

Road safety in The Netherlands: Policies and Management

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F.C.M. Wegman
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SWOV Institute for Road Safety Research, The Netherlands

SWOV Institute for Road Safety Research
P.O. Box 170
2260 AD Leidschendam
The Netherlands
Telephone 31703209323
Telefax 31703201261

ROAD SAFETY IN THE NETHERLANDS

POLICIES and MANAGEMENT

Fred Wegman

SWOV Institute for Road Safety Research, the Netherlands

Abstract

The Netherlands is one of the highly-motorized countries with a relatively good road safety record. Although, 1300 road deaths per year and ten thousands of injured people are considered as unacceptable. The Dutch Government has set targets: to reduce the number of road deaths with 50% by the year 2010 and the number of injured people by 40%. How to reach these targets is described in a policy paper: "Long term policy for road safety". Six priority areas are defined: drinking and driving, accident black spots, speed, seat belts and helmets, heavy vehicles and cyclists. A rather new approach has been introduced in this policy as well: sustainable safe road transport. This policy paper with its relevant background information will be introduced during this presentation.

1. Introduction

In 1950 over one thousand people died in accidents on Dutch roads, in 1960 over two thousand people died in an accident. During the peak year, 1972 this figure was more than 3200. In the year 1992 1285 people were killed in road accidents. The development in the number of road deaths in the Netherlands is shown in Figure 1.

Following the Second World War the Netherlands and most western countries were confronted with an explosive increase in mobility, which was accompanied by an enormous decrease in road safety. From 1950 to 1990 mobility increased more than tenfold (measured in terms of kilometres travelled by motor vehicles). How can this apparently remarkable development of a threefold increase between 1950 and 1970, followed by a decrease of over 50% in the next twenty years, be explained against a background of an explosion in mobility?

In various papers, my colleagues Koornstra and Oppe have established a relationship between the development in mobility and road safety (cf. Oppe & Koornstra, 1990 and Koornstra & Oppe, 1992). On the basis of empirical data from various countries, they came to the conclusion that on a macroscopic level the annual number of road deaths can be expressed as the product of mobility (motorised kilometres) and the fatality rate (deaths per kilometre). Both factors can be expressed in terms of monotonic trends: a logistic, sigmoid trend in the case of the number of kilometres that approaches a certain saturation level and an exponential curve in the case of the fatality rate (Figure 2). The fatality rate in the Netherlands dropped over 6% each year. However this reduction rate has slowed down the last few years to only 4%.

A cyclical fluctuation should be added to this. It emerges that if the fluctuation in the increase in mobility leads to a sharper increase than that based on the monotonic trend, the reduction in the fatality rate is relatively minor. This is disadvantageous for the development of road safety on two counts: the sharp increase in mobility and the moderate drop

in the fatality rate. From the point of view of road safety, this calls for a controlled increase in mobility and should this growth be high, for example due to a strong economic growth, then extra attention needs to be devoted to road safety measures with the aim of further decreasing the fatality rate.

This development was not unique for the Netherlands, as can be seen from Figure 3. A common explanation for this descending risk curve is that people are increasingly able to deal with traffic as it becomes integrated into their society for a longer period. This view therefore sees the curve as a reflection of a learning process.

From this a number of interesting conclusions can be drawn:

- even in a period of mobility growth a reduction of road accident fatalities (and casualties) is possible, if the reduction in the fatality rates is higher than the increase in mobility;
- reductions in fatality rates are not following a 'law' and are not self-evident but have to be deserved by proper road safety policy integrated in other policy areas;
- knowledge about the relationship between developments in road safety and in mobility can be used for the setting of road safety targets;
- road safety has to be an integrated part of policies dealing with traffic planning, physical infrastructure investments etc.;

2. Dutch Transport Structure Plan

Although road accidents continues to give cause for considerable concern, other problems related to our transport and traffic are causing concern as well. Economically, it is vital for the Netherlands that access to and from our main ports continues to be guaranteed: the harbour of Rotterdam and Schiphol airport at Amsterdam. Nowadays transport problems exist in the conurbations in the western part of the Netherlands. Main road capacity falls short of demand, not only during the rush hours, threatening accessibility. Commuter traffic hinders business and freight traffic. And, on the other hand, environmental problems caused by traffic deserves our attention.

