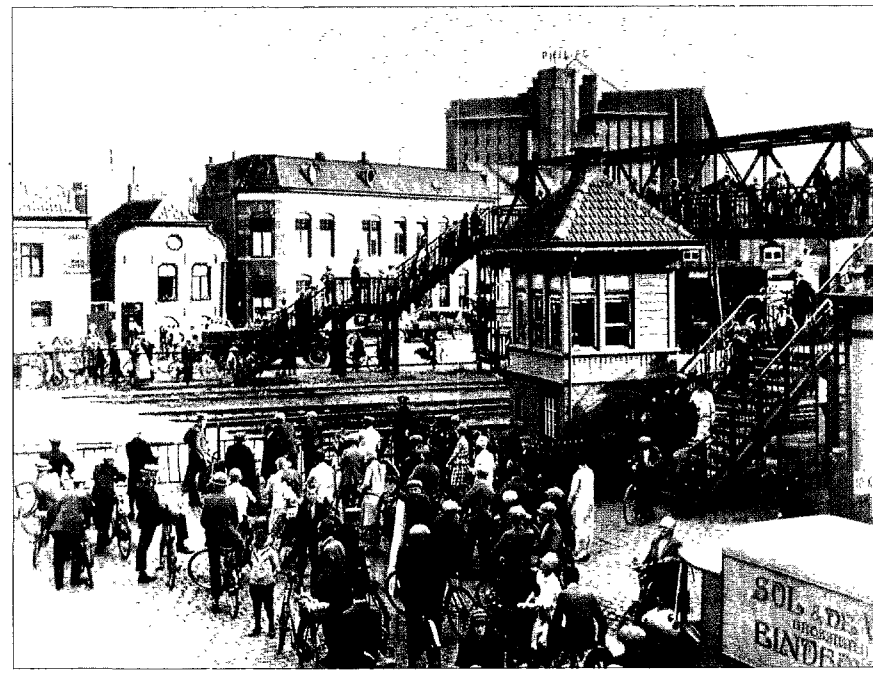
Although bicycles dominated the Amsterdam traffic scene before the war, the increase in car traffic downgraded the image of the bicycle from the 1920s onward. The rise in motorized traffic and increasing numbers of traffic accidents gave rise to the bicycle being depicted more and more as an unsafe mode of transport and the cyclist as a careless, unpredictable, undisciplined and unprofessional traffic participant who seriously impeded and slowed down other traffic (car, bus and tram). The large numbers of bicycles randomly parked were also considered a nuisance because they took up much pavement and road space. These notions resounded through numerous city councils and committees in the period 1920-1960 and long thereafter.

Eindhoven, Enschede and Heerlen/Kerkrade: a lot of bicycle traffic, little attention

The national increase in bicycle traffic in the 1930s could also be seen in Eindhoven, Enschede and Heerlen/Kerkrade. The share of bicycle traffic in the total number of trips by bicycle, car and public transport was approximately equal in all three: 80-90 per cent. The car did not actually play a role and public transport in Heerlen/Kerkrade played only a limited one. In spite of this, all three of these quickly developing cities saw little or no policy attention to bicycle traffic in the 1920s and the 1930s. There were, however, clear differences in the traffic developments in each city. What did these cities look like at that time?

Eindhoven grew from around 20,000 inhabitants in 1900 to more than 48,000 in 1920, primarily due to the large increase in employment at the Philips light bulb factory. By 1945 there were 130,000 inhabitants in Eindhoven. Enschede developed in a short time at the beginning of the twentieth century into a centre for the textile industry. The rise in population was comparable, from approximately 20,000 in 1900 to around 100,000 in 1930. The same story was true for the Southeast Limburg region (the cities of Heerlen and Kerkrade primarily), which saw an increase from around 23,000 people in 1899 to more than 141,000 in 1939, the driving force being the rapidly developing mining industry.

Eindhoven, 1928.



In Southeast Limburg, where altitudes range from approximately 80 to 170 metres above sea level, the hilly terrain influenced bicycle use. According to the city of Kerkrade, in 1935 only six of the 28 inclines could be ridden by the average cyclist in both the uphill and downhill directions, twelve could only be used for going downhill and the remaining ten could not be cycled at all by the average rider.

Maximum bicycle speed limits

The morphological conditions in Southeast Limburg and the traffic danger these caused may possibly explain a number of traffic ordinances in the 1920s and 30s, which prescribed the same maximum speed limits for cyclists as for motor vehicles on various streets within the built-up area. These limits were 20 km/hour in 1922, 35 km/hour in 1930 and 45 km/hour in 1939.

Transportation and compensation for mineworkers

Bicycle use among mineworkers was also initially high following the Second World War, so that in 1954, 46 per cent used the bicycle for commuting. Bicycle use was "encouraged", among other things, by making transport by company bus more expensive for employees who commuted for short distances at non-hilly stretches. The prices of company transport amounted to 3.55 guilders per week for distances up to 4 km, 2.65 guilders per week for distances from 4-7 km on flat terrain and 1.75 guilders for the remaining distances (1950).

Differences and similarities between nine Western European cities in the 1930s

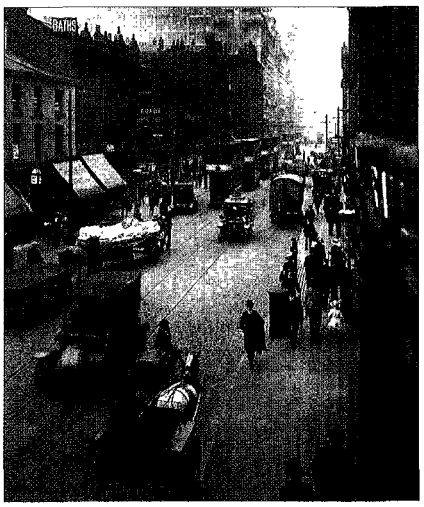
It is not surprising that bicycle use in the 1920s and 1930s in practically all cities in the *SHT* study of the history of bicycle use and policy in nine Western European cities, was relatively high in comparison with later years. By that time the bicycle had become a familiar and affordable mode of transport for the majority of people, making it possible to travel longer

distances than on foot. Moreover, only a few could afford the alternative, the car. Public transport was well developed in some of the cities, but remained a relatively expensive mode of transport. At the same time, a relatively intense process of urbanization began developing in (continental) Europe in the late 19th century, which lasted until the 1950s. As economic, social, political and cultural activities in the cities became more concentrated, the number of city inhabitants grew. The majority of city inhabitants were also employed within their city of residence. Urbanization coincided with both industrialization and an increasingly compact built-up area (condensation) and had a generally positive effect on bicycle use.

The bicycle share of the total bicycle, public transport and car trips in Amsterdam, Eindhoven, Enschede, Southeast Limburg, Antwerp and Hanover was quite large: 70-90 per cent. A public transport system was almost entirely lacking in Eindhoven, Enschede and, to a lesser degree, in Southeast Limburg. This is logical, too, considering the size of these three cities at the time, as regards inhabitants (approx. 100,000 in 1930) as well as surface area, and the concentration of employment opportunities and facilities in the city centres. An extensive public transport system is not worthwhile for a relatively small number of trips over short distances. The public transport system in Hanover was also not strongly developed, for unknown reasons, although it had become a sizeable city by the 1930s (400,000 inhabitants). This resulted in bicycle use in Hanover involving massive numbers and Hanover being the first city in which this became a "problem".
Despite the presence of a public transport system in Amsterdam in the inter-war period, the city, with a population of 750,000 inhabitants, was primarily conducive to cycling, partly due to the above-average concentration of activities in and near its centre. In relation to this, a benevolent attitude towards bicycles was adopted early on in Amsterdam. This was not in the form of "specific" bicycle measures, but in the form of facilitating the cyclist as a normal traffic participant.

A high bicycle share in spite of a relatively extensive public transport system was also true in Antwerp (350,000 inhabitants), though to a lesser degree than in Amsterdam. The car, however, also seemed to play an important role here both in reality as well as in terms of its image, partly due to early industrialization. This resulted in a somewhat lower bicycle share.

Manchester, 1913.



An extensive system of public transport already existed in Manchester (700,000 inhabitants) and Basle (160,000 inhabitants) before 1940, so that the modal share of the bicycle (in relation to the total bicycle, public transport and car trips) only reached a maximum of 25 per cent (Manchester) and 15 per cent (Basle). Why there was a significantly better and more extensive public transport system in Manchester and Basle in particular is difficult to establish. In Manchester it may have had to do with early suburbanization, while in Basle it may have been the result of its specific morphological and spatial structure, i.e. an elongated, densely constructed city in a narrow valley.

The situation was slightly different in the extremely compact city of Copenhagen (700,000 inhabitants), which had a good public transport system and a benevolent attitude towards bicycle use very early on. There were therefore an approximately equal number of trips by public transport as by bicycle in this city.

2 1950-1990: The decline and rediscovery of the bicycle

From around 1950, the bicycle share in the total number of trips and kilometres travelled started to decline and the decline accelerated after 1960. The total number of bicycle kilometres declined after 1960, as the bicycle began to be replaced more and more by the moped (motorized bicycle) and subsequently the passenger car. However, this decline in bicycle use came to a standstill in the 1970s and from the mid-1970s onward one could again speak of an increase in bicycle use on a national level.

This chapter initially examines the decline in the period 1950-1975. As in Chapter 1, a description of the development of traffic is given first, along with its social context and marked effects on traffic safety. The degree to which government policy focussed attention on car traffic - more so than in the period 1920-1950 - is subsequently discussed. The development of bicycle use and bicycle policy in the four Dutch cities mentioned earlier shows that the initial shifts of emphasis in traffic policy were already perceptible at a local level during this period.

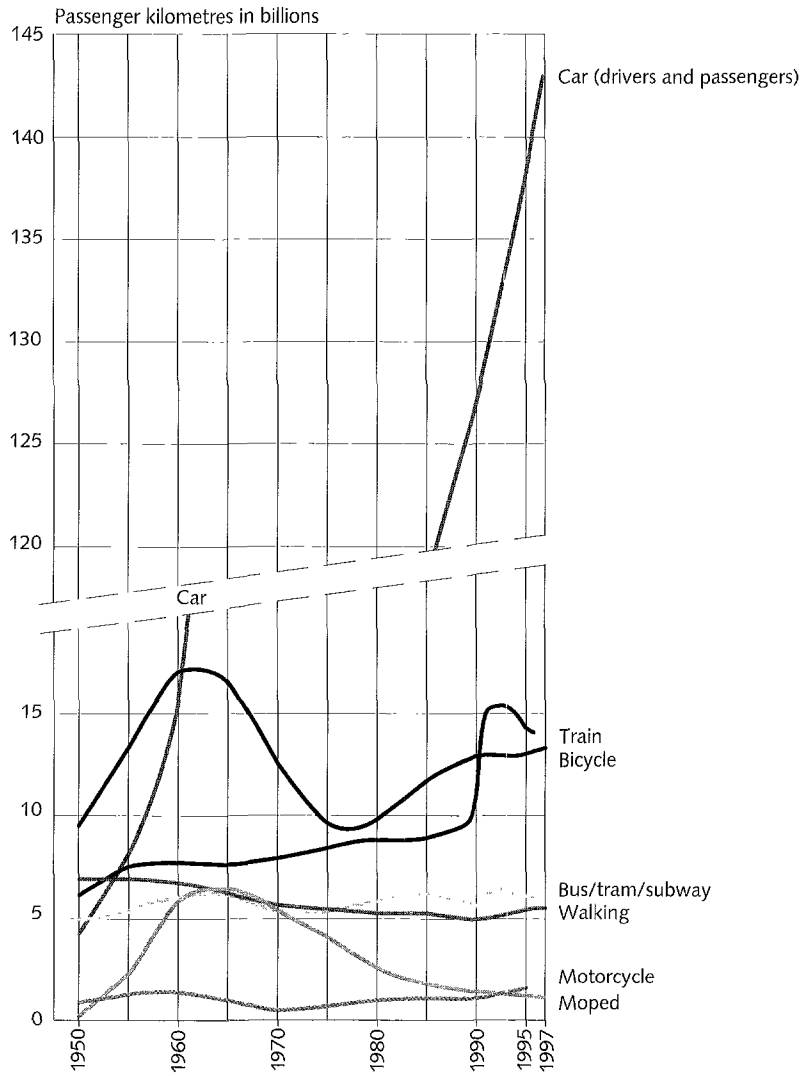
The rediscovery of the bicycle in the period 1975-1990 is subsequently examined. Government policy also underwent a fundamental change during this period. A prudent "trend reversal" took place in the perception of the increase in car use, which was expressed in growing attention to bicycle traffic, among other things. This was expressed primarily in financial terms until the 1980s and then, in later years, more with respect to the content of policy documents. Amsterdam, Eindhoven, Enschede and Heerlen/Kerkrade exemplify the rediscovery of the bicycle by the people. Local traffic policy in various cities was even clearly "ahead" of national policy. The trend reversal in national policy can therefore also be seen as a reaction to these local developments. For this reason, these four cities are brought into the limelight somewhat earlier in this section.

2.1 1950-1975: The significance of bicycle traffic declines

Car, bicycle and moped possession and use

After the Second World War, the total number of kilometres travelled by passenger cars showed an explosive increase from around 4.5 billion passenger kilometres in 1950 to 89.1 billion in 1975. The number of passenger cars rose from 139,000 in 1950 to 3.4 million in 1975. The average number of vehicle kilometres travelled per car, however, remained virtually constant from 14,900 km per year in 1963 to 16,300 km in 1994. This means that the increase in the number of (passenger) kilometres travelled by passenger car can be nearly entirely ascribed to the increase in the number of cars (Figure 9).

Figure 9
Change in the use of the various modes of transport in the Netherlands in passenger kilometres, 1950-1997.



Source: Central Bureau of Statistics and Ministry's Research Center *AVV*

As far as the number of kilometres travelled are concerned, notable curves can be perceived in the period 1950-1975 for the moped as well as the bicycle, both of which are on a quite different level from that of the passenger car. Since their introduction in the Netherlands in 1949, mopeds showed a spectacular growth to a maximum of 1.9 million in 1971. The decline that followed (primarily because the car became more affordable) was just as spectacular: to 463,000 in 1994.

Estimates are that between 1950 and 1960, there were between five and six million bicycles in the Netherlands. In 1970, this number had risen to 7.3 million and in 1975 to 8.6 million. Until 1960, the number of passenger kilometres travelled by bicycle was greater than by car. Bicycle use declined sharply thereafter and by 1974 had returned to its 1950 level. Precise figures on the development of the total number of trips per bicycle in the Netherlands are unavailable for this period. It is probable that the trend in the total number of kilometres travelled by bicycle can also be seen in the number of trips by bicycle but in a reduced form, as it is probable that the average distance per trip had also declined. Although the significant decline in the total number of kilometres travelled by bicycle, and probably also the number

of trips, only set in after 1960, the year 1950 is used as the turning point in this chapter nonetheless, owing to the fact that it can be inferred from local data that the relative significance of bicycle use had already dropped by around 1950. The bicycle share in the total number of trips dropped in Eindhoven and Southeast Limburg as early as 1950, slightly later in Enschede and even more so in Amsterdam, but clearly before 1960. The fact that the relative share of bicycle use had already declined earlier on can easily be attributed to the rapid increase in car use in the 1950s.
Absolute decline (after 1960) and relative decline (after 1950) of bicycle use were not only caused by mass motorization but also by the related, fairly unco-ordinated process of urbanization and by scores of social, spatial and economic developments.

Social, spatial and economic developments

The period following 1950 is characterized in many respects by turbulent developments. The number of inhabitants in the Netherlands rose from 10.0 million in 1950 to 13.6 million in 1975, an increase of more than a third. In the same period, the professional population increased by 44 per cent from 3.9 million to 5.6 million. The number of houses doubled from 2.2 million in 1950 to 4.4 million in 1975, while at the same time the average house occupancy rate fell from 4.4 to 3.1.

The combination of these developments did, of course, strongly influence the number of trips and their lengths. The relative share of the various modes of transport was also influenced considerably by changes in spatial developments. Between 1950 and 1975, the size of the built-up area increased by a factor of 2.9. This process was accompanied by a decrease in population density in the cities and generally led to longer travel distances. An expansion of housing facilities initially took place on a large scale and immediately adjacent to existing urban areas, often involving high-rise buildings. In the mid-1960s, sizeable new residential areas in centres of urban growth were created some 25 to 50 km from existing cities. The assumption was that employment would follow, but this was not the case. Commuting, largely by car, was the result.

The modal share was also strongly influenced by a considerable increase in the size of companies, all forms of education, hospitals, shopping centres and the like. In general, this development has led to an increase in travel distances, which has had important effects on the volume of traffic flows and the choice of mode of transport. The increased specialization of people and companies, too, has generally led to larger spheres of influence, and consequently longer travel distances. This increase in specialization is evident from the large diversity in professions and expertise, which has influenced commuter traffic and commercial traffic. Specialization in industry and in the service industry has influenced commercial traffic as well as cargo transport.

Prosperity, measured by disposable income in real terms per wage earner, rose in the period between 1950 and 1975 by a factor of 3. The rapid increase in car ownership is directly linked to this rise in prosperity. The increase in car use was further boosted by the increasing emancipation of women - partly made possible by increased prosperity, education, more liberal views, smaller family units and the spread of domestic appliances - and led to an increase in the number of women's activities outside of the home.

Decreasing traffic safety

The more the car dominated the traffic scene, the more traffic safety deteriorated. In 1950, the total number of traffic fatalities was 1,021, while 19,500 casualties were registered. The share of cyclists was 33 and 42 per cent, respectively. Those numbers reached a peak in 1972 with 3,264 traffic fatalities and 70,000 casualties of whom 17 and 32 per cent respectively were cyclists. This was, in other words, a 200 per cent increase in fatalities and a 250 per cent increase in registered casualties over a period of 20 years. This increase can naturally be attributed to an increase in car use. The fact is that the car is a threat to other road users, certainly if traffic behaviour, traffic regulations and infrastructure have not yet been adjusted to the dominant role of cars. From 1970 onwards traffic safety improved greatly and this trend, although levelling off somewhat, continues until today.

National traffic policy: road construction dominant, bicycle traffic out of the picture

Following the liberation from the Germans in 1945, public administration got going again quickly, including renewed attention to the road sector. The damage to roads and cross-river connections that had taken place over the course of the war was repaired in a short time. Naturally, thought was also given immediately to amending the State Road Plan. However, the State Road Plan financing could no longer be based on the Traffic Fund, which had been suspended in December of 1946 for a three-year period in order to devote the funds to post-war reconstruction. This three-year period was extended repeatedly and these financial obstacles resulted in the State Road Plan of 1948 differing very little from the one of 1938: only a single extra connection. Ten years later the situation had hardly changed and the 1958 State Road Plan was for all intents and purposes identical to its predecessor. The projects that had been planned two decades earlier were therefore far from having been completed. Other aspects of government policy (reconstruction, housing, and defence) were given priority, despite persistent pressure from the road construction sector.

Car ownership forecasts

Attention to car infrastructure dominated the traffic policy of the 1950s and 1960s, but in retrospect, can be seen to be based on strikingly low forecasts for the growth of car ownership.

Forecasts	Actual number of cars
Directorate for the National Plan, 1946:	
300,000 in 1960	522,000
450,000 in 1975	3.4 mill.
Traffic Research Centre, Rijkswaterstaat, 1953:	
600-800,000 in 1970	2.4 mill.
Le Cosquino de Bussy of the Rijkswaterstaat, 1958:	
nearly one million in 1970	2.4 mill.
Main Road Network Structure Plan, 1966:	
four million in 1980	4.5 mill.
seven million in 2000	1997: 5.8 mill.
Second Transport Structure Plan, Part A, 1988:	
eight million in 2010	

Table 9
Car ownership forecasts.

By the late 1950s, there were fewer financial obstacles. A consensus arose within the central government for financing road improvement from a new fund to be developed for this purpose. This State Road Fund was set up in 1965, financed from the national budget and, increasingly, by a surcharge to the road tax.

The budgets made available for national highways subsequently rose quickly, from 265 million guilders in 1965 to 678 million in 1971. In connection with this strong incentive for road construction, the Ministry of Transport created a "Main Road Network Structure Plan" in 1966, which replaced the State Road Plan for long-term planning. Based on American methods for calculating the network "grid", this plan contained a formidable number of (motor) ways to be newly constructed. In retrospect, this master plan can be characterized as the "high point" of government traffic policy aimed at facilitating car traffic, and therefore "asphalt-orientated".

From 1950 to 1975, the bicycle was almost entirely excluded from the government's vision. The Ministry of Transport subsequently admitted this whole-heartedly in 1983 (Verkeer en Waterstaat, 1983) by stating:

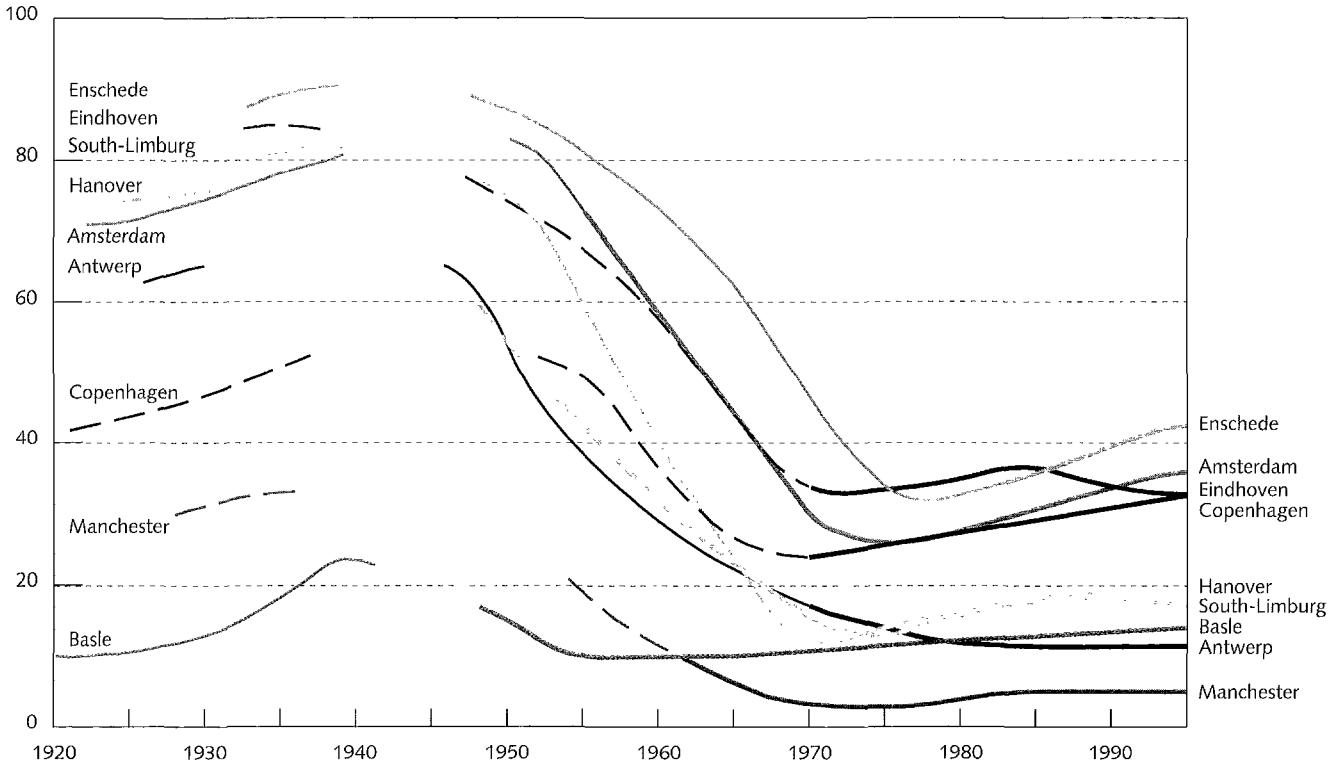
> "The number of passenger cars has increased since 1960 from half a million to 4.6 million in 1981. The significant rise in prosperity has not only contributed to cars becoming more affordable, but also actively promoted their use, including for those distances for which the bicycle was used in the past. This development was reinforced further as the distances between social activities grew significantly as a result of smaller family units and an increasing usage of space per person. As a result, the bicycle as such became less attractive. Until the early 1970s, attention to bicycle traffic was minimal. The prosperity expectations were such that within the foreseeable future bicycle traffic would decrease, certainly for commuting, to a negligible share compared to car traffic."
>
> "In the period between 1960 and 1975, the construction of bicycle facilities lost much ground due to the increase in car traffic, which resulted in greater emphasis being placed on constructing facilities for cars. The increase in car traffic left little

room over for the cyclist, while very few new bicycle facilities were being constructed. As a result, utilitarian bicycle traffic was pushed into a tight corner."

Local policy: Dutch cities compared to other Western European cities

This pattern of limited attention to a decrease in bicycle use was also clearly seen at a local level, though with considerable variation - and even more so in other Western European cities (Figure 10). In Manchester and Antwerp, for example, the bicycle no longer played a role in conceptualization and policy after 1950 as the bicycle share plummetted to less than 20 per cent of the total number of bicycle, moped, public transport and car trips. In Copenhagen, on the other hand, the bicycle share fell "only" from 50 to 30 per cent.

Figure 10
Reconstructed trend line of the bicycle share in the total number of car, public transport, bicycle and moped trips in the 9 cities studied.



These reconstructed trend lines of the development of bicycle use are based on the following types of data:

- *Modal splits for trips:*
  "Cut-and-dried" modal split figures were seldom available. Those that were available frequently lacked the "walking" mode of transport in their comparisons. As this was usually also the case with traffic counts (see below), pedestrians are not included in the comparison. A more limited problem with modal split data was that it was not always clear which "group" the modal split referred to, i.e. residents or travellers in a particular city? Assuming that the data contamination due to this uncertainty is limited, no further correction has been made. In any case, this data contamination will mean that there is always a slight underestimation of the bicycle share.
- *Traffic counts:*
  All vehicles passing a particular location (point, cordon or boundary line) were counted during a particular period, broken down into vehicle categories. Traffic counts were

especially useful if they encompassed a longer period; if they had a cordon-like set-up within the city; and if buses did not have a predominant share (so that variations in the degree of capacity utilization of those buses could not disrupt the picture too much). Traffic counts are used as supplements to modal split figures in such cases. In addition, they are always generally used to reconstruct trends separate from the precise figures.

Trend lines have been assessed per city on the basis of these data on modal splits and counts. Thin or interrupted trend lines mean a stronger degree of assessment. However, no sound assessment can be made for certain periods and as a result, the trend line is missing for those periods.

Rotterdam, 1960.

In general, it seemed that bicycle traffic in the Netherlands received little or no policy attention, but that there was no real anti-bicycle policy, as existed in other Western European cities. In Antwerp, the existing bicycle infrastructure was scarcely maintained from the 1950s onwards and was even removed in places. No funds were made available in Hanover for restoring pre-war bicycle paths and they were no longer constructed in new housing developments. Moreover, a bicycle ban was put into effect in many of the city centre streets. The majority of bicycle paths in Basle also disappeared due to road widening and bicycle lanes were converted to car parking lanes.

Bicycle parking policy in Basle in 1951

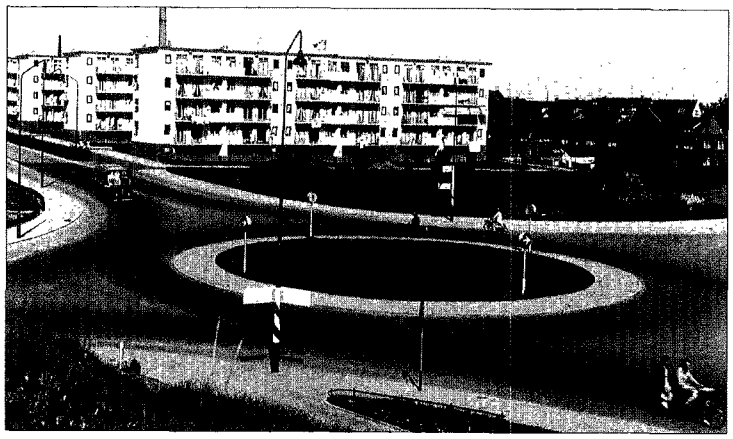
Even parked bicycles came under attack in the 1950s in Basle. A decision was made to expand bicycle parking facilities, make them obligatory and limit parking duration because, according to the Basle Chief of Police, "chaotically parked bicycles in the city centre seriously 'obstruct' other traffic participants". The duration limit was considered necessary in order to prevent "long-term parking" and was therefore limited to 1 hour close to shopping streets and 2 hours for movie theatres.

Among the four case-study Dutch cities, a comparable negative attitude towards bicycle traffic was only found in Southeast Limburg and, to a considerably smaller degree, in Enschede. In Eindhoven and Amsterdam, however, the opposite was the case, i.e. prudent acknowledgement of the value of bicycle traffic.

Southeast Limburg: bicycle traffic must go

The car needs to get into town

The daily regional newspaper *Limburgs Dagblad* repeatedly drew attention in the 1950s to the worsening traffic situation in the centre of the city of Heerlen. The newspaper felt that the city's traffic situation "continues to be geared towards the farmer's cart and those first bicycles which made the city unsafe back around the turn of the century". It urged "traffic measures in favour of car traffic on behalf of the traffic fatalities. It's time that Heerlen receives planning. This means that safe streets with ample parking need to traverse the city centre. A young city such as Heerlen should not set out to guide traffic around the city, but allow traffic to easily and safely enter and traverse the city."



Heerlen, 1953.

In 1963, the city of Heerlen decided to remove a number of bicycle paths along several main roads and to use that space for widening the streets and car parking facilities. Removing the bicycle paths also resulted in a number of other advantages:

> "The head of the traffic police division has declared that the city's traffic situation is leading increasingly to the use of traffic signals at intersections. Should bicycle paths appear at these intersections, this would require separate traffic signals, which would be too costly. Moreover, it would cause too great a delay for 'fast' traffic."

In the 1960s, the moped and the car replaced the bicycle to an increasing degree in Heerlen en Kerkrade. Traffic experts assumed that bicycle traffic was dying out. Moreover, the existing bicycle facilities and infrastructure were considered to be more than sufficient.

Heerlen travel patterns

A 1973 study into the trip patterns in Heerlen showed that 83 per cent of all households polled owned a bicycle, yet the bicycle had a share of only 14 per cent of all trips (excluding walking), the moped 14 per cent, the car 49 per cent and public transport 21 per cent. The low percentage of bicycle use and high percentage of moped use were exceptional for the Netherlands. The fact that the moped had become an important factor in Southeast Limburg in particular was certainly linked to the hilly terrain. The rest of the Netherlands, however, is virtually entirely flat.

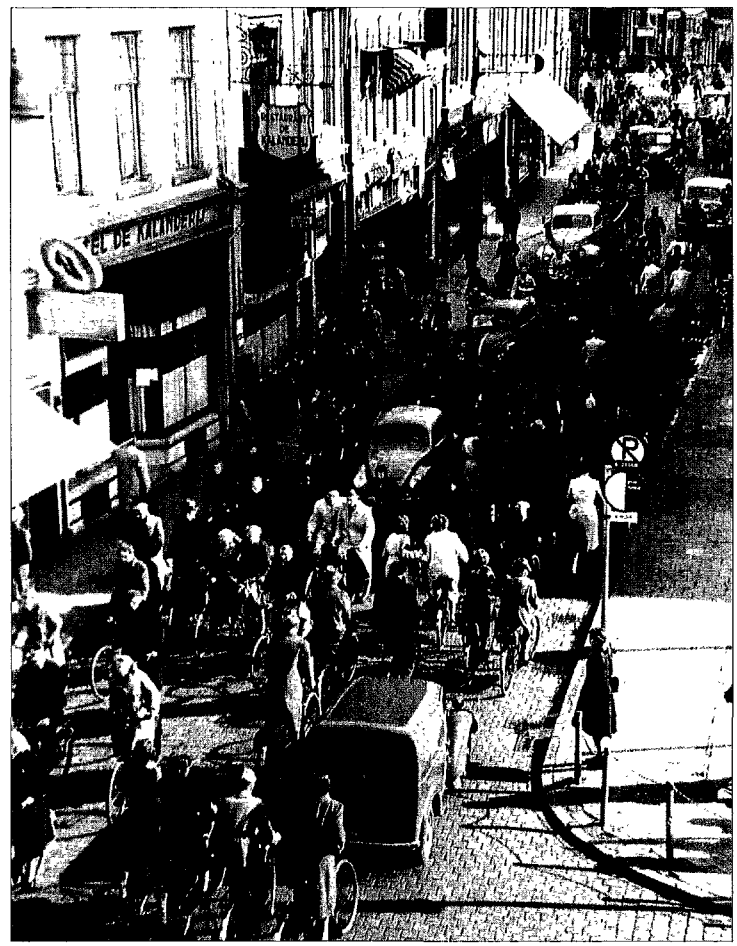
Enschede: bicycle traffic may vanish

The textile industry in Enschede and the vicinity, which was the main source of employment, began declining in the 1960s. New work locations were often situated further away from residential areas. A process of suburbanization also began in the late 1960s, creating significantly longer commuting distances and resulting in less bicycle use and more car use.

The underlying and dominant expectation in the traffic policy of the 1960s was that "city development" and mass motorization would lead to a decline in bicycle use. This expectation and the extrapolations of traffic intensity based upon it informed decisions on the dimension of planned roads and intersections in the city. The local Road Structure Plan of 1965 focussed on the "accessibility" of city services and facilities by car as well as the "openness" of the city centre by car.

Although policy makers in the 1960s expected the bicycle to vanish from the traffic scene in Enschede, the city resolved nonetheless to continue taking the bicycle into account until that time came. Bicycle lanes of 2.5 m in width were allocated on both sides of arterial roads, one of the reasons for which was certainly the promotion of the flow of motorized traffic on the main roadway. An incidental advantage was that the bicycle lanes could serve as parking lanes for car traffic following the anticipated disappearance of bicycle traffic.

Enschede, 1951.



Eindhoven: bicycle traffic can join in on receiving attention

In the late 1950s, the debate surrounding the increase in car traffic intensified in Eindhoven, as it did in the rest of the Netherlands. Many believed that the critical factor was the assumed economic importance of car traffic. This was also true in Eindhoven, where the target of activities in the city centre was urban construction and where accessibility by car was the creed. The flow of car traffic remained a problem as long as the ring road had not yet been completed.

In 1961, the German Schaechterle proposed that traffic would be diverted around the city at a greater distance from the centre. This would entail a system of interconnected expressways around the city and would result in through traffic no longer needing to pass through the city centre. Bicycle traffic would also profit from this, according to Schaechterle:

> "This development makes it necessary to create new space for traffic in order to relieve the arterial roads, which contain insufficient capacity, particularly around the city centre. In doing so, attention should primarily be paid to bicycle traffic, which has not yet lost any significance here. The relief of the present streets around the city centre that we are pursuing will lead to better traffic conditions for two-wheel vehicles."

