

Policy information on road safety programmes in the Netherlands: to measure is to know

Paper presented at the Conference on 'Russian Federal Targeted Road Safety Programme 1996-98', Sochi, Russia, May 28-29, 1997

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view of the astonishing lack of road safety data and research from Rus-
sia in international issues, attention is focused in particular on the
information aspect of road safety programmes.

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1. Preface

"Science begins when measurement begins"

Mendeleev

"Meten is weten" (to measure is to know)

A Dutch proverb

This paper was especially prepared for the Conference on 'Russian Federal Targeted Road Safety Programme 1996-98', held in Sochi (Russia), May 28-29 1997.

The purpose of this paper is to inform readers about policy in the field of road safety programmes in the Netherlands. The authors are convinced that a lot of knowledge accumulated in the Netherlands could be very useful for the Russian situation as well.

In our paper, attention will be focused in particular on the *information aspect* of road safety programmes. This preference is very easy to explain by the astonishing lack of road safety data and research from Russia in international issues. Reading international sources, such as statistical reports of EC, IRF, IRTAD etc., one can find only a few Russian data. In the meantime, the road safety problem in Russia is one of the most serious in the world.

The lack of information could be explained by the confidential character of such data in the Soviet past. But at the end of the 1980's, Russian road accident data have been public as in the majority of countries of the world. The road accidents data system should be not only public, but also *operational*. Operationalism at the international level means that usual international figures and indicators must be available for comparison with other countries. Operationalism at the national level means that the data structure should provide monitoring of road safety programmes. Achievement of targets should be measurable.

From international experience it is well known that the transition from an old type of information system to a new, public and operational system takes time and money. Creation of good policy in this field is very important.

This paper starts with a preliminary general description of road safety in Russia, based on available information (Chapter 2). Chapter 3 gives a short overview of road safety in the Netherlands. The development of accident risk in the Netherlands is briefly presented. Chapter 4 contains an introductory survey of the Dutch long-range programme for road safety and a literature guide for readers who are completely familiar with this matter.

The authors thank the Ministry of Transport of the Russian Federation and JSC Transconsulting, Moscow, for the invitation to take part in the conference. Especially, we would like to acknowledge support and suggestions of prof. Igor Wengerov, and dr. Aleksei Chebichev.

We would also like to thank our SWOV colleagues Ms Jenny Hendriksen, who provided us with some inevitable data sources and Mr Stephen Harris, whose comments and suggestions on an earlier draft of this paper really improved its clarity.

2. An introduction to road safety in Russia

The absolute numbers of road accidents victims in Russia are extremely high. There were 29,468 fatalities and 178,378 injured in 1996. Over the past years, an average of 14-15% of injured people died. Such severity of road accidents, comparing to 2-3% in highly motorised Western countries, is not acceptable.

Russia is faced with a giant task of implementing serious changes in present road infrastructure and road accident prevention system. The two-dimensional road safety diagram presented by *Figure 1* in *Appendix B* shows that personal risk (deaths per 100,000 inhabitants) is two to three times greater than it is in the highly motorised Western countries. The level of traffic unsafety (deaths per 10,000 vehicles), which is the measure of performance of road accident prevention system, is even almost six times higher than in the safest countries (see for comparison *Figures 2* and *3* in *Appendix B*).

The diagram in *Figure 1* shows an extremely remarkable development of road safety in Russia since 1984 until now. This curve of development could be better explained by Russian specialists, who are closely engaged with macro-economical and social analyses.

Let us give only a short comment on the presented development. There are a couple of obvious trends, which could be concluded from this diagram:

- a slight positive trend from 1984 with saturation and break in 1986-1987;
- a drastically worsened situation, firm increase of risk between 1987 and 1991;
- a gradually improved positive trend since 1992 until now.

Unfortunately, there is no place in this paper for a more detailed analysis. The most important fact is that after a drop until 1992, the road safety in Russia, although still being poor, is going to recover.

3. A short description of road safety in the Netherlands

First of all, the present situation in the field of the road safety should be summarised. Printed below, some absolute numbers give a general idea about dimensions of the road safety in the Netherlands:

Year	Injured -total	Deaths	Hospitalised	Others
1974	66212	3092	22542	43670
..				
1986	50203	1527	14706	35497
...				
1992	49361	1285	11654	36422
1993	48990	1253	11562	36176
1994	50513	1298	11735	37480
1995	52045	1334	11688	39023
1996	50163	1180	11966	37017

These most important absolute figures have been rather steady during the last couple of years. To evaluate the meaning of these figures, we should take into account the longitudinal inland and international trends.

3.1. Trends and international comparisons

In the early 1970's there were more than three thousand road deaths and about seventy thousand injured persons every year. Since the middle 1990's, these figures were reduced to respectively about 40% and 70%.

Accordingly to the recent demands of international research, the road safety must be estimated on basis of two independent types of accident rates:

- personal safety rates, for instance: deaths per 100 thousands inhabitants;
- traffic (un)safety rates, for instance: deaths per 10 thousands vehicles, or (if available) deaths per kilometre travelled.

A two-dimensional comparison (how closer to the left bottom corner of the diagram how safer!) of the motorised countries put the Netherlands in the group of five safest countries in the world as presented in *Figure 3* in *Appendix B*.

The development to this high performance is presented in *Figure 4*. This diagram can be used to estimate how many year it takes to reduce the risk from a certain value to the present level and to increase personal safety and traffic safety as well.

3.2. Costs

SWOV Institute for Road Safety Research has undertaken a research to estimate the costs of road (un)safety for 1993 (Muizelaar et al., 1996). The model used is almost the same as the one used by McKinsey &

Company for comparable research in 1983. The results of this research compared with the results in the McKinsey & Company report, are summarised in the table below (prices in millions of Dutch guilders).