The Second Transport Structure Plan from 1990 tries to find the balance between all relevant interests, of which road safety is only one. The Dutch Government does not believe any more that merely building more road capacity could meet growing traffic demand: the growth of traffic has to be curtailed in the interest of the environment. A set of targets for the year 2010 has been defined in the Transport Structure Plan. To illustrate this approach, some examples are given here:

- the 70% growth of car traffic forecasted for the year 2010 has to be reduced to an 'acceptable' growth of 35%;
- a target of 2% probability of congestion on the important motorways;
- a 30% increase of kilometres travelled by bicycle;
- a 20% reduction in commercial vehicle kilometres by better transport management;
- NOx emissions from private and commercial transport has to be reduced by 75%;
- and: half the number of road accident fatalities and 40% fewer injuries.

3. Long Term Policy for Road Safety

As mentioned before, road accidents are one of the adverse effects of road transport.

Although the Netherlands holds a relatively good safety record (fatalities related to the number of inhabitants and to the number of motor vehicles used), the yearly road toll due to road accidents are considered as unacceptable. To improve road safety effectively and efficiently it was decided to incorporate road safety policy in the Transport Structure Plan. This road safety plan has set quantitative targets: 25% fewer road accident casualties by the year 2000 (compared with 1985) and 40% less injuries and 50% fatalities by 2010. Using the relationship between developments in mobility and road safety, on a macroscopic level, but also using more disaggregated levels, SWOV calculations demonstrate that the road safety targets remains feasible (Noordzij & Oppe, 1993). For this we accept a mobility growth of 35% and we suppose we manage to reduce the fatality rate as we managed in the past. However, SWOV calculations demonstrate that the targets set are feasible for all categories of road users: extra attention has to be paid to older road users and occupants of lorries and vans.

A limited number of so-called spearheads are defined in the Dutch safety plan: drinking and driving, use of seat belts and helmets, speeds, accident 'black spots', cyclists and accidents with heavy vehicles. Before going into more detail, it is appropriate to try to answer the question which measures which were implemented in the past, could explain the improvement in road safety.

Roughly, a number of types of measures can be distinguished in the past. In Figure 4 these measures are shown. The first generation of measures relied heavily on legislation and enforcement of these legislations: a traffic code, speed limits inside urban areas are examples to be mentioned. Expanding the road network, especially the motorway network, and improving the quality of the existing network, for example by constructing by-passes around towns and villages, can be considered as the second generation of measures. In the seventies and eighties a lot of residential areas were (re)designed as 'woonerf' or 30 km/h-zones.

The next type of measures were passive safety measures: helmets for users of mopeds and motorcycles and improved passive safety of vehicles. In this respect seat belts have to be mentioned explicitly. In the Netherlands in the beginning of the eighties we see a lot of attention being paid to measures in the field of education and enforcement: in the field of preventing drinking and driving great progress was made. The last shoot of this tree is decentralisation of activities. The Dutch central government has tried to create more commitment among municipalities, provinces and private organisations to participate in the efforts to improve road safety. An interesting programme which could be mentioned here was the effort to use financial incentives (Wegman et. al, 198.).

This overview cannot be exhaustive and it has to be admitted, we cannot fully understand the contributions different measures had made to the improvement of road safety. Let me give you some information about three important measures: drinking and driving, use of seat belts, infrastructure. In Figure 5 the development is shown of the percentage of drivers of motorcars during weekend nights above the legal limit of BAC (>0.50/00). Based on the 'alcohol-law' from 1974 and coupled with the alcohol discouragement policy, many anti-drinking and driving campaigns (education combined with enforcement activities) have led to less people who drink alcohol before driving and to less fatalities and casualties.

Seat belt usage on front seats is legally obliged from 1975 in the Netherlands. An enormous increase of usage was the positive result. A majority of users fasten their belts when travelling (Figure 6). Usage of seat belts (and child restraints) on back seats is obligatory since 1990. However usage is rather poor. We hold the opinion that improvements in usage rates are still possible and effective, keeping in mind the experiences in the United Kingdom and Germany.

