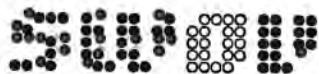


ANNUAL REPORT FOR 1972



# annual report for 1972



INSTITUTE FOR ROAD SAFETY RESEARCH SWOV

P.O. BOX 71 DEERNSSTRAAT 1 VOORBURG 2119 THE NETHERLANDS

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# Introductory

1972 saw the start of the reorganisation of SWOV's bureau announced in the Annual report for 1971.

The reorganisation was motivated by the desire to group SWOV's research activities so that on the one hand the authorities' current problems could be dealt with better, while on the other hand information could be conveyed more directly and with greater efficiency.

This change-over to a new working method proved in practice, in both staffing and research aspects, to give rise to a number of difficulties that could not have been envisaged. In particular, the effect was felt of:

1. The functioning of a number of new Interdepartmental project groups.
2. The inability to increase the number of personnel.

The new approach to the research programme and the consequent readiness to deal with urgent needs meant that in 1972 a comparatively large amount of time was devoted to projects involving an Interdepartmental project group (Crash helmets for moped riders, Road accident recording, Vehicle perceptibility).

The first of these project groups were set up in 1971 in order to safeguard communication between the authorities and SWOV.

This form of research has made the following possible:

- a. to achieve a more precisely formulated statement of problems and terms of reference from a practical, policy and research point of view;
- b. to provide scope for consultation and guarantees regarding the desired and essential conditions in road and traffic situations;
- c. to ensure a closer link-up between research results and the authorities' primary questions;
- d. to ensure that SWOV research results and conclusions are interpreted as correctly as possible in formulating policy and practical measures.

A substantial part of SWOV's activities comprised research, outside the pattern of the existing project instructions, which led to recommendations based on knowledge already existing and/or obtainable in a brief space of time.

The work forming part of SWOV's function of disseminating information from and on research resulted in 1972 in a total of forty published papers, articles, reports, etc.

The necessary planned increase from 73 workers (including 8 part-time) to 83 could not be effected. In 1972 only two new employees were recruited and, owing to six leaving, there was even a decrease to 69 at 1st January 1973.

Completion of the internal reorganisation will enable many of the above difficulties to be overcome, clearing the way for well-balanced development within SWOV: well-balanced in the sense that research projects can be carried out according to plan,

while numerous unanticipated short-term recommendations can also be made without the work programme suffering. This development can be successfully completed only if the process of growth comes from the inside. To make sure that this process of growth in SWOV is satisfactory is a task with which all SWOV workers are intensively concerned.

Th.J. Westerhout, Chairman of the Council

# The Institute

The Council of the Institute for Road Safety Research SWOV was organised as follows at 31st December 1972:

Th. J. Westerhout, Chairman

Th. van der Meer, Deputy Chairman,  
on the recommendation of the Nederlandsche Vereniging De Rijwiel- en Automobiel-  
industrie RAI (Netherlands Association of Bicycle and Automobile Industry RAI)

J. Volmuller, Secretary  
on the recommendation of the Minister van Onderwijs en Wetenschappen (Minister  
of Education and Sciences)

J. D. J. Idenburg, Treasurer  
on the recommendation of the Nederlandse Vereniging van Automobiel Assuradeuren  
(NVVA) (Netherlands Association for Automobile Insurance NVVA)

H. A. M. Elsen  
on the recommendation of the Minister van Volksgezondheid en Milieuhygiëne  
(Minister of Public Health and Environmental Hygiene)

C. A. Kuysten  
on the recommendation of the Koninklijke Nederlandsche Toeristenbond ANWB  
(Royal Dutch Touring Club ANWB)

J. W. Tops  
on the recommendation of the Minister van Verkeer en Waterstaat (Minister of  
Transport and Waterways)

O. P. F. M. Cremers  
on the recommendation of the Nederlandse Wegverkeers- en vervoersfederatie Cen-  
traal Overleg (Netherlands Federation of Transport Organizations 'Centraal Overleg')