	Gross		After tax	
	1983	1993	1983	1993
Medical costs	349	440	349	440
Production losses	3281	4346	2007	3190
Material costs	3404	4188	3404	4188
Settlement costs	260	303	260	303
Accidents costs, total	7294	9277	6020	8121
Prevention costs	1939	3077	1939	3077
Total costs	7554	9580	6280	8424
Total costs as % of GNP	2,4	2,1	2,2	2,0

3.3. Mobility aspects and exposure

The Netherlands are a small country with one of the highest population densities of the world. More than 15.5 million inhabitants live on 42 thousand km² of territory. A third of the territory is used for agriculture. Machine industry and building industry is the most intensive in Europe. As a result, a very huge road infrastructure has developed (almost 114,000 kilometres).

The road density of 2.6 km per km² is second in the world after Belgium. There are more than 22,000 kilometres motorways, without intersections, connecting all twelve provinces of the Netherlands. These motorways are very safe (3.4 deaths per one billion vehicle-kilometres). Other road categories outside urban areas (about 56,000 kilometres) are also safe (10.8 deaths per billion vehicle-kilometres). Inside urban areas risk is a bit higher: about 15.2 deaths per billion vehicle-kilometres. This can be explained by the very intensive use of bicycles and mopeds.

The Netherlands belong to the group of ten highest motorised countries in the world. More than 5.7 million vehicles are used in the country. About 70% of households have one private car or more (5.3 million cars totally). Private cars are used for 54.3 % of all home-to-work journeys. In 86% of all these journeys the car driver is travelling alone. Personal car occupants make about 75% of all traveller kilometres (see *Figure 5a* in *Appendix B*).

The traffic jams on the major road network form an important issue in the mass media and of course they constitute one of the main problems that the Ministry of Transport has to cope with. The dozens of congestion locations and kilometres of tailbacks are announced every day on the radio.

Some specialists consider traffic jams as a positive factor of too intensive road traffic during the rush hours. They call this phenomenon 'self regulated exposure'. They mean that slowing down traffic because the capacity of the road has been reached slightly increases accident risk but reduces the severity of accidents during the rush hours.

This view is in accordance with one of the successful policies: “To achieve safety you should control the mobility (exposure) and speed”. Just a couple of measures to indicate this approach:

- car pool;
- park and ride;
- limited parking time and other obstacles against the car expansion in the towns;
- traffic calming (road humps, strips, barriers, narrowing of the carriageway etc.);
- ‘big brother is watching you’ - automatic electronic enforcement systems;
- dosed access to the motorways and express roads;
- promotion of public transport use, reduction of personal car use;
- special attention to bicyclists and bicycle paths and routes.

3.4. Two-wheelers

The Dutch use a lot of two-wheelers. A bicycle is really a kind of transport in the Netherlands and not just a sport or recreation machine, as in other European countries.

There are more than twelve million bicycles in the Netherlands. Practically every healthy Dutchman has a bicycle and prefers to use bicycle tyres rather than shoe soles. On the streets you can see more cyclists than pedestrians. Statistics on kilometres travelled and killed persons in road accidents (see *Figure 5*) reproduce this Dutch phenomenon. The exposure of bicyclists is 2,5 time greater than the kilometres made by pedestrians. More cyclists than pedestrians are killed in road accidents as well (almost three time more than the respective share of exposure). Especially high relative risk have the moped riders (nine times more killed than respective share of exposure) and motorcyclists (eight times more killed than respective share of exposure).

4. Dutch long-range programmes for road safety

This chapter offers a short introduction on the subject of Dutch long-range programmes for road safety. For readers who want more detailed information in this field, a literature list of selected Dutch publications in English is attached in *Appendix A*.

4.1. Main issues

In the beginning of the 1970's and in 1975, a number of additional road safety measures were taken. The reason for this was a wide social awareness concerning the steadily increasing of the accident risk and casualties at the end of 1960's and the beginning of the 1970's (see *Figure 2* in *Appendix B*). Some of the most important preventive actions were the following measures:

- introduction of compulsory use of seat belts by front-seat occupants of all private cars;
- higher fuel prices (also related to the so-called 'energy crisis');
- implementation of an overall speed limit on roads outside the built-up areas of 100 km/h on motorways and 80 km/h on other roads;
- Compulsory wearing of crash helmets by moped riders.

Results of these measures were detected already in mid 1975. Regular measurements and accident analyses have shown the significant drop of the number of casualties within the respective groups of road users.

The concept of the road safety control was as follows:

...

(i) road safety analysis >

> detection of high or deviating risks >

> taking of measures >

(i+1) road safety analysis (including the effect of measures taken)

...

Since the mid 1980's road safety policies have been set out in 'Long-Range Plans for Road Safety' (MPVs). Initiator and manager of the Dutch long-range programmes for road safety is the Ministry of Transport, Public Works and Water Management.

As basis for these programmes a new concept was selected of road safety control, *targeting management*:

> formulation of long-range target >

> elaboration of alternative scenario's to achieve a target >

> realisation and evaluation of demonstration projects >

> taking wide measures to achieve a target >

> monitoring (regular measurements) >

> correction of measures if necessary >

The following Long-Range Plans for Road Safety (MPVs) have been achieved in the Netherlands:

MPV-1 was published in 1987, entitled "More kilometres, fewer accidents" (target: for the year 2000 25% fewer casualties in comparison with 1985).

For the first time, the road safety plan set the *target*. In order to achieve this, so-called ‘spearheads’ were chosen, in which long-term attention was focused on a small number of important themes:

- drinking & driving;
- safety devices on the road;
- speeding;
- hazardous situations;
- old and young road users;
- novice drivers.

MPV-2 appeared in 1989, entitled “Ambitious but feasible”. It contained further elaboration of the spearheads’ policy, and also placed considerable emphasis on the importance of involving provinces, municipalities, and market parties in road safety policies.

The second Master Plan for Traffic and Transport (*SVV-II*) of 1990 set out a number of issues relating to traffic and transport, including the *target situation* for road safety for the year 2010. In 2010, the number of deaths must be reduced by 50% in comparison with, 1986 and the number of hospital admissions must be reduced by 40%.

