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SWOV Programme 2003-2006 Road Safety Planning Office function introduced at SWOV

A Road Safety Planning Office function is introduced in the Netherlands. SWOV will carry out the Planning Office tasks. Apart from executing the planning office function, SWOV will continue to carry out fundamental and anticipatory road safety research over the coming years.

In addition, SWOV will remain an active partner in international research. Knowledge dissemination and knowledge management continue to occupy an important place in the Programme 2003-2006.

Road Safety Planning Office function

SWOV's Road Safety Planning Department will survey and analyse road safety developments in the past and aim at explaining them. In order to keep an eye on long-term road safety developments, the department will simultaneously carry out research into expectations for future developments. Not only the basic traffic data will be used when carrying out the explorations and analyses,

but also the economic, social, and demographic developments will be taken into account. The Planning Department research will focus on four tasks:

- Road Safety Analyses: reporting periodically on the current road safety conditions, monitoring and explaining recent developments;
- Analyses of external influences: studying various background conditions and developments in society that contribute significantly to the present and future road safety situation (e.g. housing and planning, socio-cultural conditions,

"Falling asleep at the wheel is something which could happen to any driver, of any age on any journey"

(UK Road Safety Minister David Jamieson)

Editorial

SWOV recently published its new four-year Programme 2003-2006 and the opening article in this issue of Research Activities gives an impression of the coming SWOV activities. The future asks for new efforts to further improve road safety, but only the past can reveal the trends and developments in road safety as the article about Road Safety Developments in the Netherlands illustrates.

demographical developments, economic conditions, traffic and transport ;

- Prognoses: making predictions of the development of road safety in the next decade, making use of time series analysis of accident and exposure data and the results of the analyses of recent developments, of external influences, and impacts of potential road safety interventions;
- Knowledge and information systems: the results of safety research are summarized according to the needs of decisionmakers and made accessible for them through the Knowledge Base on the web; basic data that are needed for SWOV research are collected from several providers and stored in internal databases.

Anticipatory research

In the coming years, SWOV's fundamental and anticipatory research will be carried out in ten different projects.

The Road Safety Explorer

SWOV has an important task in supporting policy makers and road authorities in making the right decisions. In order to be best-prepared for decision-making, it is essential to make the best possible estimations of effects and the costs of measures, and to choose the best method to select the most effective set of measures. In the past period this has led to the development of the Road Safety Explorer (VVR). The project Road Safety Explorer aims at a further improvement of this method.

Infrastructure and road crashes

The project Infrastructure and road crashes aims to research the quantitative relationship between road infrastructure characteristics and road crashes using data to describe risk and exposure. The practical data may for instance be obtained from the VVR.

Analysis of speed, speed variation, and crashes

This project has one of the most important problems of the present traffic safety issue as a key topic. The essential question is to which extent speed control can help improve traffic safety under specific circumstances. To answer this question a vision on speed limits is developed which will be used as a framework for further research into the links between (variation of) speed and road crashes.

Measures for speed control

The project Measures for speed control focuses on possibilities to reach the desired level of speed control. Optimizing police supervision is one of the possibilities, but other measures like Intelligent Speed Adaptation (ISA) are also interesting.

Choice of route in a road system

Choice of route in a road system concentrates on the possibilities of influencing a driver's

choice of route in such a way that the route conforms to the demands of Sustainably Safe. One of the demands that must be met is that the shortest and the safest route must correspond.

Recognizable layout and predictable behaviour

Recognizable layout and predictable behaviour investigates in which manner the distinguishing features of the road and its environment can influence the identification of the road and the predictable traffic behaviour which is a result. The intention is to encourage safe behaviour and make unwanted (risky) behaviour less likely.

Novice drivers and driver training

Understanding, influencing and measuring 'calibration' is the key issue in the project Novice drivers and driver training. In this project the term calibration is used to describe the balance between self-estimation of competences and judgement of the complexity of the driving task. The understanding which is gained, will be used to develop teaching methods and diagnostic measuring instruments for the driver training.

Effects of education and information campaigns

The project Effects of education and information aims at optimizing education and information programmes. In order to make a reliable estimate of the safety effects of several kinds of programme, pilot programmes are set up and evaluated.

Optimal investments

In the project Optimal investments standard methods and reference data are developed which can be used for cost-benefit and cost-effectiveness analysis of a variety of traffic safety measures. The analyses can be used in different phases of decision making.