An absolute separation of traffic flows on the new main roads was carried out on the basis of these basic principles, complete with numerous tunnels allowing bicycle traffic to be guided beneath the motorways. Traffic policy that focusses on granting free passage for the car, if there is sufficient space available, could therefore be equally as beneficial for cyclists. In 1976, at a time when the population of Eindhoven had reached nearly 180,000, this led to the construction of more than 155 km of bicycle paths, bicycle lanes and parallel roads, in addition to eight bicycle tunnels and bridges.

Eindhoven, 1958.

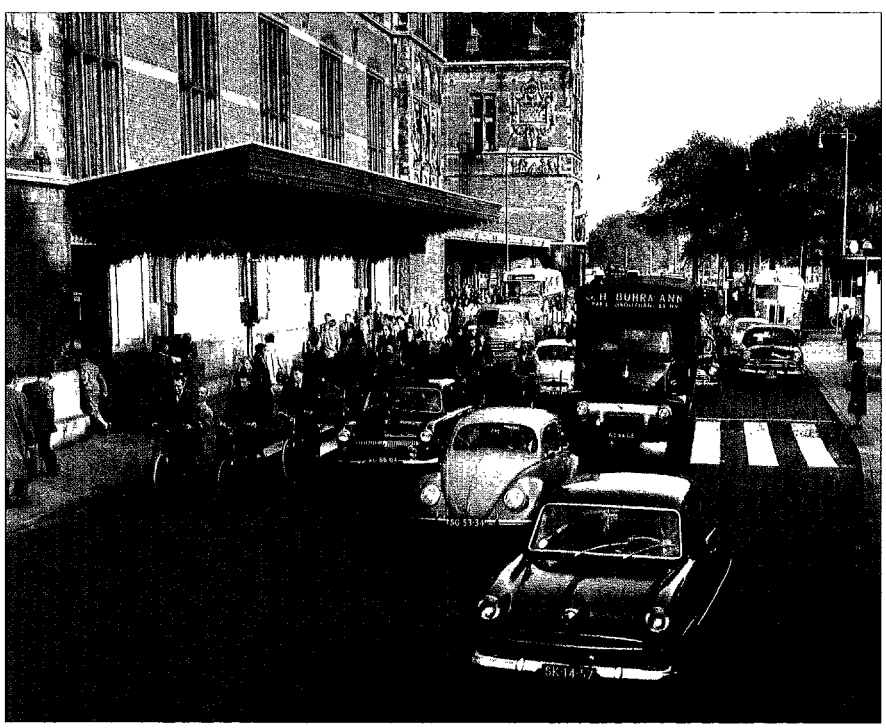
Amsterdam: bicycle traffic also deserves attention and space

The population of Amsterdam in 1958 was 875,000, after which a protracted decline in the number of inhabitants set in. The most significant reason for this was the process of suburbanization, which increased commuting distances as well as car use to and from the city centre. Around the year 1940, the maximum trip distance in the city was seven km, but by 1970 this was 15 km.

The major traffic issue in Amsterdam in the 1960s was the question of whether the city should adapt itself to motorized traffic. Plans emphasized the stimulation of public transport, as it had been concluded that the existing road network, particularly in the sizeable historic section of the city, did not lend itself well to mass car use. Car traffic would therefore need to be limited to only those trips deemed necessary and important for the city's functioning (responsible car use).

Starting in the late 1960s, the pedestrian and cyclist also received more policy attention as a result of an observed decrease in bicycle and pedestrian traffic. According to the Traffic Committee, if the bicycle were to be banned from the streets of Amsterdam, car speeds would increase intolerably and traffic safety for pedestrians, for example, would deteriorate. The increase in car traffic in the 1960s prompted a proposal to allow access on certain streets to bicycle traffic alone and to have one-way traffic rules which did not apply to cyclists. Because the dominant point of view was that a cyclist was a normal traffic participant, virtually no bicycle paths and lanes of any significance were constructed in the Amsterdam city centre in the 1960s. The Amsterdam city council and its Traffic Committee were against an (absolute) separation of the various modes of traffic on the basis of practical arguments ("no room") as well as policy considerations ("traffic participants have equal rights").

Amsterdam, 1955.



2.2 1975-1990: Bicycle traffic regains ground

Bicycle use began increasing again after 1975, and continued to do so until the mid-1980s. At the same time, changes began taking place in the basic principles of traffic policy, primarily at a local level though subsequently also in national policy.

Rediscovery of the bicycle on the street and in municipal policy

Traffic safety became a political item, particularly on a local level, when the annual number of road victims reached an all-time high in 1972. The oil crisis was taking place in the Netherlands at this time, the result of a boycott of Arabic oil-producing countries due to the Dutch stand in the Israeli-Palestinian conflict. Resistance to conceding entirely to the demands of the car rapidly gained ground. Car traffic regulation and the promotion of public transport became topics of discussion. Parking fees were levied in city centres and the first *woonerfs* (small residential areas where pedestrians have priority and car speeds are restricted) were created. In 1975, the Dutch Cyclists' Union *enfb* was established, initially as a counterpart to the *ANWB* (Royal Dutch **Touring** Club), which no longer promoted (solely) bicycle interests, and was therefore originally named the *Enige Echte Nederlandse Fietsersbond* ("The One and Only True Dutch Cyclists' Union").

Cycling became more and more popular too. Bicycle use increased considerably between 1976 and 1983, the total number of kilometres covered by Dutch cyclists rising by 35 per cent during this period.

The pattern of socially reassessing the bicycle, increasing policy attention and altering the prolonged decline in bicycle use could be seen everywhere in Western Europe. In cities such as Manchester and Antwerp, this was primarily limited to a change in the bicycle's image in the eyes of the people and no revival took place in policy and use, possibly because bicycle use had declined too far in the meantime. A reversal in bicycle policy could be seen in Basle, but the effect on bicycle use remained limited to stabilization. Dutch cities experienced a renewed increase in bicycle use, as did Copenhagen and Hanover (see Figure 10).

Amsterdam, Eindhoven and Enschede: good bicycle plans, limited execution

Bicycle use in Amsterdam began increasing gradually from around 1977. At the same time, there was an increase in attention to bicycle traffic, fueled to an important extent by the activities and notions of local parties, including neighbourhood groups and the local branch of the Dutch Cyclists' Union. Policy-making officials continued to study different possibilities for mixing and separating the various types of traffic. A proposal was made as early as 1972 to create separate routes for bicycle and moped traffic. This resulted in a bicycle traffic plan, in which the feasibility of segragated bicycle infrastructure was confirmed.

Amsterdam, 1990.

The traffic circulation plan of 1978 dictated that priority should be given to "projects under preparation within the Bicycle Route Network." Broad political support arose for developing the network, for constructing and expanding bicycle facilities and for solving bottlenecks. Given the traffic-related conditions of Amsterdam and its compact nature, the intended separation of the various modes of traffic actually meant that other traffic participants, especially cars, would lose road space. Since there was still a desire to continue taking car traffic into account, this resulted, in practice, in an incomplete separation of car and bicycle traffic in the majority of places.

Amsterdam, 1990.

The temporary end of neighbourhood indoor bicycle storage facilities

At the same time as policy attention to bicycle paths and routes was increasing, there came an end, virtually unnoticed, to another important facility: the indoor bicycle storage facility. Until the 1960s, there had been a large number of indoor (neighbourhood) bicycle storage facilities in Amsterdam, which were necessary because most houses did not have space for storing bicycles. Between 1970 and 1985, however, many neighbourhood storage facilities disappeared due to urban renewal and their poor profitability. Bicycles thus needed to be stored on the street more often, resulting in a greater chance of theft and vandalism.

Extensions were made and are still being made to date to the bicycle infrastructure within the entire city of Amsterdam. The Bicycle Route Network was further developed, dozens of neighbourhood bicycle storage facilities were set up, expanded or renovated once more and hundreds of bicycle racks were added to Dutch Rail stations and subway stops.

Bicycle use also increased slightly in Eindhoven after 1970. Traffic counts show that the percentage of cyclists between 1970 and 1974 rose by 17 per cent though after 1985, however, the bicycle share experienced a slight decline. From the early 1970s onwards, criticism of the city's technocratic approach grew. Breakthroughs, demolition activities and road widening in the framework of executing the traffic plan resulted in deteriorating living conditions in the city centre. The inconvenience of car traffic also became more obvious in the 1970s, as was acknowledged in the target memorandum of the 1976 traffic circulation plan:

> "Both the negative symptoms (individual hindrance and irritation) experienced by city dwellers due to car traffic as well as the amount of space occupied by the car are clearly obvious."

In 1976, a plan was developed for expanding the existing bicycle paths into a complete network of bicycle routes. This plan was actively carried out, though it was inferred from evaluation results (1988) that too little had been done and what had been done was primarily derived from car policy. More drastic action needed to be taken:

> "In practice, making car use selective only appears to be feasible through reducing accessibility by car, by means of parking restrictions, etc."

The new traffic memorandum in 1990 therefore read:

> "(..) effectively curbing avoidable car use and limiting the annoyance caused by car traffic (..) One of the consequences of the above is that rush hour needs are no longer the benchmark for road capacity. Congestion is acceptable, provided that there are good alternatives in the form of the bicycle and public transport."

In Enschede, the increase in policy interest in the bicycle as an urban mode of transport coincided with the restructuring of the city centre which began in 1970. The basic principle in 1973 for planning and developing the future main roads was therefore formulated as follows: "All traffic participants must have equal rights." Bicycle use would need to be stimulated through the construction of bicycle paths and lanes along the large arterial roads. The focus of the recommendations in the first *Bicycle Memorandum* (1974) was the construction of bicycle routes and parking facilities.

Hesse's pressure

An important impetus for local policy attention originated from the people of Enschede. They made themselves heard repeatedly regarding the issue of improving the traffic safety of school-age children on bicycles. An important initiator in this "social bicycle (path) movement" was the architect Hans Hesse, whose own study demonstrated that the traffic safety of school-age children on bicycles in Enschede had serious shortcomings. Hesse's study functioned as a catalyst. It was discussed at great length in the press, after which various school governors, neighbourhood associations, parents' associations and local action groups reacted by demanding more, safe bicycle paths. The city of Enschede had no choice but to respond positively to the pressure of this "bicycle coalition".

Due to the unremitting attention in the local press and the involvement of more and more local parties, bicycle safety remained on the political and public agenda in Enschede throughout the 1970s. In connection with this, the 1976 Traffic Circulation Plan announced that priority must be given to bicycle traffic. Promotion of bicycle use was deemed possible through the construction of bicycle paths and lanes along main roads. This was then expanded in 1978 to include the construction of a network of bicycle routes.

Although the execution of the bicycle route network was begun in 1979, the *Traffic Plan 1980-1990* concluded that the current bicycle facilities were still minimal and did not form a coherent whole; that the intensity of car traffic on all main roads was so high that a mixture of bicycle and car traffic was impossible; and that parked cars seriously impeded the bicycles on bicycle routes. The execution of the bicycle traffic plans continued to lag behind in official planning into the 1980s.

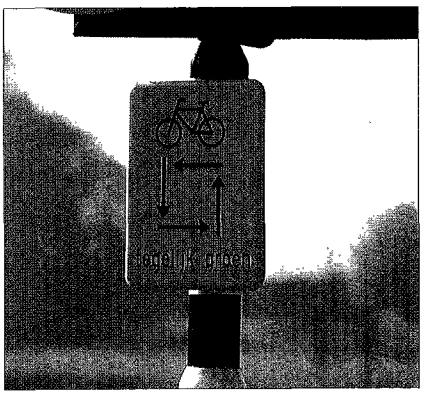
Southeast Limburg: recognition of the value of bicycle use

In 1994, the urban agglomeration of Heerlen/Kerkrade numbered 270,000 inhabitants. Southeast Limburg had become one of the most densely populated areas in the Netherlands. There was, however, relatively little bicycle use in the area - indeed the share of bicycle traffic in the total number of trips in Southeast Limburg amounted to only 14 per cent, significantly lower than the national average of 28 per cent.

Nonetheless, policy attention to the bicycle had also increased in Limburg in the 1970s and the urban district bicycle route plan of 1978 stated:

> "Stimulating pleasurable and safe cycling can result in the car being used more selectively, which could then lead to a reduction in car use."

The potential role of the bicycle in urban and interurban traffic was also emphasized in the Heerlen traffic circulation plan of 1979. Various municipalities began abolishing the existing measures that obstructed the bicycle. For example, in 1987, the city of Heerlen began to abolish the one-way traffic rules for cyclists on a large number of streets. These initiatives received an important impetus from the city council and social groups. Compared to the other Dutch cities, however, these measures were overdue and limited.



A trend reversal in national policy

Policy changes such as those made in Amsterdam and Eindhoven were also evident in national traffic policy. For the Ministry of Transport the most important reason for this was a financial one. Successful developments in road construction at the end of the 1960s could not continue, as the central government was having an increasingly difficult time finding the

necessary budgets for the Road Fund. But there was more to the story. The spectacular vision of W. Drees Jr., Minister of Transport, Public Works and Water Management from 1971-1972, was equally as relevant. Drees let it be known frequently that he considered a different policy necessary. Selective car use and the promotion of public transport would be needed to reduce the assault by road traffic on space and social climate. The Parliament was not opposed to this. On the contrary, they requested more concrete plans of Drees Jr.

In addition, there was the Dutch Economics Institute's pretentious and shocking 1972 report, which was to serve as the foundation for future "integral traffic and transport policy." Calculations showed that it was advisable to expand the road network considerably by means of both broadening existing roads as well as constructing entirely new infrastructure. The investment needed for this would amount to a total of 15 to 22 billion guilders by the year 2000. The report's political effect was disastrous. Nearly every political party viewed the future that was outlined - a future full of roads with dozens of lanes - as unacceptable. The prevailing reaction was that this trend needed to be stopped and the Ministry of Transport adopted this conclusion remarkably quickly.

The new policy line of Rijkswaterstaat

In his 1973 New Year's speech Director-General Van de Kerk of the Rijkswaterstaat stated that "the policy now should be directed towards achieving a certain number of objectives to a greater extent than in the past". This entailed:

- Limiting the increase in travel demand;
- Stimulating the use of public transport and encouraging selective car use in urban areas in particular;
- Bearing in mind the economic imperatives, aiming at an acceptable "level of service" for long-distance traffic on the main roads.

It was clear to the ministry in any event that the increase in awareness of the value of a good living and working environment, as well as of scenic areas, would need to lead to a greater emphasis on concentrating traffic flows. The structure of the road network included in the Road Network Structure Plan of 1966 would therefore not necessarily have to be changed, but the number of connections planned would certainly need to be.

For the *Transport Structure Plan* (*SVV*), which was ultimately established in 1980, this meant in actuality that the planned road network consisted of significantly fewer (motor)ways than did the 1966 structure plan (3390 km versus 5300 km). The Road Fund amounted to 939 million in 1973; by 1983 this amount had only reached just above 1,053 million. The launching of new projects was therefore kept to a minimum.

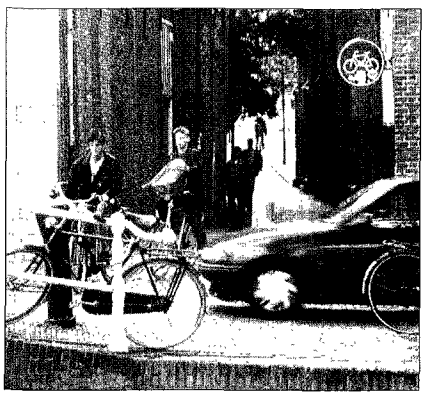
The *SVV*'s good intentions in 1980

The *SVV*'s principal aim was as follows:

To meet the demand for the transport of persons and goods, purely insofar as the contribution to the welfare of the community is ultimately positive and in such a way that the realization of a desirable spatial structure is promoted and damage to agriculture, the natural environment and the landscape is avoided as much as possible; to promote traffic safety; to meet the demands made on the housing and living environment as much as possible, with regard to parking disruption, emission of air pollutants, sound pollution and eyesores, etc.; to promote desirable socio-cultural and economic development; to limit the use of scarce materials; to limit the consumption of government resources to a sensible level within the total government policy."

Formulated nicely, but difficult to achieve.

"Slow" traffic (pedestrians and cyclists) again came up for discussion in the first SVV. It was argued that "slow" traffic should be valued, considering the minimal environmental and energy costs it entails. Traffic safety, however, was considered to be a significant problem of "slow" traffic and so arguments in favour of improving and constructing bicycle paths and footpaths were put forward.



Prior to the publication of this *SVV* intended for the long term, a new plan equally as revolutionary was published for the short term: the 1976-1980 Passenger Transport Plan. Bicycle traffic had returned to the policy's main objectives for the first time in this plan. The goal was a "guided" policy directed towards preserving urban functions, improving the quality of life and improving safety for "slow" traffic. Four policy themes were distinguished in this plan for achieving these objectives:

- Limiting the growth in car use, "differentiated by place and time";
- Improving the flow of public transport;
- Stringent parking policy;
- Constructing safe and attractive bicycle routes.

National bicycle policy: contribution regulations for bicycle paths and pilot projects

In the context of increasing social attention to the bicycle and local initiatives, the Ministry of Transport introduced two contribution regulations in 1976. The first one entitled cities to receive payment for 80 per cent of construction costs for city bicycle facilities, while the second one allowed cities and provinces to be subsidized for 50 per cent of the costs for constructing bicycle paths along existing secondary and minor roads. Both regulations were presented emphatically as a means for catching up, i.e. an extra financial injection for making up ground lost in the construction of bicycle paths since the 1960s. The total budget for both regulations rose from 25 million guilders in 1976 to 53 million in 1982.

The second regulation certainly had an obvious effect. It was expected that more than 90 per cent of the secondary roads and around 70 per cent of the minor roads would be provided with bicycle paths by the end of the planning period (1986). All provinces had completed bicycle path plans in the meantime, or had reached an advanced stage in their planning. The majority of municipalities also made headway with similar plans in the meantime (Verkeer en Waterstaat, 1983).

The contribution regulations as an immature policy

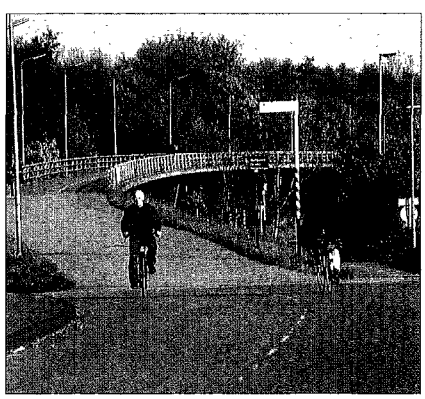
The contribution regulation policy that was strongly focussed on bicycle paths along main roads was not terribly valued by the Dutch Cyclists' Union *enfb* later on (Ploeger, 1990):

> "In 1975, the national budget finally allocated funds for constructing bicycle paths once more. Lost ground was to be made up. Bicycle paths continued to be seen as something along the road where you could safely put aside cyclists. Bicycle paths that reduce detouring, but which do not lie alongside a road, were not considered for a subsidy. The first roads considered for bicycle paths were the busiest ones."

The value of the contribution regulations can be seen in the fact that between 1978 and 1988, the length of bicycle paths increased from 9,300 km to 16,100 km, a 73 per cent increase. During the same period, the total road network increased by 11 per cent to 101,000 km and the motorway network grew by 19 per cent to 2,100 km. This significant expansion of the infrastructure for bicycle traffic is undoubtedly a contributing factor to the revival of bicycle use since the mid-1970s. People are quicker to choose the bicycle because they generally experience less delay when cycling on bicycle paths and feel safer there than in situations in which they need to share the space with fast moving car traffic.

Other than the contribution regulations, the involvement of central government in bicycle policy during this period primarily involved several large-scale pilot projects.
Around the year 1975, high quality bicycle routes were constructed in The Hague and in Tilburg with the support of central government. These pilot projects aimed at improving cyclist safety. The projects were also designed to shed light on how bicycle use could be stimulated and could therefore contribute to solving urban traffic problems. An evaluation followed in 1981, which concluded that bicycle use had remained unchanged following the construction of the routes. The use of the bicycle routes, however, was considerable, as many cyclists chose the new routes over the old ones.

Two high-quality routes outside of the built-up area were also constructed around 1982 with government support. The results of these pilot projects corresponded well with the experience gained in The Hague and Tilburg, i.e. a single high-quality and separate bicycle route is apparently insufficient for stimulating more bicycle use and less car use. The conclusion was that a complete network of bicycle routes was needed, one which would need to include a small grid-width within the city. The 1981 report indicated a maximum distance of 500 m between routes.

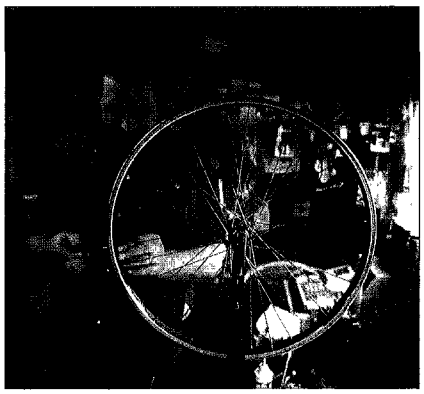


Building on these experiences, a pilot project was set up in Delft (90,000 inhabitants) in order to study the effects of an entire network of bicycle routes. Between 1982 and 1987, a total of 29 million guilders was allocated for carrying out a large number of measures for providing the city with a nearly complete network of bicycle routes consisting of three hierarchically distinguishable subnetworks: the city network (with a grid-width of around 500 m), the district network (with a grid-width of 200-300 m) and the neighbourhood network (with a grid-width of around 100 m). The results were twofold: bicycle use initially increased slightly due to the newly-built facilities and cyclist safety improved. In the long term, the growth of bicycle use proved to have been a once-only occurrence. Traffic safety developed favourably in the long term as well as the short term. Although the total number

of victims among cyclists did not decline, the percentage of fatalities and severely injured did drop dramatically. Accidents therefore resulted in fewer serious injuries for cyclists on average (Verkeer en Waterstaat and Vereniging van Nederlandse Gemeenten [Association of Netherlands Municipalities], 1994). The most important lesson learned here was that the construction of a network of bicycle routes is insufficient in itself for bringing about a sustainable increase in bicycle use. The simultaneous execution of a policy discouraging car use is deemed necessary, as is attention to good bicycle parking facilities and informing people of the route network on a continual basis. Finally, a temporary financial impetus from the State proved to offer an insufficient guarantee for a structural (financial) municipal effort in the area of bicycle policy.

Policy documents on the bicycle, 1983-1985

The 1980 SVV lead to various detailed plans in the area of bicycle policy, including the *Bicycle Traffic Memorandum* (Verkeer en Waterstaat, 1983) in 1983. Incidentally, this memorandum had been at the insistence of Parliament, which had requested an integral outlook on "slow" traffic.



The *Bicycle Traffic Memorandum,* however, was more an evaluation of the contribution regulations than a formulation of new policy. In view of the success of subsidizing bicycle path construction, the Minister announced the discontinuation of the contribution regulations as of January 1, 1985, and a decentralization of budgets to the municipalities and provinces via general funding. This was partly done in the framework of the State's general endeavours to decentralize government tasks where possible. Governmental bicycle policy tasks therefore became severely limited once more (Verkeer en Waterstaat, 1983). The Ministry of Transport did not indicate, however, how it intended to go about executing this limited task in bicycle policy.

Just as the 1983 *Bicycle Traffic Memorandum* had been in response to Parliament's wishes, this was all the more true of two detailed plans from the memorandum. In June, 1985, a memorandum on bicycle theft appeared, which primarily gave a detailed run-down of possible measures and the relevant parties and which stressed "techno-preventative measures", i.e. locks and parking facilities. The most concrete recommendation in the memorandum was the creation of a consultative group with regard to preventative measures (Justitie, Verkeer en Waterstaat en Binnenlandse Zaken [Ministry of Justice, Ministry of Transport and Ministry of Home Affairs], 1985). Nothing became of this consultative group, however. The Ministry of Transport did not like the idea of embarking on such policy terrain and the Ministry of Justice subsequently deemed it more sensible to include this matter in more regular interdepartmental consultation on petty crime.

Six months later, in December of 1985, a report on the "integration of the bicycle and public transport" came under discussion, also at the insistence of Parliament. This report gave a more extensive and solid enumeration of possible concrete measures than had the theft memorandum (Verkeer en Waterstaat, 1985). Its focus was primarily on parking and storage facilities (capacity, construction, opening times, locations, etc.) as well as on the possibilities for taking bicycles on trains, buses and trams and for renting bicycles for transport after transit.

Whereas the 1983 *Bicycle Traffic Memorandum* no longer formulated much national bicycle policy, the theft memorandum and the Public Transport + Bicycle report did, though actions on the budget and action plan were omitted here as well, and next to nothing was carried out.

Bicycle policy after 1985 proved to have just as little perspective as did the broader SVV policy of which it was a part and was equally unsuccessful. Car use continued to increase dramatically despite limits in the construction of car traffic infrastructure. The policy target of limiting an increase in car use was nowhere in sight, as was increasingly acknowledged in Parliament. Something different, or at least something more than simply delaying road construction, was needed.

The Second *SVV*

In November of 1988, the *Second Transport Structure Plan, Part A: Policy Resolution* (*SVV-IIa*) was launched. Its emphasis laid to a greater extent than in the past on transport policy to manage demand:

> "The policy is characterized by the central position occupied by mobility guidance. Without curbing the increase in unnecessary passenger travel by car, it will not be possible to assure accessibility by road for professional passenger travel and cargo transport while simultaneously improving the quality of life."

The memorandum assumed eight million passenger cars in the year 2010 and as a result of unaltered policy an increase in car use of 70 per cent in relation to 1986. The main objective of the policy laid down in the *SVV-IIa* was a reduction in the growth of car use to "a mere" 35 per cent.

The *SVV-IIa* was one of three policy memoranda that came about in the late 1980s in mutual co-ordination and which contained policy objectives in the areas of spatial planning, traffic and the environment until the year 2010. The three memoranda made a direct link between the objectives and measures in these three policy areas for the first time. The growth in car use needed to be reversed for several reasons, namely, the accessibility of cities and economic centres, livability in cities and preservation of the environment, landscape and nature. Spatial planning was conceived as an important instrument for limiting car use

through concentrating residential areas, work locations and facilities as much as possible in the urban area (the compact city) and in the vicinity of public transport junctions (location policy).

In addition to more rigid measures for curbing the increase in car use, the *SVV-IIa* distinguished itself from the first structure plan by its stronger orientation towards executing policy resolutions. It was a coherent plan with clear-cut, quantifiable targets for the year 2010, which were to be achieved by executing a large number of concrete projects and activities based on co-operation between all parties involved and with the central government playing a catalytic role. But, although the *SVV-IIa* came about following consultation with 230 key figures from a multitude of branches of society, it devoted little attention to the bicycle as an alternative for short and (in combination with public transport) long car trips.

3 Dutch bicycle policy in the 1990s: the Bicycle Master Plan

During the 1990s, Dutch bicycle policy took shape within the framework of the Bicycle Master Plan (*BMP*). Section 3.1 briefly outlines the realization of the *BMP* and is followed by a discussion of its framework, objectives, strategy and organization. Subsequently, section 3.3 provides an overview of the projects that have been carried out, including their results. The degree to which bicycle policy has become part of the policy of ministries, provinces, municipalities, companies and public transport operators is discussed in section 3.4. Finally, the chapter ends with a cautious response to questions as to the extent to which the formulated targets have been met so far or appear to be feasible before the year 2010.

3.1 The development of the Bicycle Master Plan

The fact that the *SVV IIa* devoted little attention to the bicycle as an alternative for short and (in combination with public transport) long car trips was met with criticism from various sides during the open forum phase of the *SVV*-plan. The Ministry of Transport decided to devote more attention to bicycle policy in part d of the *SVV*-plan ("government decision"). To this end, a brainstorming session was held in November of 1989, attended by representatives of interest groups, ministry officials and a number of consultants. A *BMP* concept was created during this two-day gathering, which included objectives derived from the tasks set in the *SVV-IId*, quantified targets per policy theme and a global cost estimate of 200 million guilders per year until the year 2000. To a large extend, the Dutch Cyclists' Union *enfb*, together with sympathizing consultants, were responsible for the contents of the concept.

Dutch Cyclists' Union *enfb*

By the mid-1990s, The Dutch Cyclists' Union *enfb*, established in 1975, had 35,000 members, more than 100 locally active branches and a national bureau with a staff of 20. The Dutch Cyclists' Union devoted itself to serving the interests of cyclists on a national, regional as well as local level.

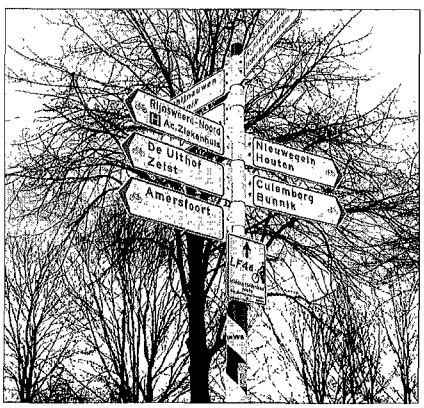
The Ministry of Transport made funds available in the 1990s in support of the local framework of the Dutch Cyclists' Union. These funds were to be used for courses for volunteers at the local branches and for the national bureau to co-ordinate the conversion of national campaigns to local and regional levels.

The main features of the *BMP* project proposal were adopted into the *SVV-IId*, which came out in June of 1990. Part d of the structure plan stressed a "sustainable society as a standard for the policy to be executed" more emphatically than Part a had done. This involved a well thought-out location policy, restricting car use through the selective expansion of road infrastructure, raising the costs of car use compared to costs of other modes of transport and significantly improving alternatives to car use, namely, public transport and the bicycle.

"Stimulating bicycle use" was a separate two page "track" (no. 15) in *SVV-IId* which devoted attention to the image of the bicycle, theft prevention, bicycle route networks, facilities at public transport stops and recreational use.

In response to *SVV-IId*, a project manager was named and a project group subsequently set up after the summer of 1990. The project group was comprised of individuals with relevant knowledge and experience from the various divisions in the Ministry of Transport. The employees initially came from the central directorates and the ministry's research centre and were supported by several consultants that were brought in. From early 1992 on, employees of the regional directorates of the ministry also participated in the project group.

In addition to the project group, a 'sounding board' group was formed from interest organizations in order to create a broad basis for bicycle policy and the execution of activities in the framework of the *BMP*. This group consisted of representatives of the umbrella organizations of municipalities and provinces; the consumer groups the Dutch Cyclists' Union *enfb* and the *ANWB*; organizations of bicycle industry, bicycle trade and bicycle parking facilities; the *Vereniging Veilig Verkeer Nederland* (Dutch Traffic Safety Organization) and the *Stichting Landelijk Fietsplatform* (National Bicycle Platform Organization).



The National Bicycle Platform Organization

The National Bicycle Platform Organization (*SLF*), established in 1987, is responsible for constructing, signposting, describing and promoting national bicycle routes. The executive committee is formed by the *ANWB*, the Dutch Cyclists' Union *enfb*, the Cycle! Foundation (a bicycle industry umbrella organization) and the provinces. Since 1991, the Ministry of Transport has contributed financially to the work of the *SLF*. Around 6,000 km of recreational bicycle routes have been mapped in total in the form of the "national bicycle routes". As of late 1996, a total of more than 2,000 km of these have been signposted with special green and white route signs. Two general guides and six route guides for the national bicycle routes have also been published.

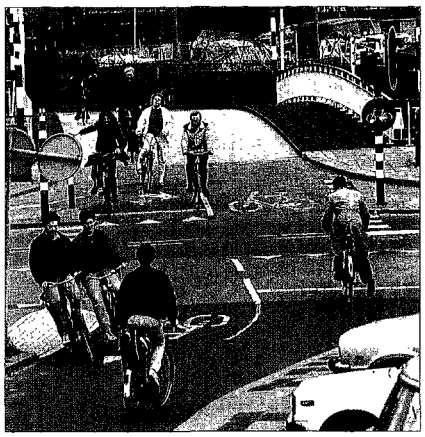
In June of 1991, the *BMP* project group presented the *Bicycle Master Plan Policy Document* (Verkeer en Waterstaat, 1991), which was approved by the parliamentary commission for transport policy in March of 1992. A four-year completion time for the *BMP* project was the initial target: from late summer 1990 through 1994. Because the project group set up numerous research, pilot and model projects and continuously undertook new actions, the Ministry of Transport resolved to extend the completion time by three years at most. The project officially ended in late 1997, although the finishing touches were still being carried out in 1998.

3.2 *BMP* framework, objectives, strategy, project organization and evaluation

Framework

The objectives and strategies of the *SVV-II* naturally formed the framework for those in the *BMP*. The main objective of the *SVV-II* was the halving of the increase in car use that would

be expected, should existing policy continue. The strategy laid down for achieving this consisted of the following five steps:



Step 1: Dealing with the source.

This means clean and efficient vehicles, limiting land use for infrastructure and limiting vehicle access to towns and areas of natural interest.

Step 2: Reducing and managing mobility.

This requires shorter distances between places where people live, work, shop and spend their free time. It will be necessary to increase the price of mobility.

Step 3: Improving the alternatives to the car.

In terms of passenger transport this means the bicycle, public transport and carpooling.

Step 4: Providing selective accessibility by road.

All places should not always be totally accessible to all modes of transport.

Step 5: Strengthening the foundations.

This involves communications, government co-operation at all levels, finance, enforcement and research.

This strategy would need to make it possible to have places remain accessible and, at the same time, improve the quality of life, which had to include considerations of the environment, energy and safety, among other things. The objectives were also formulated and quantified and included lowering nitrogen oxide and hydrocarbon emissions due to car traffic by 75 per cent by the year 2010 from the base year of 1986; lowering carbon dioxide emissions by at least ten per cent; and reducing the number of traffic fatalities by 50 per cent and traffic injuries by 40 per cent.

The *Bicycle Master Plan Policy Document* was actually an elaboration on the bicycle promotion policy that the State had planned as part of step three in the *SVV-II*. With regard to the position of the bicycle policy within the framework of national traffic and transport policy, the document states the following:

> "The bicycle as an attractive alternative to the car fits perfectly (...) within the *Second Transport Structure Plan*. The role of the bicycle in mobility policy has been and will continue to be worked out within the framework of the *BMP*. The second *SVV* contains important points of departure that are interwoven in the plan. Taking its departure from an **integral policy** for curbing car traffic, (...) the *SVV-II*'s second starting point is a **decentralized approach** in policy execution. An important role has been laid down for parties other than the central government. (...)
> The bicycle can contribute to realizing the *SVV-II*'s objectives in the short term - that is, if the measures are carried out consistently and coherently."

