



Means of stimulating the voluntary use of bicycle helmets

The Ministry of Transport has asked SWOV to gather knowledge about the possibilities of promoting voluntary use of bicycle helmets in the Netherlands. SWOV carried out three studies: a literature study of the developments abroad, a study of the potential contribution of various parties and organisations towards promoting the use of helmets and an interview study held amongst some potential cyclist target groups.

According to the records of the principal diagnosis for hospital admission following a traffic accident each year over 2300 cyclists in the Netherlands suffer head or brain injury. Every year, about 1000 young cyclists (0-19 years of age) sustain a head or brain injury during a traffic accident. For cycle victims aged 0-19, the proportion with head or brain injury represents about 50% of all hospitalised road

accident victims. Head or brain injuries sustained by cyclists are considerably more often the result of unilateral accidents, rather than the result of a collision with a motor vehicle. According to Thompson et al (1989), cyclists who do not wear a helmet have a 6.6 times greater probability of sustaining a head injury and are 8.3 times more likely to suffer brain injury than cyclists who do wear a helmet. According to these data, therefore a reduction by a factor of 8 in the annual number of cyclist victims with brain injury could be achieved if all cyclists were to wear a helmet!

Experiences with stimulating the use of helmets overseas

The experiences gained overseas in stimulating cycle helmet use indicate the important role played by the following factors:

the spontaneous activities and efforts of civil activists and volunteers;

- *aside from attention given to helmet use in the mass media, much attention has also been devoted to the cycle helmet in local projects, in which government and private organisations tended to collaborate;*
- *funding schemes where helmets are offered at reduced prices;*
- *a broad range of attractive, colourful and sporty cycle helmet designs;*
- *clarity about the safety standards which a bicycle helmet should meet.*

The results of the study into contributing factors

By means of individual interviews and a group discussion, it was attempted to gain an insight into the activities which various organisations are prepared or able to undertake to promote the use of bicycle helmets. The principles adopted by the government organisations are as follows. Helmet use for bicyclists is not compulsory. The voluntary choice to wear a helmet should not be obstructed by the lack of social acceptance of helmet use. Therefore, it is advisable to consider how to stimulate helmet use amongst cyclists in the Netherlands. In addition, it was stated that the stimulation of helmet use should be made

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dependent on knowledge yet to be acquired about risky cycling conditions.

The private (public interest) organisations presently do not wish to stimulate the use of cycle helmets through controlling policy. They make the following critical comments: Stimulating the use of the cycle helmet:

- could have a negative side effect in that an unjustified link may be established between cycling and danger;
- could have a negative side effect in that cycle use may drop;
- does not fit well into current government policy, which primarily focuses on the prevention of accidents and on promotion of bicycle use.

In addition, there is still insufficient clarity about the requirements that a good cycle helmet should satisfy and the degree of protection expected or demanded from the helmet.

Those organisations who are concerned with the safety of specific cyclist groups do have a positive attitude towards the use of helmets (touring cyclists and racing cyclists) and also offer information and advice on this subject. The organisations involved in general safety and health differ in the attention they wish to devote to the cycle helmet.

The results of the interview study

In the cycling experience of adults and youthful cyclists two types of cycling are clearly distinguished: everyday cycling, which is only intended to achieve the practical purpose of transport and recreational cycling, which places great emphasis on the elements of sportiness, adventure and physical relaxation. In regard to everyday cycling, people believe that the helmet represents an outward symbol of ineptitude, weakness or exaggerated fearfulness; they suspect the helmet will be uncomfortable; they say they feel 'stupid' if they stand out in a crowd



wearing the helmet with ordinary clothes and they are not interested in trying out the helmet. For sporty, adventurous cycling purposes, the helmet could be considered as a standard and useful part of the total cycling equipment, the helmet represents an outward expression of skill, rather than ineptitude, the helmet fits into the image that one wants to present to others, people feel 'tough' or 'sensible' wearing the helmet, rather than 'stupid', and persons who have never worn a helmet feel some inclination towards trying the helmet during holiday trips or rough terrain cycling.

Conclusion: adults and children have no, or hardly any, intention to voluntarily wear a helmet during everyday cycling. With more adventurous forms of cycling, they are more inclined to wear the helmet, provided they are riding a special cycle and also wearing special, matching clothes.

Potential for the government

To promote helmet use in the Netherlands, the government could offer support to the following activities:

- research (accident study, market-oriented study, product study);

- local projects where the cycle helmet is promoted as a means of intervention (special price offers, cycle promotion teams, local safety projects);
- traffic education where special attention is devoted to the cycle helmet;
- development of special facilities to enable storage of the helmet.

In the short term, it would seem that in particular special price offers, perhaps in combination with education campaigns, offer the best means of promoting helmet use. In the longer term, the promotion of helmet use would certainly be served by product assessment and improvement (by means of research) and by the development of special facilities.



Mogelijkheden van het stimuleren van vrijwillig gebruik van fiets-helmen

(Means of stimulating the voluntary use of bicycle helmets)

Dr. Ch. Goldenbeld &
drs. R.D. Wittink
R-93-53, 48 pp.

(only available in Dutch)

The influence of risk of detection and fines on traffic offenses

What theoretical model can be formulated which represents as effectively as possible what is presently understood about the influence of the severity of punishment and likelihood of detection on the degree to which road users commit traffic offenses. By carrying out a literature study SWOV tried to answer the above question.

Firstly the deterrence theory was considered. The deterrence theory offers a theoretical framework for understanding the influence of punishment and risk of detection on traffic offenses. Deterrence in a rigid, restricted sense includes only one underlying, explanatory process, namely deterrence through fear for legal consequences. In addition, other psychological and social processes can exert a deterrent effect such as the fear of social stigma associated with punishment.

In addition a theory on planned behaviour as applicable to traffic offenses was described. According to the theory of planned behaviour, the intention to carry out a certain action is determined by the attitude towards that action, the observed social standards with respect to that action and the control one believes one has over performance of that action (perceived behavioural control). Study has shown that the intentions to drive under the influence and to speed could be reasonably well predicted on the basis of these factors. The intention to tailgate and to overtake in a dangerous manner could not be predicted as accurately. The factor of perceived behavioural control proved to be a particularly strong predictor of the intention to drive under the influence or to drive too fast. The next step was to consider various field studies.

Driving under the influence of alcohol

Important conditions for reducing driving under the influence are that new legislation and/or intensified enforcement is accompanied by the

necessary publicity and that the detection methods made possible through legislation and the judicial penalties are also consistently applied. In particular, the enhanced subjective risk of detection is considered responsible for the effectivity of legislation and police enforcement, to a lesser degree or not at all, the change in the severity of punishment. Overseas study has shown that stable forms of deterrent are possible.

In Sweden and Norway, stable deterrence seems to have resulted from a combination of legislation and social standards with respect to driving under the influence. In the United States of America, a reduction in driving under the influence was realised through a complex contribution of cultural, social, political and perhaps also economic factors. In Australia, a suitable deterrent effect was achieved through the rigorous application of specific forms of police enforcement, where motorists were stopped at random in order to undergo a (compulsory) breath test.

A study conducted in New South Wales showed proof for all links in the causal chain of the deterrence process. The survey study into the process of deterrence illustrated that deterrence should not only be understood in terms of fear for the possible legal consequences of behaviour, but also - and perhaps more strongly - in terms of informal social sanctions which can follow behaviour and in terms of the conscience of the person involved.

Seat belts

After introduction of new legislation which made the wearing of seat belts compulsory, use of the seat belt increased markedly. When the legal obligation was subsequently reinforced by making non-wearing of seat belts punishable by law and through enforcement of compliance, seat belt use increased further, reaching wearing percentages of 60 to 80%. Study has shown that seat belt use not only results from a positive attitude with regard to the wearing of a seat belt, but also from a positive attitude with regard to legislation and social standards concerning seat belt use. There are also strong indications that the initial seat belt use realised under the minor threat of legislation (and possible enforcement) rapidly leads to habitual behaviour and therefore becomes preferential behaviour.