Infrastructure improvements have had an enormous impact on road safety as well. Undisputed, expanding the motorway network and redesigning residential areas have improved road safety (Figure 7).

4. Sustainable safety

Since the UN Brundtland Commission introduced the concept of sustainable development in 'Our common future' - a concept which links economic development to ecological potential - sustainability has become an important point of departure for many areas of policy: how can today's needs be met without burdening future generations with the consequences of our consumption and production methods.

This concept has also inspired the vision we have developed for road safety: no longer do we accept that we hand over a traffic system to the next generation in which the Netherlands tolerates that road transport leads to thousands of fatalities and tens of thousands of injured, no longer do we respond with hindsight to the results of thoughtlessness, lack of expertise or simply afford the issue inadequate policy priority.

Instead, we should try to drastically reduce the probability of accidents in advance, by means of the infrastructure design. And where accidents still occur, the process which determines the severity of these accidents should be influenced such that serious injury is virtually excluded. This, therefore, is our interpretation of the concept of sustainable safety; not something futuristic, not a completely overhauled road transport system, but nevertheless, a system that differs considerably from the current one.

The concept of sustainable safety is based on the principle that man is the reference standard when designing infrastructure, applying new technologies, creating public acceptance for that new infrastructure and get this concept organised and implemented.

A starting point for the development of a sustainable safe infrastructure is that every road is appointed a specific function and is designed such that the road or street in question meets the specific functional requirements as optimally as possible; most of all that it guarantees optimal safety. Three functions can be distinguished: flow function, access function and residential function.

The key to arrive at a sustainable safe road traffic system lies in the systematic and consistent application of three safety principles:

- prevent unintended use, i.e. use that is inappropriate to the function of the road;
- prevent large discrepancies in speed, direction and mass at moderate and high speeds, i.e., reduce the possibility of serious conflicts in advance;
- prevent uncertainty amongst road users, i.e. enhance the predictability of the roads' course and people's behaviour on the road.

The application of these principles is most successful on motorways and in special 'woonerven', i.e. 30 km/h residential zones. This is demonstrated by the fact that these types of roads and streets show a relatively low accident risk, while arterial roads inside the built up area and 80 km/h roads demonstrate a high risk: high driving speeds, many inconsistencies, many differences in direction and speed, different types of road users occupying the same space (Figure 7). The sustainable safety solution: apply the safety principles consistently.

Road safety is a facet of many other policy areas, such as traffic and transport policy, policy in the field of physical planning, economic policy, environmental policy etc. It may be concluded that, on the whole, the impact certain decisions have had on road safety has not been taken sufficiently into account to date. This means that, when hazard has been demonstrated, extra measures, sometimes at high cost, are offered in retrospect in order to eliminate the negative safety consequences. In a sustainable approach to road safety, it is assumed that policy decisions which touch on road safety, will also consider the road safety aspect explicitly and consistently. In this context it has been suggested that a *road safety audit* or a *road safety impact assessment* be issued for relevant decisions dealing with traffic and transport and with physical planning.

In a sustainable safe road transport system, the road user represents the most important link. He must in principle be prepared to accept a road system, vehicles, rules of behaviour, information and control systems that markedly restrict the freedom of the individual in return for a greater level of safety. Furthermore, attention should remain focused on adequately informing the road user, in all phases of his life as a road user. And it will still remain essential to discourage certain groups from using the road, e.g. those driving under the influence of alcohol.

In the Netherlands we try to develop ideas about this sustainable safe traffic system, in close cooperation with the road safety community in our country, in different pilot projects. Of course we shall report about our progress in this field as soon as we have information available about how this sustainable safe traffic system looks like.

5. A national road safety plan

In the Netherlands, with its political and cultural context, a *National Road Safety Plan* is an important means of getting and keeping this subject on the political agenda. What is more, a plan act as a reference for implementing policy. First and foremost, the plan should include a philosophy about how road safety is to be improved, in the short term and in the longer term. The plan should therefore open up possibilities and indicate frameworks.

A plan is not enough in itself. Conditions must be established that the plan will also be implemented. In the Netherlands quantitative road safety targets, amongst other targets, have proved to be an effective way of seriously monitoring the implementation of a plan and are also a good means of achieving a more effective policy.