The *BMP* project group chose an integrated framework from the outset. The bicycle policy was regarded as an inextricable part of traffic and transport policy as a whole and cycling as a mode of transport amidst other modes. Cycling and bicycle policy were expressly not conceived as objectives in themselves but rather as a means of contributing to solving traffic and transport problems and/or restricting the growth in car use. This notion was based on the efficiency of the traffic and transport systems as a whole and the facilitation of the cyclist within it. Mobility was conceived as the degree to which individuals, companies and

organizations are capable of taking part in economic and social activities. This was to be seen in terms of the numbers and types of trips, distinguished by distance and reason and not necessarily by the numbers of kilometres travelled. The question at the centre of decision making was therefore: "Which mode of transport is the most efficient for which type of trip?" Instances in which the bicycle is the obvious choice should be met with facilities that facilitate bicycle use. Instances in which the car causes too much nuisance at certain places and times should be met with measures for curbing car use, measures which are physical, financial or regulatory. An integrated package of "pull" as well as "push" measures of this kind ("carrot and stick measures") is necessary for curbing car use and stimulating bicycle use. At the same time, the spatial planning of functions and activities, and the trip distances that peoples' participation in these functions and activities entails, must be taken into account. These are significant in determining the possibilities of influencing the choice of mode of transport by traffic and transport policy - and therefore by bicycle policy. After all, the shorter the trip distance, the greater the possibilities for stimulating bicycle use; in other words, the more spatially concentrated the functions and activities are, the greater the chance of bicycle use.

In addition to this integrated outlook on traffic and transport policy and the importance of short trip distances for stimulating bicycle use, the decentralized approach to executing the policy also formed an important point of departure for formulating the objectives and strategy of national policy in the framework of the *BMP*. Municipalities and provinces had always been the most important designers, executors and financiers of bicycle policy and facilities. Public transport operators, the business community and interest groups also formed important parties in stimulating bicycle use.

Objectives

The universal objective of the Ministry of Transport's bicycle policy in the *Policy Document* was formulated as follows:

> "Promoting bicycle use while simultaneously increasing bicycle safety and appeal."

This universal objective was translated into five spearheads for bicycle policy and worked out into targets for 1995 and 2010 (Figure 11).

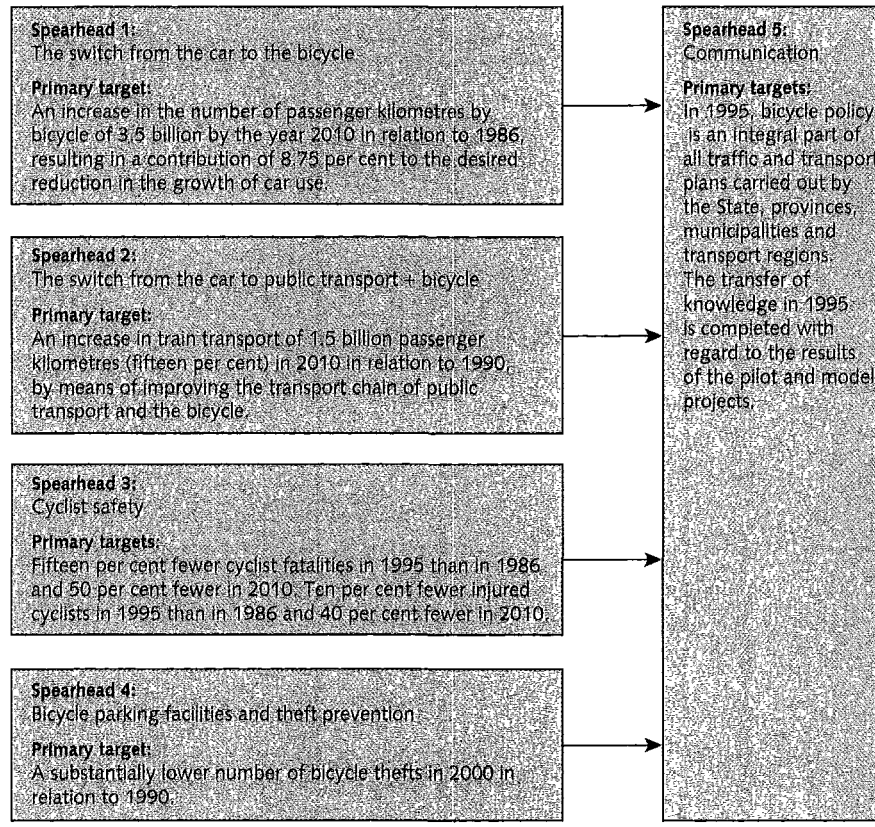


Figure 11
Overview of spearheads and targets.

The *Policy Document* clearly indicated how the limited completion time of the *BMP* related to the long-term targets set forth in the *SVV-II*:

> "Achieving this picture of the future is a question of systematically executing measures over a longer period. This does not mean, however, that bicycle policy is only a question of holding out. The bicycle in particular lends itself well to short-term measures being taken to produce direct effects. (...)
>
> Short-term measures are aimed at resolving bottlenecks, providing examples and attaining improvements quickly. This entails intensifying the policy that has already been implemented and executing plans that are under preparation. These short-term measures provide an initial impetus for the desired quality improvement. In the short term, attempts will also be made to make up lost ground as far as the availability of relevant knowledge is concerned.
>
> Long-term measures are usually accompanied by innovation in facilities, public relations and organization. Innovation needs to provide the desired quality improvement for bicycle traffic. Innovative developments are launched in the short

term with the objective of making them part of the policy on all levels for the medium range (1995)."

To give an impetus in the short term to resolving existing bottlenecks at the local and regional levels, the Road Traffic Facilities Contribution Regulation (dated 1988) was adapted in anticipation of the *Policy Document* in May of 1990 in such a way that municipalities, provinces and water board districts could also receive contributions henceforth for constructing bicycle facilities in or between cities and villages. Bicycle facilities included not only bicycle paths but also bridges and tunnels for cyclists and bicycle parking facilities, among other things.

Table 10
The budgets for subsidizing the construction of bicycle facilities indicated in the *Bicycle Master Plan Policy Document*, 1991-1995 (in millions of guilders).

1991	45.7
1992	50.0
1993	60.0
1994	40.2
1995	44.0
Total	239.9

The activities of the *BMP* project groups needed to concentrate on the medium-range objectives. The *Policy Document* observes:

"The role of the State is initially of a catalytic nature. The State aims for an integral approach in promoting bicycle traffic, stimulates innovative developments, collects and distributes knowledge, makes financial contributions, sees to legislation and the issuing of regulations and creates a broad basis for bicycle policy by the government (municipalities, transport regions, provinces, ministries, including the Ministry of Transport) and private organizations by means of public relations, model projects and consultation."

The central government wanted to fulfill a catalytic function in the short term with the desired result being:

"In 1995, bicycle policy will be an integral part of all traffic and transport plans developed by the State, provinces, municipalities and transport regions."

Strategy

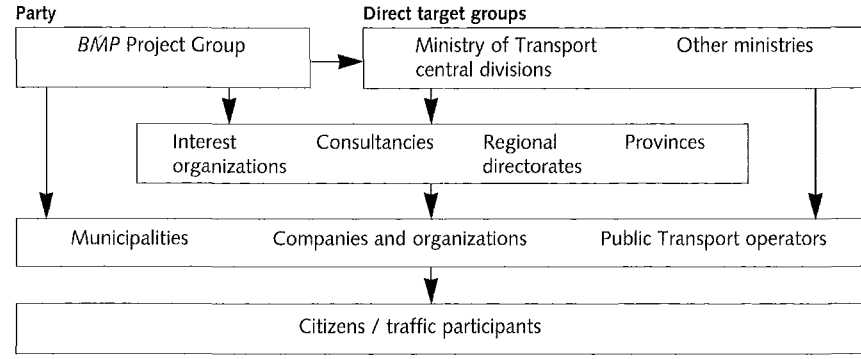
The main task of the project group was to stimulate the authorities, public transport operators and enterprises to embed bicycle policy in their policy plans and activity programmes, so that *Policy Document* objectives could be achieved. This entailed establishing pre-conditions in these target groups for the medium range, which would make it possible to achieve the desired goals in the long term. The strategy that the project group pursued to that end was fairly simple. It involved developing relevant knowledge, arguments and instruments for the policy pursued by these target groups - preferably together with them - and then subsequently distributing these in a target group-orientated fashion via effective senders and channels, preferably using a variety of media.

Knowledge, arguments and instruments were developed by carrying out or commissioning numerous research, pilot and model projects. These projects were set up and carried out jointly with the intended target group as far as possible. Communication took place by

means of brochures, handbooks, video films, a quarterly magazine, trade journal articles, various small-scale gatherings, readings, lectures, interviews and numerous personal contacts with the various target groups. The more the *BMP* progressed, the more the core of activities logically shifted from project execution to communication.

Figure 12 shows the manner in which the *BMP* made its way towards the final goal via various target groups.

Figure 12
Overview of target groups.



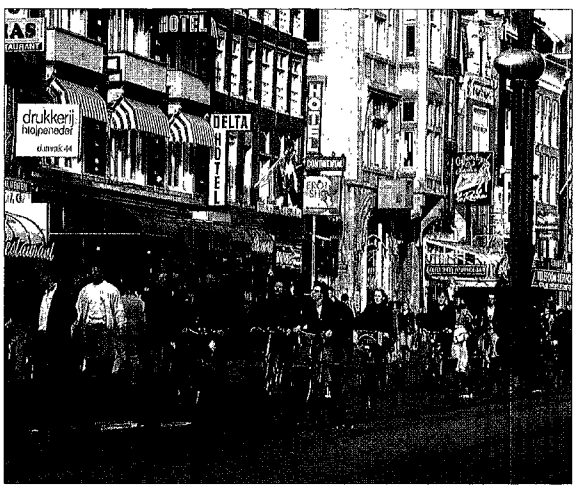
Municipalities formed the most important target group by far. Considering their responsibilities and potential, they are in the best position to pursue effective bicycle policy. Provinces were an important target group during the last years of the project as a result of the decentralization of government tasks, though this was not primarily through their role as a road management authority, but was more with regard to policy and co-financing. The opposite was true for the regional directorates of the ministry, whose significance for bicycle traffic and policy declined as the provinces increasingly assumed their tasks. The central divisions of the Ministry of Transport and other ministries were target groups for the *BMP* because bicycle policy is highly dependent upon other national policy in the area of traffic and transport and, for example, spatial planning, the environment and recreation. Consultancy firms and interest groups were not to be ignored as a channel for dispersing and adapting the *BMP*'s range of ideas. Relatively less important than municipalities and provinces were, for example, companies and organizations (in the framework of transportation demand management). They are able to influence just company-related passenger transport, only in part moreover. Public transport operators also were less important, because the importance of public transport in total passenger traffic is limited and because the combined use of public transport and the bicycle is only relevant, once again, for a portion of it. In view of the *BMP*'s final strategy, the least important target group turned out to be the general public.

The manner in which the *BMP* project group operated was not comprehensively and definitively established in a practical document at the onset of the project. The working method was developed during the execution of the project and characterized by a number of considerations:

- The *BMP* project was well aware that its activities formed only a limited part of total *SVV* policy. It was in interaction with one another that the *SVV* projects would lead to the set objectives. The notion that the achievement of the *BMP* targets strongly depended upon other policy, parking policy, infrastructure and spatial policy limiting car use in

particular, was present from the outset but was becoming more and more clear.

- The project group was also aware that the State's influence on the contents of local traffic policy is limited and will become more so through the continued decentralization of central government tasks. The project groups acknowledged that the State itself is unable to influence bicycle use directly and that only other authorities, companies and organizations located closer to the cyclist could accomplish this.
  - The embedding objective was therefore central: facilitating the bicycle policy pursued by other authorities through the development of knowledge, arguments and instruments was considered by the project group to be *the* task of the government.
  - In order to encourage the promotion of bicycle use by agencies other than the central government, the project group focussed primarily on "co-productions" with the intended target groups, as much as possible within concrete projects.
  - The *BMP* project group considered central decision-making, with regard to appropriating funds for research, pilot and model projects, as being essential for avoiding the re-invention of the wheel and to make certain that the money intended for innovation would actually get spent on projects breaking new ground. Therefore, the budget was not decentralized to regional directorates of the ministry, as was customary with other projects.



These considerations resulted in a clear-cut communication strategy with the following basic principles:

- Content is central. Communication needs to be directed towards facts and arguments that are presented informatively.
- In order to have facts and arguments penetrate, they need to be repeated continually in different ways and via numerous channels: "*frappez toujours*".
- The *BMP*'s integral approach as a project within the *SVV*, and the role of bicycle policy as part of traffic and transport policy, needs to be expressed repeatedly in communications.
- Promoting bicycle use without improving bicycle facilities is meaningless. The Dutch citizen knows what a bicycle is and how to use it. The promotion of bicycle use does not require billboards, but instead adequate, suitable facilities. The project group therefore did not communicate directly with the general public, but dis so rather via the media of interest groups, local and regional authorities and the press.

A consequence of the policy strategy was the execution of a broad scope of numerous projects and not the execution of merely a handful of larger, more talked-about projects. This was a conscious decision, as a continuous flow of information offered the greatest possibility for obtaining sustainable attention to bicycle policy. This attention was necessary for getting bicycle policy higher up on the political agenda by means of arguments and in order for elementary factual knowledge and instruments to sink in properly. Choosing only a limited number of much talked-about projects would have resulted in too many important questions being left unanswered. Moreover, it was questionable whether it would be possible to succeed in carrying out a few large-scale examples. Doing so would require much funding, as well as the necessary political courage and staying power, primarily on the part of the project partner. The *BMP* therefore emphatically chose to develop, establish and communicate pro-bicycle policy instrumental knowledge and fundamental arguments. The result was a communication philosophy of an unremitting, but reasonably reserved and discrete target group-orientated spread of knowledge.

Project organization

A total of 112 projects were eventually carried out within the framework of the *BMP*. This included 31 research projects, 41 pilot and model projects, 18 projects for instrument development and 22 for information exchange. Table 11 shows how these projects were divided amongst the various spearheads. A brief description of a selection from these projects is included at the end of this brochure (Appendix 1).

Table 11
Types of projects according to spearhead (broken down into areas for special attention).

	Research projects	Pilot and model projects	Instrument development	Information exchange	Total
General				**7**	**7**
Spearhead Car → Bicycle	**8**	**17**	**8**	**7**	**40**
Bicycle policy support	6	2		4	12
Bicycle policy in practice	2	6		2	10
Bicycle infrastructure		6	8	1	15
Bicycle improvement		3			3
Spearhead Car → Public transport + Bicycle	**9**	**13**	**2**		**24**
Arguments	3	1			4
Bicycle parking facilities at stations	1	3	1		5
Bicycle parking facilities at bus/tram/subway stops	3	5	1		9
Bicycle availability on activity side of trip	2	4			6
Spearhead Cyclist safety	**6**	**5**	**3**	**4**	**18**
Infrastructure	2	4	1		7
Vehicle policy	2		2		4
Behaviour	2	1		4	7
Spearhead Bicycle parking facilities and theft prevention	**8**	**6**	**5**	**4**	**23**
Bicycle parking policy	2	4	5	4	15
Bicycle parking facilities	1	2			3
Bicycle locks	2				2
Identification and registration systems	3				3
Total	**31**	**41**	**18**	**22**	**112**

The projects did not cost so much money (an average of 200,000 guilders per project) as they did time, as a result of the intensive guidance that was chosen, i.e. 40 man-years from project group members, nearly 40 per cent of which was external (Tables 12 and 13). Both the intrinsic guidance of projects as well as the propagation of the results achieved ate up much time.

Table 12
BMP spending categorized according to spearhead and project type, 1990-1997 (in thousands of guilders).

Project types	Number	Car → bicycle	Car → PT + bicycle	Cyclist safety	Bicycle parking facilities	Total
Research projects	31	1.246	685	1.186	936	4.053
Pilot and model projects	41	6.305	3.623	683	3.361	13.972
Instrument development	18	2.428	122	303	728	3.581
Information exchange	22	837	0	98	211	1.145
Subtotal		10.816	4.430	2.270	5.236	22.751
General:						
- General *BMP* communication						1.736
- External support						4.508
- *BMP* evaluation						804
- Communication abroad						721
- Miscellaneous						2.094
Subtotal						9.863
Total	112					32.614

Table 13
BMP project group staff deployment, 1990-1997 (in available working days per group concerned).

	1990	1991	1992	1993	1994	1995	1996	1997	Total
Ministry of Transport policy staff	308	616	624	660	660	540	496	402	4.306
Research/The Ministry's Research Center AVV	35	105	105	105	75	35	35	31	526
Regional directorates of the ministry			36	60	58	60	30	24	288
External support		110	419	715	643	791	654	260	3.592
Total	343	831	1.184	1.540	1.456	1.426	1.215	717	8.712
Number of FTE's	1,6	3,8	5,4	7,0	6,6	6,5	5,5	3,3	39,7
Number of persons	6	7	13	15	15	14	14	12	

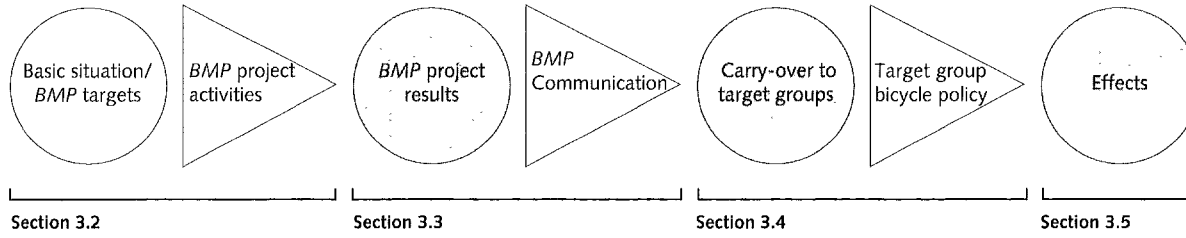
Evaluation

Various evaluation studies were carried out during the final phase of the *BMP*. These studies were necessary and significant for the following reasons:

- An extensive and long-term project such as the *BMP*, which is discussed by Parliament beforehand, needs to be rounded off with a justification to the commissioners, namely, the Minister and the Parliament.
- The extent to which the *BMP* objectives for 2000 and 2010 appear to be attainable - and the circumstances necessary for that attainment - need to be determined.
- Those involved and interested are able to learn considerably from the project.

The structure of the evaluation is determined by the three levels that the *BMP* project group has distinguished in the final results of its activities (Figure 13).

Figure 13
Intended policy process.



Results are the direct outcomes of the projects that have been carried out in the framework of the *BMP*, i.e. the knowledge, arguments and instruments developed and partly established and distributed in products.
Carry-over relates to the degree to which the exchange of information regarding the results of *BMP* activities influences the pursuance of policy by relevant authorities, who in turn are able to influence bicycle use directly. This refers to the influence of the execution of *BMP* projects and distribution of knowledge, arguments and instruments on the pursuance of policy by target groups.
Effects are the ultimate results in everyday reality of the policy that was carried out, i.e. the extent to which the *BMP* objectives (targets) have been realized or are feasible.

It was not possible to make adequate evaluations at all levels of the results of *BMP* activities, the results at a project level being easier to evaluate than those of the carry-over that was accomplished. After all, carry-over in target group policy takes time and the degree to which observed carry-over can be solely or chiefly attributed to the activities of the *BMP* would be next to impossible to establish and is debatable, in view of the relationship with other *SVV* policy. A causal connection is even more difficult to make when measuring effects, considering the larger time span between *BMP* activities and changes on the street (via carry-over in policy pursued) and because of the even larger number of other influencing factors, such as demographic, spatial and economic developments.

The results of the various types of *BMP* projects, the carry-over to the various target groups and the effects are discussed in sections 3.3 and 3.4. Section 3.5 contains an assessment of the (possible) effects on the various spearheads. A comprehensive overview of developments in the scope of bicycle use and cyclist safety is given in Chapter 4.

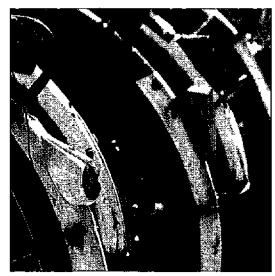
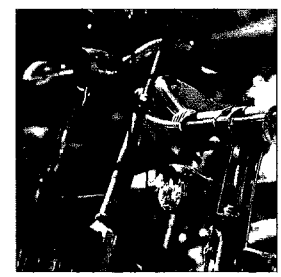
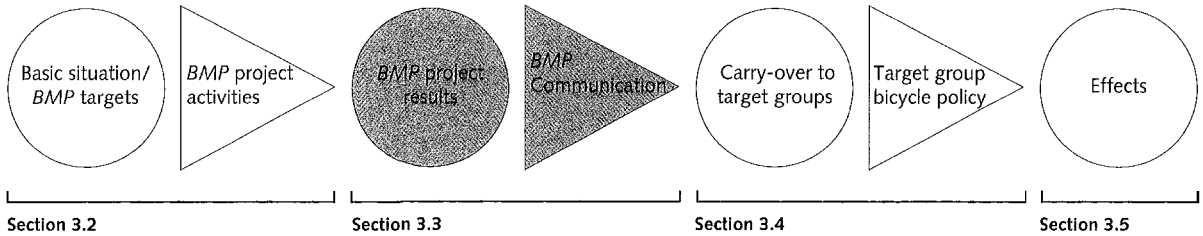



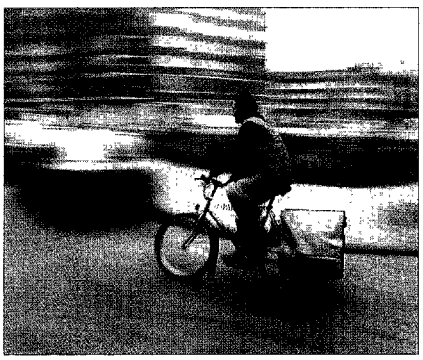

Figure 14
Intended policy process.



Project results

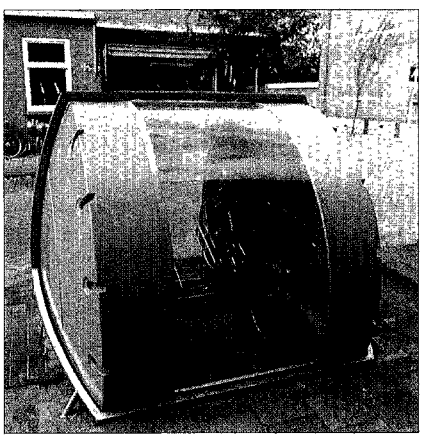
What concrete results have the 112 projects delivered? What were the most tangible direct results? The outcomes are varied:

The results of the 31 **research projects** were generally positive. The majority of projects provided a clear-cut and practical response to the research question. This can be attributed in part to the clarity of the research questions, which the project group had based on the concrete need for knowledge gained from experience.



More than half of the 41 **pilot and model projects** were successful. The fact that the results of the other half fell short was related to the nature of the projects, as these were innovative projects breaking new ground. Deliberate risks were therefore taken.
Nearly all of the projects that did not score well were part of the newer policy themes (the switch from the car to a combination of public transport and the bicycle, bicycle parking facilities and theft prevention). After all, these are areas in which much development was needed and in which risks were unavoidable. A number of pitfalls can now be recognized:

- Afterwards, hypotheses and policy theories were found to be illogical and therefore difficult to realize;
- On further consideration, it can be seen that project partners co-operated less than had been proposed or agreed upon beforehand;
- Futhermore, the project group was regularly tempted to seize hold of the project, whereby others felt less involved and let their attention wane.



In addition to the intrinsic goal of developing a practical argument or instrument, the majority of pilot and model projects also had the objective of involving, stimulating, activating and convincing target groups. Moreover, the *BMP* group also used the target groups to create wider attention to bicycle policy. Judging by these "process objectives", the results of the pilot and model projects were generally positive.

Pilot projects which entailed the **technical development** of a product formed a special category. These technical development projects cost a relatively large amount of money. Changes in the role of the *BMP* project group during the project also greatly influenced the results of all of the development projects. Experience has taught us that as long as the ministry acts as the co-financier or chief financier of a technical development project, it is a natural role with few or no risks. As soon as the role of commissioner is taken on, however, risks will

arise. Put simply, a project has the greatest chance of succeeding if the originator continues to remain personally responsible for the realization of his product. As soon as a different party in the project takes his place, the interest of the originator declines as far as giving his all is concerned. After all, as long as the project progresses smoothly, he will take credit for it. As soon as problems arise, however, fingers start pointing at project management.

The reason why the *BMP* fell into an unnatural role in a number of technical development projects can be explained. As soon as problems arose in carrying out a development project, the tendency arose to hasten to assist, to enforce measures in the area of project management or to put more money on the table in order to solve the problems. These led to the role of the chief financier being shifted to that of commissioner and sometimes even from that of commissioner to project owner. Although understandable, this ultimately failed to deliver the desired effects nearly every time and, in several instances, even led to decreased involvement in the project on the part of the partners.

The value of the results of the 18 **projects for instrument development** primarily lay in the degree of usage by target groups. Systematic insight is unavailable into the usefulness for, and usage by, target groups of the instruments and arguments developed and the information distributed on them, apart from the design manual of which an English and German version were also published: *Sign up for the bike* (1993) and *Radverkehrsplanung von A bis Z* (1994). The Dutch version was evaluated in the spring of 1997 by means of a written survey, in which the vast majority of the road management authorities target group (and a number of consultancy firms) assessed the design manual as being "comprehensive", "topical" and "logically arranged", though the degree of satisfaction was lower with regard to "search-friendliness". Nearly all of them use the design manual at least several times per year, primarily as a reference for concrete data and as a source of ideas and examples. They also use it, logically, as a guideline for designing bicycle traffic facilities.

The 22 **projects for information exchange** are discussed with the communication results at the end of this section. The results of the "carry-over" to targets groups of the knowledge, arguments and instruments developed and distributed by the *BMP* can be found in section 3.4.

In spite of the large number and varying types of projects that were carried out, some matters still remain. Recognizing this 'unfinished business' can be relevant for the future and therefore deserves a brief summary:

- Trip distances influence bicycle use considerably and are determined in part by spatial developments and spatial policy. More intensive involvement with the world of spatial planning, urban development and location policy can be profitable.
- More contact with urban development experts is also desirable in order to integrate bicycle parking facilities into the townscape and in and around buildings more successfully and more often.
- Strong, empirical evidence for various essential issues in traffic policy on a national as well as local level is still lacking, including the following: the relationship between highway congestion and bicycle use; the importance of the differences in travelling times between the car and bicycle; and the consequences for shopkeepers' sales of a switch from the car to the bicycle for shopping.

- A systematic analysis is also lacking of the trips currently made by car that could be made by bicycle, whether or not in combination with public transport. This would include a study of the purposes of trips, how often they are made and under what kinds of circumstances,.
- Clear-cut evidence is lacking of the effect of the "stretching" of bus lines (more direct routes, fewer stops) on the total number of travellers and on their choice of mode of transport to reach the bus stop.
- That an increase in bicycle use can make traffic safer has been made plausible by the *BMP*, though hard evidence is still lacking.
- Too little systematic research has been carried out into the best method of safeguarding cyclist safety.

Subsidy scheme results

Although the *BMP* project group was not directly involved in executing the *Road Traffic Facilities Contribution Regulation*, this regulation has been of indirect importance for the project's effectiveness. Financial contributions to municipalities, provinces, water district boards and regional authorities from the special "bicycle article" of the *Contribution Regulation* were a clear signal that the Ministry of Transport believed bicycle infrastructure to be of importance. This had a favourable influence on the attention paid to bicycle traffic and on the traffic and transport plans of other authorities. The regulation also acted as a 'breeding ground' for *BMP* activities.

A start was made in May of 1990. The leading pre-conditions of the subsidy scheme were a subsidy percentage of 80 per cent and a minimum project scope of 200,000 guilders. The percentage was reduced in January of 1992 to a maximum contribution percentage of 50 per cent. The reason for this was that it would allow more projects to be carried out and that the personal responsibility of road management authorities would be emphasized by a contribution percentage of 50 per cent. The bicycle budget was included as of January 1, 1996 in a "Goal Payment " (GDU), which was distributed in its entirety directly to provinces and a limited number of urban district authorities, resulting in the complete decentralization of the budget for bicycle facilities.

During the five-and-a-half years that the Contribution Regulation existed (from May 1990 through January 1996), the regional directorates of the ministry distributed 270.9 million guilders from this subsidy pool for nearly seven hundred bicycle projects. With the amounts that were eventually spent on independent bicycle infrastructure - separate from the adjustments that were automatically included, for example, in the construction of infrastructure for motorized traffic or sewerage improvement - the promises from the *Policy Document* were more than fulfilled. The total *Contribution Regulation* budget was an estimated 25 per cent above the total municipal and provincial expenditures for bicycle traffic, which amounted in 1991 and 1992 to approximately 200 million guilders per year.

In 1991 and 1992, there was an estimated total of 300 to 350 million guilders spent annually in the Netherlands for constructing and reconstructing infrastructure for bicycle traffic. Municipalities were responsible for half of this, the provinces for 15 per cent and the various ministries for the remainder. The annual amount was estimated at the same level for subsequent years.

The subsidy article was popular. The total number of requests was always larger than the available budget. This regulation has allowed municipalities to carry out more projects and to do them earlier. Moreover, the subsidized infrastructure projects from the *Contribution Regulation* were larger (including 19 tunnels) and more innovative than they would have been without the subsidy. In particular it was those innovations breaking new ground that otherwise would not have taken place. Table 14 lists the projects that were financed with contribution funds. Eighty-one per cent of these cases involved new facilities, while the remainder involved reconstruction. The majority of the funds (66 per cent) went to bicycle paths and lanes.

Table 14
Distribution of completed projects and contributions granted from the *Contribution Regulation*, according to types of measures, 1992-1995.

	Number of measures*		Contributions (in thousands of guilders)		Average contribution per project (in thousands of guilders)
	Absolute	*Percentage*	*Absolute*	*Percentage*	
Bicycle paths along roads, two way	157	21	48.288	24	308
Bicycle paths along roads, one way	175	24	47.024	23	269
Bicycle path, own infrastructure	69	9	15.375	8	223
Bicycle lanes	86	11	13.791	7	160
Roundabouts	55	7	13.507	11	246
Lighting	6	1	584	0	97
Bridges	27	4	16.848	8	624
Tunnels	19	3	19.068	9	1.004
Bicycle parking facilities	36	5	3.176	2	88
Signposting	5	1	949	0	190
Intersection reconstruction	36	5	4.683	2	130
Other	66	9	16.918	8	256
Total	737	100	200.203	100	272

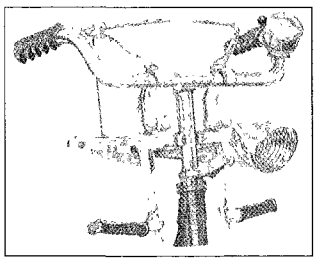
* Total number of measures is higher than the total number of projects; a single project can consist of various measures.
Source: see Verkeer en Waterstaat, 1998.

Nearly seven hundred kilometres of bicycle routes were constructed using money from the *Contribution Regulation*. The number of kilometres of bicycle paths and lanes increased between 1990 and 1996 by around 2,000 to 19,000 km. This is a magnitude not to be ignored in view of the total length of roads and streets in the Netherlands. The road infrastructure amounts to around 113,000 km of paved road, more than 50,000 of which is within built-up areas. The motorway network encompasses around 2,200 km and there is around 2,700 km of railway and approximately 30,000 km of routes in total for buses, trams and subways.

Communication results

The knowledge, arguments and instruments yielded by the projects were distributed by the *BMP* via dozens of brochures and handbooks, two video films, 15 editions of their own quarterly magazine *Fietsverkeer* (Bicycle Traffic), articles in professional journals, various workshops, education, around 30 presentations in workshops and conferences in the Netherlands and 20 abroad, 50 interviews and frequent oral consultation and personal contact between members of the project group and the *BMP*'s target groups. In addition to the direct distribution of project results to the various target groups, the project group devoted a lot of effort to indirect and non-project-related communication. All of this has contributed to a certain public familiarity with the *BMP*.

It is possible that the value of the BMP does not necessarily lie in the concrete projects, but primarily in something more general, such as the constant validation of the existence of the BMP, with a clear-cut vision translated into clear policy and supported by the existence of the Contribution Regulation.



More and more effort was put in to achieving widespread influence, i.e. reaching target groups with polymorphous messages by means of any kind of channel, and if possible, via numerous channels simultaneously.
BMP activities and products can be subdivided as follows:
- Policy, argumentational and vision-orientated communication and products;
- Technical, instrumental and implementation-orientated communication and products.

An evaluation study among a number of municipalities showed that the argumentational communication and products were less valued than the instrumental ones. The instruments developed by the *BMP* were generally well received and the municipalities studied used them frequently and intensively. On the other hand, the distribution of arguments via the quarterly magazine and a number of brochures was of relatively little use due to the fact that it was written and often non-recurrent. The arguments developed were favourably received indirectly as soon as the municipalities allowed them to be heard from not only the *BMP* but from other circuits as well.

This modest and usually written communication aimed at an unemotional presentation of facts earned criticism from the 'sounding board' group, as did the lack of communication with the people. Nonetheless, this method of information transfer was most in keeping with the situation. The primary issue was to adequately establish existing knowledge about bicycle traffic and policy, so that it could be built upon later on. Those who were already planning to develop bicycle policy and facilities needed to get hold of practical resources. The chosen method was fitting for such a purpose. It was only at a later stage that the time became ripe for convincing the rather reluctant policymakers.

With regard to the criticism of the lack of public-orientated promotional campaigns, the project group only considered it significant in combination with concrete improvements for bicycle traffic. The Dutch are familiar with cycling and are aware of its advantages and disadvantages. They travel by bicycle when it is more efficient than using another mode of transport. The better the bicycle traffic facilities and the more unappealing the use of other modes of transport become, the more often the bicycle is chosen. Individuals have little influence on the measures necessary for this, though the direct target groups of the *BMP* do have such influence. The issue here is to stimulate bicycle-friendly policy. For this reason, administrators and policymakers were the most important target groups.

Arguments for bicycle policy

The *Policy Document* provides important instructions for the message with which the project group got started:

> "Policy that focusses on an increase in the role of the bicycle in passenger transport can be successful by means of taking advantage of the positive traits of the bicycle, cycling and bicycle traffic and by removing obstacles."

Part of such a policy includes collecting and distributing knowledge regarding policy arguments. Different collections of arguments are employed per target group.

For citizens, an indirect target group only (Figure 12), it is important to receive honest and well-founded information regarding the fact that:

- many trips are short: seventy per cent of all trips made in the Netherlands are shorter than 7.5 kilometres;
- the bicycle is the most efficient mode of transport for many short trips and inexpensive at that;
- cyclists experience reliable arrival times and no traffic congestion;
- cycling is good for staying in shape and is relaxing;
- cycling, as an individual mode of transport, offers privacy; the bicycle is always available and takes you from door to door;
- it does not rain quite as often in the Netherlands as is commonly believed.

The above arguments are also relevant for the direct target groups of the *BMP*, i.e. municipalities and provinces, public transport operators, the business community and institutes, particularly if they have taken measures or have developed facilities and wish to encourage the use of those facilities by means of informing the end-user about them.