Use of information in decision-making on traffic safety

The project Use of information in decision-making on traffic safety consists of two parts. The first

part concerns the influence of cooperation during the decision-making process in relation to public acceptance on traffic safety policy. In the second part of the project, the relevance of traffic safety interests for the decisions on investments in road infrastructure, is investigated.

Other activities

Knowledge management

The previous topics do not cover the entire field of road safety. SWOV will actively gather, interpret and update the knowledge within four so-called 'domains': Road user, Vehicle, Road, and Supporting Processes/Information. In turn, each of these domains contains a large number of subjects. SWOV will regularly report the results within each of the domains by means of literature studies and fact sheets.

International

In the Programme 2003-2006, SWOV will also remain internationally active. The work will generally be carried out in international projects, mainly within the EU.

Knowledge dissemination

The results of SWOV research are published in reports and articles. These reports are not only available in printed form but, since 2000, can be consulted and downloaded from the SWOV website (www.swov.nl). The Knowledge Base can also be found there, providing all road safety professionals with an enormous amount of information. Finally, SWOV's library of 100,000 titles will also continue to expand.

More detailed information about the SWOV Programme 2003-2006 is available in the Dutch language SWOV report R-2003-18. The report may be consulted and downloaded from the SWOV website www.swov.nl. Presently a brochure in the English language is being prepared, and on completion will also be published on the website. ◀

Annual report 2002 on SWOV-website

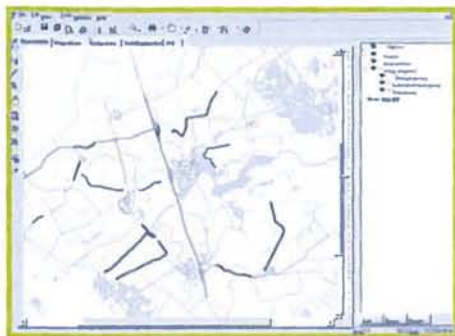
The year 2002 was a special year for SWOV. Not only did we celebrate our 40th anniversary, we also concluded the research period 1999-2003. In the annual report SWOV looks back not only on the eventful year 2002, but we also give a survey of all the SWOV research done over the past four year research period. The annual report has been translated into English and may be consulted on the English part of the SWOV website.

Symposium

On December 2nd a symposium on police enforcement will be organised by the 4th Framework Programme ESCAPE consortium of 11 European countries. The objectives of the symposium are to communicate and discuss the main results of the large European ESCAPE project. Moreover, DG TREN, European Commission, will introduce the coming traffic enforcement directive. Both the project and the draft directive will be commented and discussed by invited speakers. The symposium can be attended by a limited number of traffic enforcement experts. More information about the symposium and registration can be found on the SWOV website under News.

How to measure Sustainable Safety in practice

Although there is sufficient information about planning and designing roads according to the principles of **Sustainably Safe** (in Dutch: **Duurzaam Veilig**), in practice the recently redesigned roads sometimes do not meet the **Sustainably Safe** requirements.



This is, on the one hand, the result of making concessions to other aspects than Sustainably Safe and, on the other hand, the loss of information in the course of concept implementation. For several years now, SWOV has been working on a computer program that can indicate to which extent a certain piece of the infrastructure meets the sustainably safe planning and design principles.

By feeding in features of road segments and intersections, the sustainably safe level meter, named the DV-meter, can calculate the sustainably-safe level. With the help of the DV-meter, the non sustainably safe road features can

already be detected in the planning and design phase and then be adapted before actually redesigning the road.

This makes the DV-meter an ideal instrument for road authorities, all the more because it can also be used for measuring the sustainably-safe level of the existing infrastructure. A road authority can thus see which parts of the infrastructure need improving.

The working of the DV-meter

The DV-meter is a computer application with a GIS (Geographic Information System) background. The planning area is indicated by a topographical map with the road network superimposed as an extra layer. By selecting a road or intersection on the map, a new window appears on the computer screen. For various parts, the existing road features can be selected in this window. The advantage of the DV-meter is that, because of the simplicity and user-friendliness of the program, everybody can feed in these features without having had a specific training. Within the DV-meter, the data fed in is tested against the desired sustainably safe road and intersection features. The assessment of all the

features then leads to a certain percentage of features that meets the sustainably safe requirements.

The data can be fed in visually (using digital maps) as well as using tables. This can be done at various levels:

- Road section or intersection level,
- Category level,
- Area level.

On a digital map, all non sustainably safe roads and intersections can be shown with a special colour. Furthermore, the DV-level can be shown using different colour shades.