In the Netherlands a great many policy plans have emerged in the past in the area of road safety. Based on our experiences the following 'ten commandments' could be formulated:

- raise awareness and support in society and create public acceptance of safety measures;
- integrate with other areas of policy;
- create network of well-educated professionals and interested citizens;
- use know-how when implementing policy;
- check quality of implementation;
- combine long-term strategy with short-term successes;
- start with well-known and simple cost-effective measures;
- reduce chance of human error by increasing predictability in traffic, making traffic more homogeneous, reducing speed and separating road user categories;
- improve vehicle safety;
- improve emergency services and hospital care.

6. Organisation of a road safety policy

A former Dutch Minister, who was responsible for coordinating road safety policy, once wrote: "As Minister of Transport, Public Works and Water Management, I am responsible for the national road safety policy. I do not shirk this responsibility. However, I would stress once more that a Minister alone can accomplish very little. Road safety is a matter that directly concerns half of the Cabinet, but also, and particularly, administrators of provinces and local authorities, not to mention over 14 million other Dutch people". From this very interesting statement the following conclusions were drawn:

- attach more importance to coordination within the Cabinet;
- more targeted collaboration by all of the organisations that have to play within the context of road safety;
- persuade citizens to obey traffic regulations that are vitally important.

Over the years it has proved necessary to have a separate unit within central government where road safety policy is coordinated and specific aspects of the policy can be implemented. Due to the complexity of road safety problems, some countries have opted to house this 'Road Safety Agency' within the offices of the Prime Minister (Japan, France). Other countries, like the Netherlands, have brought a unit of this kind within a specialised department.

If, in addition to coordination, a unit of this kind is allocated executive tasks, two risks should be combatted. First of all that other departments within central government (in the field of physical planning for instance, the health care system etc.) think that, because a road safety unit exists, they can be less involved. It might also happen that the dynamism of the road safety unit takes the initiative away from other bodies.

To summarise, an attractive type of organisation is a separate unit or agency which combines coordination of policy (road safety seen as a facet of other areas of policy) and implementation of policy (particularly within the road safety sector, such as driving lessons, road safety campaigns). This unit has a relatively modest budget to enable policy to be implemented by others based on the idea of 'setting a sprat to catch a mackerel'. In addition, the unit will lay great emphasis on coordination by facilitating the activities of others, by providing encouragement and by making it attractive for others to contribute to improving road safety.

Other sections of government and private organisations are vital links when implementing policy. Local and provincial government in every country in the world has a crucial role to play in physical planning and in construction and maintenance of road infrastructure. The more active these administrative layers are, the more knowledge they have available, the higher the budget allocated to improve road safety, the more effective the efforts made in terms of a reduction in the number of road accident casualties. Perhaps this is one of the most important provisos for a successful road safety policy.

Another effective means appears to be allowing private organisations to participate in formulating policy and to involve them in implementing aspects of policy. What is more, private organisations need to work together and reinforce one another rather than hinder one another. The road safety unit has an important part to play in this process. Private organisations and organised interest groups that are working together must be considered capable of exerting social pressure and creating public support within society. A road safety parliament or a road safety council might be seen as a formal expression of these views.

And last but not least, an active role of interested politicians, members of parliament, town councils etc, could be very stimulating for the road safety community and is essential when unpopular measures in the sake of road safety have to be decided.

Literature

Koornstra, M.J. & Oppe, S. (1992). Predictions of road safety in industrialized countries and Eastern Europe. Paper presented to the International Conference "Road Safety in Europe", Berlin, 1992.

Ministry of Transport, Public Works & Water Management (1991). Long Term Policy for Road Safety. The Hague, 1991.

Ministry of Transport, Public Works & Water Management (1990). Second Transport Structure Plan; transport in a sustainable society. Part D: Government Decision. Second Chamber of the Parliament. The Hague, 1990.

Noordzij, P.C. & Oppe, S. (1993). SVV-doelstelling verkeersveiligheid: nog steeds haalbaar! (Transport structure plan targets for road safety still feasible!). R-93-15. SWOV, Leidschendam. (in Dutch).

