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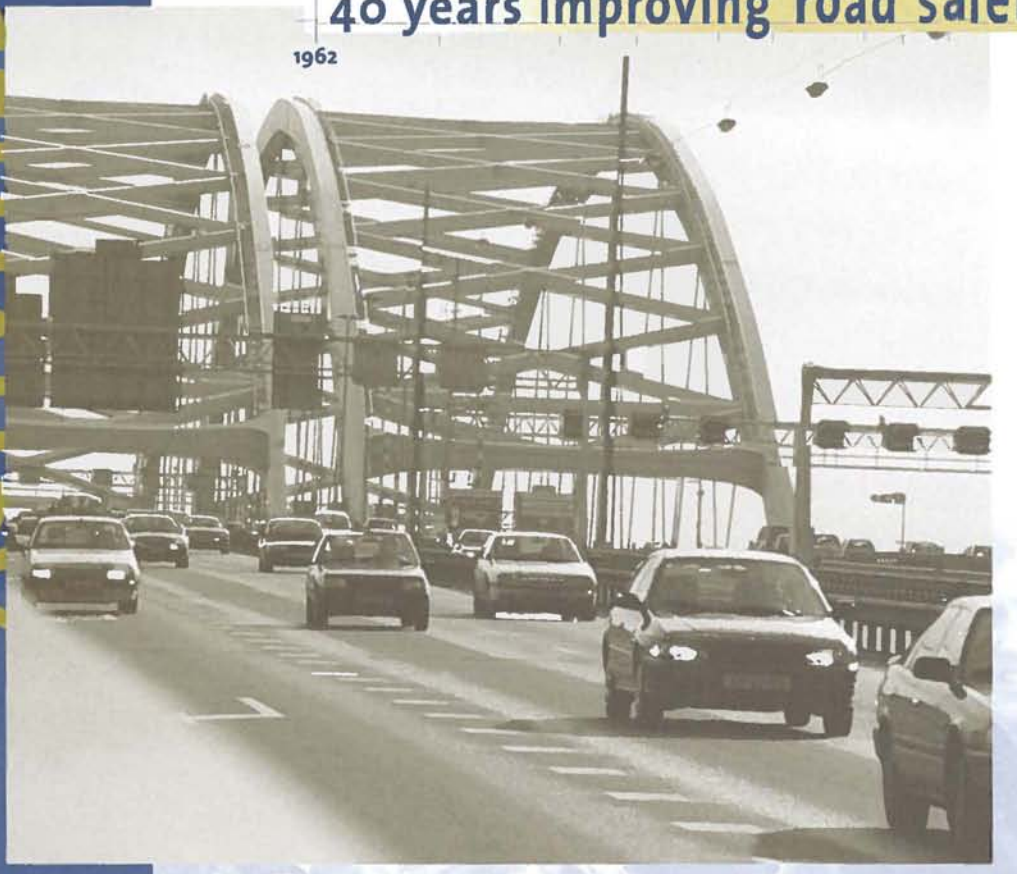
SWOV
INSTITUTE FOR ROAD SAFETY RESEARCH

RESEARCH ACTIVITIES

40 years improving road safety

1962 2002



Annual number of road deaths can be 700 less

THE NETHERLANDS HAS NEARLY 1100 ROAD DEATHS A YEAR. ACCORDING TO SWOV, THIS COULD BE 700 LESS. SWOV PROPOSES AN ADDITION TO THE CURRENT GOVERNMENT PLANS AS SET DOWN IN THE NATIONAL TRAFFIC AND TRANSPORT PLAN (NVVP). IF ALL THE ROAD SAFETY INTENTIONS OF THE NVVP ARE REALISED, THIS WOULD RESULT IN THE SAVING OF 350 LIVES A YEAR BY 2010. SWOV'S ADDITIONAL PROPOSALS LEAD TO A FURTHER SAVING OF 350 LIVES A YEAR. THE COSTS OF ROAD ACCIDENTS, CURRENTLY AMOUNTING TO APPROXIMATELY 8 BILLION EUROS PER YEAR, WOULD DECREASE BY ALMOST TWO-THIRDS. THIS CAN ALL BE FOUND IN THE SWOV PUBLICATION 'SAFE; WHAT IS SAFE?' FROM LAST NOVEMBER.

The National Traffic and Transport Plan; a good beginning

The NVVP contains quantitative targets for the numbers of road deaths and in-patients in 2010, which SWOV supports wholeheartedly.