Even better

During the last year, a practical test of the DV-meter has been carried out. Based on this test, SWOV has signalled a number of possible improvements for optimal application of the DV-meter in future projects:

- Including the accident database in the DV-meter;
- Modifying the DV-meter to the present GIS standard to simplify the linking with other, comparable computer programmes;
- The attributing of different weights to the features to apply the DV-meter more to the actual road safety situation.

In the meantime, a start has been made with tuning the DV-meter to other programmes. After this, SWOV will examine the possibilities for introducing the other applications.

Presently the DV-meter is undergoing maintenance, and the updated version is expected shortly. For information about the DV-meter and its availability, you can contact Sjoerd Houwing via e-mail: sjoerd.houwing@swov.nl.

Fatigue behind the wheel

For a long time now, fatigue in traffic was mainly attributed to the time spent driving. It was believed that in a small country like the Netherlands distances are too short to cause fatigue.

However, a literature study carried out by SWOV has shown that fatigue has a variety of causes. Too little sleep, a poor quality of sleep (e.g. sleeping disorders or use of medicine) and time of day can all cause tiredness.

This means that fatigue behind the wheel does not only occur in countries where long distances are driven, but also in smaller countries like the Netherlands. Moreover, fatigue happens to both professional drivers and private drivers.

Effects

Tired drivers have a higher accident chance. Fatigue affects the driving skills in such a way that drivers steer less accurately and swerve more. Drivers also are less alert to a decrease in



speed by the car in front or to information from the environment. Mood and motivation for safe driving deteriorate: drivers are easily irritated.

It is very hard to determine the exact influence of fatigue on crashes happening. It is almost impossible to diagnose fatigue objectively.

Several foreign sources of information, however, indicate that fatigue contributes to about 10 to 15% of serious crashes.

Measures

The possibilities to remedy fatigue in traffic are limited until now. Information can make the private driver aware of the dangers of fatigue. For professional drivers there are rules and regulations they must adhere to. Applying and following these rules, as well as a broader safety culture must be stimulated in the entire transport branch.

Technical aids to detect fatigue in a driver are expected in the future. These systems can warn the driver with sound signals or even intervene by correcting the course of the car. These systems are not suitable for wide use in cars yet.

The Dutch language report entitled 'Fatigue while driving; inventory of causes, effects and measures' (R-2003-16), can be consulted and downloaded via the SWOV website <http://www.swov.nl>.

Emotions in traffic

Most road users get irritated now and again in traffic. It is often possible to say what caused the irritation: there are enough Top-10 lists of traffic annoyances. But what about other emotions? Is one ever pleased when a trip has gone well? Or anxious when approaching a complicated crossroads? Or thankful when one is unexpectedly given right-of-way? And what is the effect on road safety?



The subject "Emotions in Traffic" is part of a SWOV research programme over a number of years. This subject includes various projects, two of which have recently been completed.

Emotion process

One of the central questions in the first project was: along which processes do emotions in traffic occur? According to the emotion theory of Dutch psychologist Frijda, an influential theory in the field of emotion research, the emotion process goes through a number of phases. The first phase is that of observation, in which one asks oneself: what is happening? Then an evaluation follows of what happened: is this event important for me? The evaluation leads to feelings of comfort or discomfort: do I like this or not? The next step is an alteration of action readiness: am I inclined to react to this event?

Role of emotions

Which specific emotion occurs depends on the positive or negative feeling, but also on other evaluations. Thus, anger occurs mostly if something negative happens. If the extent of control is high, and if there is somebody else around that we can blame. The emotion theory of Frijda offers many leads for traffic psychological research in order to formulate relevant questions and find possible solutions. The literature studied thus shows that specific emotions (such as anger, fear, guilt feelings, or enjoyment) occur in traffic and are related to safe and unsafe behaviour. In order to estimate the road safety relevance more precisely, it is necessary to study the origin, course, and behavioural effects of emotions in traffic.

Diary

That is why, in a follow-up project, a number of specific features of emotions in traffic were examined. For a period of one week, respondents

were requested to keep a diary in which, per journey/trip, they recorded details of the journey and the emotions experienced. When recording the emotions they could choose from a list of 29 descriptions of emotions which were later clustered in 6 types of emotions: pleasure, affection, surprise, anger, sorrow, and fear.

The following features of these emotions were specifically studied: frequency of occurring, intensity, cause, and road safety effects.

