SWOV RESEARCH ACTIVITIES 5

SWOV
Institute for
Road Safety
Research

MARCH 1996

SWOV research for ERSF: Road safety measures for interurban roads

The European Commission decided to set up a Working Party 'Infrastructure', to recommend a limited number of road safety measures suitable for application in the short term. Mr. P. Elsenaar, director of the Traffic Research Centre of the Dutch Ministry of Transport is the chairman of this Working Party. The activities should focus on interurban roads because these roads are relatively dangerous. According to the country, between 50 and 70% of all road fatalities occur on them. A report on this matter was compiled by SWOV on behalf of the European Road Safety Federation (ERSF).

About 90% of all casualties on non-motorway roads outside built-up areas can be connected with just four kinds of manoeuvre:

No	Part of driving task	Nature of most accidents	Approx. %
A	Keeping course	Going off the road	35
B	Intersecting	Collisions with intersecting vehicles	20
C	Following	Rear-end collisions	15
D	Overtaking	Head-on collisions	20

All percentages mentioned are slightly lower on roads passing through villages because there, a fifth type of accident (E), i.e. collisions with vulnerable road users such as pedestrians or cyclists, occur more often (around 15%). The average consequence of this type of accident is usually more serious. Measures to combat road hazard, mostly called 'countermeasures', should focus on the prevention of these five kinds of accidents.

Questionnaire

A questionnaire was sent out to the Member States asking for relevant information on the subject. It was the intention to base the subsequent selection of the measures mainly on the answers to this questionnaire.

The measures (in the broad sense of the word) to be selected must be those most likely to lead to a decrease in the number of road victims in the short term. An indication of the effect of each measure on road safety should possibly be given, together with the preferred order of priority among the measures. An international review of the road safety situation must be added, to show the scope and the nature of the problem.

Ten countermeasures

The study has resulted in the selection of ten countermeasures. A distinction is made between countermeasures on three levels: analyses, traffic engineering and traffic operation. A separate column in the table on the next page indicates which of the five manoeuvre categories mentioned might be addressed by each countermeasure.

Attractiveness of the countermeasures

One of the factors - though definitely not the only one - determining the ▶

CONTENTS

No.	Countermeasure	Manoeuvre
Analyses		
1	Road, traffic and accident data collection	all
2	Road safety inspection	all
3	Black spot analysis and treatment	all
4	Road safety impact assessment (RIA)	all
Traffic engineering		
5	Traffic calming on thoroughfares through small towns and villages	B E
6	Building roundabouts instead of intersections	B
7	Safety barriers at hazardous locations	A
8	Restricting the possibility of overtaking	D
Traffic operation		
9	Consistency in the signing and marking of (sharp) bends	A
10	Alternative routing of slow traffic	E

attractivenes sof a countermeasure to be taken i sits cost -effectiveness. Three groups of countermeasures can be formed, with diff erent degrees of cost effectiveness. (A high cost - effectiveness means that the money is well spent). There is also a group for which no cost-effectiveness could be established.

No cost-effe ctivene ss to be established

1 Road, traffic and accident data collection.
2 Road safety inspection.
3a Black spot analysis.
4 Road safety impact assessment (RIA).

Relatively high cost-effectiveness

3b Black spot treatment.
6a Building small roundabouts instead of intersections.
9 Consistency in the signing and marking of (sharp) bends.
10a Alternative routing of slow traffic without building parallel link.

Medium cost-effectiveness

5 Traffic calming on thoroughfares through small towns and villages.
7 Safety barriers at hazardous locations.

Relati ely low cost effectivenes s

6b Building large roundabout s instead of intersections.
8 Restricting the possibilitie sof overtaking.
10b Alternative routing of slow t affic with the building of parallel link s.

In the mean time SWOV ha sbe en a ked by the ERSF to conduct another study on this subject. The project is called Intersafe and the goal is to prepare a Technical Guide describing the current practice on certain values which influence road safety most. The study provides the latest information in order to clear up confusion and to harmonise opinions. It gives the optimal values together with the reasoning behind their selection. The results as a compilation of read y for use knowledge, will be suitable for designing and operating roads with special regard to road safety.