Speeding

Dutch and foreign study into the effect of police enforcement on speeding offenses demonstrate limited, time and place associated effects. Speeding behaviour seems more difficult to influence than driving under the influence. Exceeding the speed limit is encouraged because the speeding behaviour of others is imitated, because cars are becoming increasingly faster and more comfortable, because speeding behaviour occurs in response to motivations such as 'being in a hurry' and 'driving pleasure' (since the risk of detection can be influenced even while driving) and because the relationship between speed and risk of accident is not immediately evident.

Then the cognitive decision making theories which may be relevant in the field of traffic-related

study into offences were considered. The prospect theory represents a descriptive theory of decision making. Important notions are that people define decision making problems in terms of gains and losses, that people tend to take risks more easily if they must choose between losses rather than choose between gains and that more value is attached to guaranteed returns than to unguaranteed returns. Decision making in traffic also involves decisions concerning risk taking. The studies concludes with a discussion. A general model is drawn up of the individual factors which determine how road users experience punishment and risk of detection and how they respond. Finally, a number of conclusions and recommendations are given for the further development of models relating to traffic offenses.

De invloed van pakkans en straf op verkeersovertredingen

Een inventarisatie van onderzoek en modellen over de mogelijke relaties tussen bestraffing, pakkans, beslissen en verkeersovertredingen

(The influence of risk of detection and fines on traffic offenses; an inventory of research and models concerning the possible relationships between punishment, risk of detection, decision making processes and traffic offenses)

*Dr. Ch. Goldenheld
R-94-15, 121 pp.
(only available in Dutch)*

Workshop for *Russian* specialists organised by SWOV

It is to be expected that a sharp increase in private motorised traffic in Central and Eastern European Countries will lead to an increase in road accidents and casualties. Furthermore, it is to be expected that road safety measures could reduce road accident casualties even under the condition of mobility growth. There is a need for support

from Western countries to combat the road safety problem.

During the past few years SWOV has made contact with researchers and policy makers from different countries. With several countries SWOV has signed a Memorandum of Understanding, in which the wish to cooperate is assigned. In this context the Hungarian Research

Institute KT has asked the SWOV to develop a proposal for a point demerit system in Hungary.

The proposal SWOV has made is described elsewhere in this magazine. As a result of the bilateral agreement between SWOV and Transconsulting from Russia, SWOV will organise a one week workshop for a group of twenty Russian managers and specialists in the field of road safety. The workshop will be held in November this year and the subject will be the main characteristics of road safety in The Netherlands. The goal of this programme is to disseminate knowledge and experiences to the Russian participants about the Dutch road safety system. The purpose is also to discover the possibilities of cooperation between The Netherlands and Russia.

Representatives of Transconsulting (l) and SWOV (r) signing the workshop contract.



Differences and similarities between European drivers in opinions about traffic measures

As the result of a collaborative effort of 15 research institutes, led by the French Institut National de Recherche sur les Transports et leur Sécurité (INRETS), a representative survey was conducted in 15 European countries. This project was named 'SARTRE' which stands for 'Social Attitudes to Road Traffic Risk in Europe'. This survey covers a wide spectrum of biographical driver data as well as opinions and attitudes to practically all subjects of road safety. More specifically, the survey focuses on the following subjects: drivers road behaviour, attitudes and opinions concerning drinking and driving, speeding and seat belt use, opinions on accident causation and on traffic measures, experiences with police enforcement, perceptions of behaviour of other drivers, car preferences, experiences with driving in foreign countries and risk perception. Altogether more than 17,000 drivers participated in the survey.

Purpose of this research is to make comparisons between countries, to study determinants of traffic behaviour and to determine a degree of social support for different traffic measures. An important aim of this survey is to assist European policy makers in their decision making about traffic legislation measures and campaigns.

It is important to answer the following questions:

- are there important national differences with regard to opinions, attitudes and behaviours concerning traffic?
- how can we describe or interpret the dimensions along which European car drivers differ?
- which grouping of European countries are similar or dissimilar on a particular dimension?

The main conclusions are as follows:

Degree of strictness

Regarding the opinions on different traffic issues it can be conceptualized as the degree of strictness in matters of traffic safety. The more 'strict' countries (Sweden, Denmark) prefer relatively low speeds on motorways and an obligation for daytime running lights, they consider seat belt use absolutely necessary and they tend to reject the individual freedom

to drink and drive. For the relatively speaking, less 'strict' countries (Italy, Portugal, France), the opinions on these issues tend to be less outspoken or to be in the opposite direction.

Relation with economic prosperity

There is a partly but not perfectly correlation with the economic prosperity of the countries: on one side are relatively poor countries (Hungary, Czechoslovakia, Ireland) who are very much in favour of an improvement of the quality of their roads, whereas the richer countries (Germany-West, Switzerland, Austria) on the opposite side of the dimension are more concerned with restricting speed in residential areas and in towns.

Speed limits

Questions on speed and speed limits in towns and on main roads show that English and Irish drivers prefer lower limits on these types of roads than Hungarian or Czechoslovakian drivers.

But there are more differences:

- it was found that Swedish and Danish drivers prefer relatively low speed limits on motorways in contrast to German, Italian and Austrian drivers,

- German and Dutch drivers prefer low speed limits in towns and in residential areas; on the other extreme we find Hungarian, French and Portuguese drivers who tend to prefer somewhat higher limits in these areas;
- concerning the opinion on the maximum speed limit on main roads and on the causes of accidents: the countries that tend to attach little importance to speed as an accident cause (Hungary, Czechoslovakia), prefer a higher speed limit on the main roads.

Clusters of countries

Instead of interpreting the results as done above, it is also possible to think of them as indicating a network of opposing clusters of countries where specific issues give rise to specific oppositions between groupings of countries. Seen in this way the results have revealed the following opposite clusters of countries:

- Sweden and Denmark versus Italy and France.

Topics of difference: obligation of daytime running lights, speed limits on motorways, attitude towards seat belt use, freedom in drinking and driving.

- Sweden and Denmark versus Germany-West, Austria, Switzerland and Italy.

Topic of difference: speed limits on motorways.

- Hungary, Czechoslovakia, United Kingdom, Ireland versus Germany-West, Austria and Switzerland.

Topic of difference: need for improvement of roads, minimum age 17 for driving and speed limit in residential areas.

- Hungary and Czechoslovakia versus United Kingdom and Ireland. *Topics of difference:* preferred alcohol limit, speed limits in towns and on main roads.

General conclusions

The more general conclusions about international differences in opinions, attitudes and behaviours concerning traffic and traffic regulations are:

- *When only speed related opinions, attitudes and behaviours are taken into account, international differentiation is to a large extent dominated by differences of opinion on the preferred speed limits on different types of roads. The questions about speeding behaviour, causes for accident, technical devices for restricting speed, experiences with speed enforcement, engine size and about yearly amount of kilometres driven were not important in differentiating between the European countries on these two dimensions.*
- *When several measures are taken into account, differences of opinion on preferred speed limits are still very important in characterizing international differentiation.*
- *The most general conceptual dimension of international differentiation includes opinions on several traffic measures (speeding limit on motorways, seat belt use, drinking and driving, the obligation of daytime running lights). This means that a more general attitude towards traffic safety can be postulated rather than several, independent attitudes towards specific issues.*
- *Differences of opinion about the speed limit on motorways, the speed limit in towns and in residential areas, and about the speed limit on main roads, are reflected in different dimensions of the analysis. This means that general tendency to prefer either high limits or low limits, irrespective of the type of road, is not typical for most of the European countries. In other words, the international differences of opinion about the speed limits change with the type of road that is being considered.*
- *The questions about the harmonization of speed limits*



throughout Europe show more general agreement on 'harmonized' limits than on 'the most subjectively preferred' limits.