Oppe, S. & Koornstra, M.J. (1990). A mathematical theory for related long term developments of road traffic safety. In: Koshi, M. (Ed.). Transportation and traffic theory. Plenum Press, New York.

SWOV (1993). Towards a sustainable safe traffic system in the Netherlands. National Road Safety Investigation 1990 - 2010. SWOV Institute for Road Safety Research, Leidschendam.

Wegman, F.C.M., van Selm, J.A. & Herweijer, M. (1991). Evaluation of a stimulation plan for municipalities in The Netherlands. Paper presented to the International Road Safety Symposium in Copenhagen, 1990.



Figure 1. Road deaths in the Netherlands (1950-1990)

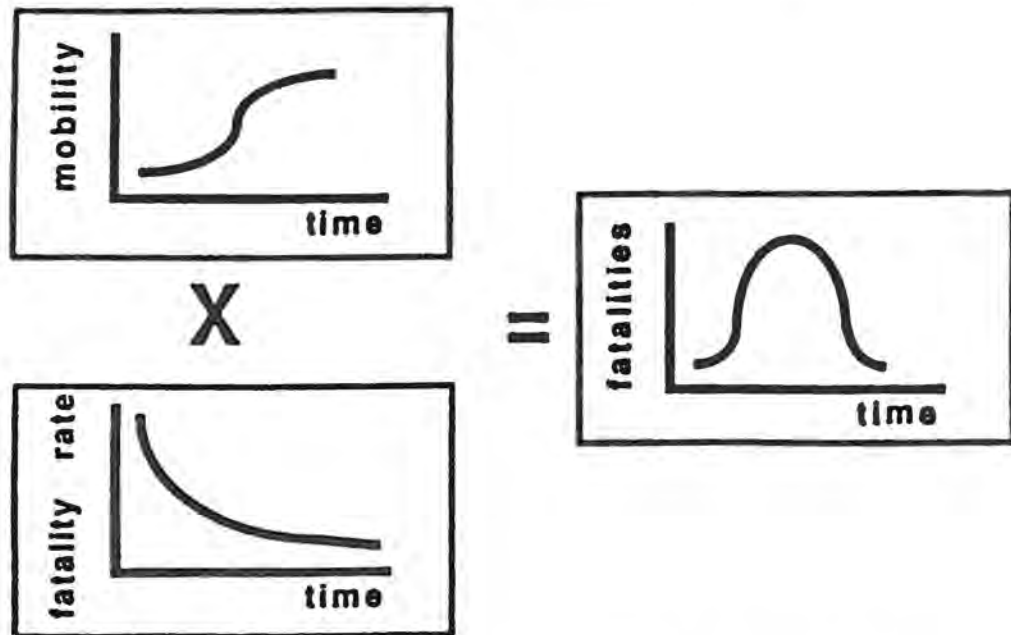


Figure 2. Trend in fatalities as result of trends in mobility and fatality rates

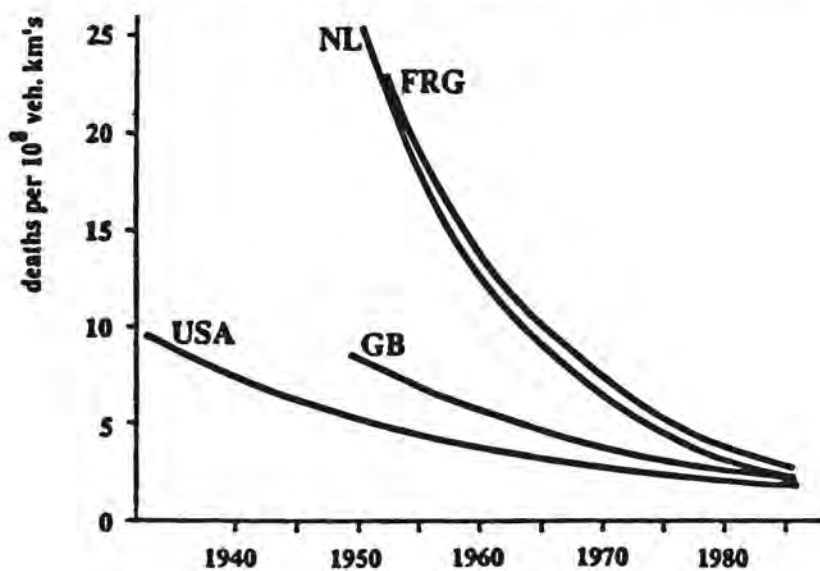


Figure 3. Fatality rates, United States, Great Britain, (West) Germany, the Netherlands