Decision-makers at the direct *BMP* target groups are also approached with other arguments. These include the following:

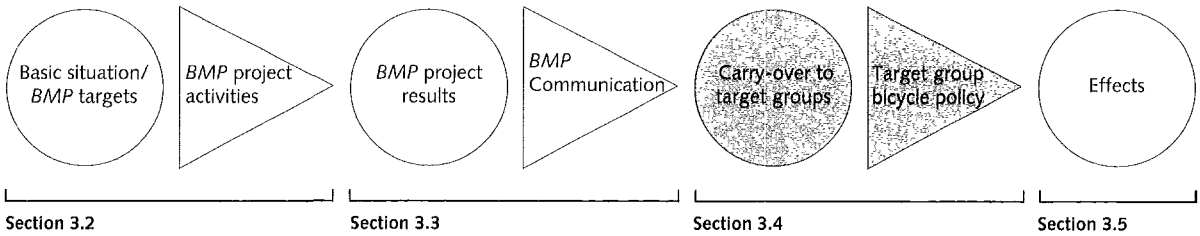
- Cycling is an important mode of transport: 28 per cent of all trips made in the Netherlands are covered by bicycle (48 per cent by car, 17 per cent by foot and 5 per cent by public transport). Residents in some cities use their bicycles for half of all trips.
- Practically everyone cycles: young and old, men and women, rich and poor. There is therefore a broad basis for bicycle policy.
- There is an abundance of potential for more bicycle use. People themselves state that bicycle use may be stimulated at the expense of car traffic. This primarily concerns numerous short car trips, forty per cent of which are no longer than five kilometres.

Motorists themselves indicate that nearly half of those short car trips in the city and village could have been made by bicycle without any inconvenience.
- Bicycle use in transport to and from the train and regional transport can improve the efficiency of the combined use of public transport and the bicycle considerably, and can increase the use thereof as an alternative to long car trips.
- Cycling is clean. If half of all short urban car trips had been made by bicycle, it would reduce the CO_2 emissions by approximately half of the reduction that would have been achieved through the effective reduction of the speed limit on highways from 120 to 100 km/hour.
- Cycling is a silent mode of transport.
- Bicycle routes do not split up urban and rural areas.
- Bicycles take up little space, both when being ridden as well as when parked.
- Bicycle traffic and bicycle parking facilities are inexpensive in comparison with facilities for car traffic and public transport. Infrastructure for bicycle traffic costs an average of two to three cents per kilometre cycled. Every kilometre covered by a passenger in urban public transport costs around forty cents subsidy on average, just to cover shortages on operation costs. Moreover, investments in facilities for bicycle traffic appear to be able to pay for themselves in the long run.
- Cyclists form an important group of shoppers. They spend less money per visit on average, but visit shops more frequently.

Other combinations of arguments are important per target group and per situation. Efforts are continuously made in presenting these combinations to make clear that the goal is not to have everyone travel by bicycle at all times. The ultimate objective is that the most appropriate mode of transport or combinations of modes of transport get used as much as possible for every trip. The bicycle therefore shows up here more often than is generally assumed by policymakers.

The disadvantages of bicycle use are always greater in conceptualization regarding bicycle traffic than they are in reality:
- Cycling is not as dangerous as is often assumed. Cyclists are vulnerable, certainly the inexperienced ones and those who are no longer skilful, often young people and the elderly, respectively. This can be resolved in part, for example, by shielding them wherever possible from rapidly moving motor vehicles.
- From the point of view of safety, large groups of motorists would be better off travelling by bicycle than by car for short trips. It goes without saying that this is favourable for total traffic safety.
- Cyclists are confronted with socially unsafe situations. Specific measures can often reduce or remove the problems, but not in all cases. The fact of the matter is that social danger is not specifically a cyclist problem.
- The quality and maintenance of bicycle traffic facilities leave something to be desired, but that can be easily remedied at relatively low costs.
- Many bicycles are stolen and the fear of theft is sometimes an obstacle to bicycle use. However, this does not have to be limited to simply observing the problem. There are measures to deal with it.
- Finally, with regard to rain: it only rains six to seven per cent of the time in the Netherlands.

Figure 15
Intended policy process.



Did the *BMP*'s activities and the results and communication of these activities have any influence on the pursuance of policy by authorities able to influence bicycle use directly? To what extent was the *BMP* information received, accepted and applied? The answers to these questions provide insight into the degree to which "carry-over" has been accomplished in the policy plans and implementation programmes of the various target groups. But it does not provide an answer to the question: To what degree can the accomplished carry-over be attributed to the *BMP* project group? The relationship with other components of transport policy as well as other factors which may be of influence has already been pointed out. Therefore, we have chosen here to present the state of affairs at the various target groups. This includes the central divisions of the Ministry of Transport, the provinces, municipalities, businesses and institutions, public transport operators and citizens. The regional directorates of the ministry are not included here because, as provinces assumed their tasks more and more, their influence on the development of bicycle traffic and policy declined. Other ministries too are not brought up for discussion because the intended co-operation turned out in practice to have been too optimistic. Finally, we do not dwell upon consultancy firms and interest groups because, although they were a channel to be used for distributing and adapting the *BMP*'s range of ideas, the extent of the *BMP*'s effect on their recommendations to municipalities, provinces, companies and other policymakers has not been explicitly studied.

The current situation at the Ministry of Transport

The Ministry of Transport's communication goal was stated in the *Policy Document* as follows:

> "In 1995, the establishment of bicycle policy in the Transport, Public Works and Water Management organization will be completed in order for bicycle policy to become an integral part of traffic and transport policy."

Certain central divisions of the Ministry of Transport were important partners for the *BMP*, given the stated *SVV* strategy - that activities and measures would have to lead to the set objectives together, in correlation and in connection with one another. The embedding of the *BMP*'s range of ideas in these ministerial divisions was therefore crucial to maintain the valuable position of bicycle policy in traffic and transport policy as a whole. Consequently, the project group endeavoured to achieve a good rapport with the responsible divisions for public transport, transport management, urban traffic, parking, price policy and traffic safety, among others. Accomplishing this integration, however, proved to be a complex and

labourious process. The project group therefore ultimately limited its efforts. It should be mentioned that the embedding of bicycle policy within the ministry at the start of the project was not stable, and that this still holds true. This is reinforced by the fact that at the moment the ministry, in accordance with agreements with other road management authorities, withdraws to those areas of interest that other levels of government are unable to encompass, i.e. the roadway network and large infrastructure projects.

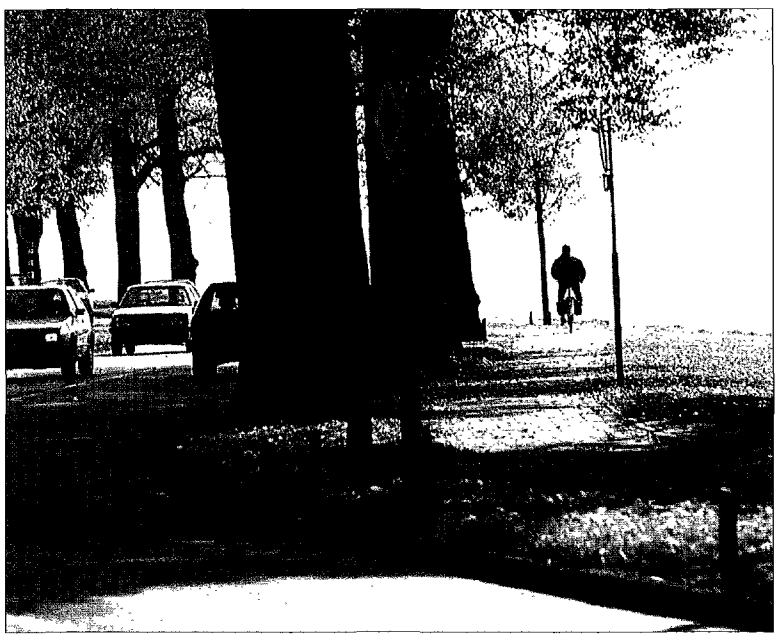
Nonetheless, the policy visions within the various central divisions of the ministry appear to have grown towards one another, with regard to acknowledging the importance of a policy that stimulates bicycle use. This ultimately resulted in the establishment of best practice agreements as to the numbers, quality and financing of bicycle parking facilities inside and outside of stations. The implementation programme for realizing sustainable safe traffic infrastructure that was agreed upon with all road management authorities also contained numerous desirable measures proceeding from bicycle policy. Finally, there is increased attention to the role of the bicycle in the framework of parking policy and transport management at companies.

The current situation in the provinces

The communication target formulated in the *BMP*'s *Policy Document* was to have bicycle policy be part of all provincial traffic and transport plans by 1995. The *BMP* primarily aimed its activities towards provinces after it became clear that the provinces would become an interesting intermediary, in the framework of the decentralization policy, for the most important target group for bicycle policy: the municipalities. This new role also formed the most important incentive for the provincial "Bicycle Traffic Meetings" organized by the *BMP* and held between March 1996 and March 1997 in eleven of the twelve provinces, the goal of which was to exchange the knowledge, insight and experience gained with the *BMP* and to provide a number of practical examples from within or outside of the province concerned. Nearly 700 people took part. The meetings were concluded with a national theme day on provincial bicycle policy, which was organized together with the national province umbrella organization. A single action like this on the part of the *BMP* naturally does not have any noticeable influence on provincial policy, but perhaps the meetings were a good initiative nonetheless for filling the new provincial role as planner for province-wide

traffic policy and as a catalyst for municipal traffic and bicycle policy. Besides this largely new task, the provinces, as road management authorities, have been involved since time immemorial in realizing bicycle facilities along their provincial roads and financing them from their own budgets. This requires little to no improvement.

Nearly all provinces are busy with creating a "new style" provincial transport plan, which will need to serve as a testing framework for municipal plans. If, in doing so, provinces use the regional traffic and transport plans made earlier as a basis, one may assume that bicycle policy will be well in keeping with those plans. After all, it was determined in an analysis of those regional plans carried out in 1994 that substantial contributions for bicycle infrastructure had been included.

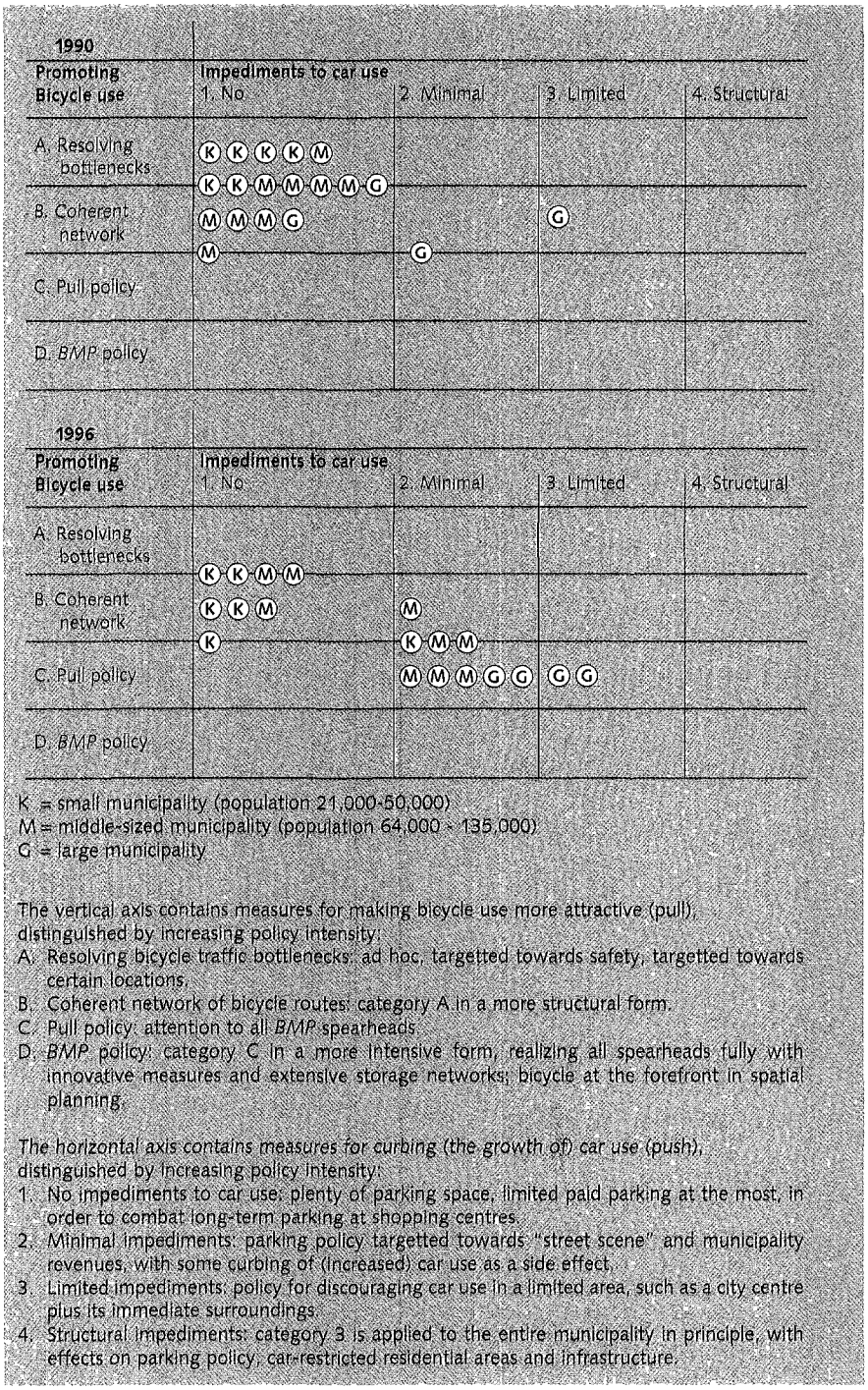


The current situation in municipalities

Municipalities are by far the most important target group for the *BMP*. Their responsibilities place them in a position of being best able to pursue effective bicycle policy. The majority of the *BMP*'s projects were therefore directed towards this target group. The target for municipalities was, just as for provinces, to have bicycle policy established as an integral part of all traffic and transport plans in 1995.

In 1996, the *BMP* project group carried out a qualitative study to analyze the state of affairs of the bicycle policy of municipalities in the year 1996 and to survey developments since 1990. This involved making assessments of the *BMP*'s influence, wherever possible. Four consultants with ample experience in municipal bicycle policy carried out a meticulous analysis in 19 sample municipalities, whereby they studied the relevant documents per municipality and interviewed policymakers, directors and representatives of the Dutch Cyclists' Union *enfb*. Municipalities were selected according to their geographical distribution and number of inhabitants. The results are shown in Figure 16. The score is based on the municipalities' plans and actions.

Figure 16
Development of the intensity of bicycle policy (pull and push) in nineteen municipalities between 1990 and 1996.



1990

Promoting Bicycle use	Impediments to car use 1. No	2. Minimal	3. Limited	4. Structural
A. Resolving bottlenecks	(K)(K)(K)(K)(M)			
	(K)(K)(M)(M)(M)(M)(G)			
B. Coherent network	(M)(M)(M)(G)		(G)	
	(M)	(G)		
C. Pull policy				
D. *BMP* policy				

1996

Promoting Bicycle use	Impediments to car use 1. No	2. Minimal	3. Limited	4. Structural
A. Resolving bottlenecks				
	(K)(K)(M)(M)			
B. Coherent network	(K)(K)(M)	(M)		
	(K)	(K)(M)(M)		
C. Pull policy		(M)(M)(M)(G)(G)	(G)(G)	
D. *BMP* policy				

K = small municipality (population 21,000-50,000)
M = middle-sized municipality (population 64,000 - 135,000)
G = large municipality

The vertical axis contains measures for making bicycle use more attractive (pull), distinguished by increasing policy intensity:
A. Resolving bicycle traffic bottlenecks: ad hoc, targetted towards safety, targetted towards certain locations.
B. Coherent network of bicycle routes: category A in a more structural form.
C. Pull policy: attention to all *BMP* spearheads.
D. *BMP* policy: category C in a more intensive form, realizing all spearheads fully with innovative measures and extensive storage networks; bicycle at the forefront in spatial planning.

The horizontal axis contains measures for curbing (the growth of) car use (push), distinguished by increasing policy intensity:
1. No impediments to car use: plenty of parking space, limited paid parking at the most, in order to combat long-term parking at shopping centres.
2. Minimal impediments: parking policy targetted towards "street scene" and municipality revenues, with some curbing of (increased) car use as a side effect.
3. Limited impediments: policy for discouraging car use in a limited area, such as a city centre plus its immediate surroundings.
4. Structural impediments: category 3 is applied to the entire municipality in principle, with effects on parking policy, car-restricted residential areas and infrastructure.

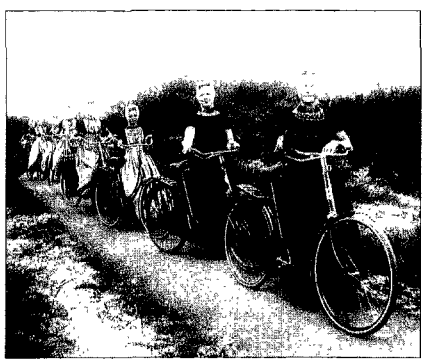
The matrix shows that the intensity of bicycle policy is connected with the size of the municipality, although the differences are minor. Clear developments can be seen in the period from 1990 to 1996:

- Policy was heightened in 16 of the 19 municipalities. No municipality showed a reduction in policy intensity.
- Policy for promoting bicycle use clearly shifted in intensity from categories A and B to B and C.
- Policy for curbing (the increase in) car use was shifted in half of the municipalities from

category 1 to 2. The fact that this shift primarily occured in the medium-sized and large municipalities is in accordance with expectations, as those municipalities have the most reason to accentuate their policy.

The municipalities were well organized in 1996, with regard to the existence and quality of bicycle plans. A bicycle plan has been created since 1990 in the four large cities, eight of the nine medium-sized cities and five of the six smaller municipalities, whether or not incorporated into a broad traffic and transport plan. Bicycle plans are currently being drawn up in the remaining two municipalities. Of the 17 bicycle plans, 13 deserve to be called excellent due to their scope and concrete programmes for implementation, including costs and financing. Eleven of the 19 municipalities had considerable structural budgets for bicycle policy in 1996. There has also been much realized on the street: only six municipalities continue to do little tangibly for cyclists. The picture is less favourable as regards policy for curbing car use, the generally less pleasantly experienced side of the *SVV* picture. Conscious policy for stimulating the switch to the bicycle in this way can be seen in only two municipalities.

All in all, bicycle policy has been successful in municipalities, as regards planning, realization and organization. It is clear that the *BMP* target for making bicycle policy an integral part of traffic and transport plans has been met, broadly speaking.
In general, however, municipalities have not yet ended up at clear and intensive bicycle policy. It is only possible to speak of bicycle policy as an optimal integral part of traffic policy in intensity categories D and/or 3 (Figure 16). Only two municipalities have a policy intensity that satisfies the most difficult criterion, namely, Amsterdam and Utrecht. Developments between 1990 and 1996 make it clear why this is so. There was an enormous way to go to D and/or 3 in 1990 in nearly every municipality, though progress has been considerable since that time. The stage that a municipality had reached in 1990, with regard to policy intensity, largely explains where that municipality was at in 1996. Policy-heightening processes take time. It is therefore logical that the consultants came to the conclusion that the "bicycle past" factor is the main explanatory factor for differences between municipalities in the lower categories of policy intensity. This was also shown in a historical study of bicycle traffic and policy in a number of Dutch and foreign cities (Albert de la Bruhèze and Veraart, 1999), which showed that municipalities that start earlier with bicycle policy are much further ahead in later years than municipalities having a later start.



The matrix shows that many municipalities are on the verge of leaving the lowest categories by now. The question for the near future is whether municipalities will be in a position and have the intention to make the transition to a more intensive promotion of bicycle use (D2) or to more intensively restrict car use (C3). This involves politically difficult steps. If a municipality wants to intensify its bicycle policy, it can expect heavy political discussions as to the costs of totally bicycle-friendly infrastructure networks, which are considered to be high. Municipalities will also run up against opposition if they resolve to curb car use more intensively.
Whether or not the political choices necessary for further intensifying municipal bicycle policy will be made is primarily dependent upon two related factors, which explicitly emerged during the study:

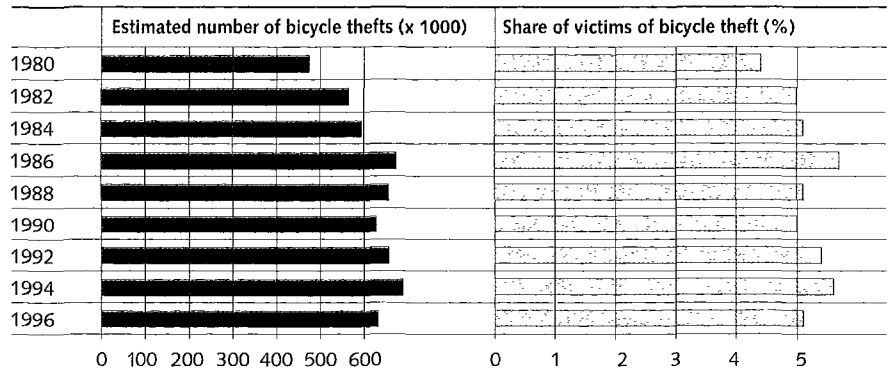
- Local traffic problems and the perception thereof: the degree to which traffic problems are experienced and the consequent need to control (car) traffic.
- Political will: the degree of political will for limiting car use by promoting a switch to the bicycle, dependent on the standpoints, political courage and long-term vision of the councillor concerned.

The policy for facilities for cyclists on their bicycles was incorporated into the analysis of municipal bicycle policy. Less attention was paid to the new theme in bicycle policy forming a special spearhead within the *BMP*, i.e. bicycle parking policy as a means of controlling bicycle theft. The type of bicycle parking policy pursued in 50 municipalities was examined in 1992 and 1996 in other research projects under the authority of the *BMP*. It was observed that, in the year 1996, attention was paid in numerous municipalities to developing suitable bicycle parking facilities in policy plans. The picture on the street shows that on average the quality of unprotected bicycle parking systems has improved. According to estimates by the 50 municipalities, the number of unprotected bicycle parking facilities with anti-theft provisions has, in four year's time, anywhere from doubled to increased tenfold to a share of around ten per cent of alle bicycle parking in small municipalities and 80 per cent in larger ones. The municipalities estimate that the capacity of guarded parking places, excluding bicycle storage facilities at stations, has increased by one third in that same period to a total of 34,000 bicycle racks. This is still only a drop in the bucket, however. As an estimated 1.5 million people park their bicycles daily in public areas in these municipalities, only around two per cent of them are therefore able to park their bicycles in a guarded facility.

Integral municipal policy for combatting bicycle theft in collaboration with the police and judicial system, among others, was found to be less successful. In 1992, 30 of the 50 municipalities studied reported taking steps in that direction. In 1996, however, that number had fallen to nine.

Bicycle theft, as well as the possibility of becoming a victim of theft, had stopped increasing after the early 1980s (Figure 17). The situation had neither improved nor worsened. The *BMP* target - a substantial decrease by 2000 - appears difficult to attain.

Figure 17
Change in the estimated number of bicycle thefts and percentage of population older than 15 years of age that has been a victim of bicycle theft, 1980-1996.



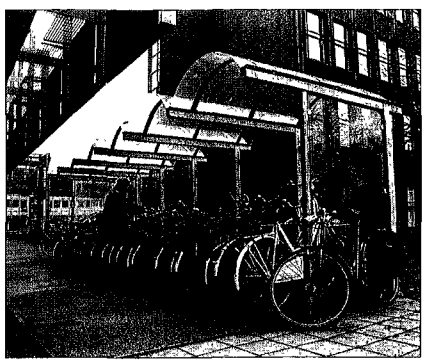
Source: see Verkeer en Waterstaat, 1998.

A closer analysis of the data of the 50 municipalities has shown that victim percentages differ greatly according to municipality size. In other words, the larger the municipality, the higher the victim percentage. That percentage is highest in large cities with a considerable student population.

The current situation in companies

The following topic was added to the numerous policy projects forming a part of the *SVV-II*: all companies and organizations in the Netherlands need to be stimulated to take all possible measures for their personnel to reduce unnecessary car use. A target was explicitly formulated in the *Policy Document* on this topic, known as "transportation demand management by companies":

> "In 1995, all companies and organizations having more than fifty employees should possess a company transport plan, of which the bicycle comprises a part."



It is apparent that the bicycle now plays a role in virtually all of the existing company transport plans. Moreover, the bicycle appears in practice often to be the alternative with the most potential. Employees who need their car for business reasons aside, research has shown that, taking into account of the commuting distance, an average of 28 per cent of solo motorists can make the switch to the bicycle without experiencing any significant problems. The most important *BMP* action in this area was the compilation and distribution of the brochure *Werken met de fiets* [Working with the Bicycle] among companies. The first edition of 4,600 copies was distributed in 1992 via intermediaries and in 1993, companies requested 16,000 copies from a second, revised edition. This considerable interest in the brochure demonstrated that many companies were interested in the bicycle alternative.

The carry-over to companies and agencies in the framework of transportation demand management can be assessed on two different levels:

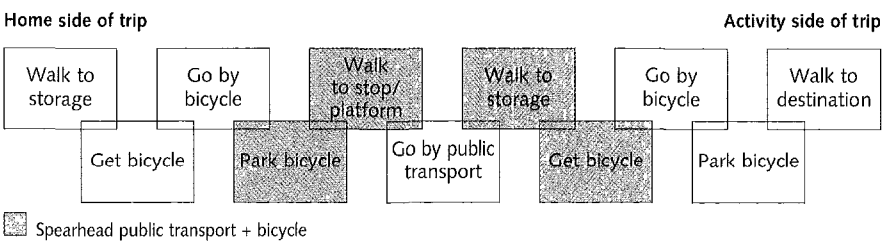
- In relation to other modes of transport and measures, the bicycle and bicycle measures have been relatively successful in the application of transportation demand management by companies. Many bicycle measures, however, have not been the most effective and have often not been enforced consciously or recently in the framework of transportation demand management. After all, there have always been bicycle storage facilities. There was actually only one effective new measure that was also taken relatively often, namely, issuing company bicycles.

- The number of companies taking concrete measures in the area of transportation demand management continues to be limited. As a result, the relatively strong position of the bicycle in transportation demand management is of little use. The target is still far off. Incidentally, this holds especially true for private companies though the picture is a bit more favourable when the government is the employer.

The current situation in public transport operators

Dutch Rail (*NS*) and the urban and regional bus, tram and subway companies formed the most important target groups within the spearhead "The switch from the car to the combined use of public transport and the bicycle." They did not, however, form the only target group, as provinces and municipalities, in their capacity as road management authority and landowner, can also play a role in facilitating the transport chain for the combined use of public transport and bicycles, with regard to bus stops in the provinces, and *NS* stations and bus stops in the municipalities. The various responsibilities and roles are still insufficiently clear in providing bicycle racks at bus stops in particular. As a result, the parties frequently leave matters to each other, as they also do for the financing of these facilities.

Figure 18
Links in the public transport + bicycle transport chain.



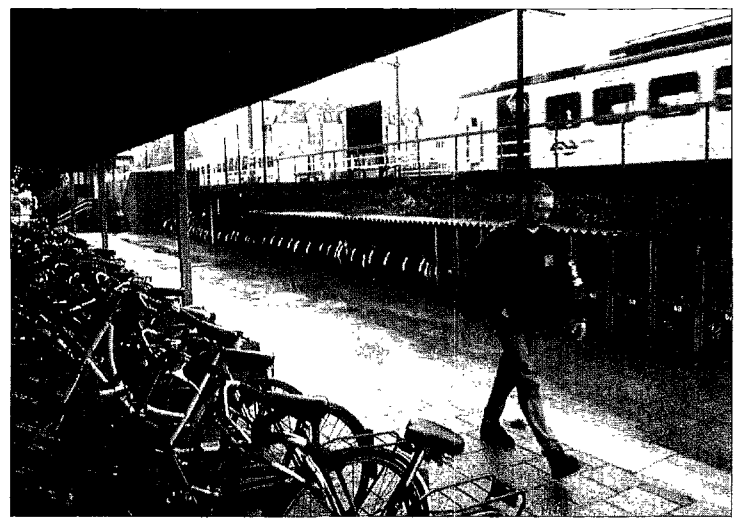
Stimulating the transport chain for the combined use of the bicycle and public transport involves nothing less than strengthening the links (Figure 18). Besides improving the trip by public transport, this also involves the following:

- The presence of good and sufficient bicycle parking facilities. This is the best means for combatting obstacles to bicycle use, such as bicycle theft, vandalism and weather influences.
- Availability of bicycles for use after leaving public transport. Taking along a bicycle in public transport or storing the bicycle on the activity side of the trip is perceived by many

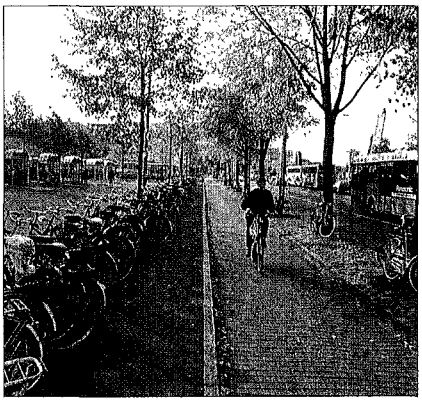
as being inconvenient. Companies could help by giving employees a company bicycle for 'transport after transit'. Public transport operators could actively promote this and could offer suitable (reserved) parking facilities at the station or bus stop. Only a few activities have been developed in this area.

- Card and fare integration. Public transport operators have still not taken any measures for offering travellers a combination card for storage and travelling. Indications show that we need to wait for the introduction of smart card payments in public transport, to which a payment option for guarded storage could also be linked.

The bicycle (and bicycle parking in particular) are a logical point of special interest for the *NS*, as 30 to 40 per cent of train travellers reach the railway station by bicycle. At the start of the *BMP*, the *NS* made a plan to expand the number of bicycle parking places in five year's time by 60,000 places to a total of 270,000. The *NS* kept to this plan in 1993 and 1994; according to *NS* data, the *NS* developed 13 to 14,000 places per year, divided among guarded and unguarded facilities, racks and lockers, for around 13 million guilders annually. However, this progress was subsequently halted.



The current state of affairs at the *NS* is difficult to determine. Two developments are important in drawing up the balance sheet. On the one hand, definitive agreements were made in late 1997 between the *NS* and the Ministry of Transport regarding bicycle parking facilities. According to this agreement, the *NS* is obliged to offer qualitatively good bicycle parking facilities at every station with a capacity (guarded and unguarded) that meets traveller demands. The ministry in turn is obliged to finance the construction and maintenance of these facilities almost in full. If it turns out to be possible to succeed in actually employing the standards agreed upon, it appears likely that a serious stimulation of the combined use of the train and bicycle will emerge in coming years due to the supply of suitable and sufficient bicycle parking facilities. On the other hand, experience shows that difficulties are increasingly developing at many stations with regard to bicycle parking options. The endeavour to make guarded storage as profitable as possible appears to dominate, as this is a financial interest for *NS* stations. Unguarded parked bicycles are then primarily seen as an unprofitable waste of space, an eyesore on the attractive station forecourt, negatively influencing the appearance of the station; in other words, as a problem.



The combined use of bus/tram/subway and bicycle has less of a history than does the combined use of bicycles and train. The degree to which the stimulation of combined bus/tram/subway and bicycle use is currently incorporated into bus company and road management authority policy is also much less clear. Studies show that around 14 per cent of passengers in bus/tram/subway connections between important junctions travel from their homes to the bus stop by bicycle. This percentage lies between 20 and 30 per cent for the (much faster) express bus stops. As many as 60 to 70 per cent of travellers reach some stops by bicycle. Because of these percentages, it had already been necessary for the public transport operator and/or road management authority to provide considerable numbers of bicycle parking spaces. In spite of this, the impression is that vague responsibilities and financing possibilities regarding bicycle parking facilities form a hindrance, more so than with the combined use of train and bicycle. More fundamentally, opinions are still divided as to the answer to the question: When do the bicycle and bus/tram/subway compete with one another and when do they complement one another? On the other hand, the Ministry of Transport's opinion is clear: the bicycle deserves preference for trips covering distances of less than five km.

Nonetheless, there have been gratifying developments. New or extra capacity or quality in bicycle parking facilities has been realized at more and more stops. Bicycle use in combination with bus use will also increase due to the necessity to extend bus lines from commercial exploitation considerations - in other words, to take more direct routes with fewer stops. That development is enhanced by the fact that, on average, people travel increasingly longer distances by public transport (Table 15).

Table 15
Change in public transport trips per person per day for persons aged 12 and older, according to distance class, between 1986, 1990 and 1995.

	Public transport trips per person per day 1986	Change 1986-1990	Change 1990-1995
0 - 7,5 km	0,057	-0,006	0,000
7,5 - 15 km	0,039	-0,003	+0,001
15 - 30 km	0,036	+0,007	+0,002
>30 km	0,041	+0,009	+0,007
Total	0,172	+0,007	+0,010

Source: see Verkeer en Waterstaat, 1998.

In spite of the instruments supplied by the *BMP*, there is nonetheless a considerable lack of experience. At which stops are bicycle parking facilities desired? And what kind of (combined) facilities does this entail?

The current situation with the citizens

Citizens were not a direct *BMP* target group and communication with them therefore only took place via (the media of) interest groups, local and regional authorities and the press. The attitude of citizens towards bicycle traffic was consequently not studied in the framework of the *BMP* evaluation. Data can be obtained from other sources, however, for gaining an impression. In the start phase of the *BMP*, a European poll indicated that 87 per cent of the Dutch feel it is appropriate that the bicycle is given precedence over the car in traffic policy.

Additionally, the ministry has repeatedly carried out studies since 1993 into the opinions of citizens on traffic policy. These studies show that a strong foundation already exists for

bicycle policy, while the assessment of the effectiveness of bicycle policy in dealing with the congestion issue is also positive. When asked which alternative they would choose if they were to drive less often, the prominent response by motorists is the bicycle. Considering the "bicycle for short distances" score, the bicycle was and is for motorists a realistic and important alternative to the car (Table 16).

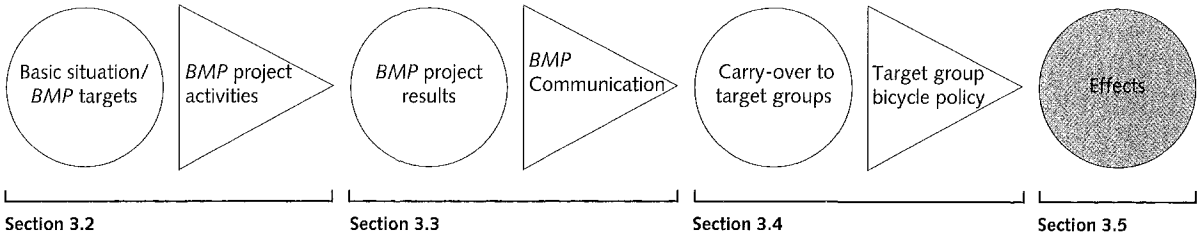
Table 16
Behaviour changes by motorists in the event of driving less (in percentages).

