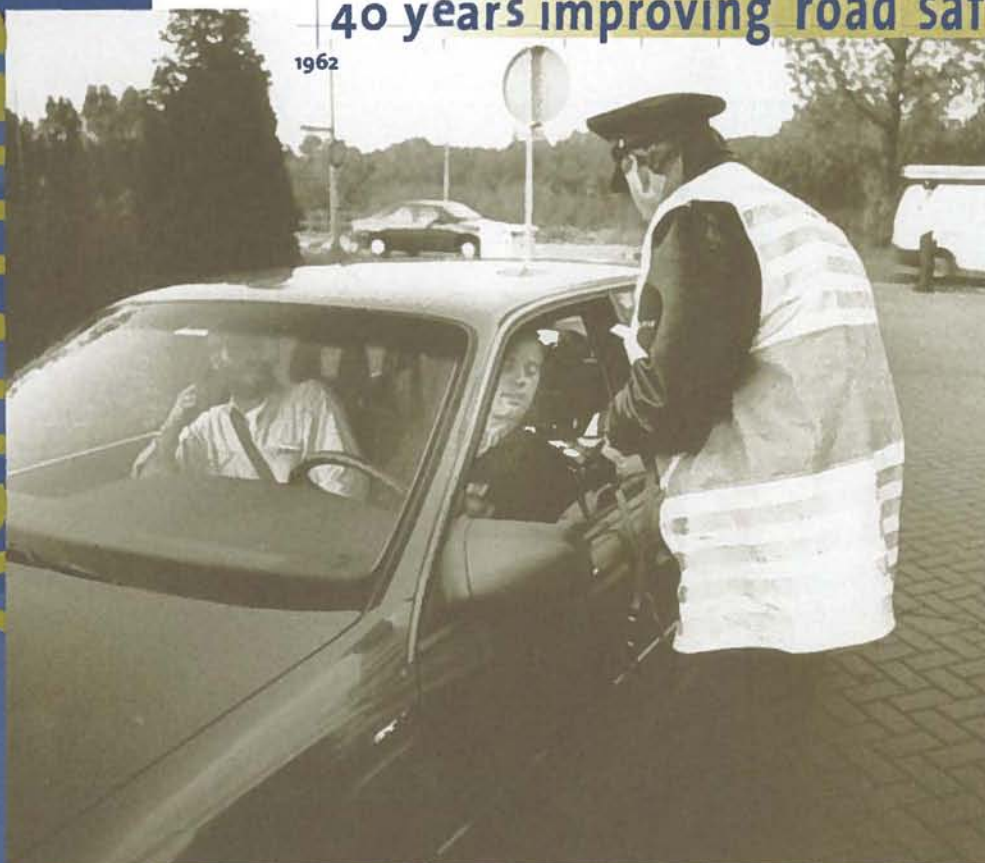


40 years improving road safety



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Combined use of alcohol and drugs in traffic: extremely high risk of serious injury

MOTORISTS WHO COMBINE THE USE OF ALCOHOL AND DRUGS RUN A VERY HIGH RISK OF GETTING INVOLVED IN A TRAFFIC ACCIDENT AND SUSTAINING SERIOUS INJURY. THEIR RISK IS SEVERAL HUNDREDS OF TIMES HIGHER THAN THAT OF SOBER DRIVERS. MOTORISTS WHO HAVE ONLY CONSUMED A LARGE QUANTITY OF ALCOHOL, (BAC OF OVER 1.3 G/L), RUN A RISK OF SERIOUS INJURY THAT IS 40-50 TIMES HIGHER THAN FOR SOBER DRIVERS. THE COMBINED USE OF SEVERAL DRUGS MAKES THE RISK OF SERIOUS INJURY APPROXIMATELY 10 TIMES HIGHER.

These are results from a feasibility study carried out by SWOV in the Tilburg police district on request of the Ministries of Transport and of Health. The study was

carried out to test a method of determining the risks of the use of alcohol, drugs and psychoactive medicines by motorists. The feasibility

study precedes a large-scale international research project commissioned by the European Commission. This European project, which started in January 2002, is called IMMORTAL, acronym for Impaired Motorists, Methods Of Roadside Testing and Assessment for Licensing. IMMORTAL investigates the influence of chronic and acute impairment factors on driving performance and accident risk. The project will provide key information to support the formulation of European policy on licensing assessment and roadside testing.