One of the actions generated by the SVV was the establishment of a monitoring project called ‘*Meten is Weten*’ (To Measure is to Know) to design a methodology to *measure the effects* of SVV.

For instance, the policy of ‘*restraining mobility*’ is presented in that project by list of relevant actions such as:

- remodel urban areas to discourage car use;
- reduce parking provided at work locations;
- use telecommunications to reduce car use;
- spread working and opening hours to reduce peak traffic loads;
- increase variable costs of commuting;
- make relative cost of public transport attractive;
- develop travel-to-work arrangements that reduce car use.

The purpose of the monitoring project was to supply all the policies with relevant measurable actions.

In the early 1990’s, doubts arose about the feasibility of the target of SVV-II. The spearhead policy was effective, but was tackling the problems insufficiently close to the source.

MPV-3 in 1991 resulted in two-track policy. The first track continues the line of *MPV-2* considering, but updating and tightening the spearhead policy. The second track was the concept now known as Sustainable Traffic Safety.

4.1.1. Sustainable Traffic Safety (STS)

The philosophy behind ‘sustainable traffic safety’ (STS) is the fact from ergonomics that ‘the human’ is the weakest chain. The road must be designed in such way that the inevitably occurring human mistakes should not lead to serious accidents.

The concept of STS means drastically reduction of the accident risk by introduction of infrastructural design, and advanced electronics. The central

point of the STS concept is control of mobility on infrastructural and local levels by the high performance of following functions of the roads:

- *flow (or transit) function* of motorways and express roads, rapid processing of transit traffic;
- *access function* of roads connecting residential areas with transit roads;
- *distribution (or residential) function*: accessibility of the destinations along a street. Layout solutions of STS (for example roundabouts) lowering the energy of cross-traffic flows so that the crash, if it happens, has only limited impact.

A more decentralised policy is declared by the introduction of STS. The local bodies concerned with road safety get more independence in their decisions, which combined with responsibility for achieving the targets established at the respective local level. Nowadays four demonstration STS-projects have being set up in four regions of the country. A lot of other regions are also working on STS redesign of the road network.

4.1.2. MIT 1993-1997

The 'Multi Year Programme of Infrastructure and Transport' (MIT) mainly contains the Dutch Ministry of Transport plans for both traffic and passenger and goods transportation for 1993-1997. MIT places great emphasis on:

- a. the improvement of accessibility to maintain and strengthen the transport and distribution function of the Netherlands, which is one of the central goals of the Dutch Second Structure Scheme on Traffic and Transport (SVV-II); and
- b. the reduction of car use.

4.1.3. MPV 1996-2000

MPV 1996-2000, issued in 1996 under the title 'Putting policy into practice', is not a new MPV but an updated and corrected continuation of MPV 3 and the STS-programme. No new targets have been introduced. The updated activities are proposed in order to achieve the targets of MPV-2 and 3.

4.2. Other issues and researches

Some selected Dutch publications in English are presented in *Appendix A*. For readers who need more information we provide below a short list of these additional publications to understand how the road safety programmes are developing and working.

Wegman [5] has summarised the major relevant characteristics of road safety programmes for implementing by the countries of Central and Eastern Europe. This experience is already used by Poland and Hungary in their National programmes. Targeted programmes, a very promising approach in road safety are described in Wegman [13].

Wesemann & Brouwer [9] have presented the Road Safety Information system, which is used in preparation and evaluation of road safety policy. The monitoring of a current situation and forecasting of future trends are of inevitable importance for the carrying out of National road safety programmes. Hundreds of users of this system at the national level and also at regional and local levels, are involved in regular prevention activities. Accessibility of information is one of the important conditions for success. The concept of Sustainable Traffic Safety is presented in [10] and [11].

5. Road safety programmes in the context of international cooperation

- Without appropriate measures it is to be expected that a sharp increase of private motorised traffic in Central and Eastern European Countries will lead to an increase in road accidents and casualties. Furthermore, it is to be expected that road safety measures could reduce road accident casualties even under condition of mobility growth. Therefore, action plans, to improve road safety by reaching certain targets are needed in these countries.
- The highly motorised Western countries have accumulated a lot of experience, dealing with the road safety problems and countermeasures. A lot of 'lessons have been learned' on effective approaches and achieving the targeted road safety programmes. These experiences could be very important for East European countries as well whose transport systems are nowadays growing and have to cope with major problems and challenges.
- There is no question about the effectiveness of some remedial measures to prevent accidents and to reduce their severity: prevention of drinking and driving, use of seat belts and crash helmets, improvements to road infrastructure and car design, the maintenance of vehicles and proper assistance to road accident victims. Enough research results are available regarding the principles of the measures and of 'best practices' as well. Although remedial measures could not simply be copied, translation to prevailing conditions are possible. The emphasis should be put on systematic and long sustained implementation.
- There seem to be no options available for simple, large scale, new and effective measures which can further promote road safety. An effective manner to improve the road safety in East European countries is not to invent the wheel again but use the most effective and well-documented measures from other, already highly motorised countries.
- A road safety information system should contain indicators for comparison with other countries. Regular and open comparisons with other countries is extraordinarily important for creating awareness in society and for obtaining governmental support for road safety programmes. A road safety information system should make road safety targets 'measurable'. To measure is to know (what to do!). An information system about road safety could help to find the best solutions and also to support implementation policy. A lot of experiences are available already to build such a system.
- The SWOV experiences in cooperation with Russia, Poland, Czech Republic, Slovak Republic, Hungary and other countries show that three major factors are very important for an effective road safety programme :
 - a road safety information system with relevant indicators on road safety problems (as well an operational description of road accidents as exposure);
 - training programmes for national specialists and other forms of scientific exchange;

- documentation on experiences about effective measures, especially low-cost measures, from abroad.