New behaviour	1993	1996
Bicycle for short distances	71	73
Public transport for medium distances	21	23
Train for longer distances	30	32
Carpool	37	45
Avoid busy roads and hours	59	54
Live closer to work	10	11
Bicycle/public transport for shopping	46	39
Bicycle/public transport for commuting	26	34
Pay more for a car	16	15

Source: see Verkeer en Waterstaat, 1998.

Citizens are evidently already aware of the fact that the bicycle is a practical alternative to the car. Exceptions to this include several immigrant population groups such as the Turks, Moroccans and Surinamese.

Figure 19
Intended policy process.



The *BMP* proceeded with quantified "targets" for the effects of the various "spearheads". An assessment of the current state of affairs is difficult for a number of reasons:

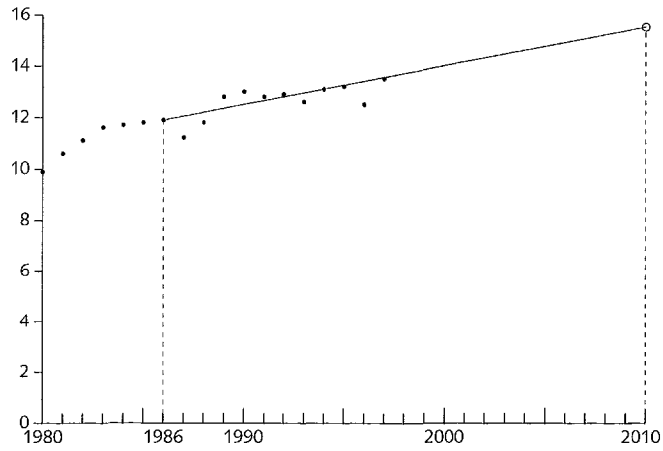
- Effects of bicycle policy or broad traffic policy only emerge after considerable time. The analysis of developments in municipal bicycle policy (see section 3.4) show that all kinds of stages in the development of municipal bicycle policy require a minimum time to develop. The intensity of bicycle policy in 1997 can be explained "historically" to a large extent; in other words, by looking back over a period of decades (Albert de la Bruhèze and Veraart, 1999).
- If evident effects are already observed in 1997, they can hardly be related to *BMP* activities, because of the development time indicated above and because scores of external circumstances, such as other (traffic) policy and socio-economic and spatial developments, are more important than the influence of the *BMP*.

It is valuable, however, to describe quantitatively the current state of affairs in bicycle use and cyclist safety, as well as to analyze development since the early years of the *BMP*, which is covered in Chapter 4. Only the progress for the various targets is described here, together with prudent conclusions on the extent to which they appear to be feasible.

Spearhead: Switch from the car to the bicycle

A 30 per cent increase in the number of passenger kilometres by bicycle by 2010 compared to 1986 is the most important target for the spearhead: The Switch from the Car to the Bicycle. Currently, less than half of that period has lapsed and this makes it difficult to pass judgement on the feasibility of the target. This is all the more so because the change in bicycle usage has no consistent trend: the index was 111 in 1995 (1986 = 100), 105 in 1996 and 113 in 1997 (Figure 20).

Figure 20
Kilometres by bicycle: annual scores 1980-1997 and the target 2010.



Source: CBS/AVV.

Nonetheless, two related conclusions can be made:

- Considering the slight increase in the number of kilometres travelled by bicycle annually since 1986, the ample growth potential of bicycle traffic for trips shorter than 7.5 kilometres and the assumption that effects of integral *SVV* policy will only be evident in coming years, the current state of affairs appears to make the achievement of the target feasible.
- The execution of integral traffic and transport policy has only begun to a limited extent to date and it is meeting the barrier of politically difficult decisions in more and more places. It is fundamental policy decisions, however, that the bicycle needs in the long term. If such choices are not made and structural push measures do not take place, expectations are that the target will not be reached.

Both conclusions can be combined. More intensive and more integral traffic policy on various governmental levels is necessary and sufficient for reaching the bicycle use target.

Bicycle traffic needs local parties - primarily municipalities but also companies - to a large extent. There is reason for optimism, however, if reaching the target primarily depends upon municipal traffic policy because generally municipal traffic policy is evolving in the directions desired for bicycle use. The time is ripe in a growing number of municipalities for further intensification of bicycle policy or for curbing the growth in car use.

Spearhead: Switch from car to public transport + bicycle

With regard to the spearhead: Switch from the car to public transport + bicycle, it can be concluded that there has been "carry-over" to the target groups *NS* and bus companies. The target, however, is formulated as follows: "15 per cent more passenger kilometres by train in 2010 than in 1990 by means of improving the transport chain for combined train and bicycle use", which makes the effect of *BMP* activities strongly dependent upon the development in train use. Furthermore, it is difficult anyhow to assess the state of affairs because there are no unambiguous time series on the development in the share of the bicycle in transport to and from the railway station.

Some information can be obtained from various sources, however, on the bicycle share in transport before transit for various public transport modes:

- 30 to 50 per cent with the train;
- 20 to 30 per cent with the Interliner (express bus);
- up to 20 per cent with the connecting urban and regional transport;
- less than ten per cent with local urban transport.

In other words, the longer the trip by public transport, the more important a role the bicycle plays in transport to and from public transport.

It is apparent that the bicycle share in transport to the train dropped considerably after 1988. This was probably due in part to the fact that, since January 1, 1991, Dutch students have been given a season ticket for public transport, for which a portion of their study grant is withheld. According to estimates, this has led to a decrease of several percentage points in total bicycle use in transport to and from the train.

Effect of student public transport season ticket on bicycle use

An interesting example of the influence of policy decisions in areas other than traffic on the choice of transport means is the introduction of the student public transport season ticket by the Ministry of Education and Science in November of 1990.

Table 17 shows how much the introduction of the student public transport season ticket, which reduced the costs of public transport to zero for students, has altered the modal split.

Table 17
Change in the division of student trips among various modes of transport, November 1990 - March 1995 (in percentages).

	November 1990	January 1991	November 1991	November 1992	March 1994	November 1994	March 1995
Car driver	18,0		13,2	10,6	11,3		12,2
Car passenger	12,3		9,8	10,2	10,2		11,9
Motorcycle	0,7		0,3	0,2	0,3		0,2
Public transport	20,7		39,0	42,8	41,2		36,9
Train	*11,0*		*17,4*	*20,6*	*17,9*		*17,1*
Local buss	*2,2*		*6,7*	*7,3*	*7,7*		*6,3*
Regional bus	*5,3*		*10,7*	*10,9*	*10,6*		*9,5*
Tram/metro	*2,2*		*4,2*	*4,0*	*5,0*		*4,0*
Bicycle + moped*	43,6		32,9	31,9	30,9		33,5
Walking	4,3		4,1	3,6	4,6		3,9
Other/unknown	0,3		0,6	0,6	1,5		1,3
Total	100,0		100,0	100,0	100,0		100,0

Introduction of student ticket

Student ticket formula change (weekly ticket or weekend ticket)

* The category "bicycle + moped" relates primarily to the bicycle.
The moped share for all 18-25 year olds is around three per cent, the bicycle share around 32 per cent.
Source: See Verkeer en Waterstaat, 1998.

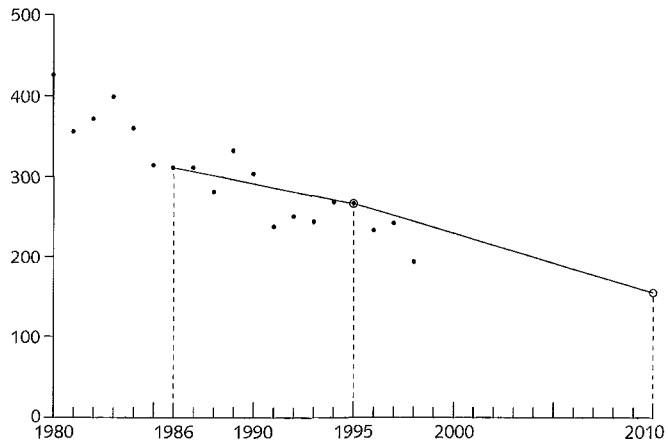
By the end of 1992, the number of student trips by public transport appeared to have doubled. Approximately one-half of the public transport growth was at the expense of the bicycle. The bus, tram and subway grew almost entirely at the expense of the bicycle, whereas the train grew at the expense of the car.

- bus, tram and subway + 12.5 percentage points
- bicycle - 11.7 percentage points
- train + 9.6 percentage points
- car - 9.5 percentage points

Spearhead: Cyclist safety

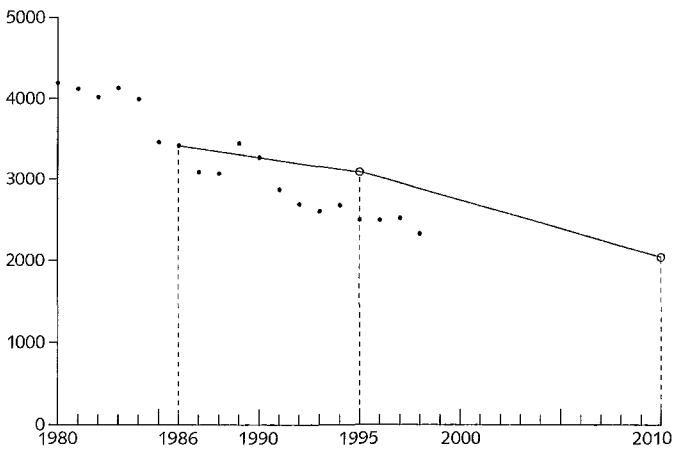
Two intermediate targets were formulated for 1995 for the spearhead: Cyclist safety. These targets entailed ten per cent fewer casualties and 15 per cent fewer traffic fatalities among cyclists than in 1986. Clear data make it possible to attain a suitable assessment of the state of affairs in this area. The intermediate targets for the number of fatalities and hospitalized cyclists have been achieved and the targets for 2010 also appear to be feasible. This is not the case, however, for the remainder of casualties among cyclists registered by the Central Bureau of Statistics, a number that was even higher in 1995 than in 1986 (Figures 21 and 22).

Figure 21
Cyclist fatalities: annual scores 1980-1998 and the target 2010.



Source: see Verkeer en Waterstaat, 1998.

Figure 22
Cyclists admitted to hospital with injuries: annual scores 1980-1998, intermediary objective 1995 and the target 2010.



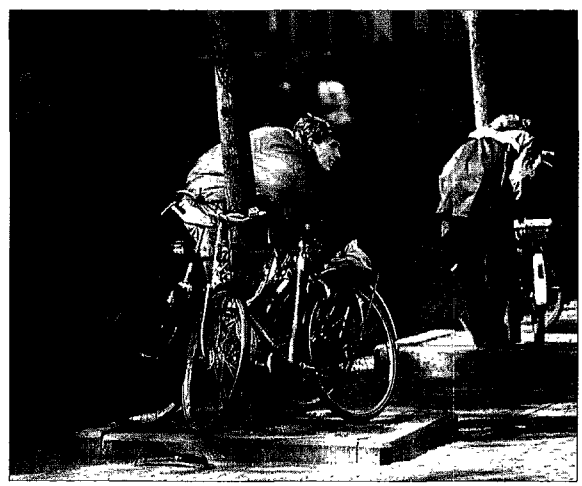
Source: see Verkeer en Waterstaat, 1998.

The registration based on police data, from which these figures have been derived, is not complete, however. This incompleteness is greater for cyclists with slight injuries than for those with serious injuries. If this is adjusted, the number of cyclists admitted to hospital with injuries in 1995 is virtually equal to that of 1986.

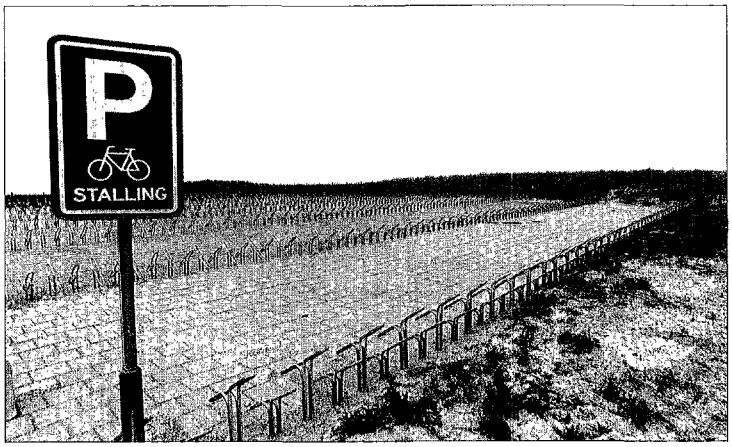
Although the targets for 2010 appear to be feasible, further improvement of traffic safety requires more choices being made. These choices concern the location, timing and frequency with which a cyclist is confronted with motorized traffic and the speed of that traffic.

Spearhead: Bicycle parking facilities and theft prevention

The policy theme "bicycle parking facilities", which has been a major focus within this spearhead, has been successful. The carry-over to relevant target groups (municipalities, companies, *NS*, bus companies) has led to concrete results. Since 1990, significant progress has been made in the attention paid to bicycle parking facilities, as well as to product quality and actual installation on the street of these facilities. The capacity of guarded bicycle parking spaces has doubled since 1990, but still only amounts to two per cent of bicycles parked in public areas. This means that bicycle thieves are still able to seize plenty of opportunities. Nonetheless, this progress is important, as cyclists can now store their bicycles safely at more places. This is favourable for cyclists' perception, and, possibly even more, the perception of policymakers.



In spite of this, it appears unlikely that the target ("a substantially lower number of bicycle thefts in 2000 than in 1990") will be reached. The annual number of bicycle thefts has remained at an even level for the past fifteen years, at between 600,000 and 700,000 thefts per year. Bicycle theft receives little attention at an administrative level, which obstructs an integral policy approach by the Public Prosecutor, municipalities and other parties. Bicycle locks hardly form a solution, as bicycle thieves are able to open pretty much every type of lock. The only exception to this may be a lock integrated into the bicycle frame. There is no good identification system that is used effectively as of yet. The discussion started by the *BMP* of a system entailing a chip in the bicycle (for purposes of considerably simplified and accelerated police monitoring) may possibly lead to the introduction of a system of this kind.



The objective behind reducing bicycle theft was to stimulate bicycle use, the intermediate mechanisms being "an improved image" and especially a "reduced fear of theft". The question that has arisen in the meantime is whether the national level of bicycle theft generally leads to a "fear of theft" and consequently less bicycle use.
Theft no longer forms an obstacle to bicycle use for a considerable portion of the population, but it is a reason for purchasing a cheaper bicycle. And evidently, or so it seems on the street, the fear of theft or vandalism keeps the good, more valuable bicycles at home. This is suggested by the bicycle racks at train stations, which are full of poorly maintained and cheap bicycles that have changed hands umpteen times.

A relationship can be established between good bicycle policy, high bicycle use and a large degree of bicycle theft. And this may not be illogical, because where bicycle use is high, partly due to good bicycle policy, there are also many bicycles parked in public areas and therefore numerous opportunities for bicycle theft.

4 Bicycle use and cyclist safety since 1986

4.1 Development of bicycle use since 1986

Table 18 shows the change in the use of the different modes of transport calculated in passenger kilometres, the unit of account for the key *BMP* target.

Table 18
Change in bicycle use in the Netherlands in comparison with the use of other modes of transport, 1978-1997 (in passenger kilometres, 1986=100).

	Bicycle		Passenger car driver		Passenger car passenger		Train		Bus/tram/subway		Walking	
	Billion km	Index	Billion km	Index	Billion km	Index	Billion km	Index	Billion km	Index	Billion km	Index
1978	8,8	74					8,1	91	5,6	90		
1979	9,1	76					8,5	96	5,8	94		
1980	9,9	83					8,9	100	5,9	95		
1981	10,6	89					9,2	103	6,1	98		
1982	11,1	93					9,4	106	6,1	98		
1983	11,6	97					9,1	102	6,0	97		
1984	11,7	98					8,8	99	6,2	100		
1985	11,8	99	65,9	95	44,3	95	9,0	101	6,4	103	5,1	104
1986	11,9	100	69,6	100	46,5	100	8,9	100	6,2	100	4,9	100
1987	11,2	94	72,0	103	47,0	101	9,4	106	6,0	97	5,0	102
1988	11,8	99	76,4	110	46,0	99	9,7	109	5,9	95	4,8	98
1989	12,8	108	78,6	113	48,0	103	10,2	115	5,8	94	5,0	102
1990	13,0	109	78,2	112	48,4	104	11,1	125	5,7	92	5,0	102
1991	12,8	108	80,2	115	49,5	106	15,2	171	6,4	103	5,2	106
1992	12,9	108	82,4	118	49,5	106	15,0	169	6,3	102	5,2	106
1993	12,6	106	82,4	118	49,0	105	14,8	166	6,2	100	5,2	106
1994	13,1	110	85,9	123	51,6	111	14,4	162	6,2	100	5,7	116
1995	13,2	111	86,5	124	51,6	111	14,0	157	6,3	102	5,6	114
1996	12,5	105	86,3	124	51,1	110	14,1	158	6,2	100	5,5	112
1997	13,5	113	89,7	129	53,0	114					5,6	114
2010 (Target)*	15,5	130	94,0	135								

*target from *Bicycle Master Plan Policy Document*.
Sources: Central Bureau of Statistics, Trip Behaviour Study and other sources.

There were 4.6 million passenger cars in the Netherlands in the *SVV-II*'s reference year of 1986, and 5.6 million in 1995, a one million passenger car gain in ten years, which nearly entirely accounts for the increase in passenger car kilometres. The average number of vehicle kilometres travelled per car has remained more or less stable for decades. At present, 77 per cent of all households own at least one car.

In the *SVV* policy there are growth targets for train as well as bus, tram and subway use, but it has become clear that the bus, tram and subway must work hard just to keep the number of passenger kilometres at the same level. The number of kilometres travelled by these

modes of transport is even threatening to be surpassed by the number of kilometres covered by pedestrians. The number of passenger kilometres by train showed an explosive increase after 1986, though this can be largely attributed to the introduction of the student public transport season ticket. The number of kilometres by train fell slowly from 1991 until 1996.

In 1990, the gradual increase in the number of kilometres travelled by bicycle that had begun in the mid-1970s came to an end. Since that time, the annual number of kilometres primarily shows fluctuations, although the 1997 score was the highest since the late 1970s.

As a rule, the *BMP* has not used the number of kilometres travelled as an indicator for the use of various modes of transport, but instead uses the number of trips. If individuals, companies and organizations want to be able to take part in various activities, the ability to make trips is more important to them than the length of those trips. The distance to be bridged does, however, play an important role in choosing the mode of transport. If the change in the use of the various modes of transport is expressed in the average number of trips per person per day, an entirely different picture emerges of the relative importance of the various modes of transport for passenger transport (Table 19).

Table 19
Change in the division of all trips in the Netherlands by persons aged 12 and older among various modes of transport, 1980-1996 (in percentages).

	Bicycle	Passenger car driver	Passenger car passenger	PT	Walking	Other
1980	27,5	Together 45,7		5,2	18,8	2,9
1986	27,8	33,3	13,8	5,3	17,5	2,7
1990	28,7	34,3	12,8	5,0	17,1	2,2
1991	27,4	33,9	13,6	5,9	16,9	2,0
1992	27,7	34,5	13,3	5,9	16,4	2,0
1993	27,1	35,0	13,6	5,9	16,4	2,0
1994	27,7	34,0	14,0	5,3	17,3	2,0
1995	27,8	35,0	13,2	5,3	16,6	2,1
1996	26,8	36,2	12,7	5,1	17,0	1,9

Source: Central Bureau of Statistics, Trip Behaviour Study.

The car is the most popular mode of transport measured by the number of trips as well. The difference from other modes, however, is not so great as is the difference in kilometres travelled. The share of motorists and passengers in the modal split is only slightly greater than that of pedestrians and cyclists combined. Taking all trips made in the Netherlands into consideration, the importance of public transport is limited. Table 19 primarily shows a picture of stability: neither does the car continue to gain ground nor does the bicycle continue to lose ground.

Calculated by the number of trips, the bicycle comes in second place in the Netherlands as a mode of transport, though is frequently in first place in urban traffic, as many trips are short and therefore easily covered by bicycle. The bicycle share of local trips made by residents in several medium-sized cities reaches as high as 50 per cent (Table 20).

Table 20
Population and share of trips per bicycle (in percentages) by residents aged 12 and older in several medium-sized municipalities, in total and up to 5 km, 1995.

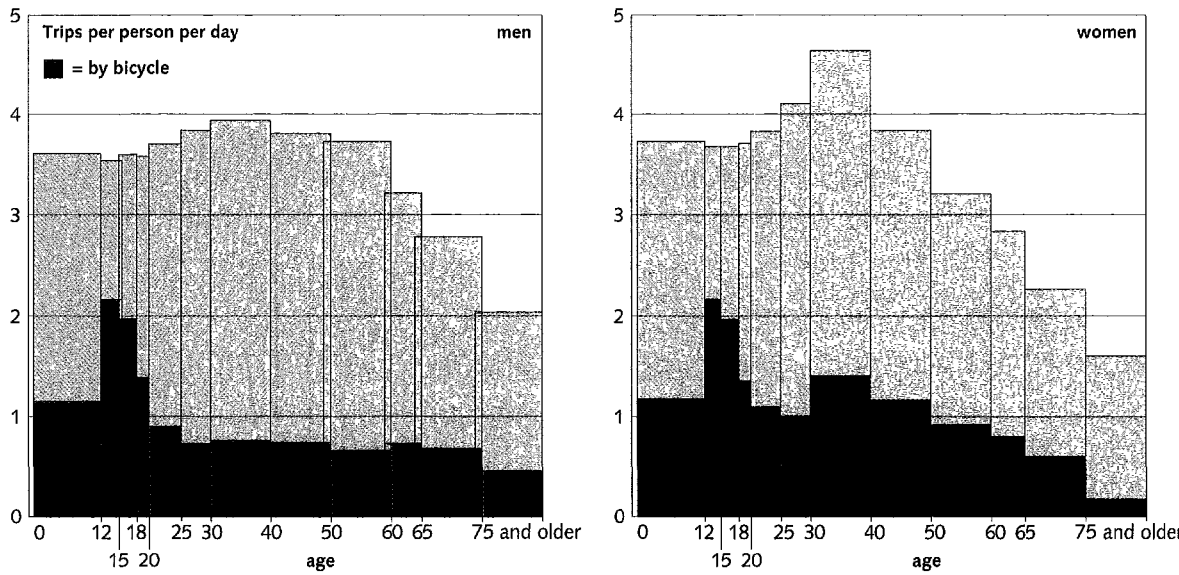
		Residents	Share of trips (in %)	
			total	up to 5 km
High scores:	Zwolle	100,000	40	52
	Groningen	170,000	39	48
	Gouda	70,000	36	50
	Leiden	115,000	36	46
	Enschede	150,000	36	45
	Delft	95,000	35	45
Low scores:	Maastricht	120,000	24	32
	Zoetermeer	105,000	22	31
	Arnhem	135,000	21	29
	Heerlen	95,000	13	18
	Kerkrade	55,000	10	15
Average for the Netherlands			**28**	**39**

Source: *Fietsverkeer* February, 1997, no. 13, on the basis of Central Bureau of Statistics, Trip Behaviour Study.

Bicycle use according to age and gender

The majority of people in the Netherlands ride bicycles - young and old, male and female, rich and poor. Differences do exist, however, between population groups, with regard to the frequency with which they cycle and the importance of the role that the bicycle plays for them in relation to other mode of transport (Figure 23).

Figure 23
Bicycle use according to gender and age (average number of trips per person per day), 1995.



Source: Central Bureau of Statistics.

Young people cycle more often on average than do adults and use the bicycle for a greater number of trips. This is natural, as there are fewer alternatives available to them. As soon as they are able to drive a moped or car, however, bicycle use drops considerably. There is no difference in the frequency of bicycle use between boys and girls younger than twenty years of age, though differences do arise from age twenty onwards. Adult women undertake more trips and cycle considerably more often on average than do men in the same age category. The older the individual, the fewer trips he or she makes per day and this decline is more

significant for women than with men. Men aged sixty and older end up travelling more often than do women, and men aged 65 and older also cycle more often than do women of the same age category.

Development of trip distances

The distance to be travelled plays an important role in the choice of transport means for a particular trip. Walking is usually only considered for relatively short distances, the bicycle for longer ones. The car and train only play a role for the longest distances. The bus, tram and subway play a role for the distances in-between.

Table 21
Division of all trips in the Netherlands by persons aged 12 and older among primary modes of transport and distance classes, 1995 (in percentages).

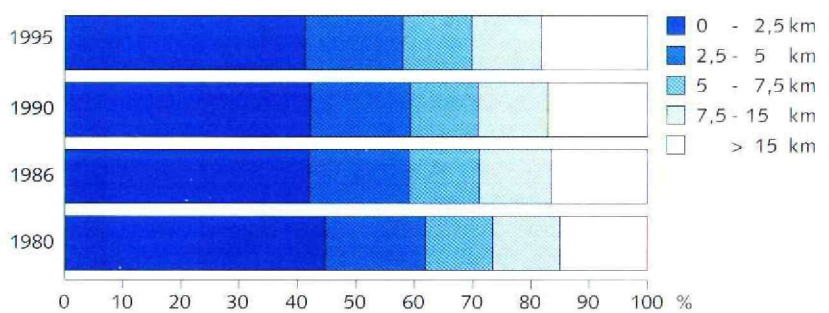
	Bicycle	Passenger car driver	Passenger car passenger	PT	Walking	Other	Total
0 - 2,5 km	16,1	7,4	2,3	0,3	14,6	0,6	41,3
2,5 - 5 km	6,6	5,9	2,1	0,5	1,3	0,4	16,7
5 - 7,5 km	2,8	5,4	2,0	0,6	0,5	0,4	11,8
7,5 - 15 km	1,6	6,6	2,2	1,1	0,1	0,4	12,0
>15 km	0,7	9,7	4,5	2,8	0,1	0,5	18,2
Total	27,8	35,0	13,2	5,3	16,6	2,1	100

Source: see Verkeer en Waterstaat, 1998.

The majority of trips is short (Table 21). In 1995, the "domain" of the walking mode of transport (up to 2.5 km) comprised more than 40 per cent of all trips. Distances in which the bicycle could dominate (roughly up to 7.5 km) involved 70 per cent of all trips. The train "market" (roughly all distances longer than 15 km) involved a scant 20 per cent of all trips and the share in which the efficiency of the car is greatest (longer than 7.5 km) was 30 per cent.

Clear developments in trip distances can be seen through the years (Figure 24). The number of trips shorter than 2.5 km is gradually falling and as a result, the market for walking is shrinking somewhat. The markets for the bicycle, bus, tram and subway remain stable and an increase can be seen in trips longer than 15 km, i.e. the market for the car and train.

Figure 24
Change in the division of all trips in the Netherlands by persons aged 12 and older among distance classes, 1980, 1986, 1990, 1995.



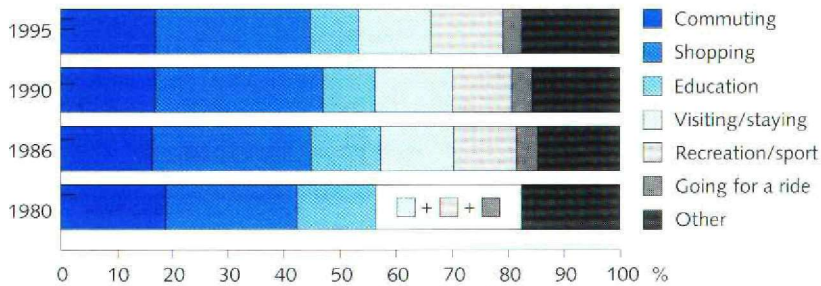
Source: Central Bureau of Statistics, Trip Behaviour Study.

Change in bicycle use according to purpose

Apart from the distance to be covered, the trip purpose also influences the choice of mode of transport (Figure 25). The bicycle is primarily used for commuting (17 per cent of all bicycle trips in 1995), shopping (28 per cent) and social and recreational traffic (visiting plus cycling to recreational and sports facilities: 26 per cent). Two trip purposes that are often considered dominant, education and recreation, appear to only play a limited role in bicycle use. It is not true that the bicycle is mostly used by children for getting to school; the

educational trip purpose comprises only nine per cent of all trips made by persons over the age of 12. Nor is it true that the bicycle is primarily used for recreation; the trip purpose "going for a bicycle ride" comprises only around three per cent of all bicycle trips, though this does involve longer trips as a rule.

Figure 25
Change in the division of trips by bicycle by persons aged 12 and older among the various trip purposes, 1980, 1986, 1990, 1995.



Source: Central Bureau of Statistics, Trip Behaviour Study.

All "utilitarian" purposes (working, shopping, education) comprised 56 per cent of all bicycle trips in 1980 and 53 per cent in 1995. This decline is entirely due to the fact that people travel less often to educational institutions by bicycle and can be almost fully attributed to demographic developments and the fact that trips between the home and schools have become longer because of the concentration of schools, among other things. Otherwise, per trip purpose the share of the bicycle over time does not show much change.

Table 22 shows the relationship between the change in the bicycle share in the most important trip purposes and the change in trip distances.

Table 22
Change in the bicycle share for trips up to 7.5 kilometres and the share of trips up to 7.5 kilometres in the total number of trips by persons aged 12 and older for the four primary trip purposes, 1982-1995 (in percentages).

	Bicycle share of trips up to 7.5 kilometres				Share of trips up to 7.5 kilometres of total number of trips			
	1982-1984	1986	1990	1995	1982-1984	1986	1990	1995
Commuting	42,0	41,9	45,4	46,7	59,9	57,0	55,1	52,2
Shopping	34,8	36,1	38,3	36,5	87,3	84,6	86,3	84,6
Education	72,2	72,0	69,2	71,0	68,9	63,8	63,2	61,0
Visiting/staying	29,5	30,3	33,2	32,6	65,6	64,6	63,9	64,0

Source: Central Bureau of Statistics, Trip Behaviour Study.

Several developments are apparent in Table 22 that were not so clearly observable in previous analyses:

- Under "shopping" and "visiting/staying" the bicycle's share of trips that could be made by bicycle has remained approximately the same. The share of trips by bicycle within the total number of trips has also remained about the same, with approximately the same fluctuations. As a result, the bicycle's share of all trips having these purposes has remained relatively stable since the early 1980s.
- The bicycle's share under "education" has remained approximately the same for trips of 7.5 kilometres and less - i.e. those that can be cycled. At the same time, however, the total share of short trips has clearly declined. This has resulted in a declining share of the bicycle under education.
- Two distinct developments can be seen under "commuting";

- The bicycle's share for distances up to 7.5 km has increased; more and more people cycle to work if the distance permits it.
- The share of trips up to 7.5 km has decreased considerably; more and more people are unable to cycle to work because the distance has become too great.

The combination of these two developments results in a stable bicycle share in commuter traffic.

Table 23 shows the development of the bicycle share in commuter traffic, subdivided into more precise distance ranges.

Table 23
Change in the bicycle share in commuter traffic trips per distance class, 1982-1995 (in percentages).

	1982-1984	1986	1990	1995
0 - 2,5 km	47,9	48,1	49,4	52,1
2,5 - 5 km	43,1	45,2	51,4	51,1
5 - 7,5 km	27,4	27,1	31,0	32,5
7,5 - 10 km	19,7	21,2	22,9	24,2
>10 km	4,3	4,6	3,6	4,2
Total	27,7	26,8	27,9	27,4

Source: Central Bureau of Statistics, Trip Behaviour Study.

It is evident that bicycle use in commuter traffic is developing successfully. Since 1982, the bicycle appears to have gained a larger share in nearly every distance range. The gain for the range of trips longer than 2.5 km is primarily at the expense of the car. In spite of this, the total bicycle share in commuter traffic will not increase, as more and more longer trips are being made, partly as a result of spatial policy and partly of social trends that are difficult to control, involving professional specialization and changes in the make-up of households. The development of the bicycle share in commuter traffic indicates that, with effective spatial policy, bicycle use can contribute significantly to the objectives of mobility and environmental policy. There is definitely reason to devote attention to this aspect of spatial policy. If the trend of increasing trip distances continues, however, the potential gain in bicycle use may not be exploited and bicycle use may then possibly even decline.

4.2 Development of cyclist safety since 1986

Trend figures

Table 24 shows the change in the number of victims among cyclists. The term casualty in the *BMP* target ("to have ten per cent fewer casualties in 1995 than in 1986 and 40 per cent fewer in 2010") refers to all casualties registered. Hospital-treated casualties are cyclists who need to be admitted to a hospital following an accident. Other registered casualties are the cyclists who are registered with injuries but not admitted to a hospital.

Table 24
Change in the number of road victims among cyclists according to the seriousness of the accident's outcome, 1980-1998 (1986=100)

	Cyclist fatalities		Hospitalized cyclists		Other registered injured cyclists	
	Absolute	Index	Absolute	Index	Absolute	Index
1980	426	137	4.199	123	8.543	99
1981	356	114	4.123	121	8.539	99
1982	372	119	4.019	118	8.880	103
1983	399	128	4.135	121	9.115	105
1984	360	115	3.995	117	9.111	105
1985	315	101	3.462	101	8.872	102
1986	312	100	3.419	100	8.662	100
1987	312	100	3.093	90	8.208	95
1988	282	90	3.075	90	8.193	95
1989	333	107	3.447	101	9.497	110
1990	304	97	3.277	96	9.574	111
1991	238	76	2.878	84	9.215	106
1992	251	80	2.697	79	9.181	106
1993	244	78	2.609	76	8.801	102
1994	269	86	2.682	78	8.883	103
1995	267	86	2.499	73	9.302	107
1996	233	75	2.494	73	8.639	100
1997	242	78	2.517	74	8.865	102
1998	194	62	2.329	68	8.485	98
1995 (Intermediary objective)	265	85	3.080	90	7.800	90
2010 (Target)	155	50	2.050	60	5.200	60

Source: Institute for Road Safety Research (SWOV), on the basis of Central Bureau of Statistics.

In spite of the increase in both car use as well as bicycle use, the number of fatalities among cyclists was 54 per cent lower in 1998 than in 1980. The 194 cyclist fatalities in 1998 represent an all-time low since the end of World War II. The total number of traffic fatalities in 1998, namely 1,066, is also an all-time low since 1950. The number of hospital-treated casualties has dropped abruptly in stages. The annual number of other registered cyclist casualties has fluctuated for some time between 8,000 and 10,000 and has therefore not decreased.