- *There is a close correspondence between official traffic legislation and public opinion. E.g. the citizens of countries that have a legal obligation of daytime running lights or that legally require a minimum age of 17 years for driving a car, tend to favour these regulations, whereas citizens of other countries who lack these regulations tend to disapprove of these regulations. Likewise, the differences of opinion about speed limits on different types of roads, are associated with existing differences in speed limits.*

Is a European traffic policy possible?

What are the possible implications these results for the development of an European traffic policy?

On one hand, some differences between countries seem to reflect a more general attitude towards traffic safety. This attitude may include deep-seated beliefs about the role of state interference and of individual responsibility in the traffic area. It may be difficult to find a middle ground between countries who differ in overall traffic philosophy as seems to be the case in the division between Scandinavian and Mediterranean countries. In this case, it may be difficult to find a compromise between these countries since their fundamental assumptions about the responsibility and the duty of the state and the individual citizen for traffic safety may differ far too much.

It may be worthwhile for European countries to have a more general discussion about these assumptions before embarking upon the negotiation of specific issues or measures.

On the other hand, differences between countries may reflect very concrete, specific interests without too much ideological sub currents. Such a concrete, business-like interest seems to be the concern of Hungary and Czechoslovakia for road improvement or the concern of Germany-West for restricted speeds in residential areas. These specific, concrete interests may prove to be a good starting point for initial negotiations.

Finally, it may be asked how the close correspondence between official legislation and public attitudes and opinions has come about. Did public opinion or social climate lead to the political acceptance and implementation of specific measures? Or did public experience with the law and its results lead to endorsement of its underlying message?

Following the lead of several authors we surmise that both these processes have been at play. Generally, there will be a base of social support for a measure before its actual enactment; after the implementation of the measure, the social support for it may grow even stronger as the result of experiences with its enforcement.

The law may even create a new social norm. The creation of such a new norm is certainly not an automatic process, but depends in part on the degree to which the law

is perceived as reasonable, is promulgated by legitimate authority and is impartially administered.

For some measures, e.g. the obligation of daytime running lights or a common limit of 30 km/h in residential areas, the base of support is strong in some specific countries, but very weak in many others. Obviously, an initial broad base of support for a particular measure would have to exist before a discussion about its acceptance and implementation can be useful. However, a broad base of support

does not necessarily mean majority support. It is conceivable that moderate or low support for a certain measure can be enhanced by persuasive communication or by experiences with or feedback about the positive results as a consequence of the new measure.

The other side of the medallion is that measures for which a majority support exists, may lose their appeal if they are not strictly and consistently enforced. If road users observe that many other road users violate a certain regulation without

any consequences as a result of this violation, they may come to doubt the necessity or the reasonableness of the new regulation.

Differences and similarities between European drivers in opinions about traffic measures

A cross national study of the results of the SARTRE-survey

*Dr. Ch. Goldenbeld
R-94-9, 68 pp.*

(only available in English)

Regionale Unterschiede und Ähnlichkeiten in Meinungen über den Verkehr in der Schweiz

Auf Ersuchen des Schweizer Büros für Unfallverhütung (BPA/BFA) wurde beim SWOV auf Grund der SARTRE-Daten eine Analyse der Unterschiede zwischen den drei Sprachgebieten in der Schweiz in bezug auf verkehrsbezogene Meinungen, Einstellungen und Verhaltensweisen erstellt.

Die Untersuchung konzentrierte sich auf Kraftwagenführer aus Schweizer Regionen und benachbarten Grenzgebieten.

Insgesamt gab es 1.749 Respondenten.

Es stellte sich heraus daß die Unterschiede zwischen verschiedenen Schweizer Regionen kleiner sind als die Unterschiede zwischen Schweizer Regionen einerseits und anderssprachigen Grenzregionen andererseits. Bei den Schweizer Regionen finden sich die größten Unterschiede zwischen der deutschen Schweiz und der italienischen Schweiz, während die französische Schweiz eine Mittelstellung zwischen diesen beiden Regionen einnimmt.

Die deutsche Schweiz und die italienische Schweiz liegen in einem ziemlich großen Abstand voneinander. Die deutsche Schweiz und die italienische Schweiz zeigen eine divergierende Tendenz hinsichtlich

Themen wie:

- Verbesserung der Straßenverhältnisse;
- Geschwindigkeitsbegrenzer, mit dem Geschwindigkeitsüberschreitungen nicht möglich sind;
- Erforderliche Strenge bei Polizeikontrollen;
- Schwierigkeitsgrad der Standardfahrprüfung.

Im Vergleich zur deutschen Schweiz ist man in der italienischen Schweiz eher für eine Verbesserung der Straßenverhältnisse, für eine Höchstgeschwindigkeit von 50 Km/S in Wohngebieten, für strengere Polizeikontrollen und für eine schwierigere Standardfahrprüfung, außerdem

wissen relativ mehr Respondenten noch nicht, ob sie für ein Gerät sind, mit dem der Fahrer eine bestimmte Höchstgeschwindigkeit nicht überschreiten kann.

Die französische Schweiz nimmt eine Mittelstellung zwischen der deutschen und der italienischen Schweiz ein. Je nach Themenkreis schwankt die französische Schweiz stark zwischen den in der deutschen bzw. der italienischen Schweiz vorherrschenden Standpunkten. Hinsichtlich der Themen der erforderlichen Strenge bei Polizeikontrollen, der Verbesserung der Straßenverhältnisse und des Schwierigkeitsgrades von Fahrprüfungen neigt die französische Schweiz eher zur Ähnlichkeit mit der deutschen als mit der italienischen Schweiz.

Auf andere Sachen liegen die französische und die italienische Schweiz nahe beieinander. Im allgemeinen stimmen die Respondenten aus diesen beiden Gebieten mit einander überein, wenn es sich handelt um Höchst-

geschwindigkeit in Wohngebieten, Verpflichtung zum Tragen von Sicherheitsgurten auf Vorder- und Rücksitzen, Verpflichtung zum Einbau eines dritten Bremslichts und Präferenz für einen Geschwindigkeitsbegrenzer, mit dem die Höchstgeschwindigkeit nicht überschritten werden kann.

Geschwindigkeit

Aus der Analyse der Fragen über Geschwindigkeit und Geschwindigkeitsübertretungen lassen sich die folgenden Schlußfolgerungen ziehen:

- *Es lassen sich zwei Gruppen unterscheiden, nämlich einerseits die Gruppe der Schweizer Regionen und andererseits eine Gruppe mit ausländischen Regionen.*
- Im Vergleich mit ausländischen Respondenten haben die Schweizer Respondenten häufiger Fahrzeuge mit einer Motorgröße von über 2000 cc, sind sie eher für mäßige Höchstgeschwindigkeiten auf Landstraßen, sind sie häufiger gegen ein Gerät, mit dem eine gewisse Geschwindigkeit nicht überschritten werden könnte und berichten sie seltener Verstöße gegen die vorgeschriebene Höchstgeschwindigkeit in Wohngebieten.*
- *In der italienischen und der französischen Schweiz ist man weniger häufig für eine niedrige Höchstgeschwindigkeit in Wohngebieten als in der deutschen Schweiz und in Deutschland-Süd.*
- *Sowohl in der deutschen Schweiz als auch in Deutschland-Süd besteht eine Präferenz für eine niedrige Höchstgeschwindigkeit in Wohngebieten, jedoch herrscht keine einheitliche Meinung über die angemessene Höchstgeschwindigkeit auf Landstraßen.*
- Deutschland-Süd und Frankreich-Ost bevorzugen eine etwas höhere Höchstgeschwindigkeit auf Landstraßen als die deutsche und die italienische Schweiz.*
- *In den italienischsprachigen Regionen wird dem Leistungsvermögen eines*

Kraftfahrzeuges mehr Bedeutung beigemessen als in den französischsprachigen Regionen.