Appendix A Literature

1. *Putting policy into practice: long-range programme for road safety MPV 1996-2000*. Ministry of Transport, Public Works and Water Management, Directorate-General for Public Works and Water Management. The Hague, 1996.
2. *A Demonstration Policy Evaluation of the Dutch Second Transport Structure Plan (SVV)*. European-American Center for Policy Analysis, Warren Walker et al. 1994, RAND Santa Monica CA.
3. *Long term policy for road safety MPV: Transport Structure Plan SVV*. The Hague, Ministry of Transport, Public Works and Water Management, Department of Road Safety, 1991.
4. *A strategic road safety plan for the European Union*. February 1977, European Transport Safety Council, Rue de Cornet 34 B-1040 Brussels.
5. Wegman, F.C.M. *Lessons to be learnt? When writing a National Road Safety Plan for Central and East European countries*. Paper contributed to the Strategic highway SHRP and traffic safety on two continents: International Conference Road Safety in Europe, The Hague, The Netherlands, 22-24 September 1993. Leidschendam, SWOV Institute for Road Safety Research, 1993, D-93-6.
6. *National legal instruments on road safety: addendum 3, transmitted by the Government of the Russian Federation for the twenty-second session of the Working Party on Road Traffic Safety, 11-15 April 1994, agenda item 11 (a)*. United Nations, Economic and Social Council, Inland Transport Committee Geneva, United Nations, Economic and Social Council, 1994, 4 p. TRANS/SC.1/WP.1/R.92/Add. 3
7. Fedorov, V.A. Semionov, E.M. & Wenguerov, I.A. *Problem of traffic safety in Russia and ways of its solution*. In: Proceedings of the First World Congress on Safety of Transportation, held in the context of the 150th anniversary of the Delft University of Technology, Delft, The Netherlands, 26-27 November 1992, p. 261-266.
8. Silyanov, V.V. & Sytnik, V.N. *The conception of the programme for ensuring traffic safety on roads of Russia*. In: Proceedings of the conference Road safety in Europe, Berlin, Germany, September 30 - October 2, 1992, Part 2, p. 45-52
9. Wesemann, P. & Brouwer, M. *The Road Safety Information System RIS: a tool for decision makers* Lecture for the Russian-Swedish seminar on traffic safety, Moscow, June 18, 1996. Leidschendam, SWOV Institute for Road Safety Research, 1996, 10 p. D-96-2.
10. *Towards sustainably safe road transport in the Netherlands*. Contribution to the conference EuroTraffic '95 "The development of the traffic sector in a deregulated Europe", 22-24 November 1995, Aalborg, Denmark. Wegman, F C M. Leidschendam, SWOV Institute for Road Safety Research, 1995, D-95-20.

11. *The concept of a sustainable safe road traffic system: a new vision for road safety policy in the Netherlands* Wegman, F.C.M. Leidschendam, SWOV Institute for Road Safety Research, 1997, D-97-2
12. Brochure "*Towards a sustainable safe traffic system in the Netherlands: National Road Safety Investigation 1990-2010*". SWOV Institute for Road Safety Research Leidschendam, SWOV Institute for Road Safety Research, 1993.
13. *Targeted road safety programmes: a promising approach in road safety*. Paper presented at 'The second conference on Asian road safety', Beijing, October 28-31, 1996. Wegman, F.C.M. Leidschendam, SWOV Institute for Road Safety Research, 1996, D-96-13.
14. *Les accidents de la route: un problème mondial qui peut être abordé avec succès! = Road accidents: worldwide a problem that can be tackled successfully!* Wegman F.C.M., Holló P., Lundebeeye S., Smith G., Werring L. Paris, Association Internationale Permanente des Congres de la Route AIPCR / Permanent International Association of Road Congresses PIARC, 1996.

Appendix B Figures

1. *Road safety development in Russia, 1984-1996.*
2. *Fatally injured people and mobility in the Netherlands, 1961-1996.*
3. *Diagram 'personal safety - traffic safety', 1995.*
4. *Development of personal road safety in the Netherlands, 1970-1995*
- 5a. *Mobility in the Netherlands, per mode of transport.*
- 5b. *Road deaths in the Netherlands, per mode of transport.*
- 5c. *Hospitalised casualties in the Netherlands, per mode of transport.*