In order to obtain a correct and balanced picture of the safety of cyclists in traffic, it is important to employ more differentiated data, thus making it possible to take more effective measures. The project group has continuously tried to contribute to this. A number of more detailed analyses follow.

Age

Table 25 shows the change in the number of victims among cyclists of varying ages for different time periods.

Table 25
Change in the number of fatalities and hospitalized cyclists according to age group, 1979-1995 (1993-1995=100).

Age group		Cyclist fatalities				Hospitalized cyclists			
		1979-1981	1985-1987	1989-1991	1993-1995	1979-1981	1985-1987	1989-1991	1993-1995
		Index			Number	Index			Number
Aged 0-14		192	109	101	137	246	148	132	1.532
Ages 15-24		168	154	135	93	191	149	131	1.392
Aged 25-49		109	101	91	133	112	111	113	1.858
Aged 50-64		149	125	127	106	128	124	123	1.212
Aged 65 and older		147	122	115	308	122	118	124	1.725
Total	Number	1.175	937	874	777	12.176	9.965	9.598	7.774
	Index	151	121	112	100	157	128	123	100

Source: Institute for Road Safety Research (SWOV), on the basis of Central Bureau of Statistics.

These data must be interpreted carefully, as incorrect conclusions could easily be drawn without additional information as to the number of persons per age group and the scope of their bicycle use. An improvement in the traffic safety of cyclists, for example, cannot be found in the 25 to 49-year-old age group, which is due in part to the fact that the size of this particular age group has increased considerably since 1980. Among cyclist fatalities, the age group 65 and older stands out clearly, as regards absolute numbers - with a share of around 40 per cent. This age group's share is smaller among hospital-treated: 22 per cent. This is rather high in comparison with their population share (around 13 per cent), particularly because they are responsible for relatively few bicycle kilometres. The most common conclusion from this is that the elderly are unsafe cyclists. This is not the case, however, as can be seen to a certain extent from the difference between their share in cyclist fatalities and in hospital-treated casualties. Their share in other registered casualties is even lower, which virtually corresponds with their population share. This means that senior citizens are not involved in accidents more often than average, but that the accident outcome is generally more serious for them.

Consequently, specific measures for improving the safety of older cyclists should not so much be directed towards their exposure to danger and their behaviour, but rather, primarily, towards their vulnerability. This is not a simple matter and, moreover, it is a matter which is not limited to traffic safety policy.

Counterparty

Apart from cyclist characteristics, the characteristics of the "counterparty" are also important for analyzing the development of bicycle traffic safety.

Table 26 shows that the counterparty in accidents in which a cyclist is killed or seriously injured usually involves "fast" traffic (motorcycle, passenger car, delivery van, truck, and bus) in 82 per cent and 70 per cent of the cases, respectively. The fact that the seriousness of an accident's outcome is connected with the counterparty can clearly be seen in the difference between accidents in which the counterparty is a truck and those in which the counterparty is a pedestrian, cyclist or moped rider. In accidents involving trucks, the ratio between fatalities and hospital-treated cyclists is around 47:100 but it is around 3:100 in accidents in which the other parties were pedestrians, cyclists or moped drivers.

Table 26
Change in the number of fatalities plus hospitalized cyclists according to counterparty, 1979-1995 (1993-1995=100).

Counterparty	Cyclist fatalities + hospitalized cyclists				
	1979-1981	1985-1987	1989-1991	1993-1995	
	Index			Number	Share (in percentages)
None (one-sided accident)	251	161	140	22 + 490	6.0
Obstacle	149	121	110	29 + 427	5.3
Pedestrian	128	100	93	3 + 78	0.9
Bicycle	112	96	108	24 + 636	7.7
Moped	186	160	154	15 + 585	7.0
Motorcycle	144	94	98	17 + 200	2.5
Passenger car	165	135	115	393 + 4291	54.8
Delivery van	65	85	100	75 + 567	7.5
Truck	146	112	131	139 + 297	5.1
Bus	184	153	157	10 + 79	1.0
Other	103	82	99	50 + 124	2.0
Total	156	127	122	777 + 7774	100.0

Source: Institute for Road Safety Research (SWOV), on the basis of Central Bureau of Statistics.

The link between the counterparty and the seriousness of a cyclist's injuries is also shown in Table 27, which is based on a more extensive accident registration system (VIPORS). Consequently, the figures are not comparable to the Central Bureau of Statistics figures previously employed, and which have been used by official bodies as a rule to date.

Table 27
Division of victims among cyclists according to the seriousness of the accident's outcome and counterparty, 1994.

Counterparty	Cyclist fatalities + hospitalized cyclists		Share (in percentages)		
	Number	Share (in percentages)	Fatalities*	Hospitalized**	Emergency room injuries**
Motor vehicle	9.022	15	2	22	76
Other traffic participants	4.171	7	1	13	86
One-sided	43.594	72	0	8	92
Obstacle	3.432	6	0	9	91
Total	60.219	100			

Source: Institute for Road Safety Research (SWOV), on the basis of *Central Bureau of Statistics and ** VIPORS.

The difference between both registration systems largely concerns the high numbers of one-sided accidents and collisions with obstacles, whereby more than 90 per cent wind up in the emergency room. The question is whether all of these emergency room accidents are also relevant in the eyes of citizens. Every accident on public roads is by definition a traffic accident. But is it a 'traffic casualty' when a child who is cycling for the first time, in wobbly circles on the pavement, falls off and gets a cut? In fact, many one-sided accidents involve cyclists in the youngest age group, including children who are learning to cycle and playing children who are riding their bicycles on the street.

It is evident that the causes of threat to cyclist safety can be roughly divided into two groups, namely, one-sided accidents and collisions with obstacles on the one hand and collisions with other traffic participants on the other. The first accident group is the most extensive but least serious. Such accidents are largely inherent in the use of an unstable vehicle such as the bicycle. Control of the vehicle is the key issue here, primarily in critical situations and when carrying out manoeuvers. The relationship with design and maintenance of the infrastructure is obvious. The second accident group is smaller but more serious. Reducing

the number of encounters with other traffic participants and the threat these encounters pose are the main causes for measures here. This entails separating cyclists and motorized traffic and, if this is not possible or desirable, drastically reducing the speed of "fast" traffic.

Results of a switch from the car to the bicycle

In stimulating bicycle use, doubts have frequently been cast in recent years by professionals in traffic safety policy. More bicycle use would mean reduced traffic safety because the bicycle would be a relatively unsafe mode of transport. It is a common point of view that the bicycle is an unsafe mode of transport, the car a much safer one and public transport the ultimate in safe transport. The standard that is usually employed in this comparison is the number of victims per distance travelled and the number for all users of the transport mode in question. It is possible and justifiable to criticize this method of comparison, certainly regarding the results of the switch from the car to the bicycle.

First of all, the majority of car kilometres travelled are on trips over a distance that it is not reasonable to cycle. These longer car trips are generally safer per kilometre travelled on average, particularly the roughly 40 per cent of all car kilometres that are travelled on the intrinsically safe highways. Second, the car is primarily used by adults in the prime of life having a driving licence and the necessary life and driving experience. The bicycle, on the other hand, is also used by young people up to the age of 18, who have few alternatives, and by the elderly who no longer wish to drive, are unable to drive or do not dare to do so. It is these groups of traffic participants that are less experienced and more vulnerable, respectively. In short, comparing the safety of "all" motor traffic with "all" bicycle traffic partly concerns different sections of "mobility" and partly different population groups. The policy aim of a switch from the car to the bicycle therefore involves "only" **trips over distances that can be cycled** and **persons aged 18 and older.**

It is possible to substantiate in several ways that the *BMP* activities geared towards a switch from the car to the bicycle do not need to be at the expense of traffic safety:

(1) The bicycle is safer than average

The cyclist share among traffic casualties has been fairly constant throughout the years. For traffic fatalities, this share has fluctuated around 20-22 per cent since 1980, between 22 and 24 per cent for hospitalized accident victims and around 23-25 per cent for the remaining registered casualties. The share of trips by bicycle has also varied little since 1980, namely, 27-29 per cent of all trips. With regard to safety, cycling scores better than average when calculating in trips instead of kilometres. In this instance, it is more correct to calculate in trips, as only for short trips the choice between the bicycle and car is being examined. Differences in trip lengths therefore no longer play much of a role.

(2) More traffic participation does not endanger safety

The recent past shows that the increase in both car use and bicycle use can go hand in hand, while there are actually fewer traffic victims among both car passengers as well as cyclists. The number of kilometres travelled by car drivers in the Netherlands has increased by 45 per cent since 1980. The distance travelled by cyclists increased by 36 per cent in that same period, i.e. from 1980 to 1997. At the same time, however, the annual number of

hospitalized accident victims and fatalities fell by 24 per cent among motorists and 40 per cent among cyclists. As a result, the average chance of becoming an accident victim per km travelled has been halved for both motorists and cyclists since 1980.
If an **increase** in car use and bicycle use does not halt the decline in victims among cyclists, we may say, with discretion, that it is not likely that the switch from the car to the bicycle (and therefore **less** car use) will lead to more victims among cyclists.

(3) Young motorists: the bicycle is safer than the car

In order to be able to make a good comparison of the results of the switch from the car to the bicycle on traffic safety, risk figures referring to that switch need to be employed. This concerns only those figures for distances that can be relatively easily cycled and figures for individuals qualified for the switch. In other words, the risks figures for the most important target group for bicycle policy: the traveller from 18 to around 60 years of age, who can choose between the car (because they own a driving licence) and the bicycle (because they are generally physically fit) for short trips. Table 28 is the point of departure for this comparison.

Table 28
Number of fatalities and hospitalized injuries among cyclists and motorists per billion traveller kilometres according to age group; average from 1994-1996.

Age group	Number of fatalities per billion traveller kilometres		Number of hospitalized injuries per billion traveller kilometres	
	Cyclists	Motorists	Cyclists	Motorists
Aged 0-14	12,0	-	142,6	-
Aged 15-17	20,5	-	254,6	-
Aged 18-24	8,7	15,2	162,6	144,3
Aged 25-34	6,7	5,0	122,4	36,4
Aged 35-49	8,1	2,9	140,3	23,6
Aged 50-64	20,4	3,8	226,5	24,1
Aged 65 and older	113,4	10,7	589,5	27,0
Total	19,4	5,1	193,8	36,4

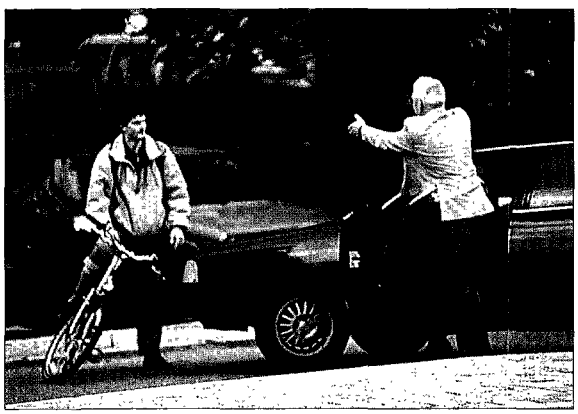
Source: see Verkeer en Waterstaat, 1998.

If we look at the chance of a fatal accident, it appears that young people aged 18 to 24 would be better off choosing the bicycle over the car. The chance of being admitted to the hospital following an accident is virtually equal for both modes of transport. For the remaining adults, however, driving a car is safer than cycling. At least, this is the case if all distances travelled by car and bicycle are compared per age group. However, it is more accurate to examine only the risk for distances that can be cycled and not consider the kilometres travelled on highways, which are the "much safer" kilometres on average. It then emerges that cycling is much safer for individuals aged 18 to 24 than is driving a car and that, considering the chance of a fatal accident, persons aged 25 to 34 could travel by bicycle just as safely as by car for shorter distances. Of *all* kilometres covered in the Netherlands by car, 18 to 34-year-olds drive around one third.

The more car kilometres that are driven on the relatively safe highways (a development that is currently taking place) and the more measures that are implemented for separating car from bicycle traffic and for reducing car speeds in areas with mixed traffic, the more motorists can safely switch from the car to the bicycle for short trips.
Comparisons have only been made so far between the risks run by individual traffic participants travelling for short trips by car and travelling by bicycle. Not only can those who

choose the car or bicycle for a certain trip die or be injured, but so can the "counterparty". There are 20 to 30 times more victims on average among "adversaries" in collisions involving a passenger car as in collisions involving a bicycle. If we consider what is best for "all" traffic safety in the Netherlands, we need to include the victims among the adversaries as well for the risks of car driving. The outcome argues even more strongly in favour of switching from the car to the bicycle for short trips, in order to contribute to improving total traffic safety.

More motorists will be able to make the switch safely if traffic policy continues to develop in a sustainable safe manner, particularly on a municipal and regional level. This will improve the safety for other traffic participants at the same time, because they will be confronted less often with a vehicle that relatively significantly threatens their safety. Or, as the Dutch Institute for Road Safety Research (*SWOV*) has concluded, "This means that considerable thought can be given to bicycle use in searching for solutions to increasing mobility."



5 Dutch bicycle policy after the Bicycle Master Plan

A number of aspects of the Bicycle Master Plan are reflected upon in section 5.1. The questions examined are "What was the value of the *BMP* as a stimulative programme and what were the most important learning experiences?" Conversely, section 5.3 looks ahead and gives a rough sketch of the Ministry of Transport's future bicycle policy. Prior to this, however, a number of conclusions are drawn in section 5.2, on the basis of the historical study by Albert de la Bruhèze and Veraart in 1999, as to the degree to which policy is able to influence the development of the scope of bicycle policy.

5.1 Value of the Bicycle Master Plan

The key objective of the *BMP* was a carry-over of knowledge, arguments and instruments to relevant target groups. This carry-over was successful, generally speaking. The effectiveness of stimulative programmes such as the *BMP*, however, is difficult to assess. After all, target groups primarily have their own "internal" motivation for policy decisions, with their own dynamics. External, intrinsic influences mostly appear in the background and, for this reason, will not often be called decisive. However, it is possible to view this the other way around. In broad terms, the bicycle policy pursued by the target groups has been relatively successful and there are signals and reasons to assume that the *BMP* has contributed to this success.

All in all, a number of conclusions may be reached.

Concerning the realization of the *BMP*

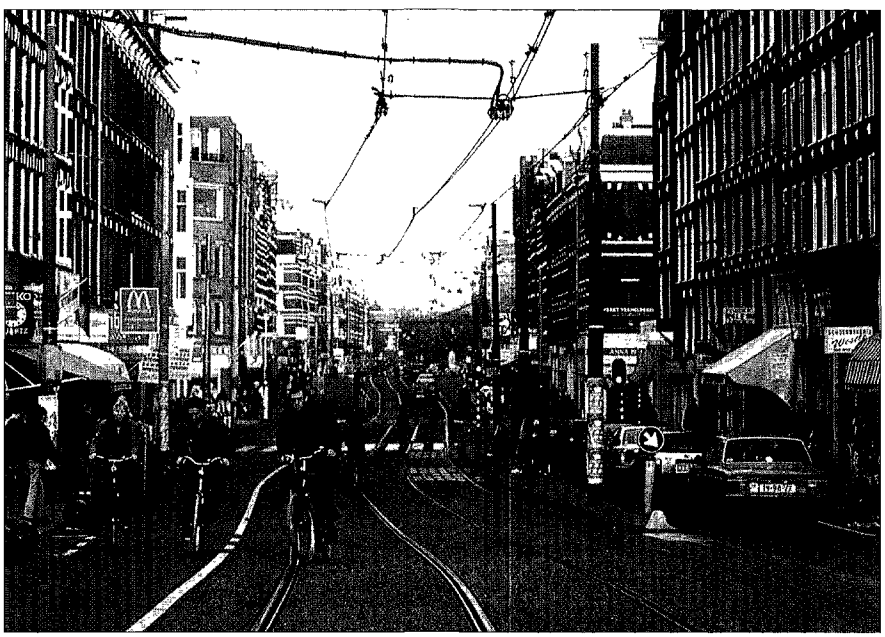
- Looking back, the fact that bicycle policy was initially lacking in the *SVV-II* in 1989 turned out to be positive, as the reaction to this omission provided a broad social basis at the start of the *BMP*, support which gave the project latitude from the onset for collaborating with target groups and intermediaries. The two-day brainstorming session with external experts and interested parties in late 1989 resulted in a solid impetus for the *BMP* programme, to which a clear financial claim could be attached.

Concerning the integral vision of bicycle policy

- The goal of an integral traffic and transport policy, in connection with spatial planning, urban development and economy was and is the basic principle for *SVV* policy. The *BMP* project group has repeatedly stressed that bicycle policy alone is insufficient for increasing bicycle use and curbing an increase in car use. This has consistently resounded in *BMP* communication, which the target groups have appreciated.
  The long-term evaluation of the bicycle route network in Delft emphasized this vision once more, though on a local level. It also became clear that integrated policy demands continuing commitment; a once-only improvement of the bicycle route network alone is insufficient.

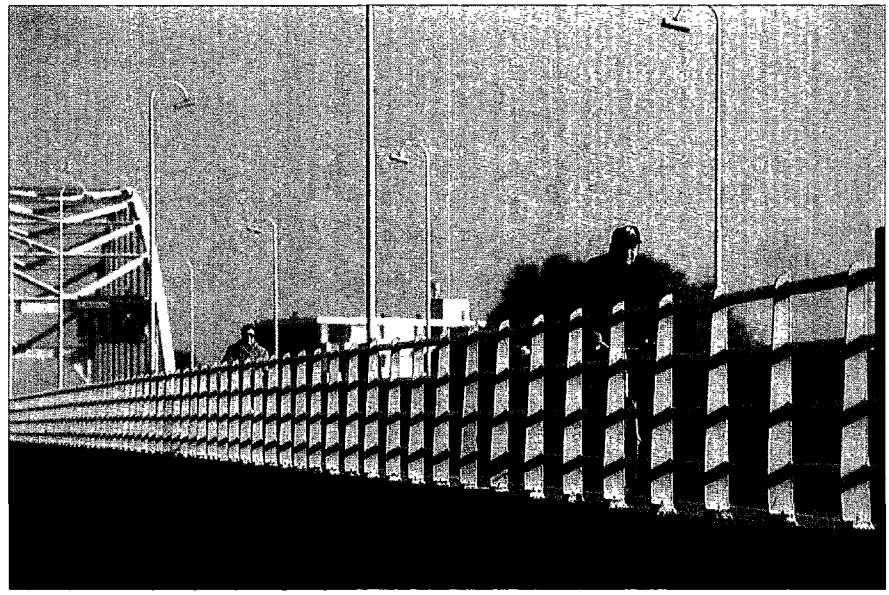
It has become clear at a national level that the spatial developments leading to greater trip distances are disastrous for the desired increase in bicycle use. While the bicycle share of trips at distances up to ten kilometres has increased, the effect of this has been virtually cancelled out due to the considerable growth in the share of longer trips, in which the bicycle share is small. This confirms that the desired integration of policy must not remain limited to traffic policy, but, more ideally, must also encompass spatial policy.

- The integral vision on traffic and transport was worked out in the contents of *BMP* activities wherever possible. During the last years of the project, however, the relationships with the necessary parties within and outside of the Ministry of Transport disintegrated. This is a negative point that has had only limited consequences, however, during the period 1990-1997. After all, the accent during that period lay strongly on the offering of instruments for facilitating bicycle traffic. Much attention is needed, however, during the following stage on the development and further integration of the bicycle portion of the traffic and transport policy.



Concerning the chosen targets and strategy

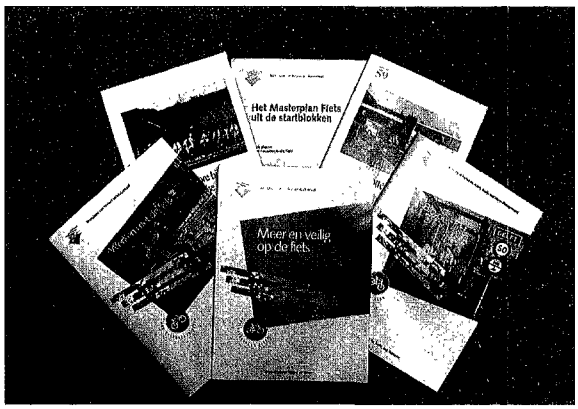
- Doubts can be cast as to the feasibility of the targets chosen for the bicycle policy:
  - Spearhead 1: The switch from the car to the bicycle: the intended increase in bicycle use is primarily dependent upon broader traffic policy, i.e. the "carrot and the stick" notion;
  - Spearhead 2: The switch from the car to public transport + bicycle: the intended increase in public transport by improving the transport chain is highly dependent upon general public transport and even broader traffic policy, as well as other policy, as is indicated, for example, by the effect of the student public transport season ticket;
  - Spearhead 3: Cyclist safety: the intended decline in the number of fatalities and casualties among cyclists is strongly dependent upon total traffic safety policy;
  - Spearhead 4: Bicycle parking facilities and theft prevention: the intended decline in the total number of bicycle thefts is strongly dependent upon the policy of the police and judicial authorities.



- The objective that bicycle policy should be embedded in government and public transport operator policy in 1995 has been achieved through the chosen strategy directed towards developing, establishing and distributing knowledge, arguments and instruments. This provided a clear-cut task, which needed to be rounded off within a surveyable period.
- The decision to carry out numerous projects and activities in a broad scope, together with the target group whenever possible, has been effective in the sense that bicycle policy has been placed higher up on the political agenda of various target groups. The continual - and target group-orientated - distribution of basic factual knowledge and of instruments developed has resulted in that attention leaving a lasting impression.
- The State's decision to perform a catalytic function, together with the establishment of a project group within the ministry, which wholeheartedly undertook the role of catalytic driving force, has strongly reinforced this lasting impression.

Concerning the communication strategy and philosophy

- The *BMP* strategy was to carry out a large number of projects, preferably together with the target group whenever possible. This made possible the logical and successful decision for target group-orientated distribution of the knowledge, arguments and instruments developed. These were established by means of effective senders and channels and were sent repeatedly, if possible, via various media forms. This *frappez toujours* strategy was well in keeping with the intrinsic strategy.
- The *BMP*'s method of communication (often "written, thorough, unemotional and distant") fitted in well with the state of affairs in the bicycle policy of target groups and the nature of the communication concerning content, which entailed much factual and instrumental information. The target groups consisted to a large degree of people who already intended in principle to "do" something, but who needed resources to do it well. The numerous publications that came about in the framework of the *BMP* established well the current knowledge of bicycle policy, which can be built upon in a subsequent bicycle policy stimulation phase.



Concerning the project approach

- The chosen project approach for activities necessitated planning, which, the more the project progressed, continually emphasized the necessity for actively completing running projects. This led to caution over launching new projects, for which there had to be sufficient capacity to ensure their completion.
- The regime employed by the project group (i.e. of central decision-making on the appropriation of the budget for research, pilot and model projects) prevented the wheel being re-invented and made sure that the money earmarked for innovation was actually spent on projects breaking new ground. This regime made it easier to carry out measurement of effects and evaluation of pilot and model projects wherever possible. It turned out to be highly important to be able to draw hard conclusions and make worthwhile recommendations. Communication was necessary and this method made sure that there was continually something to communicate. At the same time, it was equally important that the project group accepted the risk of a project failing in advance on the one hand, provided that a lesson was learned, and that the project group also saw it as its duty to account for and carry out these failures on the other.

Concerning the evaluation of the *BMP*

- During the project, the project group decided on a comprehensive evaluation of the activities carried out, in order to account for the money and man-hours spent, and as a lesson for the future and for other comparable stimulative programmes. Evaluating a project as extensive as the *BMP* has cost much time and money in itself, it's true, but has also provided extra knowledge. Moreover, the results have rendered important points of departure for decisions with regard to the question: "Where do we go from here?"

Concerning the value of the *BMP* stimulative programme

- The value of the *BMP* lies less in the results of the concrete projects than in the constant acknowledgement of the existence of a bicycle policy with a clear-cut vision, supported by the existence of a subsidy scheme for constructing bicycle facilities. The simple fact that a *BMP* project existed within the Ministry of Transport was influential; the ministry indicated that it believed bicycle policy to be important by means of the provisional financial effort via the *Contribution Regulation.* The variety of pilot and model projects has contributed to creating and maintaining interest in bicycle policy at local, regional and national levels. Dutch bicycle policy has even attracted considerable attention at an international level.

5.2 From evaluation to challenge

In view of the state of affairs that have been outlined, the logical follow-up question is "Where do we go from here?" The basic question here is to what extent bicycle policy or broader traffic policy can be expected to be effective in the future. Indications as to the degree of influence of policy measures on traffic developments can be deduced from an analysis of the differences in the scope of bicycle traffic between Dutch provinces and between Dutch municipalities, and from an historical explanation of differences in the scope of bicycle traffic in nine Western European cities.

Differences between provinces and between municipalities

There are clear indications that traffic policy, whether or not local, indeed influences bicycle use. The fact is that bicycle use differs greatly between cities (see Table 20 and Figure 26), regions and provinces. These differences also appear in cities and areas that are comparable, as regards morphology (elements such as hills and rivers), spatial and economic structure.

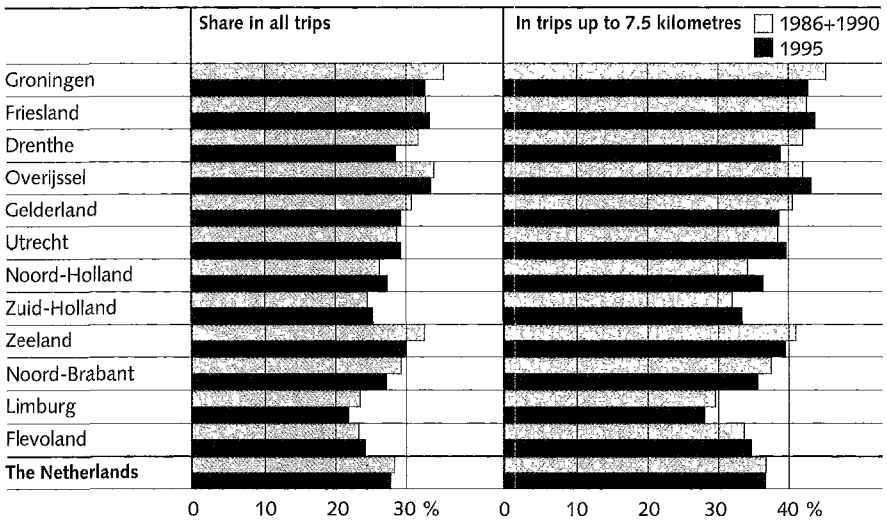
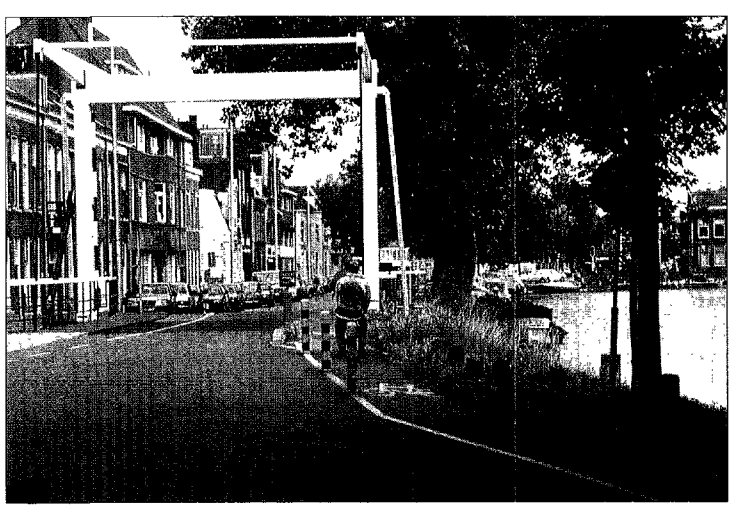


Figure 26
Change in the bicycle share in trips by residents per province between 1986 + 1990 and 1995.

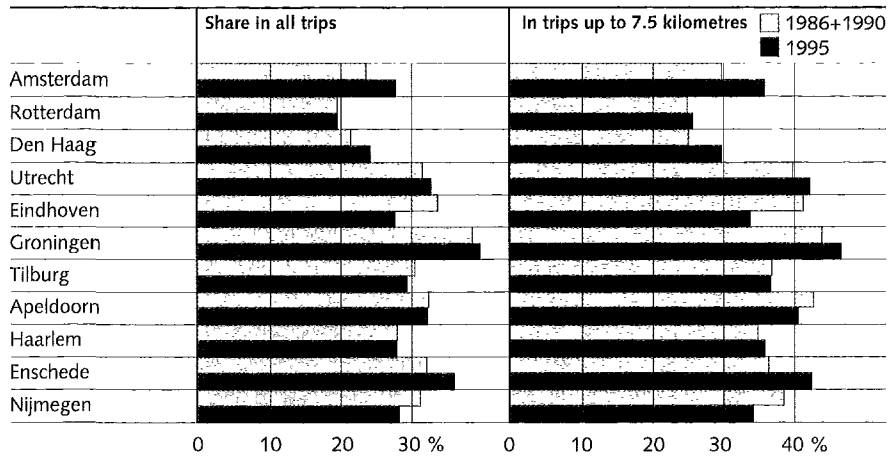
The differences between provinces cannot be blamed on the fact that the one has more distances that are easily cycled than does the other. Indeed, the provinces show the same variations in the bicycle share for distances up to 7.5 km as for all trips.

There appears to be a pattern in the change in bicycle shares between 1986+1990 and 1995. The bicycle has made slight progress in the densely populated and crowded urban agglomeration of Western Holland provinces (North Holland, South Holland and Utrecht), though it has lost some ground in the majority of other, less urbanized provinces. This may be a signal that the extent of urbanization plays a role in explaining the differences between the provinces. It appears that the bicycle has become a more attractive alternative to the car in urbanized areas due to the concentration of facilities within cycling distance as well as due to the limitations of car use, consciously or unconsciously created by the government.



This change can also be seen in a comparison between bicycle shares (and the change in those shares) in the eleven largest Dutch cities (Figure 27).

Figure 27
Change in the bicycle share in trips by residents of the eleven largest cities between 1986 +1990 and 1995.



Considerable differences exist between the cities as to the scope and development of bicycle use. Bicycle use by residents in the four largest Dutch cities increased, primarily during the 1980s, the most significant cause probably being the strict parking regime that has been made necessary due to cities becoming congested with traffic. For this reason, city residents in many instances choose the bicycle over the car for specific destinations.

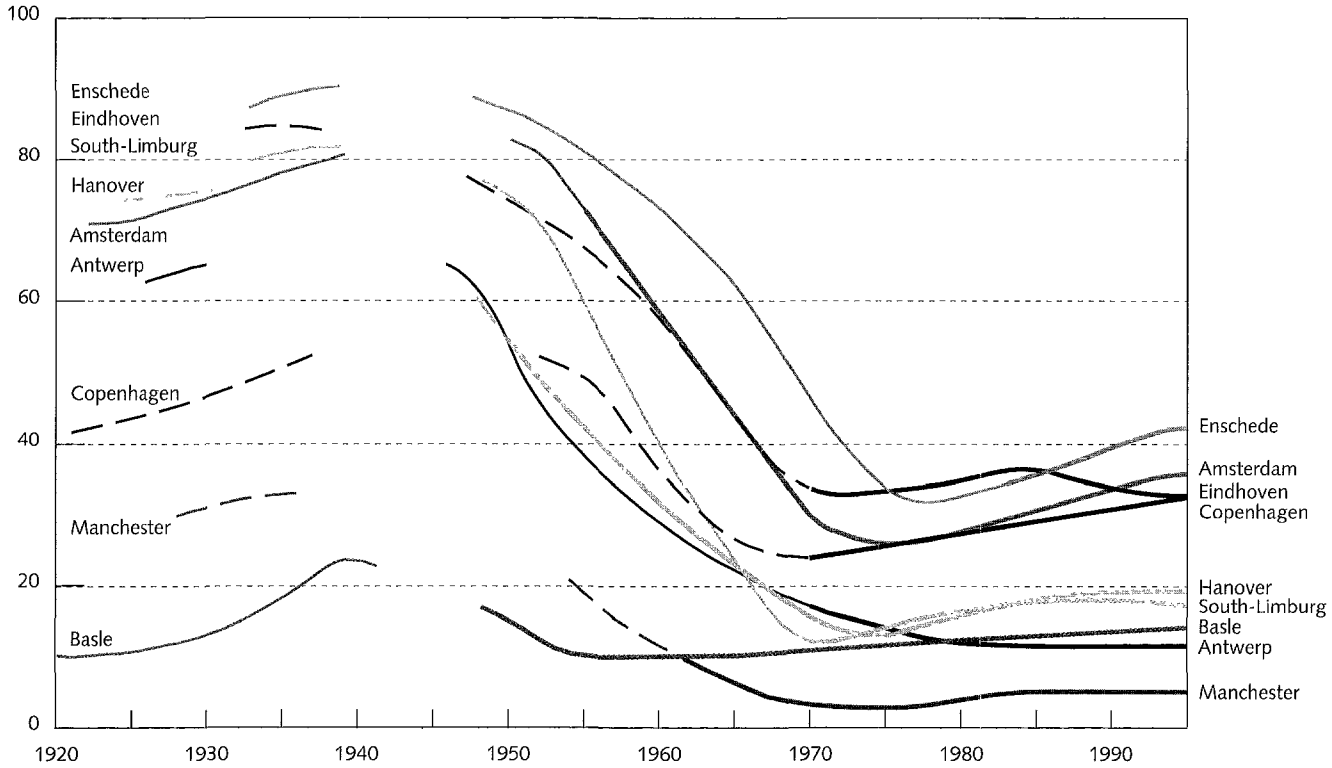
But why is the bicycle chosen for 42 per cent of trips up to 7.5 km in Utrecht and only 30 per cent in The Hague? And why is this as high as 42 per cent in Enschede and only 34 per cent in Nijmegen? Why is bicycle use increasing in Groningen and decreasing in Eindhoven? Why does the bicycle share in the one city change primarily in the 1980s and in the other in the 1990s?

Historical explanation of differences

"External" circumstances, such as population traits, spatial structure or competition with public transport can certainly not solely explain the differences between the larger Dutch cities. There must be more involved and this cannot really be anything but "policy" or, related to this, "past" or "tradition."

Albert de la Bruhèze and Veraart (1999) compared the development of bicycle use since 1900 in four Dutch cities (Amsterdam, Eindhoven, Enschede, Heerlen/Kerkrade) and five other medium-sized Western European cities (Antwerp, Basle, Hanover, Copenhagen and Manchester). For the period 1920-1995 they reconstructed the most probable trend lines in the change in the bicycle's share of the total number of car, public transport, moped and bicycle trips.

Figure 28
Reconstructed trend line of the bicycle share in the total number of car, public transport, bicycle and moped trips in the 9 cities studied, 1920-1995.
Explanation: see Figure 10.