Other good points of the NVVP are:
- the business-like approach (judging the effects and cost-effectiveness of measures);
- the proposed integrated balance between accessibility, safety, and quality of life;

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- the retention of 'Sustainably Safe' as the guiding vision;
- the keeping of this vision as starting point when expanding and rehabilitating the infrastructure.

SWOV has made estimates that indicate that the 2010 targets are attainable if the measures envisaged are taken. Additional finance should be reserved for carrying them out.

But more is possible

Every road death is, in fact, one too many. When can we say we are sufficiently ambitious in aiming at safer traffic? For this, SWOV introduces the concept of 'avoidable accidents'. Avoidable means that we know what to do to prevent accidents, and that the social benefits exceed the costs. As long as there are 'avoidable' accidents, the road safety can certainly be improved. SWOV proposes a number of feasible and highly promising measures. These proposals are explicitly meant as an addition to the NVVP intentions; they all fit within the Sustainably Safe approach. The table below shows which results the measures will have. These measures partly effect the same categories of road users. SWOV has, therefore, corrected the total effect so as to ensure that nothing is counted more than once.

In the SWOV report 'Safe; what is safe?' (R-2001-28), various concrete proposals have been made. A number of these are mentioned in the following paragraphs.

SWOV is of the opinion that the public must be much better informed about what the road safety policy really is and what its benefits are. The acceptance of the large number of road deaths must decrease, and the support for measures that prevent these deaths must increase.

SWOV proposes to increase the speed at which the road network is made Sustainably Safe to faster than that of the government plans. A faster completion does require extra finance being made available, but the social benefits of these have long been shown.

An approach plan should be developed so as to ensure that there are no more speeding offences in ten years time. SWOV makes the remark here that the present speed limits should again be examined.

SWOV also proposes to leave the system of exclusively 'rigid' speed limits. Speed limits that have been adjusted to the traffic and weather conditions are undoubtably more credible and will, therefore, be better adhered to. Where the infrastructure does not enforce the speed desired, other measures are necessary. In the short term, police enforcement is required. However, technical solutions must be examined simultaneously. An example is projecting the speed limit in force at that moment, in the windscreen of a vehicle (head-up display).

Measure	Extra absolute decrease of road deaths
Completion of a sustainably-safe road nerwork and a qualitatively better execution	330
Extra deployment of speeding control	225
Application of intelligent Transport Systems and vehicle improvements	25
Extra attention for high-risk road user categories	75
Total of all measures after correction for overlaps	350

Young mopedists, light-mopedists, and car drivers have a much greater chance of an accident; this requires a radical approach. A considerable road safety improvement can be achieved by prohibiting the current scooter model of the light-moped, and only permitting the bicycle with auxiliary engine. Moreover, the minimum age for riding a moped should be raised to 18 years old (from the present 16). SWOV also proposes that novice car drivers should be forbidden to drive during hours of darkness and forbidden to carry passengers.

Vehicle improvements are possible, especially for those being hit by cars and lorries. The Netherlands must try to achieve this through the European Union. What the Netherlands can do on its own is to increase the safety of business traffic by, among other things, the introduction of black boxes.

In the meantime, SWOV's plan has been presented to the Ministry of Transport, a large number of non-governmental organisations, and the Dutch Parliament. The plan has been positively received and is being worked out further.

More victims in delivery van accidents

During the last few years, the number of victims in accidents involving delivery vans has increased considerably in the Netherlands. The number of vans and their use also rose sharply. In delivery van accidents there are twice as many victims among the 'collision partners' of vans as among the occupants of the vans themselves. Twelve percent of all road deaths and in-patients were involved in such an accident. These developments can be seen in a recent SWOV report (R-2001-33).

According to the Dutch vehicle registration, a delivery van is a commercial vehicle of which the own weight plus that of its freight is not more than 3,500 kg. In practice however, a large variety of vehicle types is counted as belonging to this category. For tax reasons, for example, the category vans in the road accident statistics consists partly of cars, station cars, off-the-road vehicles, and (light) pick-ups. At this moment, therefore, these different types can not be distinguished separately. The table below shows that during the period 1991-1999, this heterogeneous van traffic grew much faster than car traffic.

Safety of vans

Due to, among other aspects, their larger weight and their shape, cars in the category vans are, on average, twice as threatening for the collision partners as 'ordinary' cars. On urban roads they are even five times more threatening. On rural roads vans are more often involved in single-vehicle accidents. This is probably because of the lesser stability of vans. This is also the case in American research of off-the-road vehicles and pick-ups. Instability can also be caused by too heavy a freight.