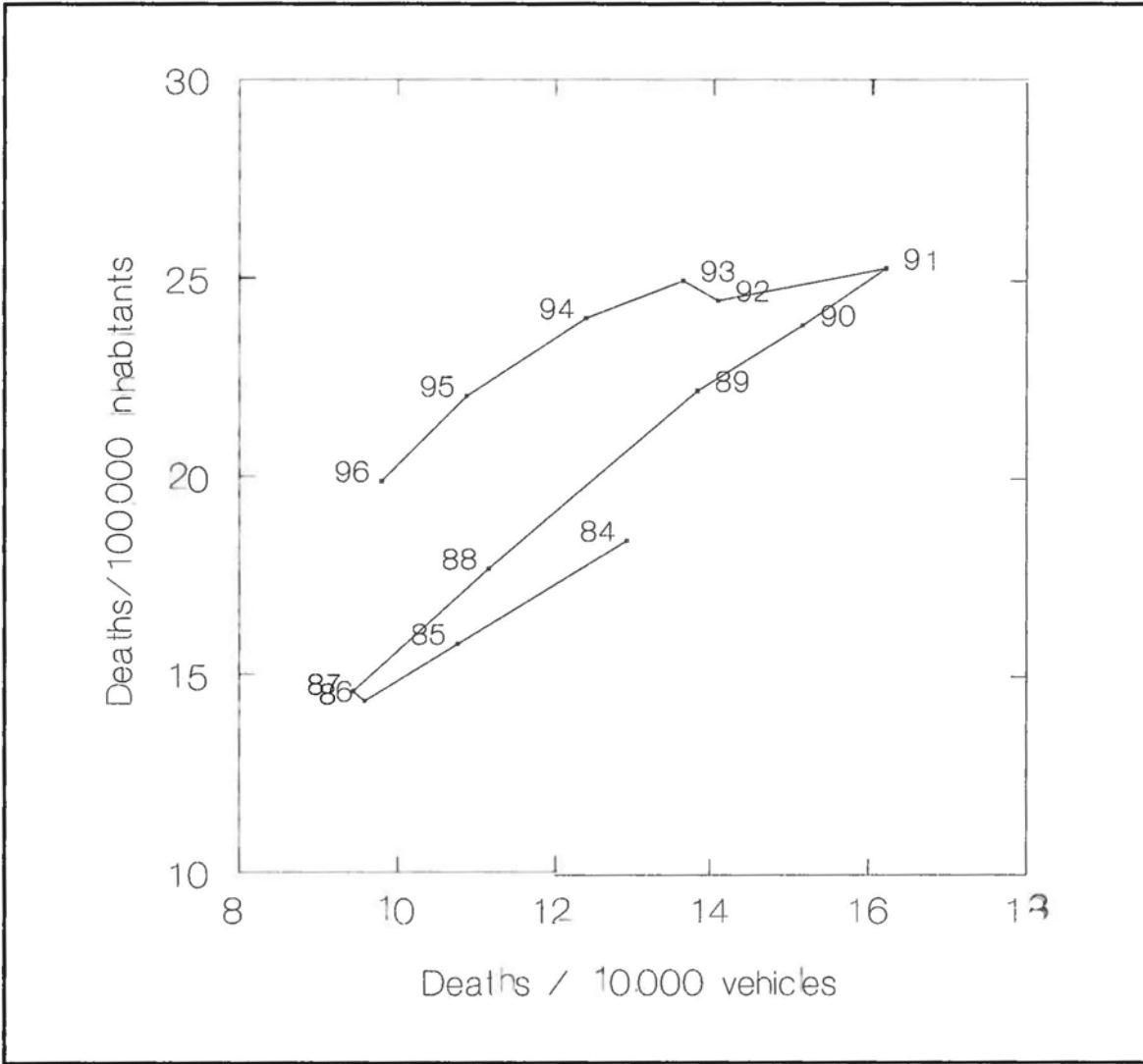


Figure 1. Road safety development in Russia, 1984-1996 (Source of data: Scientific-Research centre GAI of Russian Federation, and JSC Transconsulting, Moscow).