Recommended safety measures for application on interurban roads in the short term

Report of the Working Party 4 Infrastructure, to the High Leve l Group of Representatives of the Member States on Road Safety and to the Directorate General for Tran sport of the European Commission.

M. Slop & J.W.D. Catshoek R-95-18 28 pp. (in English)

New list of SWOV-publications available

SWOV has made a new list of publications which are written in English, German or French. The list contains reports, papers and articles published in 1985-1995.

If you want to receive a free copy of this list please send a letter or t elefax to Sandra Rietveld and ask for the publication with number R-96-2.
If you want to receive a list of our publication s in 1995, including the contributions in Dutch, ask for publi cation R-96-4.

Better *adjustment* of head rests is necessary

In November 1995 a campaign was started in order to inform road users how to adjust their head rests.

The danger of whiplash injuries due to a rear collision can be reduced when head rests are positioned correctly. Therefore it is crucial that head rests in passenger cars are set correctly. The SWOV has carried out a field survey to find out how much people know about whiplash and head rests, and how head rests are positioned in passenger cars. Another study concerned the technical aspects of head rests. Measurements of new cars were performed at car dealers and surveys were carried out in public parking areas. This field study was supplemented by a technical study.

At present, head rests in cars are not (yet) compulsory in the Netherlands. If they are fitted - as is virtually always the case - a Dutch law called the new vehicle regulation states that they should comply with an (obsolete) EC guideline. At present, partly at the insistence of the Netherlands, an adaptation to the guideline is being prepared in a European context where the requirement concerning the minimal height of head rests will become markedly stricter.

Studies

Surveys and measurements were used to gather information. The measurements were made in large car parks outside shopping centres and roadside restaurants, amongst others. The cars investigated had just come out of road traffic.

The following criteria were applied to determine the correct positioning of head rests:

- *height: the upper edge of the head rest had to exceed the person's ear;*
- *horizontal distance between head and head rest: this distance must not exceed 10 cm.*

Eighty percent of the male front-seat occupants proved to have their head rests set too low. On this point the percentage of women at fault proved to be lower (48 percent) due to their average height. For 28 percent of front-seat occupants, the horizontal distance between head and head rest was incorrect. This was mainly due to the back rest of the seat being positioned incorrectly.

Knowledge

Passenger car occupants proved to have an imperfect understanding of the correct positioning of head rests. This fact can be pointed to as the main cause of the frequent incorrect positioning. Their understanding of the function of the head rest and the phenomenon of whiplash can be viewed as adequate.

Proper adjustment not always possible

It has been shown that it is not possible to raise the head rests sufficiently in many cars.
If all front passengers were to adjust their head rest to the highest position, this would still not be sufficient in 46% of the cases.
This is an obvious point of attention for the industry as improper adjustment of head rests increases the chance of whiplash injury due to a rear collision.

This head rest is adjusted too low.

Head rests and seat belt height adjusters

Results of field research concerning the knowledge and use

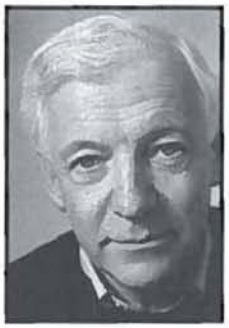
C.C. Schoon, M.L.J. Coïni & D. Burggraaf
R-95-19. 60 pp.
(in Dutch)

Technical aspects concerning the presence and use of head rests

C.C. Schoon
R-95-30. 44 pp.
(in Dutch)

Safety of bicyclists on *roundabouts* deserves special attention

Research has been conducted into three subjects that relate to the safety of roundabouts.
The first subject concerns the development of safety in the long term.
The results of a previous study gave the impression that, after some time, the number of road accident victims on roundabouts was again increasing.
This new study, in which the accident history of about 200 roundabouts was expanded by the years 1992 to 1994 inclusive, shows that safety is certainly not declining in the long term.



Jaap van Minnen, 59 years old, studied mechanics and psysics and has been working at the SWOV Institute for Road Safety Research as a researcher since 1965. His main field of interest is infrastructure and the development of a sustainably safe traffic system.