Another partial cause of single vehicle accidents is that, on rural roads, vans are often driven faster than the situation allows.

On roads with intersections there are many victims of the van manoeuvres 'crossing straight over' and 'turning off'. The vans, especially when turning off, distinguish themselves unfavourably from the car. This indicates problems with a blind area. These field of vision problems appear also from the van's relatively large involvement in accidents with the course 'not giving way'.

Especially two-wheelers, particularly motorcyclists, are the victims of such accidents.

Novice (young) van drivers are more often involved than experienced (older) van drivers in certain types of accident.

The seat belt usage in vans is also only 55%, whereas this is 80% for car occupants sitting in front (data 2000).

Possible measures

Here we mention a number of measures that can increase the safety of the van.

Exposure and victims	Van	Car
Number of vehicles	+ 43%	+ 10%
Number of occupant kilometres	+ 53%	+ 8%
Number of occupant kilometres per vehicle	+ 23%	+ 3%
Victims among van occupants	+ 25%	+ 6%
Victims among collision partners	+ 23%	- 6%

Table. Growth (1991-1999) of exposure and victims in the heterogeneous van and car traffic.

Some of these are also proposed in the Dutch National Traffic and Transport Plan. The number of van kilometres could be influenced by, for example, bundling the flow of goods more and by concentrating the activities in commercial areas. A more efficient arrangement of the transport could also result in a decrease in the pressure of time; this would have a positive effect on safety.

Improvements are also possible in driver training, for example, by introducing a special driving licence for novice (young) van drivers. A van could, in addition, only be driven after completion of a number of years driving experience. After all, a van driver has to deal with a different position of the centre of gravity, together with a varying weight because of the freight differences, and a blind area.

As far as the vehicle design is concerned, the following measures can contribute to the safety: the introduction of a board computer/event recorder, the use of navigation systems to reduce searching, and the installation of a speed limiter. The field of view could be improved by, for example, a blind area mirror, or by abolishing the, in the Netherlands, obligatory 'blacked-out' rear-side windows.

Finally, it is self evident that the seat belt should be worn more often than is now the case.

SWOV presentations at ITS 2001 congress in Sydney

At the 2001 ITS congress in Sydney, SWOV researchers presented the provisional results of two studies concerning ITS applications in traffic. One of the studies concentrated on the opportunities and limitations of Advanced Driver Assistance Systems, and the other was a theoretical study concerning the measuring of Situation Awareness.

Opportunities and limitations of Advanced Driver Assistance Systems

Within the ADVISORS project - sponsored by the EU - research is being done into the effects of Advanced Driver Assistance Systems (ADAS) on road safety, road capacity, and the environment. ADVISORS has two goals: 1) to develop a framework in which the effects of ADAS applications can be analysed, assessed, and predicted, and 2) to develop implementation strategies for those ADAS applications from which a large positive influence is expected.

A problem-orientated approach was chosen to achieve the first goal: which traffic related problems are there which ADAS applications can solve? In order to identify problem areas, an international accident analysis was carried out. In addition, a European survey was conducted, in which questions were asked about traffic related problem areas and whether it was expected that ADAS applications could offer solutions. Among others, the following were surveyed: car drivers, haulage companies, industry, and road authorities. The road safety problems identified concerned: distraction, overburdening and the state of the driver. Intelligent Speed Adaptation (ISA), navigation systems, and driver monitoring systems appear to be the most suitable for solving such problems. Solutions for the road capacity problem are expected especially from speed control, speed adaptation, collision avoidance, and cruise control (ACC/ICC).

Points of departure for implementation strategies for promising ADAS applications have been derived from a market analysis of ISA, ACC, and navigation systems. The market seems reserved about the implementation of ISA. The introduction of ISA will therefore, strongly depend on government initiatives. ACC and navigation systems, on the other hand, are launched on the market forcefully. However, road safety questions need the necessary attention.

Making Situation Awareness measurable

For an effective ITS support of the driving task it is important that ITS systems connect to the way in which road users make decisions. To study whether or not existing ITS applications meet this demand, more insight in the decision process is necessary: how do road users make short-term effective decisions? Insight is especially necessary in the decision process in complex traffic situations, such as interactions at crossroads, as support can be especially important in such situations. SWOV, together with the Technical University of Delft and the Centre for Environmental and Traffic Psychology of Groningen University, is studying the extent to which the theoretical model of Situation Awareness - developed for air traffic - is suitable for explaining the decision process of road users.