G. Dekker, surgeon  
on the recommendation of the Koninklijke Nederlandsche Maatschappij tot Bevorde-  
ring der Geneeskunst (Royal Netherlands Medical Association)

W. J. van Eijkern  
on the recommendation of the Minister van Justitie (Minister of Justice)



Th. M. J. de Graaf

on the recommendation of the Vereniging van Nederlandse Gemeenten (Netherlands Association of Local Authorities)

H. Zandvoort

on the recommendation of the Vergadering van Hoofden van Provinciale Waterstaatsdiensten (Joint Directors of the Provincial Bureaus of Public Works)

In personal quality:

H. A. W. Nijveld

hoofd van de Economisch Technische Afdeling van de Centrale Organisatie TNO (Economic Technical Department of the Central Organisation for Applied Scientific Research TNO)

The seven members first mentioned are forming the Executive Committee

The bureau is directed by E. Asmussen



# Research



# Applied research

## Pre-crash projects

### **Railway level crossings**

The project is planned to be finalised end 1973 with a report containing a documentation study and also describing research to that date.

As regards the improvement of existing safety installations and the designing of new ones, information gathered so far led to the provisional conclusion that further behavioural observations will have to be made to obtain more comprehensive and more dependable knowledge of the presumed relationship.

### **Speed limits outside built-up areas**

This research can be regarded as being completed with the report on Speed limits outside built-up areas, published in Dutch, at the end of 1971. Some supplementary investigations, for instance into the influence of police enforcement and road classification, are in course of preparation.

### **Pedestrian safety**

Compilation of a descriptive report is nearing completion. Based on this, the Inter-departmental project group can start its work, and it is apparent that elderly pedestrians and children and the appropriate town-planning measures will demand extra attention.

### **Priority rules**

In view of the many facets of the problem of right-of-way rules and the need to bring some consistency into it first, the work on a descriptive report was continued in 1972.

### **Black-spot study methods**

The term 'black spots' is used to denote stretches of road, intersections, junctions etc., where comparatively more accidents happen than at other places. The criteria and models used as a practical basis are numerous. Consequently, black-spot studies are generally difficult of comparison, while the results cannot usually be stated in general terms. Moreover, the evaluation of black spot characteristics with respect to road safety is generally based on the investigator's (subjective) experience. For black spot research to be effective it is therefore necessary for the various methods and their

possible applications to be critically evaluated.

In order to formulate the problem in concrete terms, a schedule will first be made of the methods of improving black spots customary in the Netherlands. Documentation research has now been commenced.

### **Breath analysis methods**

Scheduling and appraisal of the latest developments in breath analysers were continued during the year. Arising from this, a programme of tests will be drawn up.

The report on experience gained with existing breath-analysers already developed will be included in the reports for research into Drinking and driving.

As regards the development of analysers, a list of functional requirements has meanwhile been drawn up and negotiations have taken place with the industry.

### **Drinking and driving; Number of non-sober drivers**

Compilation of a report on these investigations, already described in our previous annual report, has commenced. It is being combined with data obtained from the research into Breath analysis methods (see above).

### **Vehicle perceptibility**

A draft report was prepared for the Interdepartmental project group. Attention was paid to the following points:

1. Research was carried out into the need for dividing vehicles into categories for road safety purposes.
2. Depending on the results of the foregoing research, it was indicated what categories should be defined.
3. It was examined to what extent various movement aspects (for instance emergency braking) might require extra indications.
4. It was indicated what functional requirements vehicle lighting should satisfy to keep faulty use to a minimum.
5. The standards for indications were described (for instance, the nature of the indications, their maximum and minimum intensity, position, colour, etc.).

An investigation was started into the perceptibility of cyclists from the rear in the dusk and after dark.

It will be decided at a later stage whether follow-up research is needed regarding indications in conditions where no lighting is required.

### **Road marking**

This relates to research into the effect on road safety of various forms of marking roads and intersections, in order to achieve greater uniformity and maximum perfection.