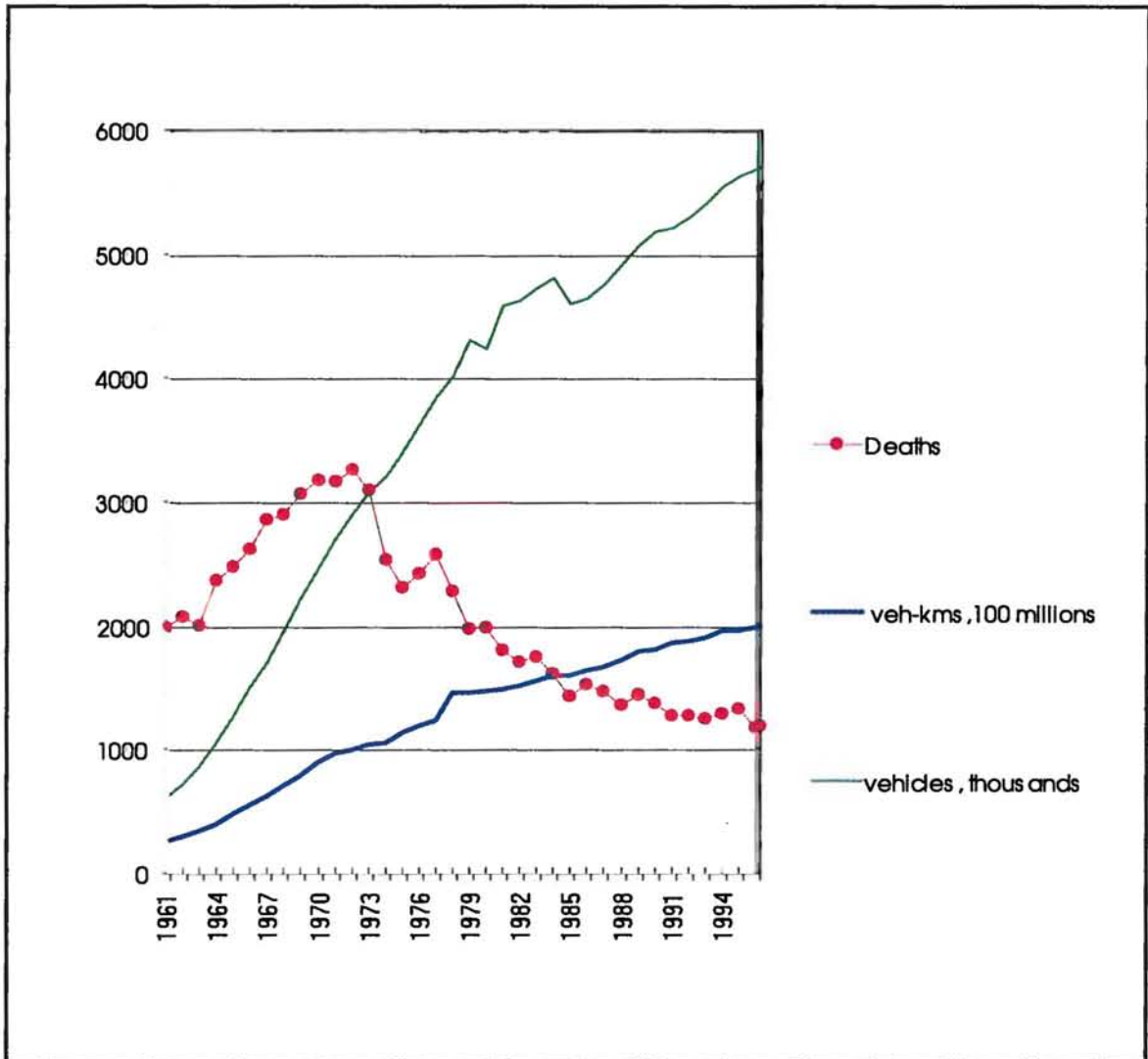


Figure 2. *Fatally injured people and mobility in the Netherlands, 1961-1996.*

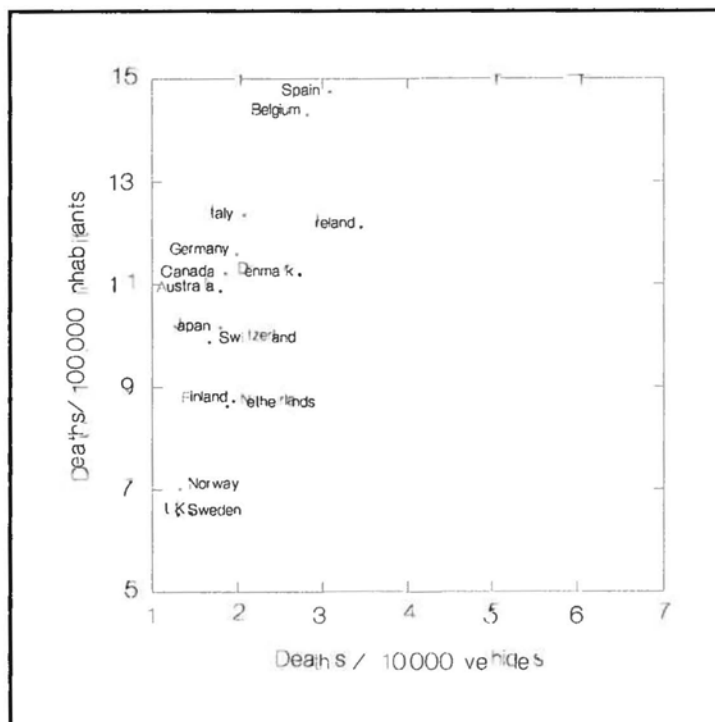
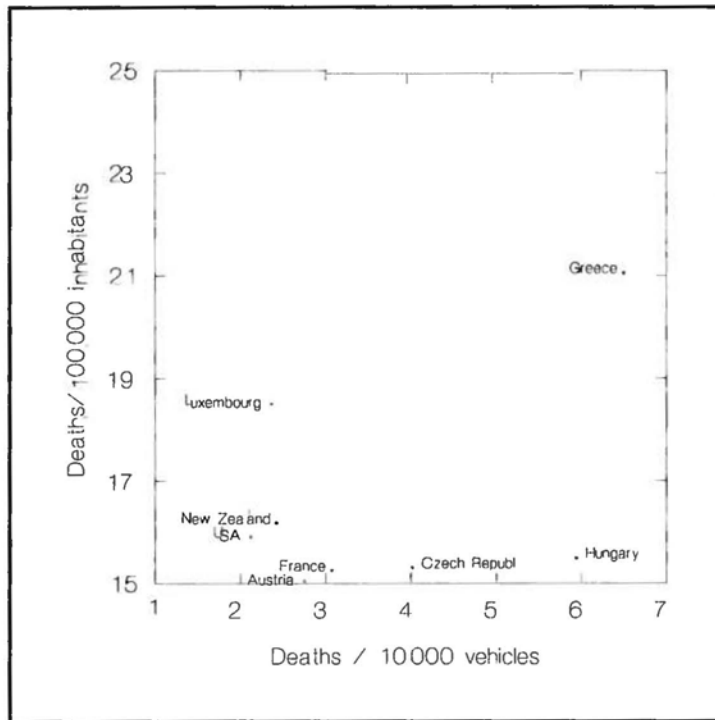


Figure 3. Diagram 'personal safety - traffic safety', 1995 (information source: database IRTAD-BAST).

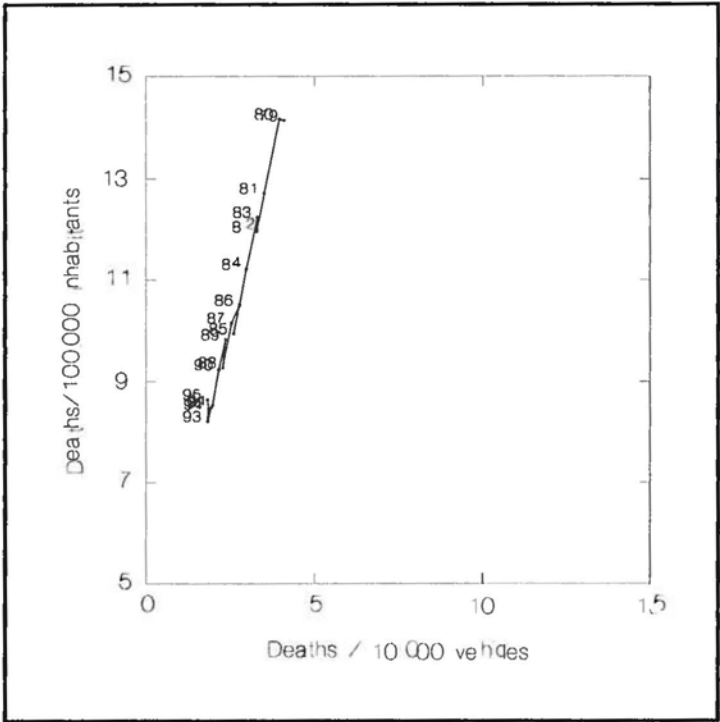
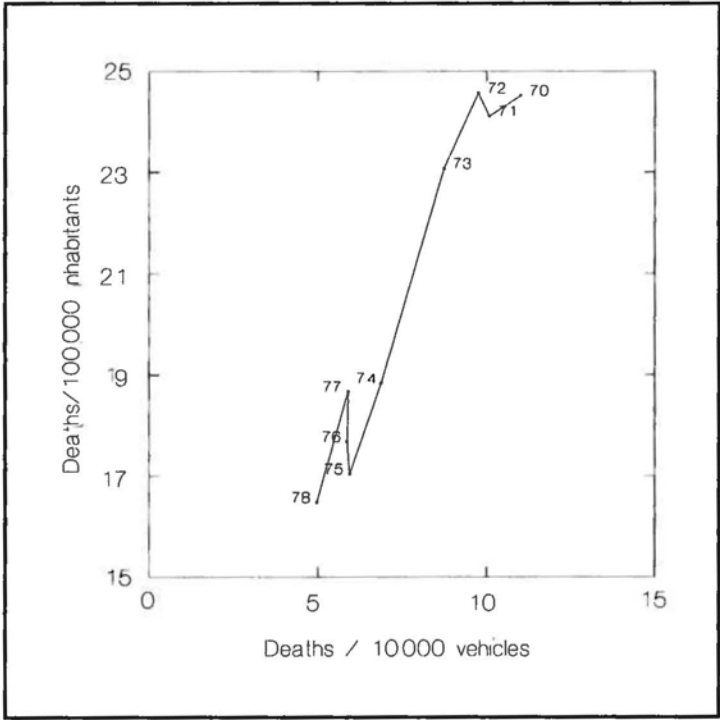