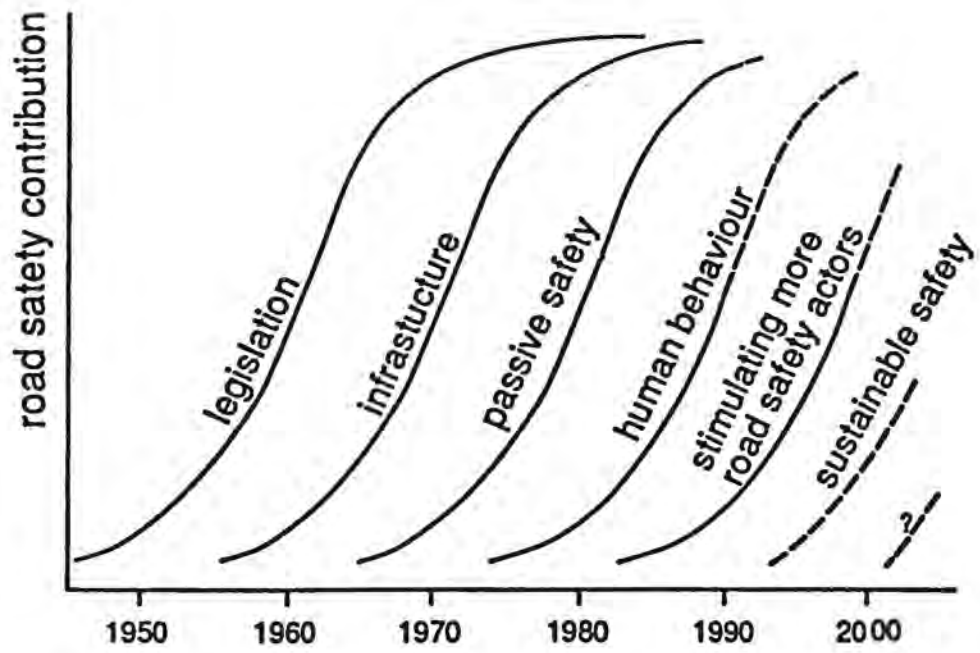


Figure 4. Schema of road safety contributions of different types of measures

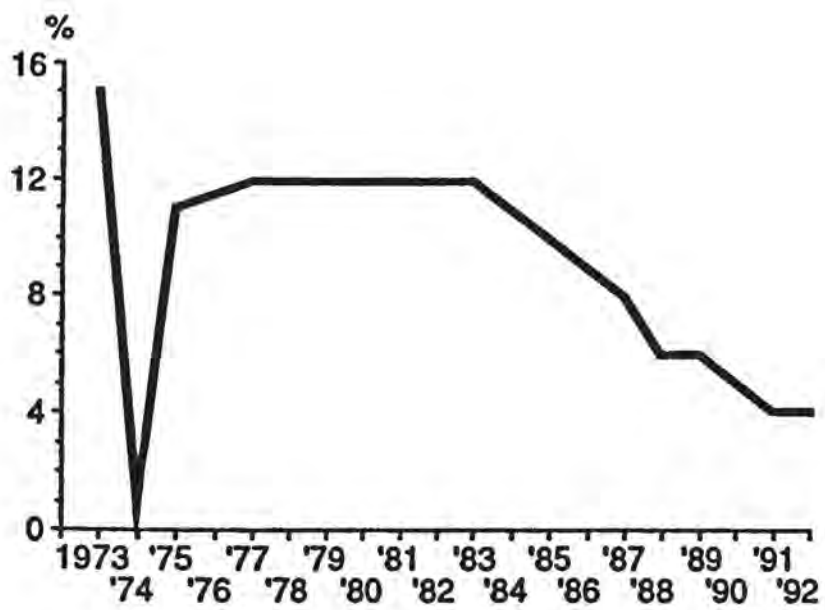


Figure 5. Motorcar drivers with BAC \geq 0.5 promille (weekend nights)