The expansion of the previously performed accident study again shows that replacement of an intersection by a roundabout reduces both the number (by 50%) and the severity of accidents. Also the replacement of an intersection controlled by traffic lights by a roundabout leads to positive results.
The study demonstrates even more clearly than the previous study did that - certainly on the somewhat busier roundabouts - a separate cycle path is almost always a safer solution than a cycle lane on the carriageway or the absence of a cycle facility. Replacement of intersections by roundabouts with separate cycle paths (cyclists do not have right of way) has led to an average decrease of the number of casualties by 90%.

Priority

The second subject concerns the regulation of priority for cycle traffic on separate cycle paths around roundabouts. In follow up to a study conducted in 1994 the road hazard on 17 roundabouts where cyclists have priority was compared with the road hazard on 62 roundabouts where cyclists do not have right of way.

Roundabout with seperate cycle track in the Dutch town Enschede. The bicyclists have right of way.

Again, it was determined that more accidents and road accident victims were registered, on average, on those roundabouts where cyclists had right of way. More than 90% of these victims related to cyclists and moped riders. The large variation in the number of road accident victims on these roundabouts represents an indication that the design and organisation of the roundabout could have a major influence on safety where this priority rule applies.

Apart from considering safety, this study also devotes attention to how the priority rule for cyclists influences the capacity of the roundabout for motorised traffic. Cyclists who have priority indeed exert a deleterious effect on that capacity, but this is only of significance with very busy roundabouts that carry a large volume of cycle traffic.

Uniformity

The third subject relates to the change in the priority rule for existing roundabouts that are older and generally somewhat larger. Accident studies on roundabouts where the priority rule was amended, whether or not in combination with (limited) reconstruction, offer a conflicting impression. The number of accidents continues to fall, while the number of road accident victims sometimes increases - and this generally relates to cyclists and moped riders.

Experts that have been consulted on this matter tend to be unanimous in their opinion that the priority rule should be linked to a reconstruction of the roundabout in the sense of radially-oriented approach roads, tighter curves and often narrowing of the carriageways. An analysis of the problem, which also involves the desired uniformity, led to the recommendation to impose priority for traffic on the roundabouts for all roundabouts in the short term, provided that a safe solution for cycle traffic is ensured at the same time. Depending on traffic intensities and the local possibilities, these will be in the form of separate cycle paths, flyover solutions or alternative cycle roads.

A full reconstruction of the roundabout is recommended, but in order to prevent a delay in the priority rule amendment, this could also be done at a later stage.

Rotondes en voorrangsregelingen

(Roundabouts and the priority rule)

J. van Minnen
R-95-58. 61 pp.
(in Dutch)

Developing a strategy to reduce the use of *motor vehicles*

The Dutch Ministry of Transport asked the SWOV and the Leyden Institute for Law & Public Policy to conduct a study under the project name: 'Innovative Strategies to Influence the Mobility of Motorists'. The objective of the project was to describe an innovative strategy on the basis of which a policy can be developed, to reduce the use of motor vehicles, with emphasis on the perception of the citizen.

This assignment was based on the observation that those measures which the government deems necessary to reduce the mobility of motorists do not correspond, or correspond insufficiently, with the needs of the individual citizen. The problems associated with motor vehicle use should concur with the personal experience and perception of the motorist. That is why the researchers have been guided in this exploration by the notion that the new approach to this policy subject should be based - more than is the case at present -

on communication and exchange between government and citizen. More specifically, the processes of exchange and negotiation between government and citizen has been emphasized, in order to realise the envisaged policy objectives.

Negotiated government

SWOV assumes that, given the nature of the policy subject, an abstract dialogue between government and the individual citizen at micro-level will have little effect. Therefore, there was explicitly chosen for policy making at meso level, where diverse government organisations negotiate and exchange with various 'organised citizens' and other social organisations. Only at such a meso level a worthwhile exchange agreement can be established between citizen and government. In this sense, a recent scientific debate is joined, entitled 'negotiated government', which refers to new, horizontal forms of government administration.