Situation Awareness is a prerequisite for the human anticipatory ability; in present-day traffic this is of great importance. People often do not have enough time to react to an immediate situation; they therefore usually react to a predicted situation in the near future. They make this prediction on the basis of an internal representation of the traffic: the Situation Awareness. Based on this it is expected that ITS applications will make a contribution to safety if they increase Situation Awareness, or at least do not disturb it. To be able to test this hypothesis, it is a primary requisite to make Situation Awareness measurable.

In the meantime, a number of exploratory simulation tests have been carried out to test the different methods of measuring Situation Awareness. In addition, a theoretical model has been drawn up for the way in which the road user - unconsciously - applies Situation Awareness in the decision process. This model describes that the decision process at a crossroads is aimed at a collective choice of one of a limited number of possible scenarios. This choice is based on information about the surroundings, the knowledge of the surroundings, the expected and observed behaviour of the other road users, the preferred speed, desired control effort and the internal state of the driver. In the following study, simulation studies are being tested to see if this model is correct and how the collective choice process works.

Development of road safety in the Netherlands

SWOV recently published an overview of the road safety in the Netherlands. This report (R-2001-30) describes and analyses the road safety developments up to the year 2000. In that year 1082 road deaths and 11,507 in-patients were registered. The efforts, during the last few years, towards achieving sustainably-safe traffic seem to be having their effects on the recent developments.

Road deaths

Although the mobility is still increasing, the number of road deaths has decreased steadily since the early 1970s. The chance, per kilometre travelled, of being killed in a road accident (the death rate) has also declined immensely, from more than 150 deaths per billion kilometres during the early 1950s, to less than 10 deaths per billion kilometres during the last few years. During the period 1973-1985, the decrease in the death rate was the greatest; 9.2% per year. This was the result of a large number of traffic and road safety measures. This decrease slowed down after 1985. Especially during the second half of the 1990s, however, it seems that the death rate again decreased rapidly (see table). It is probable that the activities in the framework of the Start-up Programme Sustainably Safe and a renewed general interest for road safety contributed towards this.

Period	Average death rate decrease per year
1985-1989	4.1 %
1990-1994	4.2 %
1995-1999	7.9 %

Table: Development of the death rate (the number of road deaths per billion vehicle kilometres) during the period 1985-1999.

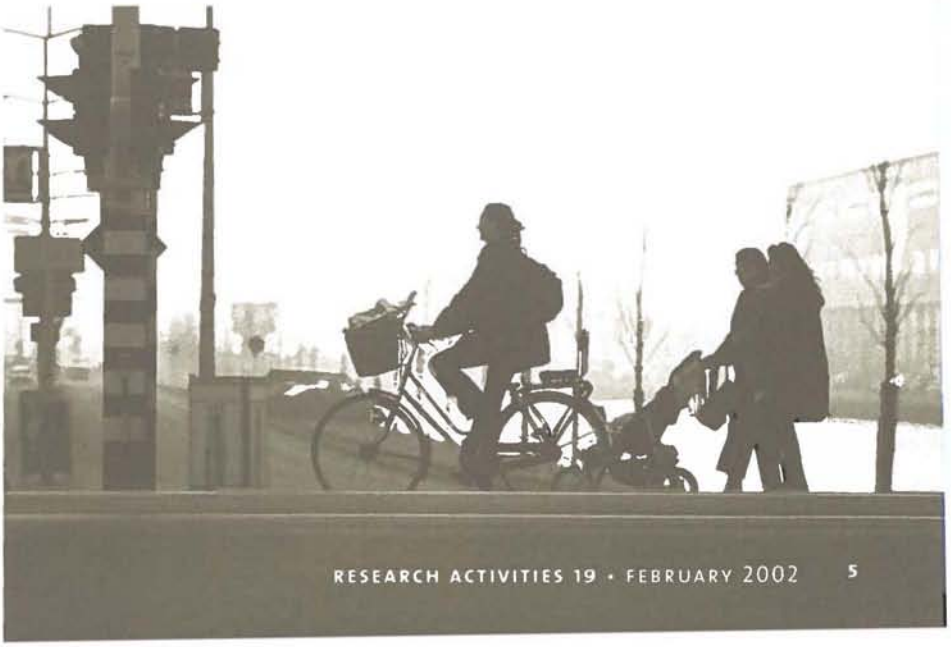
Compared with other EU member states, the Netherlands is one of the top-five, at least when measured in terms of mortality (deaths per 100,000 inhabitants). If one examines the percentage decrease of road deaths, the Netherlands also scores well. During the second half of the 1990s, the Netherlands was, just behind Germany, the best of the five safest EU countries. During the first half of the 1990s the Netherlands was the worst of this top-five. Thus it would appear that, also when compared with other countries, the Netherlands achieved a lot relatively during the second half of the 1990s.