The Tilburg study

In the period May 2000 - August 2001 SWOV has, in close co-operation with the police of the Tilburg police district, interviewed and tested a random sample of 816 motorists. Motorists were taken from moving traffic at 20 occasions at different days of the week and at different times of day. Urine or blood samples of 110 seriously injured motorists who were admitted to the Tilburg St. Elisabeth hospital in the same period were also analysed. In this

hospital blood and urine sampling of trauma patients for medical reasons is a standard procedure.

The urine and blood samples were tested for the following substances: alcohol, opioids (codeine, morphine and heroin), methadone, benzodiazepines, tricyclic antidepressants, barbiturates, cannabinoids, cocaine, amphetamine and ecstasy. Relative injury risks could be calculated by comparing the presence of these substances in injured motorists with the presence in non-injured motorists.

Higher risk

The conclusion of the feasibility study is that the research method used can provide a reliable picture of the relative injury risks associated with the use of alcohol, drugs, and psychoactive medicines. The feasibility study determined no significant risk enlargement (yet) for single-use of cannabinoids, ecstasy and/or amphetamine, cocaine, opioids, tricyclic antidepressants, or a small quantity of alcohol (BAC of 0.2-0.5 g/l). Significant risk enlargements could be

established for benzodiazepines, combinations of different drugs, and a BAC > 0.5 g/l.

By far the highest relative risk, however, was found in the combined use of alcohol and drugs: the injury risk for this group was 400 to 500 times higher than for entirely sober motorists. The research also shows that the use of illicit drugs by Dutch motorists has approximately doubled over the past 5 years. It rose from 5.5% to 11% at weekend nights.

IMMORTAL

The IMMORTAL-project started in January 2002. For IMMORTAL SWOV will continue the study in the Tilburg police district. Specimens of over 3000 random and 500 injured motorists are expected to become available for analysis. Besides in the Netherlands, at the same time studies into the risk of psychoactive substance use by motorists will be conducted in Great Britain, Norway and Denmark. The results of the IMMORTAL project are expected to be published in 2004.

Progress 'ADVISORS'

THE EU PROJECT ADVISORS AIMS AT DEVELOPING A METHOD OF DETERMINING THE EFFECTS OF VARIOUS ADVANCED DRIVER ASSISTANCE SYSTEMS (ADAS). THIS CONCERNS THE EFFECTS ON ROAD SAFETY, ROAD CAPACITY, AND THE ENVIRONMENT. IT ALSO AIMS AT (HELPING) THE DEVELOPMENT OF IMPLEMENTATION STRATEGIES FOR ADAS APPLICATIONS THAT ARE EXPECTED TO HAVE A POSITIVE EFFECT. ADVISORS, OF WHICH SWOV IS THE COORDINATOR, HAS IN THE MEANTIME REACHED ITS FINAL YEAR.

In the first place, a large scale study has determined that ADAS applications can help to solve the road safety problems of distraction, over burdening, and driver condition. Systems that can improve these problems are intelligent speed adapters, navigation systems, and systems that register driver condition. Improvements in the traffic flow are expected from systems of speed control and adaptation, and systems that avoid collisions.

Furthermore, a method has been designed to assess ADAS on criteria of road safety: usefulness, user comfort, human-machine interaction, and environmental effects. This method has been tested on various systems that are expected to be important, and will be adapted on basis of the test results. Some of the systems that are important for road safety have simultaneously been judged on their technical, behaviour

related, organizational, and legal risks after implementation ('failure chances'). An inventory has also been made of the relevant laws and insurance policy clauses so that these can be taken into account during ADAS implementation.

In the present phase of the project, desirable implementation scenarios for a number of ADAS applications are being defined. It is also being determined which action must be taken by the various parties involved. Contributions were made on June 21st by an expert meeting held at SWOV.

More information about ADVISORS can be found on the website www.advisors.iao.fhg.de

Lithuania, the peer review



THE EUROPEAN CONFERENCE OF MINISTERS OF TRANSPORT (CEMT) HAS RECENTLY TAKEN UP THE INTENTION OF CARRYING OUT PEER REVIEWS OF THE ROAD SAFETY POLICY OF MEMBER STATES. THIS IS ALREADY THE CASE IN OTHER TRANSPORT POLICY SECTORS. IN 2000 THE NETHERLANDS TRANSPORT POLICY IN BOROUGHES WAS EXAMINED BY A TEAM OF FOREIGN EXPERTS.