In view of the characteristics of this specific policy issue, the insights and study results derived from public administration science, organisational sociology, psychology and social marketing are used in this research. Using public administration and organisational sociology insights, the question is answered how exchange and structures of negotiation could work or could be developed within the given policy context. Using principles of psychology, it was investigated what relevant behavioural determinants are important, given an hypothesized exchange and negotiation situation. Various insights from social marketing were used to indicate how, within the context of negotiated government, different individual needs and preferences can be met.

Platform

The approach led to a plan that describes step by step how to organize a platform in which negotiated government can be formed. A further explanation of the method as described in the stepwise plan is offered, based on the application of this plan to an actual case, namely the region of Rijnmond, that contains the large mainport of Rotterdam.

Roelof Wittink is 47 years old and studied psychology at the State University of Groningen. He has been working at SWOV since 1979, firstly as a scientific editor, later as a researcher mainly involved with research concerning behaviour of road users and social marketing.

Onderhandelend bestuur

Een innovatieve strategie voor de ontwikkeling van automobiliteitsbeleid (Negotiated government: Innovative Strategies to Influence the Mobility of Motorists)

Dr. B. de Vroom & R. van der Ent (Recht & Beleid). Dr. Ch. Goldenbeld & R.D. Wittink (SWOV)
R-95-22. 76 pp.
(in Dutch)

Mopeds on the carriageway: a *safe* solution

Dutch law prescribes that moped riders should drive on the cycle track if there is one present, rather than on the carriageway. SWOV was asked to investigate whether it is safer to allow moped riders to use the carriageway designated for motor vehicles inside the built up area.

To this end, an accident study was performed in the form of a before and after study including trial and control sections, where registered injury accidents were subjected to an analysis. Three municipalities participated in the trial: Apeldoorn, Tiel and The Hague.

Trial

On November 1, 1991, moped riders were requested to move from the cycle track to the main carriageway on a number of roads inside the built up area of these municipalities. The before period included the last three years prior to introduction of the measure (November 1988 to October 1991 inclusive); the follow-up period included the years from 1992 to 1994 inclusive.

Less accidents

When the before and after periods of the study were comapred, the trial sections showed a marked reduction in moped accidents involving injury with reference to the increase in this type of accident on the control sections.

The number of moped accidents involving injury was reduced by 70% with respect to the before period on the trial sections, while on the control sections - analogous to the nationwide trend - a reduction of about 20% in this type of accident was shown. The same effect is shown for the number of accident victims, which was also reduced by almost 70%. In particular, collisions between mopeds and motor vehicles (at intersections) and between mopeds and cycles (on road stretches) were reduced considerably in number.

Because not all thinkable road types were included in the trial sections it is difficult to predict the exact effect of the measure 'moped on the carriageway' when the measure would be applied on a larger scale. SWOV is convinced that the effect will be positive; probably a little less than found in the trial sections.

Recommendations

Based on the results of the study, it is recommended to introduce the measure 'moped on the carriageway' on a larger scale. This is best realised by making 'moped on the carriageway' generally applicable in the Netherlands for locations inside the built up area.

The trial application of the measure 'moped on the carriageway' related only to road sections inside the built up area; no recommendations can be made on the basis of this study with respect to situations outside the built up area.

January 1996 a working group has been set up which is to draw up guidelines in mid-1996 indicating where and how the measure 'moped on the carriageway' should be applied.