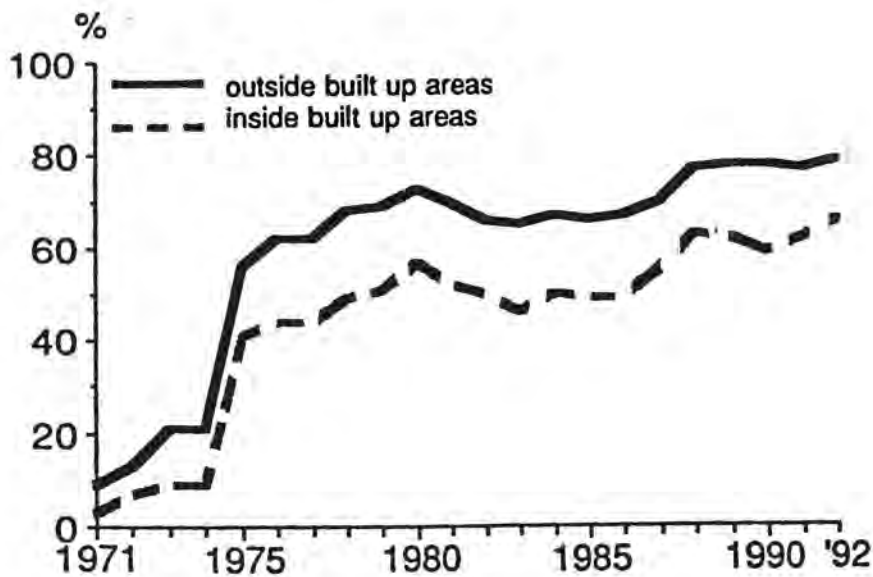
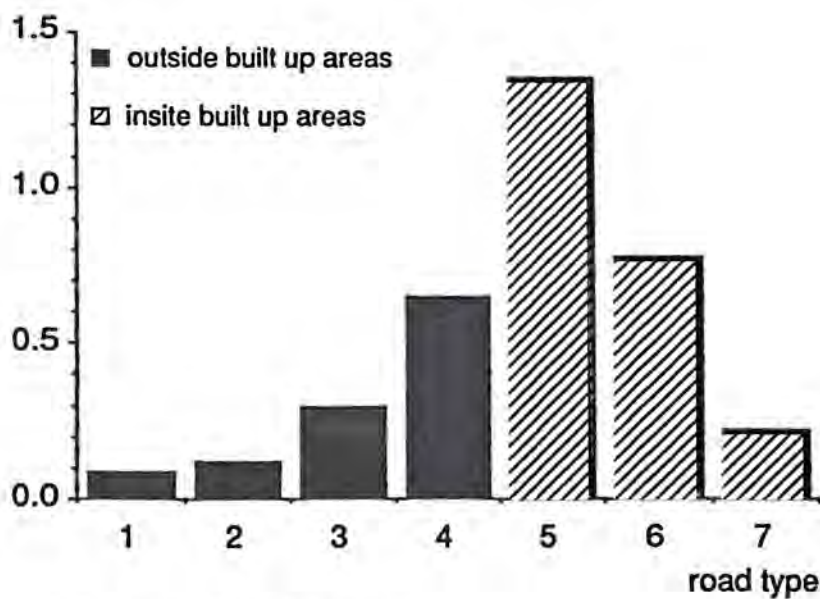


Figure 6. Seat belt usage for front passengers



1. Motorway: 100-120 km/h
2. Motorroad: 100 km/h
3. Arterial rural road: 80 km/h
4. Local rural road: 80 km/h

The most elementary classification for the built up area is subdivided into:

5. Arterial roads with a speed limit of 50 km/h (sometimes 70 km/h)
6. Residential streets with a speed limit of 50 km/h
7. "Woonerf" and residential street (approx. 8 km/h to 30 km/h)

Figure 7. Injury accidents in the Netherlands per million motor vehicle kilometres per type of road