As the first one, the government of Lithuania asked CEMT to judge the road safety policy. The Netherlands, Austria, and Sweden declared themselves prepared to make experts available. The Netherlands Ministry of Transport commissioned SWOV to do this. As a result of consultation with CEMT's secretariat and the Lithuanian Ministry of Transport, a considerable amount of documentation was collected, and a programme for a working visit was drawn up. In June a delegation visited Lithuania. Within a short space of time, a large number of

bodies was spoken with, of course personal impressions about the road safety there were also gathered.

Based on all the data collected and the impressions gathered, the three experts each reported individually to CEMT recently about the road safety situation in Lithuania and the existing policy. Simultaneously they formulated recommendations for the improvement of this policy. When the CEMT secretariat has made an integral report from this, consultation on behalf of the Committee of Deputies of CEMT will

take place with the government of Lithuania about the recommendations made. In the meantime, the governments of Estonia and Latvia have requested a peer review. Soon, CEMT will decide about these requests.



The Continuing Introduction of Sustainably-Safe Traffic in the Netherlands

THE MAJOR DUTCH ORGANISATIONS OF ROAD AUTHORITIES AND THE MINISTRY OF TRANSPORT SIGNED THE AGREEMENT ON THE START-UP PROGRAMME SUSTAINABLY-SAFE TRAFFIC IN DECEMBER 1997.



This Programme contains a number of measures that will be implemented by the end of 2002, aiming at changing the infrastructure and some traffic rules:

- Making a distinction between main roads and traffic calming roads
- Extension of urban 30 km/h zones
- Extension of rural 60 km/h zones
- Changing all main roads into priority roads
- Removing mopeds from the bicycle paths
- Equal priority rules for all drivers regardless of vehicle type
- Categorise the road network by each road authority according to a set of formal requirements.

There was a state subsidy available for these measures. To obtain the subsidy, the road authority had to supplement this subsidy.

To encourage the process of considerably extending the 30 km/h zones the road authority may suffice with a 'sober design', without the necessity to change the existing regulations.

SWOV checked whether the proposed measures differ from the original principles of a Sustainably-Safe Traffic. A few findings: The intended speed limit in rural traffic calming areas (60 km/h) proved to be too fast to mix cyclists with motorised road users. Another point of worry is the desired recognition of traffic situations that can be achieved by, among other things, uniformity. In the present proposals deviations from the general principles are possible or allowed; this is especially so for priority rules in traffic calming areas and cycle paths along the minor roads. Furthermore, a worrying point is the transition situation in potential traffic

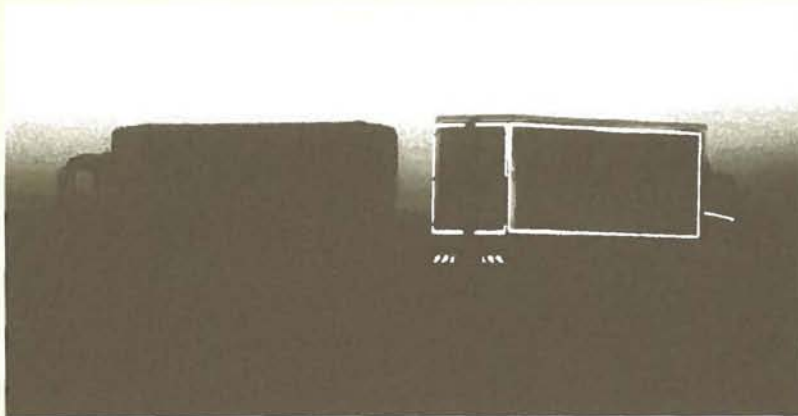
calming areas where the urban speed limit remains 50 km/h, and the rural speed limit 80 km/h, in view of the regulations (priority for traffic from the right). In general, it can be said that the proposed measures do not, in many cases, prevent a mixture of motor vehicles, bicycles, and mopeds; this will continue where there are large differences in driving speeds.