Figure 4. Development of personal road safety and traffic safety in the Netherlands, 1970-1995.

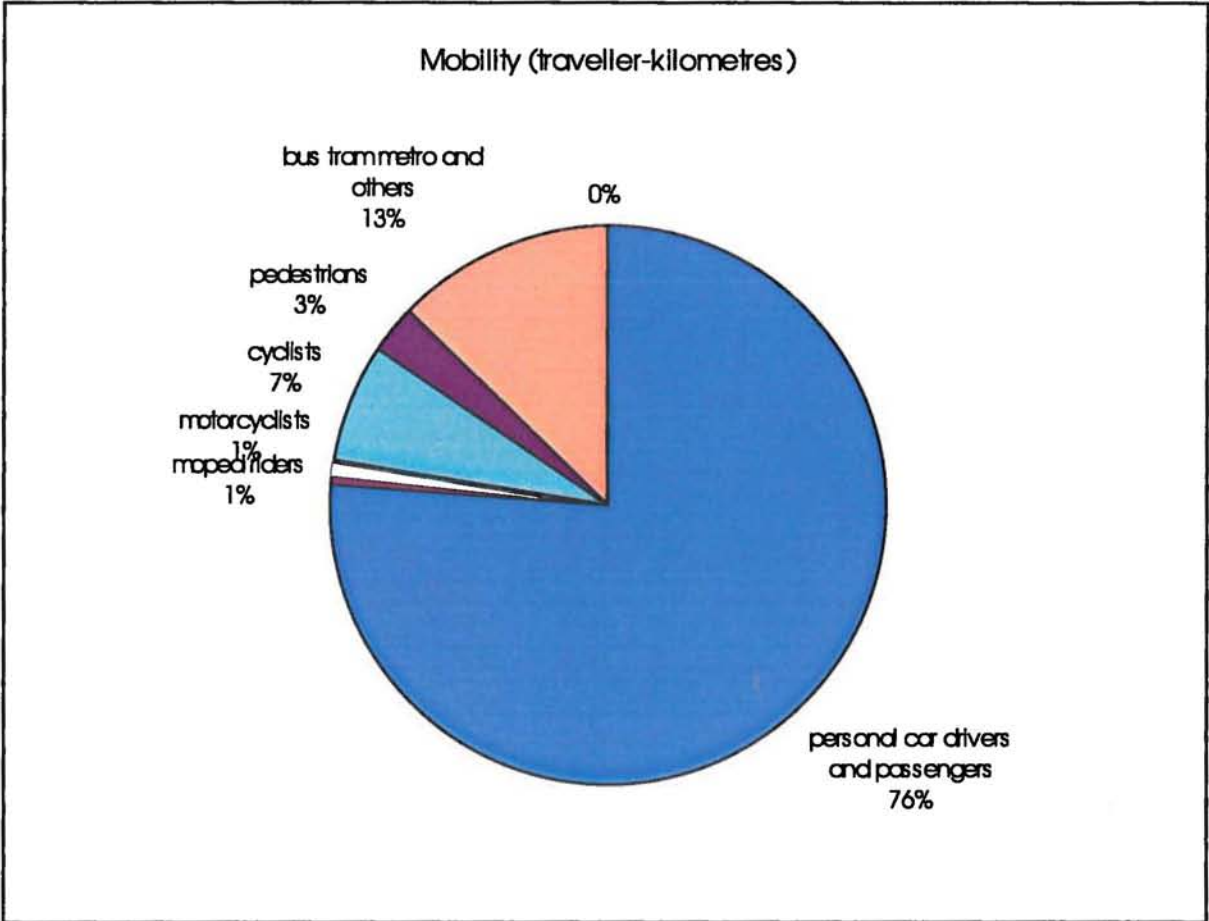


Figure 5a. Mobility in the Netherlands, per mode of transport.