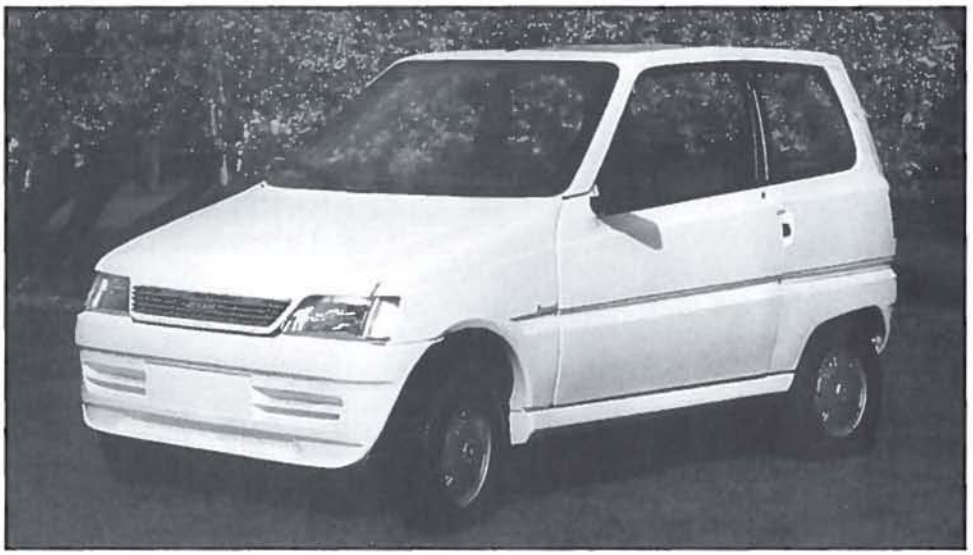
Bromfietsers op de rijbaan: ongevallenstudie

(Mopeds on the carriageway: Accident investigation)

M.P. Hagenzieker
R-95-33. 58 pp.
(in Dutch)

On this road in The Hague, which is part of the trial, mopeds have to drive on the carriageway.

The four-wheeled moped: a new *phenomenon* in the Netherlands



A new phenomenon on the Dutch road is the four-wheeled moped. A four-wheeled moped is a mini passenger car with a top speed of 45 km/h. In compliance with the guidelines of the European Union (EU), the four-wheeled moped should be admitted on Dutch roads; however, it is up to the member states to impose their own specific user rules. In the present situation in the Netherlands, a four-wheeled moped is permitted to use the cycle tracks; the minimum age for the drivers is 16 years.

The Ministry of Transport and Public Works has asked the SWOV to carry out an initial exploration of the consequences of introducing the four-wheeled moped in the Netherlands with respect to road safety. For this study most important information was obtained from importers of the four-wheeled mopeds, from sister organisations of the SWOV in France, Italy and Belgium and from the Road Traffic Division of the Dutch Ministry of Transport and Public Works.

Market

It was established that the prime target group consists of people aged from fifty-five to sixty and above, who do not possess a driving licence. The selling price of a four-wheeled moped is high in comparison to a small passenger car. For this reason too, the number of vehicles on the road is expected to remain small overall (sales on an annual basis of 500 to 700 of such cars).

Safety

In France, the risk figure (injury accidents per 10^9 vehicle kilometres) is higher for the four-wheeled moped than for the passenger car. Relatively many accidents occurred with left hand turning manoeuvres and when crossing the road.

If seat belts are worn and the four-wheeled moped is not used in an environment where speeds above 50 km/h are permitted, the four-wheeled moped offers a reasonable degree of safety to its occupants; the sides of the four-wheeled moped appear to be the weakest element.

Restrictions

It was concluded that the four-wheeled moped does not fit into the development of a sustainably safe road and traffic system. After all, this system is designed to make traffic situations simpler and clearer, also by restricting the number of vehicle types on the road. The arrival of the four-wheeled moped in contrast implies an expansion in scope. It is therefore desirable to restrict the user options such that their use does not lead to hazardous situations.

With respect to use, it is recommended to prohibit admission of the four-wheeled moped to cycle paths. Inside the built up area, the four-wheeled moped could in principle only be permitted on roads with a maximum speed of 50 km/h;

outside the built up area, the four-wheeled moped should not be permitted at all.

Drivers of these vehicles should have a specific type of driving licence; it is recommended to set the minimum age for driving a four-wheeled moped at eighteen years. With respect to the vehicle, it is recommended to introduce a vehicle document for the four-wheeled moped for purposes of enforcement, and to devote extra attention to the recognition of this category of vehicle by fellow road users.