Next phases of Sustainably-Safe

The proposals for the next phases of Sustainably-Safe were included in the draft of the National Traffic and Transport Plan. This plan was the result of consultation between all those involved in the planning and implementation of traffic and transport projects. However, in early 2002, the draft plan was rejected by parliament. The proposed kilometre-levy was the main reason for this rejection. A revised version of the plan will only be presented to parliament during the course of 2003. In the meantime, those involved will be able to adjust their plans, paying particular attention to the smaller national budgets.



Retro-reflecting contour marking on lorries: effective measure, limited effect



RETRO-REFLECTING CONTOUR MARKING IS A SIMPLE AND EFFECTIVE MEASURE THAT CAN IMPROVE THE VISIBILITY AND RECOGNITION OF LORRIES. THIS CAN CONTRIBUTE TO THE REDUCTION OF COLLISIONS OF VEHICLES AGAINST THE FLANK OR REAR OF LORRIES. SWOV RESEARCH HAS SHOWN THAT THE LARGE-SCALE INTRODUCTION OF THIS MEASURE IN THE NETHERLANDS WILL HAVE A POSITIVE ROAD SAFETY EFFECT, BUT THAT THIS EFFECT IS SMALLER THAN EXPECTED AND THEREFORE MAKES THE COSTS RATHER HIGH (REPORT R-2002-16).

Retro-reflecting lorry markings are increasingly being used for safety and advertising reasons. The necessary requirements are given in regulation ECE-R 104 of the United Nations. The Netherlands government is working on an implementation of ECE R 104 in the Vehicle Regulations and in the meantime uses the regulation as a guideline. This means it is not obligatory to apply these markings, but it creates clarity about which materials and applications are permitted.

With an eye to possible developments in the regulations concerned, the 3M Netherlands company commissioned a study. In this, SWOV studied the road safety effects, economic efficiency, and possibilities of large-scale introduction (voluntarily or obligatory) of retro-reflecting contour marking on lorries.

Road safety

Every year there are about 9 deaths and 83 in-patients as a result of collisions against the flank or rear of lorries during twilight and night-time hours. This means that the size of the problem in the Netherlands is relatively small. Complete introduction of retro-reflecting contour marking is expected to result in 2 to 3 deaths and 20 to 30 in-patients less per year. This is based on the effects that result of field and laboratory studies abroad. It must, however, be taken into account that, apart from this, some side-effects will occur that are related to the observations and expectations of drivers. The estimated road safety effect is smaller than was originally expected. This has to do with the relatively small number of accidents of this type. In addition, compared with the countries of the foreign

studies, there are few accidents in the Netherlands at night-time with no street lighting; i.e. the condition in which the measure has its greatest effect.

Economic efficiency

The total costs of introducing the measure, applied to all lorries, are estimated at € 57 million. Cost-benefit calculations indicate a modest positive balance for the social benefits of the measure. The ratio of costs and benefits is not much larger than 1, which is the critical value for a socially profitable measure. The cost-effectiveness, reduction of the number of casualties per amount invested, in comparison with other potential measures, is rather low. This means that other measures, which involve the same investment, have a greater expected safety profit. Looking at the costs and benefits at the private investment level, which concerns the transport company, the measure is not profitable.

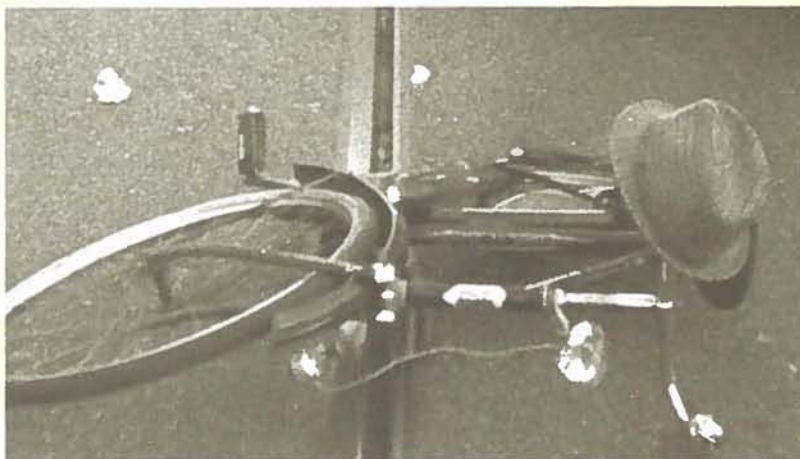
Large-scale introduction?