Gleichsprachigen Regionen

Zwischen gleichsprachigen Regionen konnten verschiedene Ähnlichkeiten hinsichtlich Meinungen oder Einstellungen festgestellt werden. Deutschsprachige Regionen bevorzugen eine niedrige Höchstgeschwindigkeit in Wohngebieten, während französisch- und italienischsprachige Regionen für eine höhere Höchstgeschwindigkeit sind. In den italienischsprachigen Regionen wird dem Leistungsvermögen eines Kraftfahrzeuges mehr Bedeutung beigemessen als in den französischsprachigen Regionen. Es ist durchaus möglich daß interkulturelle Kontakte zu den beobachteten Ähnlichkeiten beigetragen haben können.

Sehr bedeutsam ist die Tatsache, daß die Ähnlichkeiten zwischen gleichsprachigen Regionen sehr themenspezifisch sind. Je nach untersuchtem Themenkreis können in gleichsprachigen Regionen Ähnlichkeiten oder Diskrepanzen festgestellt werden. Deutschsprachige Gebiete stimmen zum Beispiel hinsichtlich der bevorzugten Höchstgeschwindigkeit in Wohngebieten miteinander überein, nicht jedoch in Bezug auf die bevorzugte Höchstgeschwindigkeit auf Landstraßen.

Ähnlichkeiten zwischen Schweizer Regionen

Schließlich wollen wir uns wieder den Ähnlichkeiten zwischen Schweizer Regionen zuwenden. Auch diese Ähnlichkeiten sind im allgemeinen themenspezifisch, wobei die Koalitionspartner wechseln. In der deutschen und der italienischen Schweiz ist man tendentiell der gleichen Meinung über die bevorzugte Höchstgeschwindigkeit auf Landstraßen und hinsichtlich einer Maßnahme, die das Mindestalter für Kraftfahrer auf 17 Jahre festlegen würde. In der französischen und der italienischen Schweiz herrschen

tendentiell ähnliche Meinungen über die Verpflichtung zum Tragen von Sicherheitsgurten auf Vorder- und Rücksitzen und die bevorzugte Höchstgeschwindigkeit in Wohngebieten. Die deutsche und die französische Schweiz tendieren zur Übereinstimmung bei Themen wie Notwendigkeit der Verbesserung der Straßenverhältnisse, notwendige Strenge bei Polizeikontrollen und Notwendigkeit eines Geschwindigkeitsbegrenzers, mit dem die Höchstgeschwindigkeit überschritten werden könnte.

Regionale Unterschiede und Ähnlichkeiten in Meinungen über den Verkehr in der Schweiz

Ein Vergleich der Resultate der SARTRE-Erhebung in drei Regionen der Schweiz und in vier Regionen in Nachbarländern

Dr. Ch. Goldenbeld
R-94-B, 51 S.
(nur in deutscher Sprache zu erhalten)



Charles

Goldenbeld, 33 years old, is working at SWOV as a researcher since 1992. Charles studied psychology in Amsterdam. From 1987 till 1992 he worked at the University of Utrecht and obtained his doctorate with a thesis on human aggression, based on experimental research.

During the two years Charles is working at SWOV he was involved in research concerning bicyclists, police enforcement and surveys on opinions of road users concerning traffic rules.

Accidents involving mopeds and low-speed mopeds

SWOV carried out a study on accidents

involving mopeds and low-speed mopeds

which covered the following areas: the differences in accident numbers, the risk of accidents and accident types between various groups of moped and low-speed moped riders. The groups were distinguished according to the rider's age, the type of vehicle and whether the machines were speeded up beyond their normal capacity. The standard accident information was supplemented by questioning the police officer who reported the accident. This procedure was used for a sample of approximately 1,000 accidents where victims died or were taken to hospital. In addition, the results of survey of the Ministry of Transport on ownership and use of mopeds and low-speed mopeds were used. The survey used the same group breakdown.

From mid-1992 to mid-1993 some 2,000 moped riders and less than 300 low-speed moped riders in the Netherlands were involved in serious accidents. The 2,000 moped riders were divided virtually equally between mopeds with gears and automatics. Slightly more than half of the mopeds with gears were speeded up.

Around 1,000 of the riders were aged 16 or 17. In comparison to adults, young people rode more often on mopeds with gears or speeded up mopeds with gears. In relative terms low-speed moped riders were more likely to be adults.

There is no large variation in risk between the various types of mopeds and low-speed mopeds (i.e. the chance of being involved in a serious accident for a given distance

travelled). But there is considerable variation between age groups. Young people (16 and 17) and older people (50 years and older) are between two and three times more likely than the intervening age groups to be involved in a serious accident. There are three important exceptions:

- *Spartamet riders (a Spartamet is a special type of low-speed moped, mostly used by elderly people) have a far lower risk; but the risk for these riders aged 50 and more is greater than for riders younger than 50;*
- *young people on a speeded up moped with gears have an increased risk, especially at the ages of 16 and 17;*
- *riders of a moped with gears aged 25 and older have an increased risk, even if the moped is not speeded up.*



P i e t

Noordzij, 51 years old is research manager at SWOV. He studied psychology at the University of Amsterdam.

As from 1968 he was researcher at SWOV, commissioned with drink driving, traffic rules and enforcement and the safety of cyclists and moped riders.

From 1981 till 1987 he worked as coordinator of research projects for the faculty of social sciences at the University of Leyden. Since 1987 he works for SWOV again.

With the exception of Spartamet riders, the risk for moped and low-speed moped riders is far higher than for cyclists. Every year around 700 serious accidents involving mopeds can be attributed to the increased risk of 16 or 17 year olds. The number of serious accidents as a result of speeding up a moped with gears is around 200 per year for the same age group. Little difference was found between groups of moped or low-speed moped riders as regards the accident locations or the other party.



Ongevallen van brom- en snorfietsers

(Accidents involving mopeds and low-speed mopeds)

P.C. Noordzij
R-93-59, 21 pp.

(only available in Dutch)

Accidents with passenger cars

In the Netherlands almost 1,300 persons a year die because of a traffic accident.

More than 13,000 people get injured in traffic and have to go to hospital.

Although the Netherlands is a relatively safe country, the Dutch Government thinks this development has to come to an end.

The last years there has been an enormous growth of mobility, especially the growth of kilometres driven in passenger cars (thirty times as much as forty years ago). Despite of these developments road safety can be influenced positively. Since the 1970's the yearly number of road

deaths has been halved while mobility nowadays is twice as much as in the 70's. The chance to get killed in traffic related to the kilometres travelled has halved every ten years. Improvements of the infrastructure and of passenger cars are due to this positive development.

Passenger cars play a dominant role in the process of road safety. 40% of the casualties are drivers or occupants of passenger cars.

One third gets killed or injured in a collision with a passenger car. In the last decennia passenger cars became more and more safe because of industrial innovation, governmental regulations and scientific contributions. It is also stated that technical improvements only have the maximal effect if road users use these improvements in a proper way.

This means the improvements should not lead to unsafe behaviour of the driver (risk compensation).



Ongevallen met personenauto's in Nederland

Bijdrage aan het KIVI-Automobiel-techniek-symposium 'De personenauto: van alle kanten veilig?' op 26 mei 1993 in Delft

(Accidents with passenger cars in the Netherlands)

*Ir. F.C.M. Wegman
D-93-1, 12 pp.*

(only available in Dutch)

The effectiveness of airbags in the Netherlands

In 1994 almost all new American passenger cars will have been fitted with an airbag on the driver's side. This results from the legal obligation to fit passenger cars with automatically operating safety systems. In Europe also, we note an increasing interest in the airbag in recent years. However, an obligation to fit automatically operating safety facilities as applicable in the United States is not to be expected in Europe in the near future.