Results

The most frequently reported emotions are pleasure (more than half of all emotions) and anger (nearly a quarter of all emotions). In traffic, therefore, pleasure is more than twice as common as anger. Pleasure was experienced in half of all journeys; anger in one-in-five. The average intensity of the emotions is 6.3 (on a scale of 1 to 10). More than half of the reported emotions were caused by others; this was the strongest for 'surprise' and 'anger', and the least strong for 'pleasure'. Hence, positive emotions (with the exception of affection) are less often caused by somebody

else than negative emotions, such as anger. In general, the idea is held that road users become irritated at the smallest provocation in traffic. This study shows that in fact the positive emotions occur more frequently than negative emotions.

Causes and effects

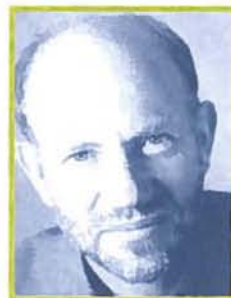
Emotions in traffic are not only caused by traffic related events. The study shows that the way one feels before the journey is just as important for the emotional state during traffic participation. Thoughts occurring during the journey can also result in emotions. A small share of the emotions is caused by conversations or telephone calls. According to the respondents, in nearly half of the cases, emotions have an influence on road safety; either positive or negative. Anger, sorrow, and fear have on average a negative road safety influence; whereas pleasure and affection have on average a positive effect. It is, however, striking that almost every sort of emotion is sometimes attributed a positive and sometimes a negative road safety effect.

Recommendations

Now we know how often all sorts of emotions occur, time has come to look more precisely at causes and effects. How do emotions actually work, and what can be done to increase the positive effects and minimize the negative ones. The diary study is a good reference point for future research. An objective answer to whether particular emotions increase or decrease in frequency and/or intensity can only be given if this study is repeated periodically. When results are reported, any shift in emotions will become visible.

Reports of both studies into emotions have been published: 'Literature study of emotions in traffic; Use and possibilities of an affective approach to traffic behaviour' (R-2002-31) and 'Field study of emotions in traffic; Questionnaire study of features such as frequency, cause, and road safety effects' (R-2003-8). Both Dutch reports include a summary in English and can be consulted on and downloaded from the SWOV website. ◀

Peter Levelt, Senior Researcher



On average, people experience an emotion once every half hour in traffic. I find this rather a lot. But what I find particularly striking is that positive emotions, such as pleasure, are far

more frequent than anger. This I hadn't expected: the idea that people mainly experience irritation has not been confirmed. It is a fact, however,

that both cyclists and pedestrians report pleasure more often than motorists and motorcyclists. What also surprised me is that cyclists get angry so often: 2 1/2 times more frequently than pedestrians. When walking, one seldom gets angry. As a psychologist it is nice, for once, to see results that were neither predicted nor expected. What I find difficult to come to terms with is that, in nearly 10% of the cases, anger has made a positive contribution to road safety. I don't yet understand how that is possible. The question: 'What can we do with this for road safety?' has not yet been answered in this study, but, happily, many ideas for possible intervention have made their appearance.

PhD projects in SWOV



SWOV frequently cooperates with Universities in the Netherlands by offering students the possibility to carry out their PhD research within a SWOV project or within a project SWOV takes part in.

Presently, five PhD students from different universities work together with SWOV and their university on a variety of topics to complete their doctoral theses.

Two projects are subprojects of the BAMADAS research program (Behavioural Analysis and Modelling for the Design and Implementation of Advanced Driver Assistance Systems). The other projects study Elderly drivers, Emotions in traffic and Telematics and traffic safety.

Elderly drivers

Ragnhild Davidse combines her work for SWOV with writing her PhD-thesis at the University of Groningen. Her PhD-thesis is about the problems elderly drivers encounter in traffic and the possibilities of improving road safety for this group of traffic participants.

Older adult car drivers form a group of road users that is getting more and more attention in road safety research and policy. An important reason for this growing interest is the increase in the percentage of seniors in the future population, and the increase of the number of senior drivers as a result of both the increasing percentage of driving license holders among the older adults and senior drivers continuing to drive actively longer than before. The attention for senior drivers is also based on a concern for the road safety implications of a growing population of senior drivers.

Several studies have indicated that the typical accident of older adult drivers occurs while turning left at an intersection. To be able to prevent these accidents from happening, it is important to know which factors lead to the involvement of older adult drivers in this type of accident. Possible sources of causal factors are the general characteristics of elderly drivers, the characteristics of intersections and the compatibility of these two sets of characteristics. In this project, the focus is on the compatibility of the task demands of turning left at an intersection

and the characteristics of the driver. The main questions are "what makes them (in)compatible?" and "How can we bring them closer together?".