Verkeersveiligheidsconsequenties van de brommobiel

(Road safety consequences of the four-wheeled moped)

C.C. Schoon & P.C. Noordzij
R-95-31. 32 pp.
(in Dutch)

SWOV REPORTS IN BRIEF

SWOV carries out research concerning road safety. Our main client is the Dutch Ministry of Transport and Public Works. Therefore, most reports are written in Dutch. Sometimes however when research is carried out e.g. for the EU or other international bodies reports are written in English. SWOV researchers also participate in international conferences, workshops and seminars and contribute to international journals. These contributions are normally written in English, sometimes in German or French. Some of those are published by SWOV.
In this quarterly the available reports in English, German or French are mentioned and a summary of the contents is given. Also some Dutch reports are summarized.
The complete reports can be obtained by writing a letter or sending a telefax to Sandra Rietveld of the public information department of SWOV.

Safety devices in passenger cars

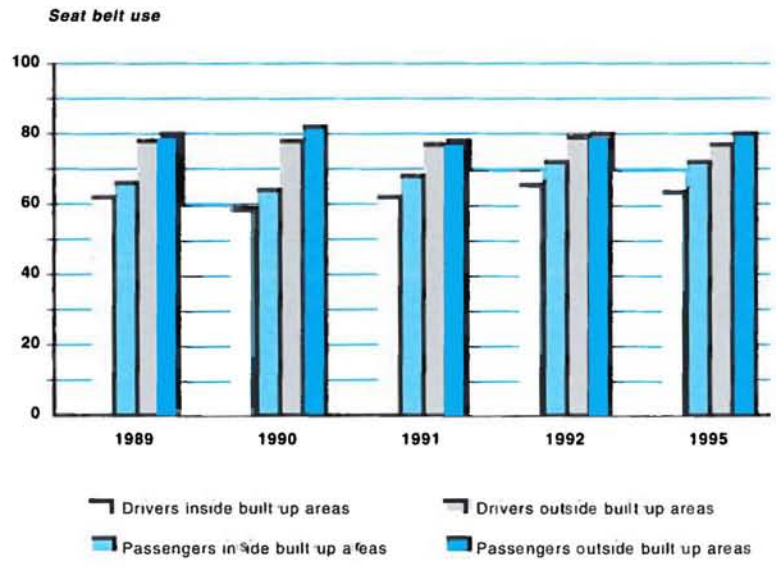
The presence and use of seat belts, children restraint systems and head rests
J.A.G. Mulder. R-95-20. 129 pp.
(in Dutch)

Surveys on the presence and use of seat belts by drivers and passengers on the front seats of passenger cars are almost yearly conducted by SWOV since 1968. The surveys were extended to seat belts on the back seats and to children restraint systems since 1989. All of these studies were conducted on behalf of the Dutch Ministry of Transport.

Data were gathered in actual traffic by observations at traffic lights on several types of roads and by setting up an inquiry into a part of the observed drivers and passengers. The main conclusions of the survey are that since 1992:

- *the use of seat belts by drivers and front seat passengers did not actually change. About 30% of the motorists is not wearing a seat belt;*
- *the use of seat belts by back seat passengers has dropped considerably. from 34% in 1992 to 27% in 1994;*
- *the use of children restraint systems is still high and has even increased to a certain extent: 94%;*
- *head rests present are at best adjusted in a proper way only half.*

It is recommended to pay more attention to the necessity of (proper)



seat belt use. The increase of seat belt use has good prospects as can be seen from foreign experiences. A combination of information and enforcement campaigns is the proper way to realise this.

Besides people should be better informed about the benefits of proper adjusted head rests. Moreover technical improvements can be considered which can help overcome certain often mentioned problems by drivers and passengers like discomfort, forgetfulness, etc.

Module for evaluating traffic safety consequences of transport and traffic prognoses

F. Poppe. R-95-21. 29 pp.
(in Dutch)

The Ministry of Transport, Public Works and Water Management and the Ministry of Housing, Spacial Planning and Environment, have ordered the development of a module (called EVV) for evaluating transport and traffic prognoses on various aspects. Commissioned by the state, SWOV, together with a firm of consulting engineers called AGV has executed a so-called 'definition-study' into the possibilities of incorporating a traffic safety module into the EVV. To answer policy questions main aggregated figures should be available. To compute these figures, more disaggregated risk figures are needed. The report points out how, from the need for main aggregate figures, it can be figured out which risk figures are needed.