SWOV calculated what the effect of an airbag is in terms of a reduction in the number of casualties in the event of a road accident. The calculation is based on the effectiveness of

safety measures such as the seat belt and the airbag. Effectiveness is defined as the reduction in a certain level of injury severity (including death) if a population of occupants

were to commence use of the measure (where it did not prior to that time), while all other factors remain the same.

Some American and European studies about the airbag are considered. In contrast to studies concerning the effectiveness of the seat belt, detailed studies concerning the effectiveness of the airbag are not available.

The most useful has proven to be the study by Evans although the effectiveness figures for the airbag

are based on small datasets and observations. SWOV has used these figures in the calculations, making no distinction between the American (full-size) airbag and the smaller European airbag, also referred to as the Eurobag.

The American literature also notes that the airbag can lead to injury. However, this form of injury is minor in nature (grazes, bruises) and mainly results from minor collisions. Generally, this form of injury is found amongst passengers not wearing a seat belt.

In order to determine the effect of the airbag for the Dutch situation, the saving in the number of road accident casualties with serious injury is calculated in the hypothetical event that all passenger cars were fitted with an airbag in 1992.

The reference year was also taken to be 1992, assuming that none of the cars involved in an accident were fitted with an airbag.

Two scenarios were calculated. The first concerns the assumption that, in the presence of an airbag, the frequency of seat belt use by drivers and front seat passengers will not change. The second scenario assumes that 5% of former seat belt

wearers would no longer wear their seat belt if an airbag were present in the car.

The result of the first scenario (unchanged seat belt use) is a reduction of 1.2% ($\pm 2\%$) in the number of victims amongst front seat occupants of passenger cars, representing 55 to 80 fewer fatalities and 380 to 550 fewer hospitalized casualties.

The result of the second scenario indicated that if 5% of front seat passengers were no longer to wear their seat belt, the reduction in the number of casualties would still be 5.5% ($\pm 2\%$). This results in a saving of 20 to 40 fatalities and 140 to 300 hospitalized casualties.

In comparison to the results of the first scenario, it is calculated that the same saving (an average of 67 fatalities and 470 hospitalized casualties) can be realised by increasing the wearing percentage of the seat belt by front seat passengers by approximately 20% to a level of approximately 95%. Therefore, a 20% rise in seat belt use would counteract the overall presence of the airbag on both front passenger seats. This is due to the minor additional effectiveness of the airbag if a seat belt is also worn: an increase of only 5% in addition to the effectiveness of the seat belt, which is calculated to be 41%.



It is recommended to commence information campaigns in advance about the combined effect of seat belt use and airbags. American figures have shown that the presence of an airbag does not exert a significant influence on the wearing percentage of seat belts. It is not known whether this can be attributed to information campaigns.



C h r i s

Schoon, 48 years old, is an engineer, specialised in car engineering. He is almost 25 years employed by SWOV as a researcher.

He carried out research on the following subjects: injury prevention related to vehicles as to safety barriers, evaluation studies concerning vehicle specifications.

De effectiviteit van airbags in Nederland

Een studie over de effectiviteit van airbags en de mogelijke besparingen in de aantallen slachtoffers

(The effectiveness of airbags in the Netherlands: a study of the effectiveness of airbags and the potential reduction in the number of road accident casualties)

Dr. P.H. Polak & ing. C.C. Schoon R-94-16, 33 pp.

(only available in Dutch)

Proposal for a *point demerit system* in Hungary

The Hungarian Research Institute KTI has asked the SWOV to develop a proposal for a point demerit system in Hungary. The system is intended to serve as a supplement to methods of enforcing the traffic rules. In addition to a fine or other penalty which a road user may receive for a traffic offence, points are also allocated. The road user's licence will be retracted for a period of time, when a maximum number of points is exceeded. SWOV should make a proposal that given the above mentioned conditions will have the greatest possible contribution to traffic safety in Hungary.

SWOV's proposal contains three parts: firstly a description of the influence of a point demerit system on road safety in general. Secondly a chapter on the Hungarian accident data and observed behaviour in traffic. And finally the proposal for a point demerit system in Hungary.

Point demerit systems in general

Point demerit systems are likely to have a limited but positive effect on road safety. This is due to the low correlation between booked offenses and road safety. Such correlations may be enhanced by increasing the subjective and objective risk of apprehension (general deterrent effect), where emphasis is placed on serious offenses. Under these conditions, an extra effect may result from a point system, in addition to the effect resulting from the greater risk of apprehension. The magnitude of the additional effect and its lasting quality over time cannot be assessed. An increase in punishment alone is unlikely to have significant deterrent effect, unless the measure has a large and genuine public base of support. In that case, social control and social rejection of offenders may have a deterrent effect. It is not anticipated that the selection and identification of problem drivers via a point demerit system will have an effect on road safety. The application of driver improvement courses as punishment should be performed with caution, given the findings that courses may also have a negative

effect on road safety. So the effects depend on general prevention in connection with the overall policy on enforcement, information and education.

Hungarian situation

Especially unprotected road users like cyclists and pedestrians are at risk in Hungary (42% of all persons killed in traffic accidents). 61% of all accidents are caused by passenger cars. As unprotected road users are most vulnerable in accidents with fast moving, high mass vehicles it is to be expected that the high number of fatalities under unprotected road users is caused by accidents with



Divera

Twisk, 42 years old studied at the Keele University in England. Got her bachelor degree in social sciences in sociology and psychology. She continued her study psychology at the University in Groningen, the Netherlands.

Since 1986 she is a researcher at SWOV, working on research on influencing human behaviour in traffic, ergonomic research and infrastructural aspects.

passenger cars. In addition, a high percentage (23%) of the total number of fatalities are passengers. This implies that 65% of all persons killed in traffic are within a group that either by their behaviour do not endanger others (cyclists and pedestrians) or do not participate actively in traffic (passengers).

A point demerit system should therefore especially be directed at drivers of motor vehicles, aiming to discourage intentionally committed rule violations in order to protect the safety of unprotected road users, passengers and drivers.

Hungarian point demerit system

The point demerit system in combination with high levels of police enforcement should:

- discourage alcohol violations;
- discourage speeding, especially in built-up areas;
- discourage speeding outside built-up areas, especially on road stretches with mixed traffic;
- discourage red light violations;
- encourage the usage of passive safety devices such as helmets by moped riders and motor cyclists and of seat belt use and child restraints by occupants of passenger cars, especially when passengers are under 14;
- discourage rule violations more rigorously if a driver carries passengers;
- protect all road users - discourage violations more rigorously if the driver operates a heavy vehicle such as busses and trucks;
- discourage violations more rigorously if the driver is inexperienced;
- encourage the use of adequate lights in darkness and poor visibility;
- discourage unqualified and under age driving; in Hungary there seems to be a growing tendency to drive without a valid driving licence;
- facilitate identification of drivers.

Furthermore one should take into account possible negative side effects of the introduction of a point demerit system such as:

- more drivers will flee from the place of the accident;
- more drivers will refrain from helping the accident victims.

Proposal for a point demerit system in Hungary

*D.A.M. Twisk & R.D. Wittink
R-94-13, 39 pp.
(only available in English)*

Young driver accidents in Europe

On behalf of the European Road Safety Federation, the SWOV was commissioned by the Royal Dutch Touring Club ANWB, to bundle the information from the member states of the European Union on characteristic young driver accidents. To date such a bundling of material at European level was lacking.

In order to gather the information, research institutes in the member states were requested by questionnaire to send any relevant information. It was found out that detailed information on young driver accidents is missing in several countries. Especially in the Southern countries information is lacking.

Results

All countries report a high proportion of young driver accidents with the exception of Ireland, where the young motor cycle accidents are more frequent. Both males and females are frequently involved in accidents, but the problem is greater with the young male.

Especially the weekend night accidents are typical young driver

accidents. The majority of the detailed studies show a significant proportion of accidents of this type. The over-representation is partly caused by the mere fact that young drivers drive more kilometres in the weekend night than other age groups. Also young drivers drive primarily during the weekend night.