The conclusions of this historical study fall into two parts. First of all, a general pattern can be seen, but this pattern has a considerable bandwidth as a result of the sometimes significant differences between the various cities. The general pattern shows high bicycle use in the pre-war period, followed by a decline until around 1975, and, subsequently, stabilization or a slightly renewed increase in bicycle use. This **general pattern** developed over the years under the influence of several crucial factors:

- Local spatial structure and related trip distances;
- Car ownership and use;
- Attention to bicycle traffic in (local) traffic policy;
- Collective conceptualization of the role and value of bicycle traffic.

In the period of declining bicycle use, these factors all point in the same direction and reinforce one another. The increase in trip distances due to suburbanization, increasing car ownership and use, limited attention to bicycle traffic in (local) traffic policy and the negative picture of the future value of the bicycle have all had a negative effect on bicycle use, but primarily in interaction with each other.

In the period of stabilization and renewed increase in bicycle use (from around 1975 to 1995), the same four factors play a main role, although with a new content and direction. The factors in the 1970s and 80s do not always point in the same direction, and there is no longer a question of an interactive process in which these factors support one another. On the contrary, during the phase in which bicycle use increased once more, there is a question of **tension** between the spatial development of cities and car ownership on the one hand and

the (national and local) traffic policy and image of the bicycle and bicycle use on the other. "Room" for the bicycle again arises in that area of tension, resulting in bicycle use increasing and eventually stabilizing, although with explicit variations in each city.

Significant **differences** can be seen in the development and scope of bicycle use within the bandwidth of this general pattern. An important part of that variation appears to be explicable, though it remains difficult to find a plausible explanation for some components. Arranged according to the current bicycle share, the overall picture of the explanation of differences is as follows:

Copenhagen, 1956.

- The four cities with a **high** bicycle share in 1995 (above 30 per cent): Enschede, Amsterdam, Eindhoven and Copenhagen:

  The explanation commences with the very limited use of public transport in the period between the wars (the three Dutch cities) or a usage of public transport that does not "replace" the bicycle, but stands "beside" it (Copenhagen). Subsequently, the acceptance in the 1950s and 60s of the cyclist as a "normal" traffic participant having equal rights became a crucial factor. The development of car infrastructure was not at the expense of cyclists and the collective image of the bicycle was fairly positive and primarily "rational". It is also relevant that, in the first decades following the Second World War, these cities still had a compact spatial structure or, in the case of Copenhagen, a public transport-orientated structure. From the 1970s onwards, this resulted in a breeding ground for the new "image of the bicycle", in relation to energy, the environment, health and the quality of life in cities. This took place to a lesser degree in Eindhoven, however, where the car occupied a larger share in earlier decades.

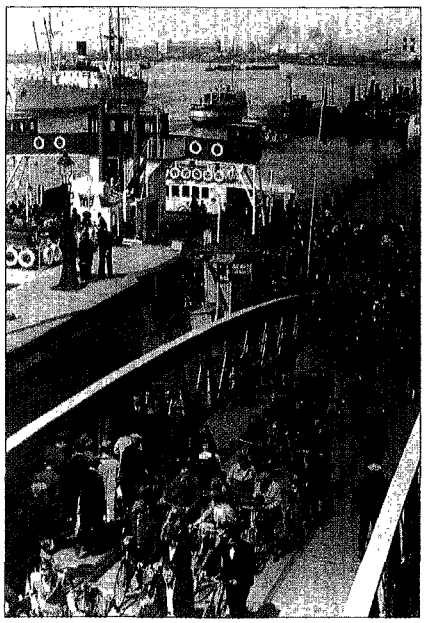
- The two cities with an **average** bicycle share (around 20 per cent): Hanover and Southeast Limburg:

  The high bicycle share in the 1930s was lost because, with the rise of the car (as well, initially, as the moped in Southeast Limburg), other developments had a negative influence on bicycle use, including a more clear-cut pro-car policy and a spatial structure more orientated towards the car. In Hanover, the stabilization of the bicycle share after 1970 was due to renewed positive attention, whereas in Southeast Limburg, this was more likely due to the fact that, in addition to the strong pro-car sentiment, some attention remained for the bicycle.

- The three cities with a **low** bicycle share (around ten per cent or less): Antwerp, Basle and Manchester:

  In Antwerp and Manchester, the decline that set in due to the rise of the car continued without "restraint" because all relevant influential factors pointed in the same direction, i.e. a negative collective image, strong car-orientated policy, development of large-scale car infrastructure, strong suburbanization and diffuse transport relationships. The lower share of the bicycle in the 1930's in Manchester than in Basle is still making itself felt to this day.

  The current bicycle share in Basle is primarily a consequence of the stabilization that took place after 1955. Despite the low level of the bicycle's share, this stabilization is difficult to explain and may be due to (a) the specific spatial structure of Basle, defined by geographical conditions, which continues to deliver potential for the bicycle (b) the significance of environmental arguments and (c) the strong political



Antwerp, 1936.

attention to altered social opinions on the bicycle, such as those that took place after 1970.

It is clear that the "policy" and "conceptualization" factors play an important role in these differences. In cities with high bicycle use, this has not necessarily been the result of specific bicycle policy being pursued in recent decades. More importantly, bicycle traffic was generally recognized in those cities as a mode of transport "that simply exists". This was not only visible in the infrastructure on the streets, but also played a part in the image of cycling on the part of the inhabitants.

The current differences in the nine cities in the share of trips by bicycle is clearly linked to the degree to which (and the severity with which) the postwar facilitation of car traffic was implemented by the municipal authorities for decades on end. Fundamental choices for a changed direction in municipal traffic policy evidently affect bicycle use, but only in the long term. There are two ways in which this is of utmost relevance in evaluating the *BMP* and in formulating new policy for the years to come:

- Both traffic policy as well as bicycle policy can be effective; bicycle use is not only determined by "autonomous" developments.
- The effects of fundamental policy decisions that mean a new course are only clearly perceptible after a number of decades.

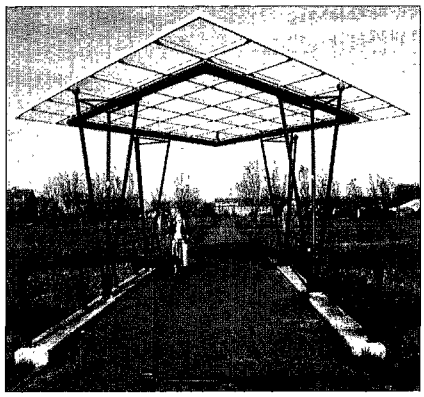
5.3 Future bicycle policy

The completion of the Bicycle Master Plan does not mean an end to the Dutch central government's bicycle policy. The assumption that the attention of the central government to bicycle policy will now fade away, in view of the fluctuation in the past, appears justified. The decentralization to provinces and municipalities of elements of the national traffic and transport policy, including bicycle policy, may possibly reinforce that assumption. This also applies to the merging as of January 1, 1996 of the *Contribution Regulation*, the State's means of subsidizing infrastructure for bicycle traffic, with a "Goal Payment" (GDU), which provinces and municipalities may, in principle, spend freely (see section 3.3).

At the present time, in the autumn of 1998, there is no reason to paint a doomsday picture, with regard to the decentralization of bicycle policy and its accompanying tasks and budgets.

- The decentralization of the government budget for bicycle facilities has had a favourable influence up to now on the availability of funds for bicycle policy. In 1996 and 1997, provinces and municipalities spent 65 million guilders annually from that budget specifically on infrastructure for bicycle traffic, which is considerably more than the approximately fifty million guilders previously made available on an annual basis from the *Contribution Regulation.*
- The decentralization of tasks in the area of traffic and transport to provinces and municipalities provides good opportunities for bicycle traffic. If there are possibilities for strengthening the position of bicycle traffic, they exist on local and regional levels. If the necessity that something needs to be done about the negative aspects of the increase in car ownership and use is recognized anywhere, it is in the cities and villages where residents

are confronted with this on a daily basis in their immediate living and working environments. If the bicycle emerges anywhere as a suitable mode of transport for the masses and as the best alternative for numerous short car trips, then it is at a local level, as the majority of these trips are short enough to be made by bicycle.



The decentralization of government tasks and budget to provinces and municipalities does not mean an end to all involvement on the part of the central government in local and regional traffic, nor in bicycle traffic. Decentralization of policy means first and foremost that there are joint responsibilities, whereby the issue is to apportion tasks and roles in such a way that the objectives set can be implemented as efficiently as possible. The intentions regarding this apportionment, as far as traffic and transport are concerned, and regarding the manner of co-operation between the central government, provinces and municipalities were established in March of 1996 in an agreement (the VERDI Agreement). The plans and agreements that were laid down in this document are currently being worked out. In the year 2000 this process should result in a National Traffic and Transport Plan, the successor to the Second Transport Structure Plan (*SVV-II*).

The central government remains jointly responsible for the following issues in bicycle traffic and policy:

- Stimulating and facilitating;
- Carrying out research and distributing knowledge;
- Supervision: monitoring and benchmarking;
- Preparing legislation and issuing regulations.

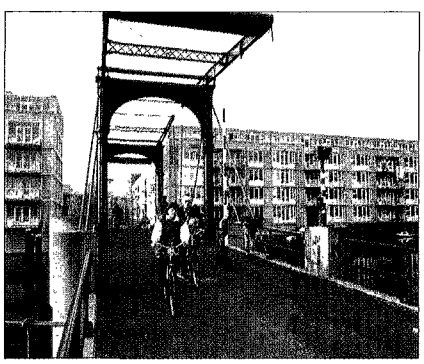
On the basis of the experiences gained during the execution of the Bicycle Master Plan it can easily be shown that continuation of the central government's involvement in bicycle policy is desirable.

- Stimulating the making of choices on local and regional levels that lead to "tailor-made transport for every trip" demands a mixture of arguments, which also recognize the value of the bicycle as a mode of transport. The central government can help in formulating and providing this. At the same time, it is important that the State focus, more so now than in the past, on integrated processes and packages of measures, which take the weaknesses and strengths of all modes of transport into consideration.
- Controlling trip lengths will increase the opportunities for bicycle use. This is perfectly in keeping with policy orientated towards improving the accessibility of all sorts of destinations, the quality of life and the environment, traffic safety and public health. Moreover, this leads to fewer emissions of harmful substances, less noise pollution, less energy consumption and takes up less space. Curbing the gradual lengthening of trips primarily requires guided spatial policy and gearing this successfully towards transport policy. In doing so, national policy determines the pre-conditions for regional and local governments to a large extent, while simultaneously legitimizing their own policy.
- Large infrastructure projects, such as highways, railways and waterways, cut across underlying road networks, which are often important components of bicycle route networks. To prevent cyclists from having to make too lengthy detours, the central government should make sure that this criss-crossing leads as little as possible to the erection of barriers.

- Transport management at companies can mean a considerable incentive for bicycle use. The central government can develop the set of instruments necessary for this and stimulate their application.
- By laying down subsidy conditions, the central government can promote public transport that is primarily directed towards offering alternatives to the car and that is not needlessly at the expense of bicycle use.
- Cyclist safety is closely linked to bicycle use **and** car use. The central government can ensure that in policy and planning for the usage and design of space, mobility and infrastructure, traffic safety is taken more into consideration than it has been so far.
- Knowledge of bicycle parking policy and theft prevention is still in its infancy. The central government can contribute to augmenting and dispersing knowledge and experience. In the world of urban planners and traffic experts, the central government can increase awareness of the fact that safe bicycle parking options contribute significantly to more bicycle use.

The central government recognizes its share of the responsibilities for bicycle traffic. This is apparent from, among other things, the coalition agreement of the new cabinet formed in the summer of 1998: "The central government will stimulate bicycle use out of responsibility and support municipalities and provinces."

During the discussion of the final report on the Bicycle Master Plan in a committee from the Lower House on September 1, 1998, the Minister of Transport, Public Works and Water Management outlined its contribution to future bicycle policy in the Netherlands as follows.



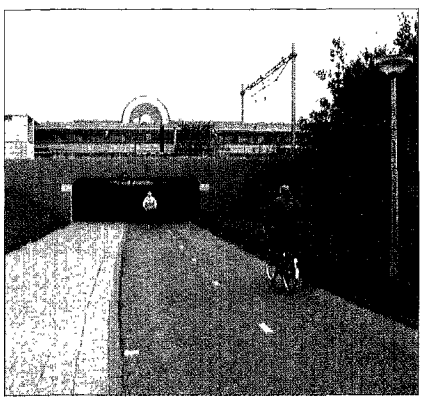
The vertical line: state, provinces, municipalities

A consequence of the VERDI Agreement is the VERDI Knowledge Platform, an information centre with a staff of four and a small working budget. The platform disperses existing knowledge relevant for the implementation of policy by provinces and municipalities. To date, research and knowledge distribution has been nearly entirely supervised by the research centre of the Ministry of Transport, but decentralization of tasks and responsibilities demands a better grip on this on the part of provinces and municipalities. The intention here is to **strengthen the Knowledge Platform** in a personnel and financial sense, and to expand its role to one of co-commissioner of the above-mentioned research centre. New knowledge can then also be developed on the basis of the needs of the provinces and municipalities and under the direction of the platform.

Since 1990, a large number of pilot and model projects and innovative activities have been launched, supervised and co-ordinated by the ministry in the framework of the *SVV-II*, including policy areas other than bicycle traffic. The ministry intends to add a portion of these activities to the list of job responsibilities of the knowledge platform, in order to prevent fragmentation of these tasks among numerous authorities. All of this demands further reinforcement of the platform, partly to disperse knowledge and experience gained.

One of the lessons learned from the seven-year Bicycle Master Plan is that a successful promotion of the interests of bicycle traffic demands just as much of an integral approach at a national level as well as on a regional and local level. The goal of an integral approach is

often expressed in words, though you would be hard pressed to recognize this integral approach on the streets. Moreover, one of the dangers of an integral approach is that the subject 'bicycle traffic' is ignored, lost, as it were, "between a rock and a hard place". This danger is real, as was demonstrated in the period prior to the Bicycle Master Plan and to combat it, the ministry wants to reinforce the contributions of consumer groups to the policy. Specifically, this involves **strengthening the Dutch Cyclists' Union** *enfb* by adding a work unit with clearly defined tasks. This work unit is to be active on a regional and local level in the area of benchmarking, for example, using instruments developed and data gathered by independent authorities. This unit will also be given a role as a supplier of knowledge and information (of "best practices", among other things) to local and regional parties, i.e. politicians, policy makers, action groups (including the local branches of the Dutch Cyclists' Union) and the people. This unit can also play a role in meeting the demand from abroad for knowledge and information on Dutch bicycle policy and traffic.



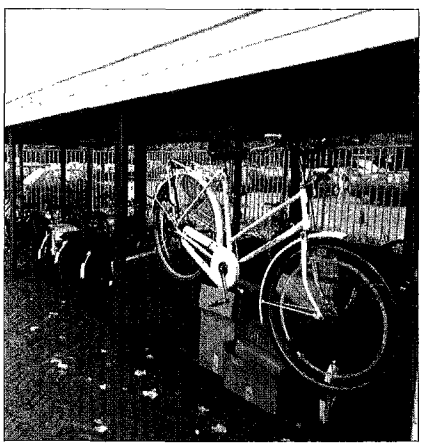
The horizontal line: collaboration with other ministries

Collaboration is frequently difficult. Nonetheless, it is important for a traffic ministry to call the attention of other ministries to the consequences of their policy for transport and traffic, and therefore for bicycle traffic. The reason for this is that numerous and extremely divergent policy areas, from economy and spatial planning to education and care of the elderly, to a significant degree influence the "necessity" of people to be mobile and, more importantly, the lengths of trips and their choice of mode of transport. Individuals' options are greatest at a local level, insofar as short trips are concerned. Of all trips made in the Netherlands, 40 per cent are shorter than 2.5 kilometres, that is, walking distance for most people. And 70 per cent of all trips are shorter than 7.5 kilometres, short enough in principle to be cycled by the majority.

Together with the Ministry of Housing, Spatial Planning and Environment, a project will be initiated that is temporarily being called "Short Trips". Its objective is twofold: an ambitious long-term goal, which would entail wherever possible, combatting the development of gradually longer trips on the one hand, and a short-term goal of promoting alternatives for short car trips on the other. Though it is tempting to address the people for this last-mentioned short-term goal, it is in fact the final link, in the intended chain of activities. The first link involves raising awareness at the two initiating ministries of the issues involved, by means for example of executing a number of carefully selected model projects. This awareness can eventually lead to the issuing of new regulations or adaptation of current ones. The development of a "mobility audit" of policy sectors can be important here. Once experience has been gained at the various divisions of the two ministries and a set of instruments have been developed, other (parts of) ministries can be approached. Only after ministries have established the manner in which they are able to influence peoples' options (with regard to the need for mobility, the lengths of trips and the modes of transport and the circumstances surrounding these options), is it relevant to approach the people. In many cases that will probably not take place through a ministry, but rather through intermediary parties such as provinces, municipalities, interest and consumer organizations, and companies.

Where the lines intersect: The Ministry of Transport

There has been a visible tendency at the ministry in recent years to withdraw to its primary responsibilities with regard to transport and traffic, i.e. the main infrastructures (road, rail, water and air). In designing a decentralization process, the ministry seemed to want to avoid all semblance of interference in urban traffic. However, this will not lead to the effective and efficient management of the total traffic and transport system. The majority of trips made by individuals begin and end in built-up areas, as do those trips for which the main infrastructures are utilized. All of this argues in favour of more attention, not less, on the part of the ministry to urban and metropolitan traffic, including bicycle traffic. This applies for policy and for the construction and management of the main infrastructures, as well as in the role of the supervisor of regional and local governments as co-executors of national policy.



The 1998 Coalition Agreement reads: "Traffic and transport policy is first and foremost directed towards improving accessibility to and within the medium-size and large cities in our country, whereby the quality of life is also addressed."

In summary:

Bicycle traffic benefits from integrated policy, a functional division of tasks and roles among, and suitable collaboration between, ministries, provinces and municipalities. The involvement of consumer organizations is desirable in order to guarantee attention to bicycle traffic.

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Both chapters on the history of bicycle policy and use in the Netherlands have depended to a large extent on a limited number of sources. Where no sources have been credited in the text, the historical sections have been taken from Veraart (1995), Albert de la Bruhèze and Veraart (1999), Ligtermoet (1990), Ploeger (1990), and Welleman, Louisse and Ligtermoet (1997). Chapters 3 and 4 on the *BMP* and bicycle use and cyclist safety since 1986 have been largely taken from Verkeer en Waterstaat (1998).

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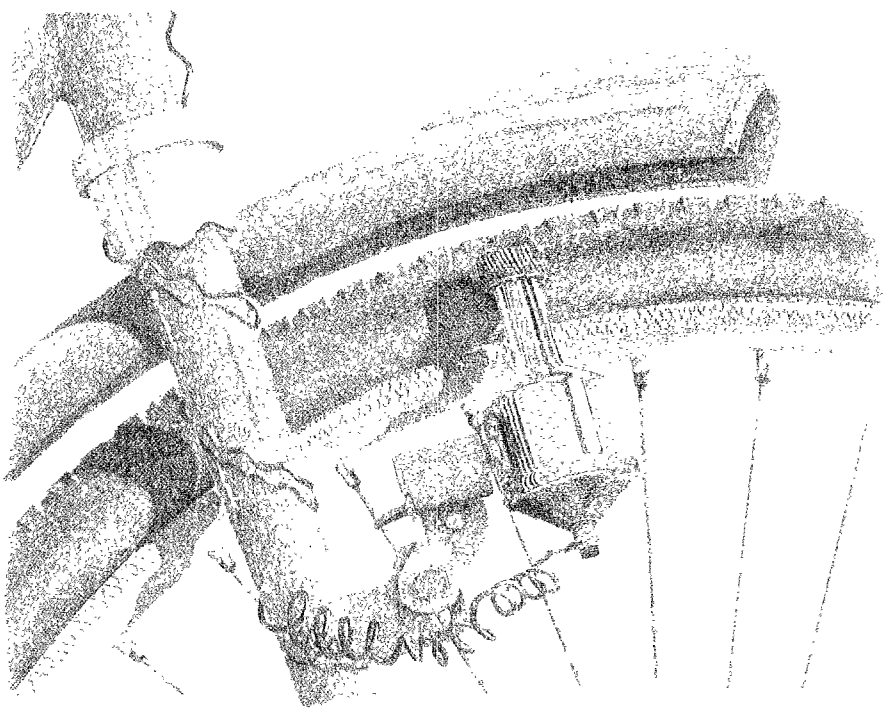


Appendix 1: Collection of Bicycle Master Plan projects

The Bicycle Master Plan project group had a total of 112 projects carried out, including 31 research projects, 41 pilot and model projects, 18 projects for instrument development and 22 projects that were primarily targetted at the exchange of information.

To a large degree the projects were carried out within the four intrinsic spearheads:
- The switch from the car to the bicycle
- The switch from the car to the combined use of public transport and the bicycle
- Cyclist safety
- Bicycle parking facilities and theft prevention

However, a number of projects cannot be grouped according to their general character.

Without endeavouring to be exhaustive, a brief description follows of projects carried out within the various spearheads, starting with a few general projects.

GENERAL

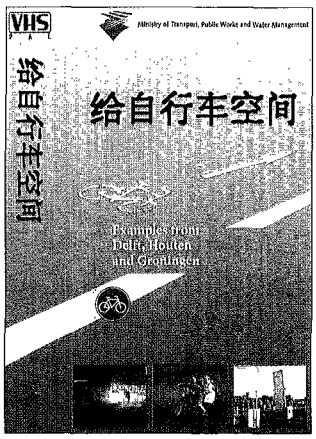

Fietsverkeer

leefbaarder en veiliger

Fietsverkeer (Bicycle Traffic) was the name of the **quarterly magazine** published by the Bicycle Master Plan project group for purposes of informing its most important target groups as to the results of the various projects as well as other developments in the area of bicycle traffic and policy. This magazine, comprising eight to 20 pages per issue, came out 15 times between April 1993 and December 1997. It had a circulation of 3,600 and was sent free of charge to those parties involved professionally or politically in bicycle policy at a local, provincial or national level.

The *BMP* project organized the postgraduate course **Cyclists in the Traffic and Transport System** together with the Technical University of Delft in 1992, 1993 and 1994. This three-day course was intended for policy workers from municipalities, provinces, ministries and interest groups. In addition, project group members contributed to the educational activities of various institutes for higher traffic education, a number of other postgraduate courses and practice-orientated courses on, for instance, bicycle parking. The *BMP* project manager has been a lecturer on bicycle traffic for a number of years one day a week at the Technical University of Delft.

A number of institutes offering information for cyclists and on bicycle traffic are active on the Dutch market. The potential for these institutes to compile their knowledge and capabilities into a **Bicycle Information Centre** have been researched in a **feasibility study**. One option that was ultimately worked out involved the setting up of a database with information for the public sector and professional market. After reviewing this option, the institutes involved decided against it for the time being, following a consideration of the balance between the necessary investments and the expected yield.



Interest exists worldwide for Dutch knowledge of bicycle traffic and policy. The ministry feels it to be worthwhile to propagate that knowledge and, in this way, contribute to achieving global environmental objectives. This **international distribution of knowledge** consisted of receiving various groups of foreign visitors, making contributions to international conferences and symposia and making information available in English, German and Chinese (see the back of this brochure for an overview of foreign publications). Intensive guided visits involved government delegations from Cuba and China. A return visit has been made to Cuba and the project group has played an advisory role in China at the request of the World Bank. At the invitation of local and national governments and cyclist groups, working visits have also been paid to Belgium, Denmark, Germany, England, Hungary and Austria. Contributions have also been made to the international Velocity conferences in Milan, Italy (1991), Nottingham, England (1993), Basle, Switzerland (1995) and Barcelona, Spain (1997), and to the Velo Mondiale in Montreal, Canada (1992).

From March 1996 to March 1997, the project group organized meetings on bicycle traffic and policy in all provinces in close co-operation with the regional directorates of the ministry and provinces. These meetings were attended by local and regional politicians, heads and employees of the traffic divisions from the municipalities and provinces, regional representatives of traffic safety organizations, the Dutch Cyclists' Union *enfb* and the *ANWB*, as well as consultancy firm employees. The objective of the meetings was to exchange knowledge on the one hand, and initiate a discussion and make contacts on the other. A total of 700 individuals visited the **Provincial bicycle traffic meetings**, half of whom were from municipal governments.

THE SWITCH FROM THE CAR TO THE BICYCLE

Dutch bicycle policy is primarily targetted towards stimulating bicycle use for short trips as an alternative to the car. More than half of all car trips are shorter than 7. 5 kilometres, so there are sufficient opportunities here for success. Policy geared towards this must be given content, form and execution, particularly at local and regional levels. Numerous projects have been carried out in the framework of the spearhead "The switch from the car to the bicycle", supported by local and regional bicycle policy. A number of other projects have also been grouped under this spearhead, which could not be placed under any of the other three spearheads.

Bicycle policy support

A study has been carried out into the potential for **replacing car use with bicycle use**. Motorists admitted in this study that 25 per cent of their car trips could easily have been travelled by bicycle. This percentage was as high as 47 of all car trips within cities and 41 per cent in villages. Motorists also admitted that an additional 25 per cent of their car trips could have been travelled by bicycle, with a bit of effort.

Studies into the **costs and benefits of bicycle policy** implemented in the medium-sized **municipality of Dordrecht** (population 120,000) showed that bicycle policy pays. Even the most prudent version, a policy assuming only a reduction of 50 per cent in the growth of car use, would result in savings of five million guilders over seven years. If all car trips that could

by cycled were actually cycled, a saving of as much as 55 million guilders appears possible in Dordrecht in the course of those seven years.

Another study showed that the average consumer prefers to **go by bicycle** for **local shopping**. The more regional the function of the shopping centre, the more the number of visitors travelling by car increases. The consumer who shops by car shops less frequently, but spends more time each shopping trip than does a consumer who does not shop by car. The choice of mode of transport, however, makes little difference on balance for the customer's spending level.

An experiment has been carried out which entailed expanding an existing **grocery delivery service**. The extent to which car use would decline and bicycle use would rise was the subject of the study. Contrary to what motorists had stated in a prior poll, the expansion of the delivery service brought in very few extra customers.

To supply employers and preventative health services with arguments for stimulating bicycle use, financial support has been granted to a **doctoral study into the relationship between bicycle use in commuter traffic and physical fitness** (Hendriksen, 1996). The study showed a clear effect on physical fitness and, therefore, on health. An individual in poor physical shape can improve his or her physical condition by ten per cent, simply by cycling a distance of three kilometres to and from work three times a week. The results are given in a brochure that has been distributed among companies and organizations that advise about and monitor working conditions in companies.

Further research was carried out into the target groups for stimulating **bicycle use for commuting.** A distinction is made between employees who already commute by bicycle and those who could be induced to do so. The most important criterion here was the distance between the home and place of employment. The report provides recommendations for the (combination of) measures that companies could take in order to keep their employees cycling or induce them to do so. A good combination of facilities (bicycle storage facilities, for example), rewards (company bicycle, for example) and penalties (lowering compensation for car expenses, for example) and communication appear to be the most effective. A brochure on the potential for companies to stimulate bicycle use on the part of the employees has been widely distributed. Financial support was granted to a group of municipal officials who cycled throughout the Netherlands advizing officials at municipalities, provinces and ministries to commute by bicycle.

Bicycle policy in practice

The Transport Management Agency established at **Schiphol airport** formulated a **bicycle plan** in 1991 together with the companies established there, the objective of which was to increase the bicycle share for commuter traffic from five to eight per cent in 1995 and to ten per cent in the year 2000. The plan was given the status of model project because of its area-orientated and integral approach. Proposed measures that were subsequently enforced were the improvement and expansion of bicycle routes around Schiphol to a total of 25 km, placement of 285 bicycle lockers at bus stops for the (new) Schiphol Personnel Bus and

promoting bicycle use on the part of employees through stimulating transport management at companies, by means of targetted communication activities. The bicycle functioned as the primary mode of transport in the plan. The personnel bus was begun for transportation to and from the airport. Personnel were given the option to lease a bicycle via the Transport Co-ordination Centre.

The project was evaluated in 1993. The bicycle lockers proved not to be optimally used. They were primarily used due to the lack of safe storage places at the workplace and much less because the personnel bus reduced the subsequent travelling time. Of all locker users, more than a quarter had previously commuted by car and around 15 per cent by public transport. In 1995, the bicycle share in commuter traffic to Schiphol was shown to have doubled in the meantime to ten per cent. A second measurement in 1997 showed, unfortunately, that bicycle use had dropped to its previous level of five per cent. According to the researchers, this was due to changes in working hours and the high turnover of personnel, as a result of the closure of the Fokker aircraft manufacturer, among other factors.

Further research into the **long-term effects of the bicycle route network constructed in the city of Delft** in the 1980s provided important lessons as to the effectiveness of municipal bicycle policy. The increase in bicycle use observed in the short term was not maintained. On average, however, the distances cycled had become longer than was previously the case and cyclists involved in accidents were less often seriously injured. The number of fatalities and hospital-treated injuries among cyclists had declined by nearly 40 per cent. The most important lesson learned from all of this was that the construction of a bicycle route network is insufficient in itself to bring about a sustainable increase in bicycle use. It has therefore been deemed necessary to simultaneously carry out policy discouraging car use.

A **model project** was launched at a municipal level in the **small coastal tourist town of Veere** (population 5,000) in order to promote bicycle use and reduce car use. The plan's objective was to improve the quality of life within the municipality and to improve the tourist product. To achieve this, 23 measures were proposed, which were particularly targetted at improving bicycle path connections and introducing good bicycle parking facilities in the town centre, at beach access points and at bus stops. Because the intended measures for curbing car use and promotional activities either did not get off the ground, or did so insufficiently, the high hopes for the plan were ultimately not fulfilled.

The idea for a transport system in which bicycles could be borrowed and returned at various locations dates back to the 1960s and has become known as the "white bike plan". The Y-tech Innovation Centre in Amsterdam developed the **DEPO system** out of that plan. DEPO bicycles are locked to a special bicycle rack and can be used on payment with a smart card. The bicycles have a vandalism-proof construction and conspicuous design. The system that was developed underwent various studies and tests with the financial support of the Ministry of Transport. A **feasibility study** indicated that the system is cost-effective to operate if carried out on a large enough scale. The first application of the system was launched in the Amsterdam city centre in 1998 in order to gain practical experience.

Road infrastructure for bicycle traffic

A model project was launched in the **municipality of Zeist** (population 60,000), located in the middle of the country, for the purposes of incorporating the *BMP* objectives into an **integral bicycle plan.** The analyses carried out resulted in the following proposals:

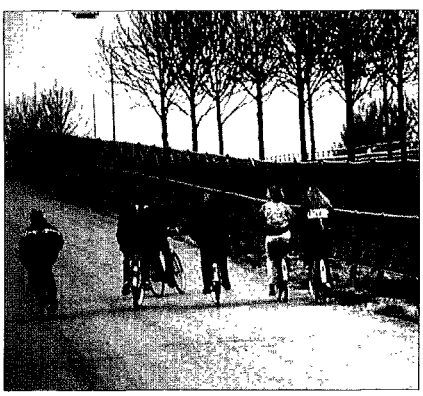
- Infrastructure measures concerning more, better and safer bicycle facilities (including bicycle parking spaces);
- Promoting the use of these facilities;
- General communication activities with an eye to creating a good bicycle climate.

The municipality set aside a budget for the period of 1996 to 2000, on the basis of the bicycle plan, to begin carrying out the plan.

Experience was also gained from the setting up of a suitable **bicycle plan on a regional scale** for the **Transport Region of Utrecht.** The future pattern of bicycle use was mapped using a calculation model for analyzing traffic flows. The most likely connections between subsectors (corridors) that deserve priority were determined. These were subsequently screened on the basis of the Design Manual *Sign up for the bike* using all kinds of bicycle-friendliness criteria. Definitive priorities were determined on the basis of this, resulting in an implementation programme.

A **calculation instrument** has been developed by order of the Ministry of Transport, which gives quantitative insights into the use of a **bicycle route network** and the anticipated effects of related traffic-engineering measures. The model was presented in 1993 to municipalities and traffic-engineering consultancies in the form of a software package. An experiment was also carried out with an existing **regional traffic model**, supplemented with data on bicycle traffic in a particular region. The experiment showed that the scope for bicycle traffic on regional connections is larger than is commonly assumed in traffic-related studies. As a result of these outcomes, **three regional meetings** were organized for model users and planners from large cities, regions, provinces and consultancy agencies.

With the financial support of the *BMP* **signposting for cyclists** has been improved on the **Walcheren** peninsula in the province of Zeeland and in the area surrounding the **city of Utrecht.** Signposts for cyclists now form a recognizable and complete system, which indicates interesting bicycle routes and is separate from signposts for car traffic. The system came into being as a result of collaboration between the various road management authorities, the Dutch Cyclists' Union *enfb* and the *ANWB*, the organization which is also responsible for the signposting for motorized traffic in the Netherlands. Research has shown that cyclists appreciate the new signposting.



An experimental **wind break for cyclists** was set up along a bicycle route between the cities of Utrecht and Houten in May, 1995, with the aim of having a positive effect on bicycle use. The goal of the experiment was to develop a wind break that would considerably reduce wind disruption, while simultaneously not causing any annoying turbulence, and that is socially safe, vandalism-proof and maintenance-friendly. The development of the wind break for cyclists was a collaboration project of the appropriate road management authorities, a road constructor, an engineering firm, a visual artist and the Ministry of

Transport. It is 1.95 m high, 360 m long and consists of arched panels with stretched iron wire netting, through which clear lexane plates have been interwoven. The wind break allows 40 per cent of the wind through and reduces the wind force by around 80 per cent (measured at 1.20 m above ground) over a distance of around six m next to it. Technically speaking, it functions as was anticipated, but cyclists say that they hardly notice the difference.

In 1997, the municipality of **Hengelo** studied the advantages of a **bicycle street** on a portion of the bicycle route between the city centre and the new housing development area of Vossenbelt. Cars are permitted on the bicycle street, but the street is designed and dimensioned in such a way that motorists need to adapt their driving behaviour to cyclists. The goal of the study was to create a high-quality bicycle route. The street was constructed in 1997 in four-metre wide red asphalt. The width restricts speed and keeps cars behind cyclists, the red colour accentuates the through route and the bicycle area and the asphalt improves cyclist comfort.

Much of the knowledge that has been acquired was compiled in *Sign up for the bike.* The first initiative to draw up a handbook for bicycle facilities came from the Dutch Cyclists' Union *enfb* and it was seen that this initiative could be considerably enhanced and broadened within the framework of the *BMP.* The **design manual** was produced by a working group, in which the most significant organizations in this field of study took part. The participation of municipal and provincial representatives was responsible for connecting it to the daily activities of urban and rural planners, traffic experts and traffic engineers. The working group spent two-and-a-half years working on the design manual, supported by several consultancy agencies and the Traffic and Transport Advisory Department of the ministry. All requirements needing to be met by bicycle-friendly infrastructure were organized and translated into concrete recommendations for traffic engineering. The design manual is not an instruction manual, but does offer arguments and ingredients that help the designer give the bicycle a valuable and safe place in the traffic and transport system. Because of international interest, English and German language editions have been published of *Sign up for the bike* and a second edition has appeared of all versions in the meantime.