Determinants of emotions in traffic and their effects on driving-related performance

Part of the work done within the SWOV project Emotions in traffic is a study carried out by Jolieke Mesken, for her PhD-thesis at the University of Groningen. The project has its origins in two areas: traffic research and emotions research. In the context of traffic, the research that has been done on emotions has focussed mainly on anger and aggression. However no systematic research has been carried out concerning the role of emotions, other than anger and aggression, in traffic. Emotion research mainly focusses on origins, processes, and functions of emotions. An area that until now did not receive much attention is the effects of emotions on performance. Many studies dealt with the effect of moods on cognitive processing, but they focussed on general positive versus negative mood, and not on specific moods and emotions. Also, these studies mainly used laboratory tasks concerning judgement, creativity or cognitive flexibility. An area open to a wide range of research, is how specific emotions (e.g. anger, sadness, happiness, pride, fear) influence complex and real life task performance. Like driving. The present PhD project aims to shed light on this issue by literature research and by carrying out a series of experiments.

Telematics and Road Safety from policy perspectives

The project Telematics and Road Safety from policy perspectives is a PhD-study in collaboration with Delft University of Technology (TU Delft) and is carried out by Ellen Jagtman. Policy makers use criteria to evaluate developments, possibilities and choices. These criteria

do not yet exist for Intelligent Transport System (ITS) applications, but they are of great importance considering the developments of applications like intelligent speed adaptation (ISA) or advanced cruise control (ACC).

This project aims to design these criteria or at least give the initial impetus to an effective formulation of the criteria. The fact that accident data do not yet exist because the applications are relatively new and developments are uncertain, complicates the project.

The present ITS developments are mainly initiated by industry and are usually aimed at one particular type of accident or factor. Head-tail collisions, alcohol interlock or speed adaptation are obvious examples. The effects on other road users, traffic and traffic safety are rarely considered in the developments. In this project these effects play a part whenever they are important for weighing up the pros and cons at the level of policy making.

In the course of the project, the HAZOP method (HAZard and OPerability method, originally used in the chemical industry) was adapted for traffic safety. A HAZOP systematically describes an intended process by weighing all parameters, possible deflections and consequences. The method is used in a top-down model which describes problems at different levels of government, and has thus become a tool in selecting the most effective of a number of measures.

Testing operational models and behavioural assumptions included in driving

Nina Dragutinovic who is writing her thesis at TU Delft, works on the project called TOMAS (Testing Operational Models and Behavioural Assumptions Included in Driving), which is one of the six projects which are part of the BAMADAS programme, two of which are carried out in cooperation with SWOV. BAMADAS focuses on the interaction between man and machine when advanced driver assistance systems (ADAS) are used. (Continued on page 6)

- 1 Ragnhild Davidse
- 2 Jolieke Mesken
- 3 Ellen Jagtman
- 4 Nina Dragutinovic
- 5 Maura Houtenbos

(continued from page 5)

Much research and development focuses on an increasing variety of ADAS to be introduced in road traffic. These systems involve the assistance and/or automation of various basic driving tasks (vehicle following, lane keeping, lane changing, proper speed keeping) based on modern technology. Although there are some expectations (assumptions) towards the influence of ADAS on driver behaviour already, there are still many uncertainties about their true effects. Project TOMAS aims to investigate the consequences of ADAS for behaviour with respect to the behaviour that drivers display in interaction with ADAS, with each other and with the road infrastructure environment. Knowledge about behavioural consequences and conditions for acceptance by the driver are considered crucial for the implementation of ADAS in the society.

Modelling Interaction Behaviour in Driving

Maura Houtenbos is also writing her thesis at the TU Delft and she works on the project called ASTIM (Advanced Safety Criteria Specification by Traffic Interactions Modelling). It is the second subproject of the BAMADAS program carried out in cooperation with SWOV. Most research on traffic behaviour has focused on the individual road user. Thus, most models of driving behaviour have been developed taking the perspective of one individual road user. However, interaction situations always involve more than one road user. Furthermore, most interactions involve time constraints. Thus, road users' expectations of the interaction situation must play a role in the interaction process. This study aims to achieve a more detailed understanding of interaction behaviour

in traffic and develop a model, which describes the interaction process but includes more than one road user. Aspects of the interaction situation road users use to form their expectations are also investigated. Eventually, when a model has been developed which adequately describes the interaction process, it will be used to assess the strengths and weaknesses of road users in this process. Subsequently, the impact of (potential) Advanced Driver Assistance Systems (ADAS) on the interaction process can be assessed.