These risk figures can be split into figures for road sections, for intersections, and for inner regions (traffic space not part of the evaluated network). The report further deals with differences between various types of roads, and between figures for motorized traffic and for bicycle traffic etc.

Also attention is given to the problems attached to the development of traffic risk over time, for the general traffic safety level as well as for the different parts (road type etc.).

The use of daytime running lights (DRL) in the Netherlands: November 1989 to December 1993, inclusive

A documentation on the field research
J.E. Lindeijer & F.D. Bijleveld.
R-94-88. 47 pp.
(in Dutch)

From November 1, 1989 to the end of December 1993, monthly measurements were conducted at various locations in the Netherlands to investigate the use of daytime running lights (DRL).
The measurement programme and measurement network that commenced in 1989 underwent various changes in the course of time. The introduction of these changes related in part to the cost of the project, in part also to the political uncertainty as to whether DRL would be introduced as a compulsory road safety measure.

In anticipation of the possibility that DRL may still be considered for introduction as a compulsory measure in the future, this report documents the following subjects:

- *the setup and execution of the measurement programme and the measurement network;*
- *the changes introduced over time, both in the measurement programme and in the measurement network;*
- *the arguments which formed the basis of the choices that needed to be made;*
- *justification of the quality control of the data collected;*
- *justification of the value of the data as an instrument to estimate the use of DRL in the Netherlands.*

In general, it can be concluded that the use of DRL has only increased to a limited degree, taking into account all circumstances which may be of influence.

Advanced driving courses in the Netherlands

An inventory of advanced driving courses for motorists, motor cyclists and of courses for moped riders, conducted in the summer of 1995
Dr. Ch. Goldenbeld. R-95-48. 172 pp.
(in Dutch)

The field of advanced driving courses in the Netherlands was explored. Most courses are one-day courses, with emphasis placed to a greater or lesser degree on vehicle control or on the prevention of accidents. With training courses for motor cyclists, the public road is often used for practical lessons.

The advanced driving courses in the Netherlands can contribute to a modest degree to road safety when considered in the short term (one or two years). 'Modest' in the sense that only a small proportion of Dutch

drivers per year follow these courses (amongst motor cyclists less than 4%, amongst motorists less than one half percent) and also modest in the sense that the one-day courses generally available offer a limited opportunity to learn new reliable automatic behaviour patterns; furthermore, these courses can only cover part of driving behaviour overall.
In order to make a significant contribution towards road safety, six conditions are of importance:

1. *A good quality programme/ instructor.*
2. *A relatively high number of kilometres driven by the target group annually, or frequent exposure to those potential hazardous situations dealt with during the training course.*
3. *No biased emphasis on vehicle control; besides attention to vehicle control skills, also attention to road safety attitudes.*
4. *Use of the group process, e.g. by way of group discussion, to develop norms of safe driving.*
5. *Voluntary participation. the authority of the instructor must be accepted.*
6. *Ensure that the course suits the target group.*

Recent development in the road safety of low speed mopeds

P.C. Noordzij. D-95-14. 11 pp. (in Dutch)

Characteristics of accidents involving mopeds and low speed mopeds

P.C. Noordzij. R-95-28. 27 pp. (in Dutch)

SWOV has made two reports on the safety of the riders of mopeds and low speed mopeds. In report R-95-28 an extensive description is offered of victims of serious accidents involving mopeds and low speed mopeds and of the characteristics of these accidents. The description of the accidents is dealt with on the basis of the road situation. Report D-95-14 describes the recent developments in the safety of the low speed moped rider. Since 1985 the number of killed and injured low speed moped riders has been increasing.
Since 1990 it is especially a problem of the young drivers (16 and 17 years old). In the Netherlands the riders of low speed mopeds have to be 16 years old. Wearing a helmet is not compulsory and they don't need any kind of license. The maximum speed is 25 km/h. It was found out that a lot of mopeds and low speed mopeds in the Netherlands are tuned up which is one of the main causes for the unsafety of this type of road user.