In constructing or re-constructing a highway or railway connection, local connections, usually the shortest bicycle routes, are frequently cut off without much thought being given to maintaining or constructing a good alternative, so that local traffic then needs to make detours. In 1997, a broadly-composed working group developed a method for assessing when the **maintenance of local connections in large infrastructure projects** is desirable. This method can be applied to large infrastructure projects during the planning phase for which procedures laid down by law apply, or for projects for secondary roads or urban beltways.

Improving the bicycle

In 1995, the Product and System Ergonomics division of the Industrial Design Faculty at the Technological University of Delft presented a prototype of a **custom fit bicycle**. This device allows the bicycle dealer to take the physical measurements and desired cycling position of the individual customer into account in order to sell him or her a comfortable and safe

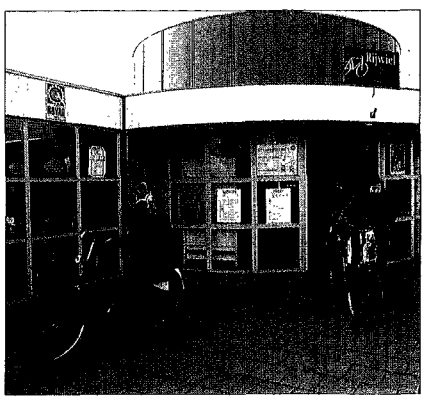
bicycle. The custom fit bicycle can help prevent the physical discomfort experienced as a result of riding a bicycle which is the wrong size or not adjusted to the rider's needs, such as saddle soreness and back pain. The introduction of the custom fit bicycle at bicycle dealers has not yet taken place, as the branch organizations and bicycle manufacturers who are guiding and co-financing the project consider the commercial risk to be too high.

THE SWITCH FROM THE CAR TO A COMBINED USE OF PUBLIC TRANSPORT AND THE BICYCLE

Those who have a choice of transport means consider the ratio between travelling times by car and by public transport crucial. **A study of 25 inter-urban commuting connections** in the urban agglomeration of Western Holland showed that travelling time improves by an average of 15 per cent in favour of public transport if the distance to and from the station or bus stop is not covered on foot or with local public transport, but by bicycle.

Following a study into the **potential of bicycle use in combination with public transport,** the Technological University of Delft came to the conclusion that the optimal availability of the bicycle in transport before and after transit can lead to an increase of 14 per cent in the number of passenger kilometres by inter-urban public transport, mostly by train. In realizing this predicted increase, optimal availability of the bicycle on the activity side of the trip is expected to have around twice as much an effect as on the home side, in view of the fact that the majority of Dutch already have a bicycle at home.

Bicycle parking facilities at stations



A number of projects have been carried out with the financial support of the *BMP* in the area of bicycle parking facilities at stations.

A study has been carried out into the feasibility of **compact automatic bicycle storage facilities**. A guarded automated storage facility is cheaper and requires less space than does the traditional guarded station storage facility, which needs at least 800 racks for a profitable commercial operation. Three systems were examined in the study for their processing capacity, surface area and costs, namely, the carousel, the paternoster and the honeycomb. The carousel proved to be the best system, with a storage capacity of 200 to 800 bicycle parking places. The differences between the other two systems were minor. The guarded storage facility remains a good solution for storage facilities having more than 800 places.

An experiment was carried out at three stations using **daytime lockers for bicycles**. The automatically operated daytime locker is intended for travellers who do not want to rent a bicycle locker on a monthly or yearly basis, but want to store their bicycles safely, but only occasionally, and for a day or part of a day at a station which does not have guarded storage, and without having to go to an office window. This practical experiment had little success because Dutch Rail considered the locker to be too unreliable in operation and that a profitable commercial operation was not feasible.

An **automatic entry control system for bicycle storage facilities** was developed and a trial set-up has been tested out. The system consists of two gates, one for the bicycle and one for the bicycle owner. The bicycle is given a chip and the owner a smart card. If the chip data

correspond with those on the smart card, the entry gate opens. The trial set-up demonstrated that the system is feasible. A follow-up practical experiment was ended prematurely after it turned out that comparable and cheaper systems that had been field-tested had become available on the market in the meantime.

A **plan for constructing an unguarded bicycle parking facility** was developed for the area around the railway station in Leiden. The current situation was surveyed and the study provided detailed information on the number of guarded and unguarded parked bicycles and the origin and destination of the owners. A prognosis was made, on the basis of the study, as to the required capacity of unguarded parking facilities. Locations have been determined on the basis of the cycling routes of train passengers and visitors to nearby shops who also park their bicycles at the station.

Questions on the planning and development of guarded and unguarded parking facilities are frequently brought up with regard to numerous railway stations. For this reason, a **manual** was put together for the railway company managers, municipal officials, and cyclist interest groups involved containing step-by-step plans for developing **bicycle parking policy at stations**. The manual includes an analysis of bottlenecks in the relationship between supply and demand; measures for improving the quality of bicycle parking facilities; and guidance for any redesigning of a station and its immediate surroundings. The manual also forms the basis for standards that in the meantime the ministry and the *NS* have together formulated for bicycle parking facilities at stations.

Bicycle parking facilities at bus stops

Of all passengers on major bus routes in urban and regional public transport, **an average of 14 per cent travel by bicycle from home to the bus stop.** Two per cent of all passengers cycle on the activity side of the trip and 60 per cent claim to be in a position of being able to cycle to the bus stop. Should the distance to the stop become longer due to a more direct bus route, one-third would henceforth travel to the stop by means of a different mode of transport and in the majority of cases this would be by bicycle. Around a quarter of the travellers would cease to travel by bus.

Research has shown that the **need for bicycle parking facilities at bus stops** primarily appears in centres with fewer than 10,000 inhabitants and at bus stops which:

- experience no "competition" with other stops in the village or city or offer considerably better transport options than the other stops in the neighbourhood, if competition exists;
- border the built-up area, in cases where other transport options exist.

Personal effort and good co-operation between the road management authority and the public transport operator appear to be of decisive importance for developing **bicycle parking facilities at bus stops.** Extensive co-ordination needs to be carried out with numerous parties and there are complicated procedures for acquiring the necessary permits and finances. The usual discussions and negotiations also take place as to the quantity, quality and execution of the desired facilities, as well as regarding the party who is to be responsible for maintenance. All of this emerged from a study into the **success and failure factors.**

Practical experiments have been carried out with bicycle parking facilities at bus stops in various places. One such experiment was carried out between 1991 and 1993 and involved considerable money being invested (together with the municipalities of Enschede and Oldenzaal) in facilities that stimulate the combined use of public transport and the bicycle on a ten-kilometre long corridor between the two municipalities. The **Combi Route** project also included an experiment with bicycle lockers equipped with an entry system using magnetic cards. The lockers turned out to be hardly used. Project results were mediocre. The desired switch from the car to a combination of public transport and the bicycle proved not to be effective for trips shorter than ten kilometre.

Another project for stimulating the combined use of the bus and the bicycle involved the construction of bicycle lockers and covered and uncovered racks at 15 **bus stops in the province of Friesland**. The facilities that were developed, the chosen rental procedure and the information campaign were then evaluated. The storage racks were well used, but only 16 per cent of the bicycle lockers were rented.

An experiment was carried out in the **province of North Brabant** entailing the construction of **facilities for parking bicycles at seven express bus stops**. The regional bus company functioned as co-ordinator and promoter. Planning and execution was the responsibility of the four municipalities involved. In spite of various unfavourable developments, including a bus driver strike, a decline in student transportation and a second measurement at an unfavourable time of year, the number of cyclists and bus passengers appeared to have risen slightly. Moreover, traveller satisfaction with the bicycle parking facilities rose significantly. The results have led to the bus company and province improving bicycle facilities at other stops as well.

Two experiments were carried out to promote combined use of **bus and lease bicycle**. In both instances, a bus company offered its passengers a bicycle plus a bicycle locker at the bus stop on a particular route. Virtually none of the bicycle lockers were used. The majority of passengers felt that leasing a bicycle via the bus company was far too complicated. Moreover, the majority of regular bus passengers had already made arrangements for their transport to and from the bus stop and thought it was too expensive to lease the bicycle and locker. An experiment with a **train and lease bicycle** was also carried out. The companies that were approached, however, turned out to be unwilling, or hardly willing, to obtain company or lease bicycles just for the journey to the station alone.

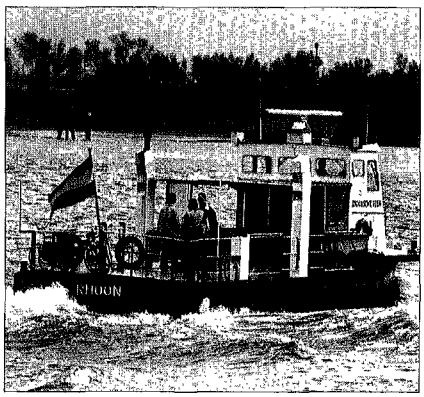
Other

A **Dutch language brochure** has been published on the subject of bicycle parking facilities at bus stops. This brochure contains a collection of the practical experiences gained.

Experiments were carried out in 1993 and 1994 involving **flexible bicycle rental along the Maas route**, a signposted bicycle route between Nijmegen and Maastricht. People were given the possibility to rent a 21-speed hybrid bicycle at five stations along the route and then return it at one of the other stations. The number of rental days amounted to 1,200 in 1993 and to more than 1,900 in 1994. Twice as many were needed, however, for a profitable

commercial operation. Bicycle shop owners at the five stations have continued with the rentals. The experiment has yet to be imitated elsewhere in the Netherlands.

The Netherlands has numerous inlets, rivers and canals, which in many places could be crossed in the past on small or large ferries. The more bridges and tunnels that were built to cross these waters, the more the number of ferry connections declined. For pedestrians and cyclists in particular this often means a (too) long detour. It was for this reason that an association for the preservation of foot-passenger and bicycle ferries was established in the 1980s. The association's activities have led in part to an increase in the number of small ferry connections once again.



During the summer months, a **foot-passenger and bicycle ferry** sails between the municipalities of Rhoon and Oud-Beijerland. This boat ferries pedestrians, cyclists and moped riders (but no cars) across the river, so that they do not have to make a detour over the bridge. Thanks to financial support from the ministry, a larger ferry was put into service and the crossing times extended to include workdays in spring and autumn and all days of the week during the summer. Covered waiting areas and bicycle lockers have also been constructed at both stopping places, and the connecting routes have been improved through the provision of lighting, signposting and a better road surface. Bicycle lockers and a guarded storage facility have been constructed at the subway station in Rhoon, where a direct subway connection with the Rotterdam agglomeration begins. The objective of all of these actions has been to promote bicycle use in commuter traffic between areas on both sides of the river.
The result, as measured in 1993, was that the ferryboat is used outside of the summer season by around one thousand individuals and by around 6,000 during the summer. Around 40 per cent of the commuter cyclists on the ferryboat previously commuted by car or bus. The lockers placed at both stopping places are hardly used by ferryboat users because these passengers bring their bicycles along on the ferryboat and continue cycling on the other side of the river. The storage facility and lockers constructed at the subway station are seldom used. Nevertheless, other subway passengers often use them.

CYCLIST SAFETY

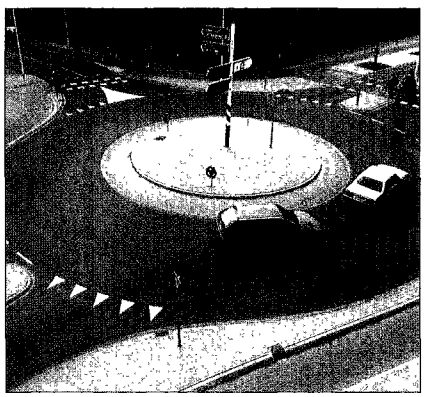
The projects that were carried out in the framework of the *BMP* concerning the theme of cyclist safety are not the only cyclist safety-related ones launched by the ministry, because the directorate that has the task of promoting traffic safety in general also carries out research and projects that are important for improving cyclist traffic safety. These activities, which are in keeping with the efforts of the Dutch central government for a sustainable and safe traffic and transport system, are not discussed here.

Research

The Institute for Road Safety Research (*SWOV*) has carried out research on stretches of road for purposes of obtaining design criteria or guidelines for **a separation or mixture of bicycle traffic and car traffic**. The research yielded a number of rules of thumb as to the desired degree of separation in various situations and the most important points of special interest for design, layout and issuing regulations. These rules of thumb have been included in the Design Manual *Sign up for the bike.* Three basic criteria were employed in formulating the rules of thumb, namely:

- Physical separation: a separate bicycle path or parallel road;
- Visual separation: bicycle lane;
- Mixed profile: all types of traffic on the same roadway.

The degree of separation depends on the road's function, the manner in which it is used and the available space. The speed and intensity of the motorized traffic plays the most important role in this consideration. Other factors include the level of parking; the importance of the bicycle connection's continuity and recognition; the number of side-roads; whether or not there is one-way traffic; and the presence of tram and bus lanes.



Half of all road victims among cyclists met with their accidents at intersections. In order to improve safety at intersections, more and more mini roundabouts are being constructed. Unlike the situation in the traditional Dutch roundabouts, traffic on the mini roundabout has the right-of-way vis-à-vis traffic entering from the right. Tight dimensions result in lower driving speeds, namely, 30 to 35 km/hour. Studies have shown that the number of victims among cyclists following the construction of a mini roundabout declines by 55 per cent on average. **Mini roundabouts with separate bicycle paths encircling them**, however, do not have a consistent **right-of-way rule** in the Netherlands and the authorities have decided that this should be changed by 1999 at the latest.

Accident analyses show that 55 per cent of cyclist fatalities involved collisions with passenger cars. Nearly half of all collisions are between "the front end of a car and the side of a bicycle". Research has shown that if all cars are equipped with a **collision-tolerant front end** to which a "soft", energy-absorbing material has been applied, the number of road victims in the Netherlands could decline annually by 11 fatalities (five of which are cyclists), 262 hospital-treated casualties (143 of which are cyclists) and 473 casualties with minor injuries (315 of which are cyclists). A methodology has been formulated in the meantime by the European Experimental Vehicles Committee for measuring the collision-tolerant safety feature of car front ends. Technical information has also been supplied for a European guideline.

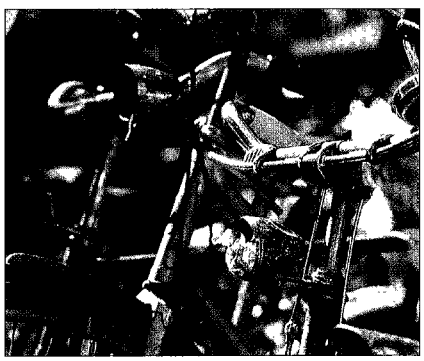
Collisions with trucks usually result in relatively serious injuries for cyclists and were the causes of around 20 per cent of all accidents involving a cyclist fatality in the last 20 years. A commonly occurring type of accident involves cyclists who end up between the front and rear wheels of trucks turning to the right, often unseen by the driver. An open side guard (one or more metal bars at axle height between the front and rear wheels) has been required on all trucks as of January 1, 1995. In 1994, an experiment took place involving the more effective **closed truck side guard**. The experiment showed that closed side guards save fuel costs - an average of 685 guilders annually per truck - so that the cost of the side guard can be recovered in three to five years.

In order to determine the type of educational instruments that can be implemented in traffic safety policy, a study has been carried out into the backgrounds and causes of unsafe traffic behaviour. Traffic accident figures and data on unsafe traffic behaviour were analyzed per age group, on the basis of which an assessment was made of the educational instruments that would be most suitable for each age group. The researchers took as their starting point the principal of permanent education. This is, in other words, a logical age-related succession and supplementation of formative instruments: education, training and

information on the issuing of regulations and enforcement. The analysis led to an overview of the following:

- Target groups that can be distinguished for purposes of education;
- Educational objectives that need to be emphasized per target group;
- Intermediaries who, depending on the target group and objectives, qualify for the role of educator.

The result was an **educational plan for safe cycling behaviour**.



With regard to the quality and maintenance of bicycles used by the Dutch, studies show that around 30 per cent of bicycles are considered "good", while a quarter are of "insufficient" or "poor" quality. In general, the condition of the bicycle's lighting is apparently worse than the condition of its frame and brakes. As the bicycle ages, its quality and maintenance levels worsen. According to the researchers, however, the situation is not a dramatic one.
Although the **relationship between the mechanical quality of the bicycle and traffic safety** appears obvious, it has not been possible to demonstrate in figures until now. A poll taken of more than 7,000 cyclists showed that a mechanical defect played a role in ten per cent of bicycle accidents, usually poor brakes. Of that ten per cent, around half involved injuries and one-third medical treatment. The figures, as well as the outcomes of a study using medical registration in a large number of hospitals, give little support to the idea of making quality demands on bicycles, not the least because poor maintenance of older bikes is the principle reason for defects. In any case, issuing regulations in this field is difficult due, among onthers things, to the lack of a licence number for bicycles in the Netherlands.

Pilot and model projects

Mopeds are obliged to use bicycle paths in the Netherlands. The relatively large speed difference between cyclists and moped riders, however, leads to many conflicts, often resulting in accidents. For this reason, an experiment was carried out in three municipalities in which **moped riders within the built-up area** were no longer permitted to use the bicycle path, but instead were obliged to use the main lanes on roads with a maximum speed of 50 km per hour. This measure proved to have a favourable effect on traffic safety, mostly that of the moped drivers themselves. The number of injury accidents was cut in half. Consultation is taking place with municipalities, provinces and water board districts as to the conditions under which the measure can also be applied elsewhere, where the local road management authority is in favour.

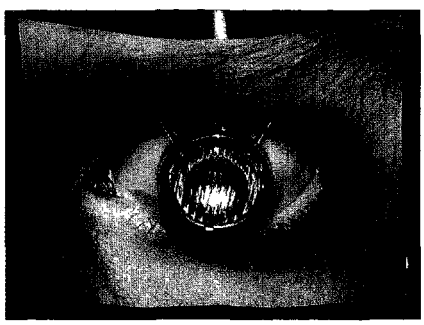
In the Westland, a horticultural greenhouse area in the province of South Holland, a comparatively high number of accidents occur involving cyclists and moped riders. Around 60 per cent of those bicycle and moped victims meet with their accidents on or near the driveway exits of companies. This primarily takes place on a number of main roads with one-sided bicycle paths for two-way traffic. To combat the problem, a project has been launched to design **driveway exits** for this type of road, **which are also safe for bicycle and moped traffic**. The first phase of the project entailed a detailed analysis of the problem and stocktaking of existing measures. The analysis showed that the injury accidents were linked to a significant degree to the presence of moped riders on the bicycle paths. Research was initially recommended on whether the road concerned lends itself well to speed-limiting

measures for motorized traffic along its entire length, in combination with allowing moped riders on the roadway. Another possibility could be deceleration lanes. In any event exits need to be sufficiently visible and conspicuous, with sufficient visibility for traffic driving in and out. Moreover, it must be made clear that the bicycle path is two-way. In the second phase, designs were to be made for suitable driveway exits. This has not been carried out for financial reasons. The recommendations from the first phase, however, have been applied to various Westland roads.

In general, and certainly at night, cyclists perceive **bicycle and pedestrian tunnels** as **socially unsafe barriers**, particularly if the tunnel is long, curved and/or narrow, and it is not possible to see all movement in the tunnel from all directions. A bicycle tunnel in the city of Zwolle was used as a model project for improving perception of safety. The entrances were enlarged visually and the tunnel itself was repainted and better lit. The tunnel can now be seen from neighbouring homes as well. An evaluation study showed that the percentage of female users who cycle through the tunnel in the dark without apprehension has risen from 37 per cent before the modifications to 74 per cent thereafter. The increase among men has gone from 60 to 80 per cent. There has been no report (yet) of the tunnel being used more often during the evaluation period.

The Amsterdam **police force** conducted a **campaign** with the slogan **"Cycle safely"**. The approach was based on the idea of "one good turn deserves another". Together with the municipality, the police saw to the improvement of bicycle routes, bicycle-friendly adjustment of traffic lights and less annoyance and danger from parked cars or cars running red lights. In return, cyclists were asked to stop more frequently at red lights and make sure that their bicycles were mechanically in shape. The police approach consisted of intensive surveillance and the provision of information for violators. Cyclists riding without any lights were given the choice of a fine or fixing their lights for around half the amount of the fine. When the campaign was evaluated, it turned out that the results were disappointing, probably for a myriad of reasons, the most prominent of which included:

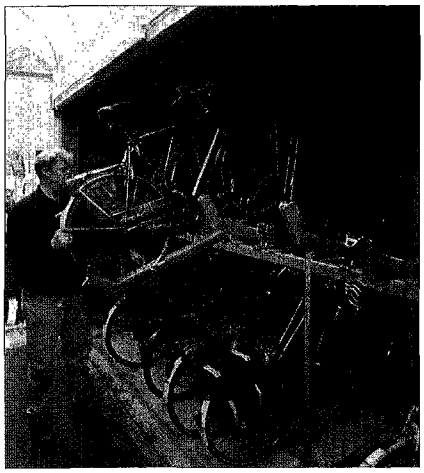
- An insufficient number of all of the proposed infrastructure improvements were realized;
- Both the citizens as well as people within the police force were insufficiently acquainted with the "barter" idea;
- The police gave the campaign insufficient priority.



BICYCLE PARKING FACILITIES AND THEFT PREVENTION

Development of bicycle parking facilities

The Dutch Cyclists' Union *enfb*, the Consumers' Organization and the TNO Institute for Technical Research carried out a **comparative commodity study** into the quality of **bicycle parking facilities** available on the Dutch market in 1993. Racks, fences, stands, posts and suspension systems were tested for their user-friendliness, costs, applicability, protection against theft and the degree to which they are susceptible to vandalism and weather influences. The researchers concluded that the quality of the facilities in general was inadequate. The possibilities for protecting bicycles against theft scored poorly in general because the materials used were usually not strong enough. Additionally the commonly employed distance between the individual bicycle stands of 30 centimetres was judged to be too narrow.



In the pre-war neighbourhood of **Vogelenbuurt** in the municipality of **Utrecht** various types of **neighbourhood bicycle storage facilities** were placed, each with its own quality level:

- The "minis": 60 bicycle clamps with possibilities for fastening bicycles, free of charge and close to home;
- The "midis": three collective locker "cylinders", each holding four bicycles and located on a car parking space within 40 m of residences and with a 15 guilder monthly usage fee;
- The "maxis": five neighbourhood storage facilities for 40 to 60 bicycles, situated at a maximum of 150 m from residences and with a ten guilder monthly usage fee.

Studies showed that the facilities were highly appreciated by residents and well used. The project has not yet had any influence on bicycle use worthy of mention.

In order to stimulate innovation, financial support was given to developing and constructing five **automatic bicycle carousels (Ficarro)**, a sort of unmanned bicycle storage garage in which monitoring, payment, distribution and locking are regulated by electronics and video. The client is given an empty rack from the carousel with a numeric code and can retrieve the bicycle once again using the same code. The advantages of this system in relation to the normal guarded bicycle storage facilities are a smaller surface area required per bicycle and lower operating costs. Field tests have shown, however, that the carousels are unreliable. Four of the five have therefore been dismantled and the fifth one improved so that it now operates trouble-free.

An experiment was held at a shopping centre in Rotterdam involving an **electronic bicycle rack**, called the Cycleguard, to which bicycles could be locked after inserting a guilder and entering a PIN code. Cycleguard usage fell considerably short of expectations. The experiment was discontinued a year later because the commercial operation was unprofitable.

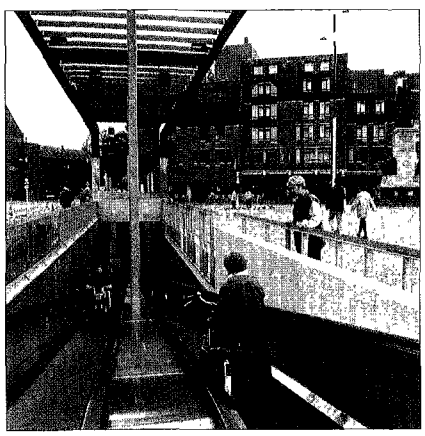
Integral approach to bicycle theft at a local level

With the financial support of the Ministry of Justice and the Ministry of Transport, a pilot project was launched in 1994 in the **municipality of Tilburg**, whereby the problem of **bicycle theft** was approached **integrally**. The following measures were taken:

- Formulating and implementing a plan for bicycle parking facilities;
- More intensive tracing and stricter punishment for thieves and receivers;
- Better prosecution policy;
- "Tidying-up" campaigns in places where parked bicycles are a hindrance;
- Public information campaign on locks;

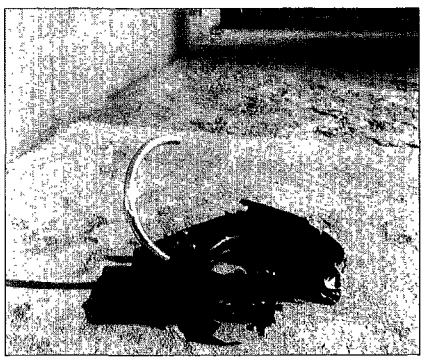
Postal code engraving campaigns.

A large number of parties were involved in formulating and carrying out the plan, including the municipality, the local police and judicial authorities, the local Dutch Cyclists' Union *enfb* branch, the regional bus company, the regional railway office, the local bicycle trade, the business community and two ministries. The plan was evaluated in mid-1996. The integration aimed for was not achieved and the efforts of some parties remained inadequate, especially that of the police. In fact, bicycle theft even rose slightly, while the readiness to prosecute declined. Nonetheless, the fear of bicycle theft among the population declined and the group of Tilburg residents who claim to cycle into town as a rule rose from 21 to 31 per cent.



A comparable **integral bicycle theft project** was carried out on a smaller scale in **Amsterdam** on the grounds of the former **Binnengasthuis**, an inner city area comprised of residences, university buildings, a theatre school and a refectory. An average of 2,000 bicycles are parked on these grounds during lecture hours. According to police estimates, 1,000 of those bicycles are stolen annually. The trade in stolen bicycles on the grounds is also active: around 3,000 are offered for sale annually. As in Tilburg, many measures were contemplated but the police also failed here because of other priorities, so that positive results were not achieved.

Bicycle locks



Studies into the **modus operandi of bicycle thieves** have shown that the majority of bicycle locks are not resistant to their methods. The only facilities that deter bicycle thieves adequately as a rule are guarded bicycle storage facilities. Locking the bicycle to a pole, tree, fence or bridge railing, which is often recommended, appears only to be effective if the bicycle is locked up so tightly that no space remains for burglary tools to be used. In response to these outcomes, recommendations have been made to adjust both test procedures on locks as well as the central government's prevention policy. In response to this, the project group carried out additional research into the **use of bicycle locks**, which showed that around two-thirds of cyclists secure their bicycle with a single lock, whereas one-third use two or more locks.

Bicycle registration and identification

In response to the limited success and resulting discontinuation of bicycle registration (which entailed postal codes being engraved on bicycles), the project group has organized two working conferences for consulting with the authorities involved as to new **systems of bicycle registration and identification**. It turned out that nearly all parties involved ultimately prefer a single system involving a chip in the bicycle frame, in combination with a matching pass for the owner. The Dutch organization of bicycle- and bicycle parts manufacturers and suppliers is currently working on the technical development and introduction of this system.

Brochures

The *BMP* project group has published various Dutch language brochures on bicycle parking:

- *Een eigen plek voor de fiets, beleidswijzer voor veilig stallen* (Room for the bicycle, a policy manual for safe parking) (1994);
- *Stallen in praktijk, voorbeelden van gemeentelijke fietsparkeerprojecten* (Parking facilities in practice, examples of municipal bicycle parking projects) (1996);
- *Plaats maken voor de fiets: leidraad voor planvorming en ontwerp van fietsparkeer-voorzieningen* (Make room for the bicycle: a guideline for planning and designing bicycle parking facilities) (1996).

The municipalities were invited to participate in four **pilot projects**, partly in order to evaluate the practical applicability of the third publication, a comprehensive handbook. A

bicycle parking plan was formulated on the basis of the guidelines for a specific area in each of the four selected municipalities by a consultancy firm in collaboration with the municipality. The ministry reimbursed the costs to a maximum of 75,000 guilders. Interest in the pilot projects was considerable: a total of 71 municipalities volunteered to participate. The experiences gained have been compiled in the brochure *Leren van fietsparkeren* (Learning from bicycle parking) (1997).

Appendix 2: Bicycle Master Plan international publications

Brochures

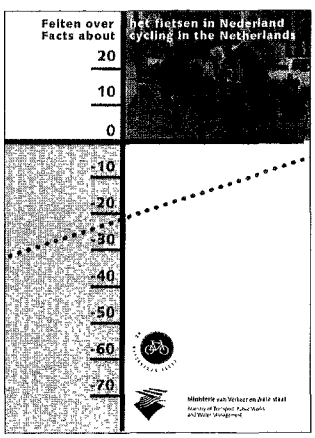
Bicycles First (*BMP*, 1992, 32 pages)
An abstract of the *BMP* Policy Document.
No longer available.

Still more bikes behind the dikes (CROW, record 6, 1992, 136 pages)
The papers of the Dutch speakers at the Velocity Conference 1991 in Milan.
No longer available.

Cycling in the city, pedalling in the polder (CROW, record 9, 1993, 264 pages)
The papers of the Dutch speakers at the Vélo Mondiale Conference 1992 in Montreal.
To order: CROW, NLG 45, fax +31 318 621112.

Cycling in Dutch cities (Dutch Cyclists' Union *enfb*, 1993 and 1997 update, 132 pages)
This booklet describes ten interesting cycling routes, each situated in a different Dutch city with an active cycling policy: Amsterdam, Apeldoorn, Delft, Enschede, Groningen, Helmond, Houten, Lelystad, Tilburg and Zwolle. This booklet allows readers to make individual educational trips through these cities by bicycle.
To order: Dutch Cyclists' Union *enfb*, NLG 50, fax +31 30 2918188.

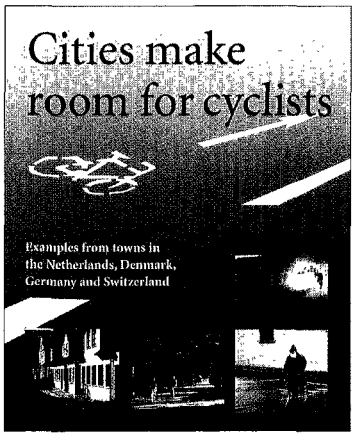
Sign up for the bike (CROW, record 10, 1993 and 1994, 328 pages)
Radverkehrsplanung von A bis Z (CROW, record 12, German edition, 1994 and 1995, 328 pages)



This handbook is a guideline for bicycle-friendly infrastructure, with recommendations for theoretical and practical traffic design. The design manual is not an instruction manual, but does offer arguments and ingredients to help the developer give the bicycle a fully-fledged position in traffic.
To order: CROW, NLG 55, fax +31 318 621112.

Facts about cycling in the Netherlands (*BMP*, 1993, 70 pages)
A comprehensive overview of data on cyclists, the bicycle and cycling in the Netherlands, placed among comparable data on other modes of transport. The basic data are also included, such as population data.
To order: Ministry of Transport, Public Works and Water Management, free, fax +31 70 3516058.

Cities make room for cyclists; examples from towns in the Netherlands, Denmark, Germany and Switzerland (*BMP*, 1995, 84 pages)
A secure cycling role requires decent facilities: room to ride comfortably and safely and a place to park. This publication looks at fourteen towns and cities in the Netherlands,



Denmark, Germany and Switzerland, outlining the facilities they have made and the views of local politicians, officials and bike-users.
The occasion of this publication was the long-term evaluation of the bicycle route network developed in the Dutch city of Delft in the mid-1980s. While the network succeeded in increasing the cycling share in the modal split somewhat in the short term, ongoing growth demands more than just a safe and pleasant infrastructure for cyclists. Decent facilities are also needed at people's homes and at their destinations. Additionally cycling strategies must be integrated into overall policies on traffic management and spatial planning.
To order: Ministry of Transport, Public Works and Water Management, free, fax +31 70 3516058.

Bicycle parking in the Netherlands (CROW; 1997, 48 pages)
This publication provides information on how bicycle parking policy can be embedded in bicycle policy; how to design an effective bicycle parking plan; examples of similar plans in four Dutch cities; and descriptions of several municipal projects.
To order: CROW, free, fax +31 318 621112.

Videos

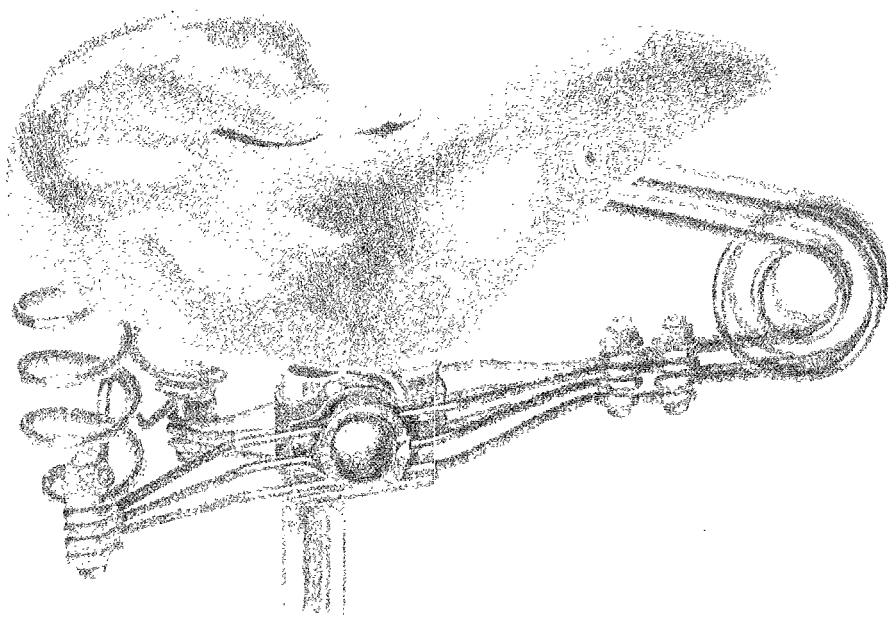
Bicycle Master Plan (English and German version, 1992 and 1993, 10 minutes)
Clarification of Dutch bicycle policy and of the *BMP* Policy Document.
No longer available.

Cities make room for cyclists (English, German and Chinese, 1995, 15 minutes)
Short presentation of the backgrounds and contents of the Dutch government's bicycle policy since 1990, followed by impressions of bicycle traffic and policy in the cities of Delft, Houten and Groningen.
To order: Ministry of Transport, Public Works and Water Management, free, fax +31 70 3516058.

Figures and Tables

FIGURES

TABLES



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