More information about BAMADAS can be found on the website <http://www.bamadas.tbm.tudelft.nl/>



Road Safety Developments in the Netherlands

Each year, SWOV analyses the road accident data in order to identify trends and to offer explanations. The analysis shows that over the last few years there has been a clear reduction in the number of road deaths in the Netherlands.

The number of injured persons also decreased, but far less rapidly. The policy that was aimed at sustainably safe traffic seems to be effective. However, extra efforts are necessary to ensure this will continue in the future.

Real number of casualties

With respect to accident data, SWOV has repeatedly carried out projects concerning their completeness and representativity. Together with AVV (the research body of the ministry of Transport) and CBS (the Dutch Central Bureau of Statistics) these efforts resulted in a combined approach to calculate the so-called real numbers of casualties, as from 1996.

Real number of fatalities

Until a few years ago, it was assumed that the numbers of traffic fatalities and fatal accidents as recorded by police were accurate. Then the results of a CBS-study were published, covering the year 1996, indicating that even these numbers were incomplete. In the study data from three different sources were compared: police registration, cause of death statistics, and judicial data concerning deaths. An extra 7% to 8% of road fatalities complying with the definition used by the police (i.e. died as result of a traffic accident, on a Dutch public road, and within the 30 day limit) were detected.

This study also showed that completeness of

the original police registration of fatalities differs with respect to type of road user.

Underregistration of fatally injured cyclists is the highest (about 15%), while for most types of motor vehicle fatality underregistration is clearly less than average.

Since then, CBS and AVV annually publish these numbers as the official number of (traffic) fatalities and some tables (the distribution of type of road user, age, sex, etc.) are presented as well.

In practice, the less complete registered numbers of fatalities are often still used for time series and other analyses, since the real numbers only represent the years since 1996, and do not cover all possible distributions.

Real number of hospitalized

It has long been known that the registered number of hospitalized based on police registration is far lower than the real number of in-patients. This fact was established by at least two independent sources: regular enquiries and data from the Dutch national hospital data registration, called LMR (an continuous registration, owned by Prismant, an organisation working in the field of public health). To establish the real number of hospitalized, SWOV has carried out several studies in which data from both police registration and LMR were statistically linked (matched).

Average completeness of the police registration appears about 60%. Here also, we see large differences with respect to type of road user, as well as collision type. Casualties from traffic accidents including motor vehicles, are far better registered than those including non-motorvehicles. The lowest degree of registration is found for hospitalized cyclists from single-vehicle accidents. Based on these studies, SWOV developed a method to calculate the real number of hospitalized, based on both the LMR-data and the registered number. The method is used by AVV to determine the number of injuries.

The real annual number of hospitalized traffic

casualties is about 18,000 (while the registered number is less than 12,000). The data concerning the real number of hospitalized is only available for a restricted number of variables and distributions, starting from 1985 up till now. For time series covering a longer period, and analyses on other variables, the registered numbers are still often used. It is clear that the results of those analyses should be used with care, considering the 40% average incompleteness, and the extra underrepresentation of cyclists.

Fatalities and risk

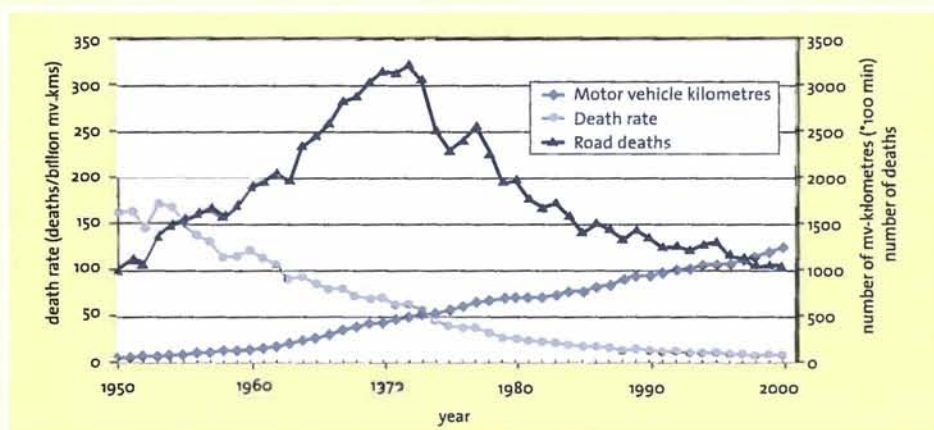
The last few years, the real annual number of traffic deaths in the Netherlands is slightly under 1100, while the registered number is a steady under 1000. After a huge peak of more than 3250 road deaths in 1972, the number has decreased steadily. Since 1950, the number of motor vehicle kilometres has increased by a factor 19. The death rate (deaths per billion vehicle kilometres) has decreased by a factor 20. This is illustrated in the graph.