Also the single accident is a typical young driver accident that decreases with age and experience. Young drivers are not over-reported in alcohol accidents. In comparison with older drivers they are even under-represented. Only in the weekend night accidents alcohol seems to play a significant role. Then young drivers tend to be over-represented.

Young driver accidents are often characterized by driving too

fast for prevailing conditions. This may also account for the high proportion of accidents in curves and single accidents. Young drivers get more often involved in the more serious accidents, partly because of the presence of many passengers. Furthermore young drivers drive more often with inappropriate speed. Speed is directly related to the seriousness of the accident.

European policy

It was concluded that because of the limitations of the information an analysis on which a European policy can be based cannot be provided. Yet, there are many comparable characteristics between the countries, which might provide a scope for European policy. It was recommended to stimulate at a national level, the analysis of young driver accidents in a fixed format, that also accounts for differences in exposure, and which uses agreed upon classifications and definitions. The outcome of these analyses may provide a more solid base for European policy.



Young driver accidents in Europe

Characteristic young driver accidents in the member states of the EU

*D.A.M. Twisk
R-94-18, 39 pp.
(only available in English)*

Safety effects of road design standards

Proper road design is crucial to prevent human errors in traffic, and less human errors will result in less accidents. Three safety principles have to be applied in a systematic and consistent manner to prevent human errors: preventing unintended use of roads and streets; preventing large differences in vehicle speed, mass and direction of movement; preventing uncertainty amongst road users, by enhancing the predictability of the road's course and of the behaviour of the fellow road users.

It is to be expected that proper road design, according to these safety principles, could reduce considerably the number of accidents and accident rates in Europe.

Road design standards play a vital role in road design. However, the unavailability and the non-accordance of road design standards in Europe increase risks and therefore contribute to the actual size of the road safety problem. Activities focused on the availability of road design standards and their mutual accordance are expected to lead to a better fulfilment of the three road safety principles mentioned and consequently to an increase of road safety.

In cooperation with a number of other European institutes, SWOV carried out a study for the EU. The following three parts may be distinguished in this study:

- gathering information about existing knowledge on the design of road infrastructure elements by:

(a) drawing an inventory of international treaties and recommendations, with information about their legal status;

(b) drawing an inventory of national road design standards and the underlying knowledge;

- analysing the role road safety arguments have played when road design standards were compiled;
- drawing a 'best practice' for road design standards in which considerations, background information and assumptions concerning road safety have been made explicit.

Because of the practical impossibility to deal with all items of road design, detailed studies were only carried out on cross-sections including medians, shoulders and verges, motorway exits and entries, curves in two-lane roads and bicycle facilities at intersections.

An introductory chapter contains preliminary considerations: status of the standards, assumptions underlying the standards, the question of allowing margins or not, road

classification, etc. There is also a chapter which summarizes the research methods to be used when quantifying the relationship between road design standards, road user behaviour and accidents.

The study reveals that existing national standards in Europe only rarely contain information on the safety effects of the road designs that are recommended or even prescribed by now. To enable the design of safer roads, more clarity is needed about the relationship between layout and safety aspects of the infrastructure elements. Then, also, a harmonization of design standards towards a common high European level of road safety could be better aimed for.

Some concrete findings from this study are recommended to be included in the set of warrants for the Trans European Road Network.

Safety effects of road design standards

A study of the situation in the European Union

H.G.J.C.M. Ruyters,
M. Slop & F.C.M. Wagman (Eds.)
70 pp.
(available in English R-94-7 and French R-94-7F)

Road *hazard* associated with riding motor cycles

SWOV has compiled a report on the road hazard associated with motor cycle riding. The reasons likely to underlie this phenomenon were sought, with special attention being devoted to developments seen over recent years.

Compared to the car, the motor cycle is a mode of transport frequently used by the young. They are subject to a considerably greater level of risk with respect to older motor cyclists. This is probably because they have a more competitive style of riding.

a more limited sense of danger or a more limited need to avoid danger. The urge for freedom and the wish to stand out from the crowd may contribute to the level of road hazard experienced by motor cyclists in all age groups.

In addition, a motor cycle is more difficult to control. The condition of the road surface has a great influence on this factor. The interaction with other traffic is somewhat more complex than when driving a car. However, a motor

cycle rider only slowly gains experience because he covers fewer kilometres and uses his vehicle primarily in the summer months.

Other road users have difficulty taking into account the presence and behaviour of motor cyclists, due to their small numbers, their appearance or their deviating behaviour.

In the event of an accident, a motor cycle rider is offered little protection against injury.

Relation with age

In recent years, developments have occurred which are strongly age-related. The number of riders aged under 25 has dropped, the average number of kilometres they cover per year has dropped and they are exposed to a greater degree of risk. The number of motor cyclists aged between 25 and 50 has risen sharply, while the average number of kilometres they cover annually has remained about the same, as has the risk. Many motor cyclists in this age group have started riding for the first time and therefore have little experience. In 1992, over 60% of all



seriously injured motor cycle riders was aged between 25 and 50. The number of motor cyclists in the group aged upward of 50 years has increased, the average number of kilometres covered has remained the same, while the risk they are exposed to has dropped. This group is likely to include many experienced riders. The final outcome of these developments is that the overall number of seriously injured motor cyclists has increased.



De onveiligheid van motorrijden
Beschrijving van het probleem en overzicht van de mogelijke verklaringen

(Road hazard associated with riding motor cycles, a description of the problem and an overview of likely explanations)

P.C. Noordzij & J.A.G. Mulder
R-94-5, 32 pp.
(only available in Dutch)

Draft design requirements for a sustainably safe road network

In 1992, the impetus was given for a new approach towards road hazard in the Netherlands, aimed at realizing a sustainably safe road traffic system. In order to ensure that this approach would find favour with the maximum number of parties involved, it is intended to realize a sustainably safe road network on a limited scale through a number of demonstration projects.

SWOV drew up a report in which the principles of such a sustainably safe road network are discussed, with as major element a monofunctional categorization of the roads. These principles lead to more concrete functional design requirements for the road network and its parts. It was

also examined which data are required to arrive at the design and implementation of a sustainably safe road network in a particular region: the data concerning the road network, the road function, the traffic and road characteristics, the actual road hazard and the costs associated with

the measures to be taken. Insofar as possible, it is also mentioned each time which party is able to supply the data.



Concept ontwerp-eisen duurzaam veilig wegennet

(Draft design requirements for a sustainably safe road network) Interim report on the preliminary study of a pilot design for sustainably safe regional road networks'

J. van Minnen & ir. M. Slop
R-94-11, 34 pp.
(only available in Dutch)

Pedestrian *opinion* on the alternative 'Maastricht' crossing

The alternative layout for pedestrian crossings, called the 'Maastricht design', where the light is positioned on the near side of the crossing, is under discussion. One of the arguments against introduction of this alternative is the supposed resistance felt by pedestrians, a resistance which has not been expressed so much through complaints lodged with the road planning authorities, but rather through several polls held amongst pedestrians on the street.

The working group for pedestrian engineering facilities of C.R.O.W (the Netherlands Research Centre for Research and Contract Standardization in Civil and Traffic Engineering C.R.O.W) wished to know if this perceived resistance should be taken into account in the recommendation.

C.R.O.W asked the SWOV to conduct a study amongst users of the 'Maastricht' crossing, in order to investigate the presence of resistance and if so, whether such resistance can be overcome through information campaigns.

SWOV questioned 200 pedestrians at 29 crossings with the Maastricht design, at 9 locations, in two municipalities.



P e t e r

Levelt, 52 years old studied psychology at the University of Amsterdam. He carried out research on children and traffic. He obtained his doctorate in 1981 with a thesis on the subject: what children can learn from television. For ten years he was head research and one of the editors of the Dutch television program Sesame Street.

Since 1986 Peter works at SWOV and his main topic is traffic behaviour.