It seems, however, that the effect of marking on road safety cannot be determined until more knowledge is gained about the behavioural effect of certain forms of marking owing to perception of other vehicles and of one's own movements, as part of the Analysis of the driving task project (See Theoretical research).

In due course, Marking-research is expected to form part of the Roads classification project.

### **Safety features for cars**

The purpose of this project is to obtain dependable findings on means of making cars safer. Starting points are among others:

1. The equipment must either be already available (as accessories or standard equipment for certain types of cars) or must require only a short development phase.
2. Equipment about which there is not enough initial certainty that it will make for greater safety is considered only if it can be re-evaluated within a short time.

This procedure is expected (more directly than with E.S.V. projects) to meet the needs of car owners and policy-making bodies. Compilation and elaboration of a list of crash and pre-crash aspects has meanwhile been completed, while a start has been made with documentation research and exploring the market.

In view of the nature and extent of this research, however, no results can be expected before 1976.

### **Tyres, road surfaces and skidding accidents**

*Sub-party I* (Research into the relationship of frictional forces, road-surface and tyre properties and speed (experimental multifactor research).

In planning the experiments and during the first stage, problems arose mainly because measurements had to be made on roads open to traffic. It was moreover difficult to find road surfaces with the required characteristics, which were long enough and did not have too much traffic.

For the subsequent stages, therefore, a road was sought suitable for reaching a speed of 100 km/h with the measuring equipment now in use. This was found at Woensdrecht Airbase. As a part of the experiments, the road surface and tyre-type characteristics were measured in a separate programme. This was done by the State Roads Laboratory, the Vehicle Research Laboratory of Delft University of Technology and the Plastics and Rubber Research Institute TNO.

The results are processed and analysed partly during actual measurement; in any event this work must be ready before a following stage starts. It is intended to make an interim report after the various stages.

*Sub-party II* (Experimental and analytical research into the relationship between braking force distribution and its implications for deceleration and stability of vehicle). The experimental research into actual braking force distributions and consequent decelerations was completed, similarly to research into existing braking force regulators. The documentation research regarding braking force distributions and their implications for multi-axle vehicles is being continued.

*Sub-party V* (Statistical single-factor research into the relationship between accident hazards and surface skidding resistance on straight roads without discontinuities). Processing and analysis of the results of the part-projects undertaken so far was completed. A start has been made on compiling a report.

# Applied research

## Crash and Post-crash projects

### **Safety structures on bridges**

Compilation of a report was commenced. A film covering the material filmed during the tests was also compiled.

### **Roadside obstacles**

The documentation research was completed. There is now nothing to prevent the compilation of a descriptive report; but this depends on consultation within the Inter-departmental project group. Some supplementary experimental research still has to be done, and this will be undertaken by SWOV in collaboration with the Central Technical Institute TNO and the Research Institute for Road Vehicles TNO.

The development of mathematical models for this research has been begun by Prof. V. Giavotto of Milan University of Technology.

### **Vehicle characteristics of importance in reducing the severity of injuries**

The data from the statistical accident research completed in January 1971 and covering 22,000 drivers involved in accidents were processed and analysed in the ordinary way. No interim report was published, because the factors involved are so interwoven that there is little point in publication without extensive multi-factor statistical analysis. This analysis has been started.

As to safety-belt enquiries (the report on the October 1968 enquiry appeared in 1970), the results of the enquiries in July and October 1969, 1971, 1972, and 1973 will be combined.

### **NATO-CCMS Accident analysis**

The data for this project from nearly fifty accidents, already referred to in our last annual report, were processed in the form of a report which is now ready in draft form.

During the collection of the data, 'workshops' were held to exchange the experience gained by those concerned in the research. It is intended to hold a final 'workshop' in 1973 at the NATO headquarters in Brussels. After this, a final report will be compiled; an active part has been allotted to the Netherlands.



### **Crash helmets for moped riders**

The preparation of test specifications for moped rider's crash helmets was completed on the basis of available knowledge.