Sustainably safe

It is actually too soon for an adequate evaluation of recently taken Sustainably Safe measures such as 'Moped on the Carriageway' and 'Priority Cyclists from Right'. In spite of this, the number of moped casualties seems to be declining since 1999. Sustainably Safe has also resulted in a regional enforcement policy, with many more police traffic controls. This became clear from an extremely large increase in the number of traffic offences, mainly for speeding. A positive road safety effect is certainly to be expected from this if motorists' speeds really do get lower. The evaluation of the effect of these and other related enforcement activities is part of a current SWOV study.

Result of sustainably safe policy

On balance, we maintain that there are certain indications that Sustainably Safe, which made its entry in the 1990s, has had its results. We conclude this from the current faster decline in accidents and casualties than in the early 1990s. Apart from the measures mentioned earlier, we



Fluctuation of Motor vehicle kilometres, Road deaths and Death rate in the period 1950-2000

Short term prognosis

During the last seven years there has been a more rapid decrease in the number of road deaths and death rate than the average for the last two decades (see table). This is good news, especially if it means meeting the road safety target (which still is 750 deaths in 2010). Using our own prognosis model, SWOV has calculated that in 2010 there will be about 625 deaths, providing that the death rate continues to decrease by more than 5% per year (as it has during the last few years). To achieve this, efforts continue to be necessary. The picture looks less bright for the in-patients; with the present insights, the target of 14,000 in-patients in 2010 does not seem achievable, and much more effort is essential.

Period	Average annual fatality-risk change
1985-2000	-4,87%
1985-1990	-4,59%
1990-1995	-2,88%
1995-2000	-7,10%

advise the sustainably safe redesign of the urban and rural roads to further reduce the number of victims. This will result in a limited number of recognizable road types that 'invite' appropriate safe traffic behaviour. The application of roundabouts instead of regulated crossroads, the introduction of traffic calming 30 km/h areas, and other areas with a speed reduction are good examples. Motorways, and now through-roads, were already recognizable road types. The main features (a strict division of driving directions, no crossroads, only motor traffic) remain a guarantee for a traffic distribution that is as safe as possible. Although the further sustainably safe redesign of the Netherlands road network still needs much investment, the decreasing death rate achieved up till now provides an emphatic indication that such investment is worthwhile.

The Dutch-language SWOV report R-2003-15, The road safety in the Netherlands up to 2002; Analysis of size, nature, and developments, can be consulted and downloaded from the SWOV website.

Colophon

Research Activities is a magazine on road safety research, published three times a year by the SWOV Institute for Road Safety Research in the Netherlands. Research Activities contains articles on scientific projects carried out by SWOV and by others.

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Editor: Hansje Weijer

Photographs: Paul Voorham, Voorburg

Realisation: SLEE Communicatie, www.slee.nl

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ISSN: 1380-703X

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ADVISORS completed

Method for comparing new technologies with each other is ready-for-use



Telematics applications in cars are no longer futuristic, they have become reality. New, luxurious cars are already, as a standard, equipped with navigation systems, advanced cruise control, and other gadgets. The manufacturers state that they have a positive influence on road safety, driving comfort, and fuel consumption.

In the four-year EU project ADVISORS, the various systems were examined to determine whether they really do support the driving task and have a positive effect on road safety, road capacity, and the environment. ADVISORS was completed this spring.

Project

The ADVISORS project, in which various partners from 10 EU countries cooperated, and of which SWOV was coordinator, has provided a framework for the evaluation of all Advanced Driver Assistance Systems (ADAS) as to their effects on road safety and the environment. Special attention was paid to the influence of the various systems on driving behaviour. Finally, study was made to determine the most desirable implementation scenario. This included specifying which actions needed to be undertaken and which parties should be involved.

Effects

Useful information about the effect on traffic flow and air pollution of some systems was obtained from simulation studies. Adaptive Cruise Control (ACC) systems did result in a better traffic flow and an increase in road capacity at low speeds. This effect was not found in Intelligent Speed Adaptation (ISA) systems, but they did result in less air pollution.