The leading role

An analysis of a sustainably safe behaviour
P.C. Noordzij & R.D. Wittink (SWOV). T. Rooijers (VSC). H. Korbee (AGV). R-95-49. 142 pp. (in Dutch)

The present traffic system offers ample opportunity for hazardous encounters, and this is viewed as the underlying cause of road accidents. The proposals given to bring about a sustainable safe traffic and transport system represent the basis for four design rules that have been formulated to combat the underlying causes:

- *avoid unnecessary use of the traffic and transport system, i.e. minimise the number of kilometres driven,*
- *avoid unnecessarily hazardous road use, i.e. employ the safest possible vehicles over the safest possible road by the most suitable users;*
- *when using the system, exclude or minimise hazardous encounters and make the remaining encounters manageable for road users; protect road users against injury in the event of a collision;*
- *no disruptions to the system or unintended use of the system.*

With the application of these rules to the behaviour of road users, it has been demonstrated that such behaviour should exhibit four characteristics:

1. *Users must have an understanding of, and agree with, the organisation of the road network. Road users must feel that their needs are being met and hence be prepared to adhere to the conditions and limitations associated with the use of the road.*
2. *When choosing modes of relocation, users must consider the inherent safety for themselves and for others.*
3. *Users must have at their disposal the knowledge and skills needed to deal with the system and take into account the interests of other road users.*
4. *Users should be able to handle emergency situations.*

The applicability of the existing theories and models used to analyse

and influence behaviour in traffic has been investigated. In the report a description is given of what is needed to make the transition from current behaviour in traffic towards the desired situation as part of a sustainable, safe transport and traffic system.
The final part of the assignment investigates what forms of behaviour modification are needed to assure the sustainable, safe conduct of road users.

The mentor system: how promising is it?

Advantages and disadvantages and practical implications of a mentor system as an integrated part of the policy of transport companies to prevent accidents and material damage
J.E. Lindeijer. R-95-55. 83 pp. (in Dutch)

Young lorry drivers form a group that carries an increased traffic risk, both for themselves but, more particularly, for others. This situation could be improved by introducing a so-called mentor system, implying that novice drivers receive practical guidance from a more experienced driver for a particular period of time. Young drivers are then periodically examined in fields such as driving skill, safe driving behaviour and customer awareness.
A SWOV study on this subject shows the following:
Advantage subject to condition: a guidance system offers optimal returns (low damage pattern, reduced absenteeism and fuel consumption), provided the company culture is based on mutual respect and good cooperation - in thought and deed - at all levels within the organisation (people-oriented management).
Disadvantages: a mentor system as a separate element of a quality policy which is only aimed at taking driving skill tests, offers less return.
The relationship between cost and benefit soon becomes (too) unfavourable in that case.
The following factors play a role in this:

- *efforts invested in a change in company culture are time consuming and hence costly, people do not change from one day to the next. A long-term investment should be taken into account.*
- *a periodical driving skill test is aimed at maintaining existing knowledge and skill. Professional drivers need more. This added value is offered by safety training courses, which should therefore form part of an overall guidance system, whether organised internally or externally. Attention should also be paid to training in emotional stability and immunity to stress.*

Added value: it appears that only a fraction of the total damage sum sustained by transport companies relates to traffic accidents involving (severe) injury. The greater majority of damages is due to material damage, sustained on the public road or otherwise.

Based on these data, the added value of a mentor system for companies will be mainly of economic significance. The greatest gain (in terms of a reduction in damage) is anticipated from companies that at present apply a sanction-oriented policy.

COLOPHON

SWOV Research Activities is a magazine on road safety research, published twice a year by the SWOV Institute for Road Safety Research in the Netherlands.

SWOV Research Activities contains summaries of research projects carried out by SWOV.

Editor: Anita van der Vorst
Photographs: Paul Voorham
Design and lay out: Additief, vormgeving en reclame, Zoetermeer
Print: Drukkerij Bestenzet, Zoetermeer
Publisher: SWOV Institute for Road Safety Research
P.O. Box 170,
2260 AD Leidschendam
The Netherlands
Tel: +31 70 3209323
Fax: +31 70 3201261

Free copies are available from the publisher. Please send suscriptions and address changes to the publisher.

ISSN: 1380-703X