The large-scale introduction of retro-reflecting marking on lorries in the Netherlands conforms to the principles of Sustainably Safe. In a simple way it improves the visibility and recognition of lorries. Because of the predictability, with a possible large-scale introduction, a complete and as uniformly possible introduction is preferred above a partial introduction.

Organizations that play a part in the decision-making process in, or implementation of, the measure 'retro-reflecting contour marking on lorries' are, in principle, in favour of this. This emerged from interviews with representatives of the parties involved. Economic efficiency is seen by all as an important criterion. However, the opinions about possible government subsidies diverge. A further discussion with all important players in this field could give a decisive answer about the Netherlands' position regarding complete application of contour marking of lorries.

Consequences of injury, a long term SWOV-study

THOUGH WE KNOW A LOT ABOUT 'SHORT TERM' CONSEQUENCES OF ACCIDENTS AND INJURIES FROM STANDARD REGISTRATIONS (POLICE BASED OR HOSPITAL BASED), NOT MUCH DATA IS REGISTERED REGARDING LONGER TERM CONSEQUENCES.



Especially the consequences of injury, after the victims leave hospital, emergency department, or any other place where direct treatment takes place, are virtually unknown. Therefore, SWOV decided to carry out a study in which this new field would be explored, in order to establish a more complete inventory of impact of traffic accidents on society.

Classification systems

In the SWOV-study, R-2002 20, consequences of injury were defined as any development of initial injury from the moment of occurrence (the accident) until, after treatment and complete or partial recovery, a stable condition is reached. These consequences therefore include both the treatment and recovery period.

In the first phase of this study, a literature study was carried out to establish existing classifications (by which consequences are defined and coded) and registrations (in which data of injured people and injury consequences are stored) in the international field of consequences of injury.

With regard to classification systems, it was found that, according to international WHO-practice, distinction is to be made between three types of consequences: impairment, disability, and handicap.

Consequences

Impairments (in the SWOV study called first order consequences) are consequences at the level of organs and other body parts, responsible therefore for functional incapacities at that level. Disability (second order consequences) takes the (dis)functioning of the human body as a whole into account, while handicaps (third order consequences) become apparent when also the social activities of the victim are taken into account.

However, none of the existing classification systems appeared practically useful for a new Dutch standard registration of consequences of injury, mostly because of their complexity, requiring extensive medical knowledge.

With regard to existing registrations of consequences of injury, none were found, apart from a few study samples.

Another finding was that the time period needed for complete or partial recovery until a stable condition was reached, could range from days to years for individual casualties.

Second phase

It was recommended therefore to acquire more insight regarding consequences of injury in the Netherlands by asking a sample of injured people about their condition, at different moments after the occurrence of the accident. Open questions would have to be asked about type and severity of the injury consequences. These questions should focus on factors that prevent the casualties from functioning as they did before the accident happened.

For practical reasons, it was recommended to focus on impairments. This decision was based on the strong impression acquired from literature that the other types of consequences (disabilities and handicaps) would be far more difficult to investigate and to link to the accident as their only cause. Though impairments appear mainly a matter of physical disfunctioning of body parts, some non-physical elements may not be excluded, such as pain and brain-injury related mental disfunctioning.

This second phase of this study started at the end of 2001 and will last until the end of 2003. Questionnaires are being sent to (ex) hospitalized and non-hospitalized (but A&E treated) casualties. These casualties have been registered in a 'short term' accident and injury registration (called LIS), after having been treated at A&E departments or admitted as in-patients. The enquiries have been commissioned to the Consumer Safety Association (Amsterdam) who administers the LIS-registration.

Inventory of the car pc developments

THE EMERGENCE OF TELEMATICS APPLICATIONS IN THE CAR IS A MUCH DISCUSSED SUBJECT. A RECENT SWOV LITERATURE STUDY WHICH WILL BE PUBLISHED LATER THIS YEAR, MAKES AN INVENTORY OF DEVELOPMENTS IN THIS FIELD AND EXPLORES ITS ROAD SAFETY EFFECTS.