In-patients

The number of in-patients has, during the last decennia, developed differently from the number of road deaths.

The number of in-patients declined strongly during the 1980s, but during the last ten years it seems to have more-or-less stabilised; the police register annually 11-12,000 in-patients. The real number is estimated to be 18-19,000 a year. The chance of being an in-patient as the result of a road accident only decreased slowly during the last ten years. There are, however, indications that the injury severity is declining.

During the last three years, a lot of work has been done in the Netherlands to achieve Sustainable Safety. Possible effects of this work were especially expected on urban roads. Most of the sustainably-safe activities were, namely, aimed at urban situations.
During the period 1998-2000 there were less cyclist and pedestrian in-patients registered as a result of urban accidents than during the previous three years. On the other hand, the number of car occupant victims increased during this period. It is too early yet to conclude from this that, within Sustainably Safe, the safety of vulnerable road users has developed better than that of car occupants. The differences in development could also be the result of there being, during the last few years, more urban trips by car and less by bicycle and walking. The data necessary to examine this is not yet available.



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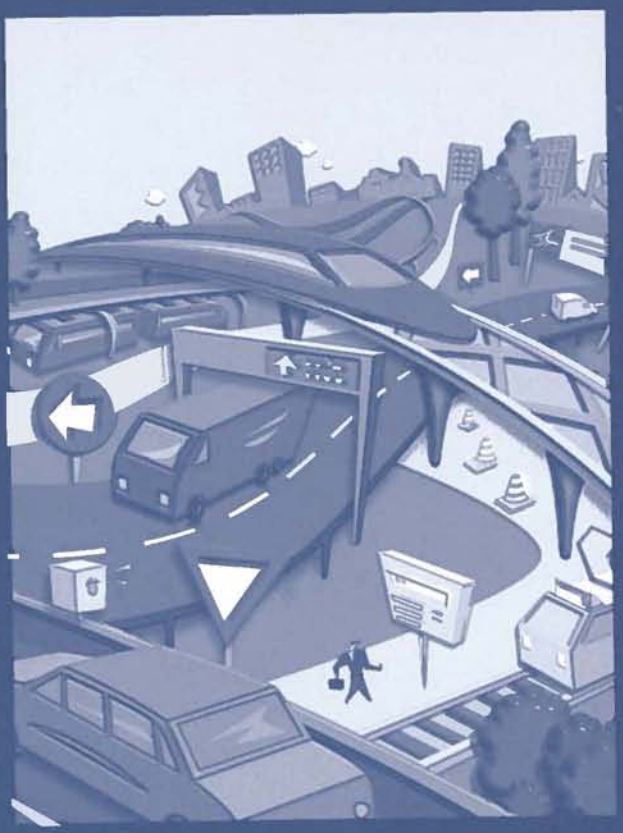

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International congress 'SUNflower' in Amsterdam

On 17th April there will be a one-day conference in the Amsterdam RAI about the successful road safety policies in Sweden, the United Kingdom, and the Netherlands.

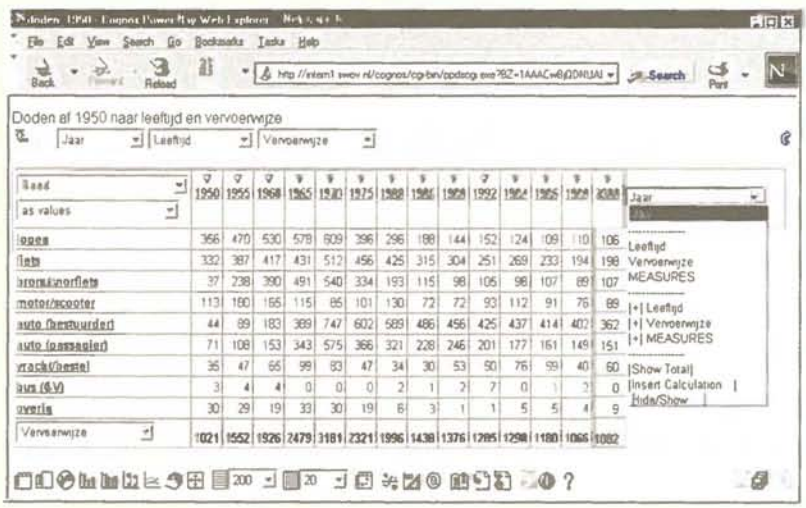
Sweden, the United Kingdom, and the Netherlands have approximately the same level of road safety. It is, however, very surprising that the road safety policies of these three countries seems to differ strongly. An intriguing question is what exactly makes these three policies so effective. Which factors or patterns lie at the base of successful but different policies in these three countries? Can the road safety policy be applied in other countries? Can other countries learn from the road safety policies in Sweden, the United Kingdom, and the Netherlands?