First, people were asked to state the characteristic differences, then their preference was asked and finally a comment about perceived safety was requested. The background to the response in favour of one or other layout was questioned. Subsequently, the opinion about a number of characteristics associated with the new layout was requested. Some information was given to the respondent regarding possible principal advantages: time won with a short 'green' interval, better visibility for the partially sighted and loss of the fright response amongst the elderly when they are confronted by a red light while crossing. Subsequently, the interviewee's preference and safety assessment was once again requested. In this way, it was attempted to obtain an insight into the nature of possible resistances, and it was studied whether information about the advantages of the new design would be able to alleviate resistances.

Results

The first striking result was that less than half of those interviewed were able to cite the actual main distinguishing characteristic: the change in position of the pedestrian light. Exposure to the system did not influence this response.

The second, most important result was that there did not seem to be great resistance to the new design, to the contrary: 32% preferred this layout, 22% preferred the old layout and 44% demonstrated no preference. The safety assessment, which is



The light is positioned on this side of the crossing.

strongly related to preference, did not favour either of the two systems: 27%, 29% and 44%, respectively. Neither was this anticipated, in view of the previous study results.

People who have used the crossing for a period of over one year, at least once a week, preferred the new system.

The advantages and disadvantages cited by people with preference for one of the two systems related both to the characteristics specific to the system and to characteristics which can also be found elsewhere. Relevant advantages quoted in particular were that the light is better visible and that it is more suitable for the elderly and the partially sighted. Further advantages cited included the presence of a push button to request a green light and the presence of a sound signal. The primary disadvantages mentioned were the lack of a pedestrian light opposite, uncertainty about when the traffic starts to move and inability to see the light turn red, so that the pedestrian is unsure whether he needs to hurry.

Those in support of the 'Maastricht design' in general cited more advantages than opponents were able to cite disadvantages.

When asked about all types of positive characteristics of the new layout in general, people confirmed in the main that they are given sufficient time to cross in this situation, that the partially sighted are better able to see the light and that the sound signal clearly indicates that the light has switched to green. People did not agree that they actually feel safer while crossing. With regard to negative characteristics, people reiterated in the main that they have more crossing time with the old system, that they do not know when the traffic starts to move and that they are more inclined to cross on red with the new system. They deny that the traffic starts moving as soon as the sound signal stops and that two systems operating in parallel would

be confusing. The inconsistency in the remarks: 'sufficient time to cross' and 'more crossing time with the old system' could largely be explained by the fact that these remarks were given by different respondents. A large number of opinions related to personal preference and the safety assessment.

The information given during the interview and the three above mentioned, again emphatically quoted, advantages did not lead to a shift in preference or in the safety assessment.

Comparison to previous study supports the assumption that resistance is primarily seen with a change to the existing situation, while there is less resistance to introduction at locations where the crossing was not yet controlled.

It was also found that only 35% of pedestrians cross only on green, and that half of those crossing on red first press the request button.

It is recommended that when assessing the 'Maastricht design', the resistances expressed by pedestrians should not be taken into account, and neither should a possible variation in uniformity. Attention is asked - with respect to the realisation and information campaigns - for giving pedestrians the option to request green, for sound signals and for sufficient crossing time, if possible by using detectors for crossing pedestrians.

It is again emphasised that unnecessary requests for a green light should be avoided, again through the use of detector systems.



De opinie van voetgangers over de Maastrichtse opstelling

(Pedestrian opinion on the alternative 'Maastricht' crossing)

Dr. P.B.M. Levell

R-94-6, 44 pp.

(only available in Dutch)

SWOV REPORTS

IN BRIEF

SWOV carries out research concerning road safety. Our main client is the Dutch Ministry of Transport. 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 them are published by SWOV. In this article the available reports in English, German or French are mentioned and a summary of the contents is given. The complete reports can be obtained

by writing a letter or telefax to Sandra Rietveld of the public information department of SWOV.

Strategies for improving road safety in the Netherlands: Past and future

*Contribution to the 5th World Congress of the International Road Safety Organisation (P.R.I.). Istanbul 12-14 May 1992.
P. Wesemann D-92-1 11 pp*

This reports deals with the following subjects: how road safety in the Netherlands has developed from 1950 to 1990; how policy has contributed to this and how one intends to continue improving safety in the future via policy and research.

Young moped riders: Reducing high risks and high insurance premiums

*Paper presented to the International Conference on Automobile Insurance and Road Accident Prevention, Amsterdam 6-8 April 1992.
Ir. F.C.M. Wegman D-92-2 13 pp*

This paper offers a description of the developments that have taken place in the Netherlands with respect to the ownership and use of mopeds, followed by a description and brief analysis of the road safety problems of moped riders. Finally recommendations describing how the problem may be tackled are presented. These also includes suggestions as to the contribution insurance companies can make.



Eye movements in traffic safety research

Paper presented at the Third International Conference on Visual Search, Nottingham, August 1992.

M.P. Hagenzieke. D-92-3. 9 pp.

The recording of eye movements and fixations is becoming a more and more popular tool in applied research, including traffic safety research. Obviously, this is a result of the more widespread availability of relatively easy-to-use apparatus to register eye movements. However, the question of what role eye fixation can play in perceptual processing is not resolved. This paper reviews a number of traffic safety studies in which eye movement recordings were collected. For what research objectives has the collection of eye movement taken place - how were they collected and which type of conclusions were drawn? Special emphasis is given to the underlying - implicit or explicit - assumptions about the meaning of the eye fixation.

Road safety activities in the Netherlands. Experiences with strategies on the national level

Paper for the Workshop on Organization and Coordination of Road Activities on the National Level, Benesov, CSFR, 5-6 October 1992.

P. Wesemann. D-92-4. 11 pp.

This paper deals with the following subjects: how road safety in the Netherlands has developed in recent decades; how policy has contributed to this; how one intends to continue improving safety in the future via policy and research; and suggestions for a strategy to deal with road safety in the Czech and Slovak Federal Republic.

Legislation, regulation and enforcement to improve road safety in developing countries

Contribution to the World Bank Seminar on Road Safety, Washington, 14-15 December, 1992.
F.C.M. Wegman. D-92-5. 13 pp.

This paper starts with a view on causes of road accidents and gives a concept of how to prevent road accidents. Next a strategy for legislation and enforcement is presented and examples concerning driving speed, speed limits, seat belts and drunk driving are given. Attention is also paid to the effect of regulations concerning vehicle requirements and vehicles inspections. It is stated that government regulations are applied on a large scale to promote road safety, and not without success. But it is also known that this form of government intervention has its limitations. The paper gives conclusions and recommendations for improving road safety in developing countries by using legislation, regulation and enforcement.

Improving road safety for vulnerable road-users in developing countries

Contributions to the World Bank Seminar on Road Safety, Washington, 14-15 December 1992.
F.C.M. Wegman. D-92-6. 15 pp.

This paper deals with the problems of vulnerable road users in developing countries, mostly pedestrians and people using non-motorised vehicles. Pedestrians form a large proportion of the traffic in the developing world. Pedestrians and especially the young ones have a high risk of road accidents

and a high level of vulnerability. Because of the expected growth in population and in mobility the number of road accidents of these groups is expected to increase. This leads to the conclusion that they should be given a high priority in measures to improve road safety. The solution for this problem can be found in physical separation of different means of transport and where this is not possible to moderate the speed of motorised traffic.

Improving safety in young drivers: in search of possible solutions

Paper contributed to International Symposium 'Young Drivers', Lisbon, 27-28 May 1993.
D.A.M. Twisk. D-93-2. 7 pp.

Young drivers: Driving behaviour, accidents, and countermeasures

Paper contributed to 193 Plenary Meeting of the Motor Insurance Committee Road Safety and Young Drivers, Madrid, 1-2 July 1993.
F.C.M. Wegman & D.A.M. Twisk. D-93-4. 9 pp.