According to market prognoses, millions of motorists will shortly have an in-car multimedia computer in their cars. Such a system, Mobile Multimedia Communication and Information System (MMICS), can fulfill functions in information, communication, and entertainment. Examples of this are dynamic route navigation, contact with alarm services, and mobile office facilities. An essential feature of MMICS is not only the possibility of dealing with all kinds of in-car electronics, but also these systems can take over the operating of existing functions, such as air conditioning and the car radio, 'handsfree', with a speech-interface. Marketeers expect that such systems will be standard in half of all new cars in 5 years time.

Worrying factors

However, until it has reached this situation, a lot of 'do-it yourself' systems and interim variations are appearing on

the market; based on available mobile computers, software, and GPS receivers. The government is interested in this so as to, during this period, create preconditions for a safe, professional installation and to have as few separate information displays possible in a single car. Another point of attention is the expected growth of entertainment via, among others, the mobile Internet. There is the danger that during the development of these commercial products, little attention will be paid to safety.

Possible road safety effects

Operating the various MMICS functions can lead to dangerous distractions. Their effects have not yet been sufficiently quantified. However, there are indicative calculations based on empirical research, which indicate that about 1.3% of all accidents can have a direct link with distraction while manually operating a car radio, air conditioning, or while

phoning. In-car computers can replace this manual operating by speech operating and thus possibly partly reduce drivers' distraction.

On the other hand however, there is the distinct possibility that more intensive use of these easy functions could lead to new sorts of distraction. There is also a considerable increase in the number of functions and, with it, the number of possible distraction sources. From some of these, such as on-board diagnostics, an (in principle) positive safety effect is expected; whereas with other functions, such as entertainment, distraction is expected to dominate. It is, however, very difficult now to estimate the balance of positive and negative effects.

How to proceed?

During the coming years, the controlling and creating of preconditions functions of the government are very important because, in the new growing MMICS market, there will be stiff competition between the large producers. The government is interested in regular inventories of new functions and applications, and in the analysis of their road safety effects. The matters of 'do-it-yourself' systems and entertainment deserve the special attention of further, policy-supporting research. A first logical step after this study would be an empirical study of use practices and road safety effects. Independent laboratory research of new applications and prototypes also remains desirable. For both types of research we recommend that there is a check on Sustainably Safe requirements.



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, as well as the language in which the report is written. Reports can be paid by credit card. For bank transfers, we will charge an extra € 7,- per transfer. After SWOV has received your payment, the reports will be sent to you by mail. Records of all SWOV publications that were published from 1962 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.

The effect of drink- and drug driving on the injury risk of car-drivers

A feasibility study in 2000–2001 in the Tilburg police district. M.P.M. Mathijssen, M.J. Koornstra & dr. J.J.F. Commandeur. R-2002 14. 30 + 23 pp. € 11,25 (in Dutch).

Emotions and moods of lorry drivers and the relations with unsafe behaviour

Detailed elaboration of a questionnaire study. Dr. P.B.M. Levelt. R-2002 15. 146 + 52 pp. € 27,50 (in Dutch).

Safety effects of retro-reflecting contour marking on lorries

Investigation of accident data, literature, costs and benefits, and opinions of parties involved. M. de Niet, dr. Ch. Goldenfeld & P.M.M. Langeveld. R-2002 16. 52 + 20 pp. € 12,50 (in Dutch).

General and periodic trends in the road safety development of eight developed countries

Dr. J.J.F. Commandeur. R-2002 17. 36 + 7 pp. € 11,25 (in Dutch).

Knowledge gaps and needs among elderly road users in Drenthe

A questionnaire study. J. Mesken. R-2002 18. 28 + 20 pp. € 11,25 (in Dutch).

The analysis of accident, road, and traffic features of the state highways in the Netherlands

Dr. J.J.F. Commandeur, F.D. B'jleveld, dr. L.G. Braimaister & S.T.M.C. Janssen. R-2002-19. 58 + 1 pp. € 11,25 (in Dutch).

The consequences of injury for road accident casualties

First phase study of a method to describe their nature, size, and severity. L.T.B. van Kampen & P. Wesemann. R-2002 20. 46 pp. € 11,25 (in Dutch).

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 summaries of research projects carried out by SWOV and by others.

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