Subsidised by the European Commission, the Dutch Institute for Road Safety Research (SWOV), the Swedish Road and Transport Research Institute (VTI), and the Transport Research Laboratory (TRL); in close co-operation with the national road safety authorities, are carrying out a study. This is to assess the background to the traffic safety strategies of Sweden, the United Kingdom and the Netherlands. During the SUNflower congress, the study will be reported and discussed.

In the enclosed folder you can read more about the varied programme. You can apply to take part by filling in the application form and faxing it to SWOV at + 31 703201261. Information about the SUNflower congress can also be found on our website www.swov.nl. If you require more information, please do not hesitate to e-mail Mrs. Nell (Jacqueline.nell@swov.nl).

WWW.SWOV.NL greatly enlarged

SWOV considers its website to be an important way of spreading knowledge about road safety. In order to continue to meet the increasing demand of users, in early 2002 our website will be further enlarged. Our website's 'knowledge bank' will be completely renewed. The present texts will be updated and there will be new subjects added. It is also important that data tables and graphs will be added to the texts. It will even be possible for the user to work with an Internet application for further analysis of the data retrieved, or to choose a suitable form of data presentation. The example shows a screen of the Dutch version of the Internet application. The English version will be available as soon as possible after the Dutch version.



Besides enabling you to consult SWOV's road safety knowledge in general, our website enables you to: download complete SWOV reports, view the international congress list, search for SWOV publications, or consult the SWOV library's catalogue. Attention is also given to current road safety issues.

Publications

Most SWOV reports are written in Dutch but they all include an English summary. Below is a selection of reports that have recently been published by SWOV. Reports can be obtained by completing the SWOV order form that can either be found on the website, or that can be sent to you by the Department of Information and Communication (info@swov.nl). The price of each report (in euros) is given in the following list. Reports can be paid by credit card. For bank transfers, we will charge an extra € 7,- per transfer. Records of all SWOV reports that were published from 1980 onward can be found on our website (www.swov.nl).

Alcohol Interlock Implementation in the European Union; Feasibility study
Final report of the European research project. Ch.A. Bax (SWOV, ed.), O. Kärki (VTT), C. Evers (BASt), I.M. Bernhoft (DTF) & R. Mathijssen (SWOV). D-2001-20. 84 + 77 pp. € 22,95 (in English).

Safe; what is safe?
SWOV vision on an even safer road traffic. F. Wegman. R-2001-28. 54 + 32 pp. € 11,35 (in Dutch).

Road Safety in the Netherlands till 2000
Analysis of the size, nature, and developments. I.N.L.G. van Schagen (ed.). R-2001-30. 63 pp. € 11,35 (in Dutch).

Developments in the number of vehicles and safety of delivery vans
An exploration within the Vehicle Safety theme of the SWOV research programme 2000-2001. C.C. Schoon. R-2001-33. 30 + 18 pp. € 11,25 (in Dutch).

Safe driving and the training of calibration.
Literature review. M. Kuiken & D. Twisk. R-2001-29. 26 pp. € 7,95 (in English).

The effect of a sustainably-safe road design on road users' behaviour: the before-measurement.
J.J.F. Commandeur & I.N.L.G. van Schagen. R-2001-24. 30 pp. € 7,95 (in Dutch).

Interaction behaviour of road users; Phase 1.
Development of a method to determine 'Situation Awareness'. A.J. Roskam (COV), J.W.F. Wiersma (TUD) & P.I.J. Wouters (SWOV). R-2001-32. 40 + 16 pp. € 11,70 (in Dutch).

Anticipation of intelligent transport systems in sustainably-safe road management
R.G. Eenink & J. van Minnen. R-2001-31. 37 pp. € 9,10 (in Dutch).

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Colophon

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