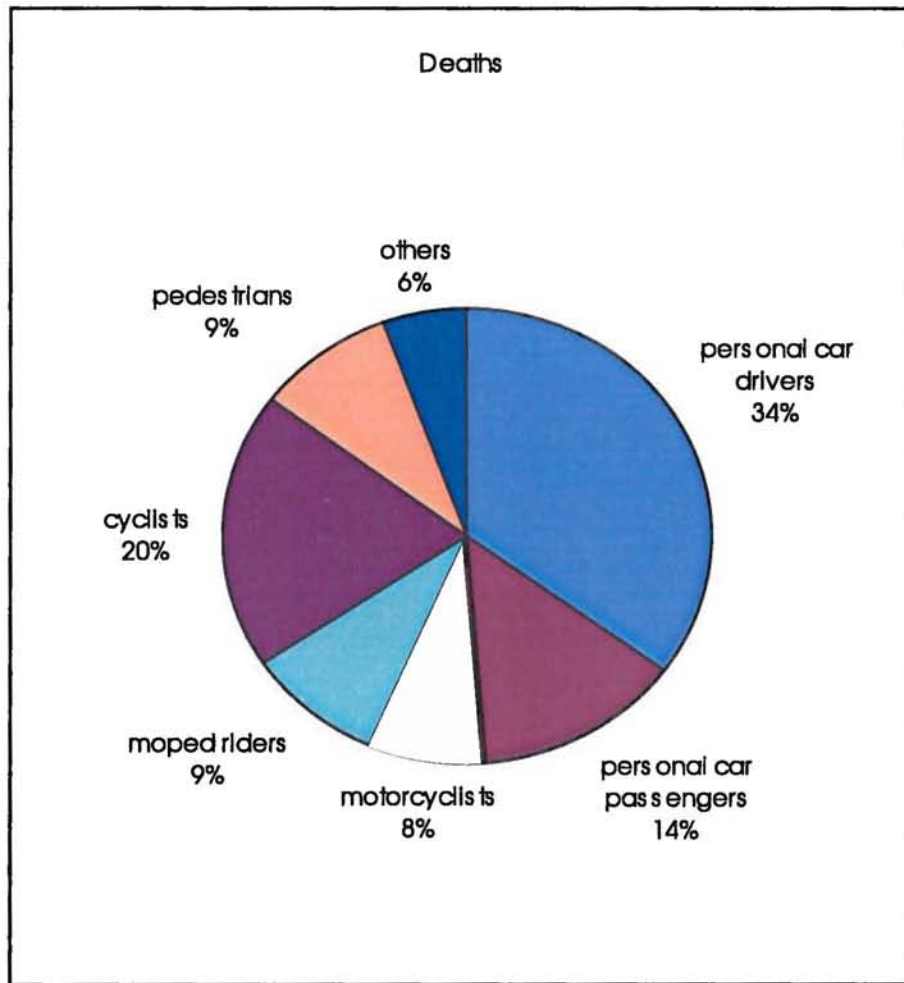


Figure 5b. Road deaths in the Netherlands, per mode of transport.

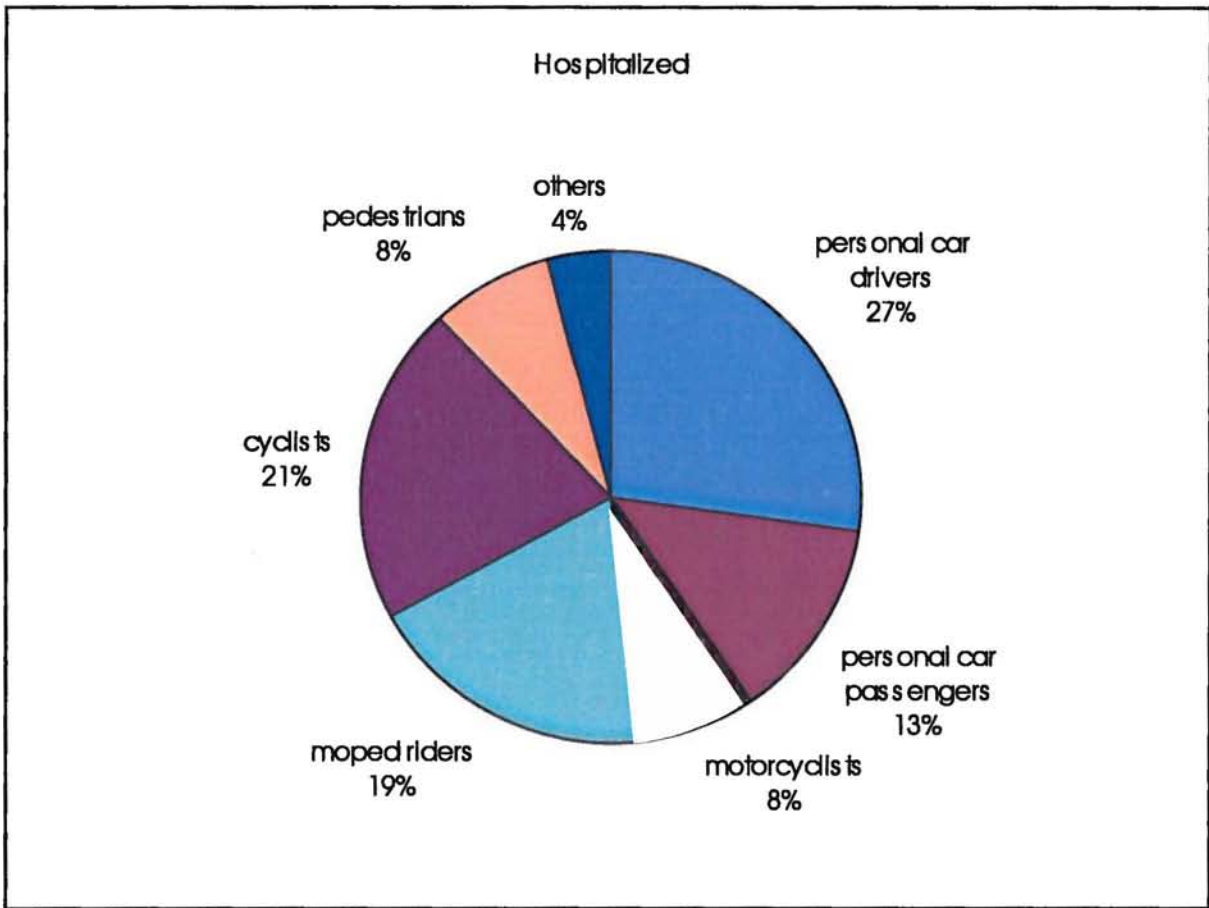


Figure 5c. Hospitalised casualties in the Netherlands, per mode of transport.