In the paper data from Dutch research on novice driver performance are introduced and the question will be raised: 'How expertly do they really drive?' Next, younger driver accident analyses in comparison to performance data will be discussed. Can novice drivers be held responsible for their high accident involvement? Thirdly, on the basis of performance and accident data, countermeasures are discussed with particular reference to the implications for insurance companies and the role they might play. In the Netherlands, one of these countermeasures has been tested on its effectiveness in a pilot study. At the end, the evaluation results with respect to attitudes and driving performance will be discussed.

Computer simulation and vehicle front optimisation

Paper contributed to 26th International Symposium on Automotive Technology and Automation, Dedicated Conference

on Road and Vehicle Safety, Aachen, Germany, 13-17 September 1993
J. van der Sluis D-93-3-8 pp

SWOV has executed a computer simulation study of side collision of cars against bicyclists. Aim of the study was to establish a description of an ideal car-front in terms of shape and stiffness. An ideal car-front was defined as the front that will cause minimal injury to the bicyclist in case of side collision. This paper describes the results of the simulation. For this kind of simulations SWOV uses the program VEDYAC, which stands for VEHICLE DYNAMICS AND CRASH. With VEDYAC various three dimensional dynamical problems can be simulated including crashes. Simulations were carried out of collisions between a bicyclist and a number of different shaped car-fronts.

Simulation was a suitable method for two reasons: variation of the shape and stiffness is more difficult to perform in case of an experimental model than when a computer model is used. Furthermore experimental simulation results were available to verify the standard simulation.

From the performed mathematical simulations it is concluded that a greater bonnet angle has a positive effect on the head acceleration. This effect also occurs when a windscreen is simulated.

Lessons to be learnt?

When writing a National Road Safety Plan for Central and East European Countries
F.G.M. Wegman D-93-6-14 pp

It is to be expected that a sharp increase in private motorised traffic in Central and East European Countries (CEEC's) will lead to an increase in road accidents and casualties. Furthermore, it is to be expected that road safety measures could reduce road accident casualties even under the condition of mobility growth. Therefore action plans to improve road safety are needed in these countries. Based on the policy

purposed in highly motorised countries and using present knowledge, it is possible to indicate what could have happened in the past in order to achieve better results. CEECs could judge for themselves what is applicable for them. The formulation of a National Road Safety Plan in Central and East European Countries needs to go hand in hand with the establishment of an organisational structure that is responsible for the initiation, preparation, implementation and evaluation of the actions planned. A politically sanctioned National Road Safety Plan can make a significant contribution to improving road safety, based on political will, on a proper organisation and making use of existing knowledge on the most effective and efficient measures.

Sicherer fahren mit Licht am Tag

Vortrag Enquete des Kuratoriums für Verkehrssicherheit, Wien, 10 November 1993
J.L. L. Heijer, D-93-13-8 S

Der Verkehrsminister der Niederlande hat im Herbst 1992 beschlossen, das Fahren mit Licht am Tag auf freiwilliger Basis anzuregen. Auch in 1993 wurden diese Aktionen im Frühjahr und Herbst wiederholt. Meinungsumfragen haben ergeben das viele Menschen selbst erlitten haben das sie ein Auto tagsüber nicht oder zu spät gesehen haben. Diese Erfahrung wird aber nicht immer als gefährlich erkannt.

Auch stellte sich heraus das je mehr Menschen mit Licht am Tag fahren, desto positiver dieses Verhalten auf die Verkehrssicherheit eingeschätzt wird. Außerdem besteht eine Beziehung zwischen Lebensalter, psychologische Einstellung zum Tagesfahrlicht und der Haltung auch jetzt schon mit Licht am Tag zu fahren. Die Hälfte der Befragten findet das die Regierung das Tagesfahrlicht zur Pflicht machen soll. Unter die bedingung das jeder mit Licht am Tag fährt, hat sich auf Grund neuer Untersuchungsergebnisse ein positiver Zusammenhang ergeben zwischen dem Effekt auf die Verkehrssicherheit durch fahren mit Licht am Tag und den Breitengrad je ferner vom Äquator, desto größer die Wirkung. Für die Niederlande ist deshalb die Konklusion das ein optimaler Effekt auf die Verkehrssicherheit allein dadurch erzielt werden kann, wenn fahren mit Licht am Tag in Absehbarer Zeit zur Pflicht werden wird.

Regranting of driving licence

A literature search
P.C. Noordzij, D-94-3-30 pp.

A literature search was made, based on the IRRD data base. A selection was made using two groups of key words. The first group contained the words drug, alcohol and drunkenness. The second driving test, penalty and driving licence.



Titles with one or more key-words in both groups were selected. This resulted in a list of 403 titles which were published in 1986 or later. To obtain a more convenient number for further search, the period was restricted to 1990 and later, with 174 titles as a result. All of these titles were screened for relevance. 88 of them promised to be relevant. As a next step the abstracts of all these titles were studied. Only 15 of these were found to be directly relevant to the subject of relicensing. They are reproduced in a report. 9 more abstracts related to licence suspension rather than regranting. They illustrate the standard procedures for suspension and regranting and their effectiveness.

Speed management systems and road safety in the Netherlands

Paper presented at Symposium on 'Enforcement and Punishment in Traffic', April 20th, 1994. Technion, Israel Institute of Technology, Haifa. Israel H.L. Oei. D-94-4. 15 pp.

In this paper several experiments which had a positive effect on speed behaviour have been conducted in the Netherlands are described. For instance automatic speed warning at the approach of an intersection in the city of The Hague gave a reduction in mean speed of 5 km/h. On four provincial road stretches with a speed limit of 80 km/h an automatic speed warning and enforcement system resulted in a total average reduction of the mean speed from 78 to 73 km/h. The percentage of speeders went down from 40% to 10%. A project on enforcement of speed on a provincial road network, which has started recently, is also described.

The SWOV Institute for Road Safety Research in 1994

International experiences in brief. Matthijs J. Koornstra. D-94-5. 14 pp.

In this report the objectives, philosophy, some features and clients of SWOV are regarded. Furthermore attention is paid to the international experiences of SWOV with the EU and various countries and international organisations since 1985.

Urban traffic safety strategies in the Netherlands

A contribution to the international conference 'Living and walking in cities - Town planning and infrastructure project for safety in city life', 3-4 June 1994. University of Brescia, Italy P.I.J. Wouters. S.T.M.C. Janzen & A.A. Vis. D-94-6. 13 pp.

The increasingly dominant role of motorised traffic in urban areas poses a growing threat to vulnerable road users. In urban areas a conflict arises between the desired accessibility for motorised traffic and upholding the quality of life. In this conflict between the traffic functions and the living functions of the urban area a well balanced solution has to be found. Since the 1970's the Netherlands have tried to tackle this problem by adopting the

principle that the urban area should functionally be divided into traffic areas and residential areas. Starting from this principle, various types of solutions have been developed and applied in practice. The effects of most of them on traffic safety have been evaluated by now. The experience contributes in evolving the new concept of a sustainably safe traffic system in urban areas.

The paper describes the traffic safety problems inside residential areas, the principles underlying a functional, safety oriented road categorization of the urban infrastructure. Then, various applications in practice are discussed as well as some results of evaluation studies on their safety impact. Finally the concept of a sustainably urban traffic safety is explained.

Road safety in residential areas

Brochure, 4 pp.

A majority of road accident casualties inside built-up areas in The Netherlands take place on traffic arteries, those streets where traffic or flow function dominates. About 20-40% of the accidents has occurred in streets with a residential function. It is an exception rather than a rule to find black spots in residential areas. Accidents are scattered over the entire area. This leads to the conclusion that an areawide approach to solve road safety problems in residential areas is most appropriate. This brochure describes the developments in the Netherlands concerning residential areas: from segregation to the woonerf concept and from the woonerf concept to 30 km/h zones.

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