Preferences

The project provided a great deal of information about drivers' preferences. No broad acceptance is to be expected from systems in which the values are set beforehand and cannot be influenced by the driver. Systems that interfere with driving behaviour also lead to more resistance than systems that provide the driver with information, or systems that give a warning signal when a particular border value is exceeded. For example, it has been shown that systems which warn the driver if he/she has fallen asleep are highly regarded, especially by those drivers whose driving was very risky at that moment.

Implementation

The study of the most desirable implementation scenario showed that each system requires its own introduction. The introduction of the various

systems requires attention in driving lessons in order to standardize operation and the possibilities of adapting the values. It is of great importance that international governments and manufacturers cooperate on these points.

Method

ADVISORS has provided a method for describing the whole course that has to be covered to determine what the expected effects of a system are. The method involves, among other things, a risk analysis, a multi criteria analysis, together with various performance and measuring indicators for the various phases of the course. Criteria have also been determined by means of which can be laid down whether or not a certain performance falls within acceptable margins. Using this method, it has been made simpler to compare the various systems with each other. It can also give a better understanding of the decision-making and the choice of installing a particular system. The method is also very usable for other technological developments.

You can find more information about ADVISORS on the website: <http://www.advisors.iao.fhg.de>. On this website the final report may also be consulted. ◀

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. Records of all SWOV reports that were published from 1980 onward can be found on our website (www.swov.nl). Reports that were published in or after the year 2000 can be downloaded free of charge.

Cooperation in decision-making about the construction of 60 km/h areas

A research design
C.A. Bax, dr. I.M.A.M. Pröpper (Partners+Pröpper) & B.P.E.A. Litjens (Partners+Pröpper) R-2003-6. 42 + 3 pp. € 11,25 (In Dutch).

Description of a research design for a study of the relation between the cooperation of policy parties during the decision-making and the decisiveness of the policy determined. With this purpose, the study is aimed at the decision-making about the construction of 60 km/h areas in boroughs. Study will be made of how the cooperation between the various parties involved affects the effectiveness, efficiency, and ambition level of the eventually determined policy. In order to gain insight into this relation, the manner and extent of cooperation are described, as well as the results of the cooperation and any conditioning circumstances.

Field study of emotions in traffic

Questionnaire study of features such as frequency, cause, and road safety effects

Dr. P.B.M. Levelt, R-2003-8. 52 + 26 pp. - € 12,50 (In Dutch).

In this study, a search is made for an answer to the question of how often emotions in traffic occur in road users with different modes of transport: per journey and time on the road.

The role of other people as cause of emotions, or as 'object' that emotions are aimed at, was also studied. Furthermore, a study was made of where the cause lies, and how road users estimate the strength of emotions and if they judge the consequences of them as safe or unsafe.

Road Safety in the Netherlands up to 2002. Analysis of size, nature, and developments

Ir. L.T.B. van Kampen (ed.), R-2003-15. 100 pp. € 15,- (In Dutch).

An analysis of the developments in the numbers of road deaths and accidents in the Netherlands, up to the year 2002. Trends, backgrounds, and explanations are described.

Fatigue behind the wheel

Inventory of causes, effects and measures
I.N.L.G. van Schagen R-2003-16. 42 + 3 pp. € 11,25 (In Dutch).

Also in the Netherlands there is an increasing awareness that driving while tired is an important factor in the occurrence of road accidents. This literature study aims at providing an overview of the knowledge and insights about the relation between fatigue and road safety.

Some behavioural effects of non-compulsory (bicycle) lanes on narrow, rural roads

Ir. R.M. van der Kooij & Ir. A. Dijkstra, R-2003-17. 34 + 2 pp. € 10,45 (In Dutch).

The uniformity of rural access roads could be improved by introducing a middle carriageway breadth for motor vehicles. Its marking consists of broken lines. The rest of the space consists of two edge markings (sometimes in red asphalt) and is meant for cyclists. We call such lanes 'non-compulsory (bicycle) lanes'. This report contains a study of traffic situations on roads where there was originally no such area and later did have one (before-and-after studies).

Towards a Czech Road Safety Information System

A feasibility study
S. de Craen & F. Wegman, D-2003-3. 16 + 14 pp. € 8,75 (In English).

Feasibility study into the successful implementation of a Road Safety Information System in the Czech Republic.

SWOV-programme 2003-2006

Research, knowledge management and knowledge dissemination
R-2003-18. 57 pp. (Entirely in Dutch, no English summary).

The programme contains a survey of the SWOV activities in the four-year period 2003-2006.

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