The final reports (except for that regarding the prototype) are thus ready in draft form.

Development research and testing of materials and structures (by the Plastics and Rubber Research Institute TNO and the Research Institute for Road Vehicles TNO) is being continued.

Periodic observations are made in order to establish the circumstances (season, place and time) and what categories of drivers wear helmets. After the test specifications for moped riders' crash helmets are prepared, a publicity campaign promoting the wearing of crash helmets by moped riders and the introduction of compulsory wearing of helmets by these road users, the percentage wearing them is expected to increase considerably. Further research is desirable because it is important to ascertain whether these activities have had the contemplated result. This research will aim at establishing the changes in the wearing of crash helmets and their effect on road safety, especially with respect to head injuries. The nature of these activities implies that this research will probably be prolonged, though it can be split up into fairly short specific phases.

# Theoretical research

## Pre-crash projects

### **Analysis of the driving task**

Progress of this research can be reported on as follows:

1. A systematic review of the problem area and scheduling of the various parts was completed.
2. As regards route selection and guidance the documentation is being researched. Experimental research will be carried out in consultation with the sponsor.
3. As regards the perception of other vehicle's locomotion, laboratory instruments were developed and the laboratory research into geometrical and optical aspects was completed (contract research by the Institute for Perception TNO).
4. Scheduling of the perception of own vehicle's locomotion was ended, the documentation research completed, laboratory instruments were developed and the second pilot field experiment was carried out (by the Institute for Perception TNO). Laboratory tests were made which will be continued in 1973. The development of field instrumentation was started (ICARUS II).
5. As regards the project on Functional field of vision, laboratory instrumentation has now been developed, in addition to the documentation study already carried out, and a start was made on introductory laboratory tests.

### **Traffic flow models**

The documentation study of flow models through traffic arteries and the specification of measurement variables is being continued, similarly to the preliminary study of measurement methods from stationary or mobile observation posts on and above the road. A progress report is not to be expected before 1975.

### **Driver/vehicle cybernetic model**

The documentation study, theoretical analysis and the specification of elements (dynamic characteristics of the human controller and the vehicle) was commenced, as was also the scheduling of research methods and apparatus (vehicle simulators, instrumented vehicles). A start was made on scheduling problem areas (vehicle/driver and road/driver interaction).

A start was made with the project on Response characteristics of special vehicles. Priority was given to a two-wheeler project which will be carried out in collaboration with the Research Institute for Road Vehicles TNO and the Institute for Perception TNO.

## **Standards for driving; Driver training**

The following progress can be reported regarding this research:

1. The project comparing driving test-performance and accident rates was completed in 1972.
  2. Compilation of aids to driver training was continued.
  3. Task analytical specification of road users' skills and differences therein as a function of experience, was started.
  4. The scheduling was commenced of general principles and methods of tuition considered of importance in instruction.
  5. Scheduling of programmes and possibilities of emergency training started in 1972. A report will be prepared on items 2, 3, 4 and 5 reviewing the current position.
- Progress in the construction of an overall evaluation system for driver performance, depends on the projects already mentioned.

# Service projects

## **Integrated road accident recording**

This project consists of the following parts:

1. Scheduling the position of road accident recording in the Netherlands.
2. Insurance companies' accident records.
3. Medical records.
4. Records of accident, road and vehicle characteristics.
5. Completeness of the basic records system.

### *1. Scheduling the position of road accident recording in the Netherlands*

Activities in this respect are led in the first instance by the Statistical Road Accident Analysis Steering group. After an initial stocktaking (in 1966) and an investigation of the effect of the limited accident recording introduced in 1967, the Steering group suspended its activities.

The Steering group was meanwhile superseded in mid-1972 by the Interdepartmental project group on Road accident recording. It started its work on the basis of SWOV's formulation of the problem. The work outlined by the Interdepartmental project group, one of the purposes of which is to arrive at more exhaustive accident records, is being carried out on SWOV's instructions by Volder & Co., an organisation and efficiency bureau, of Rijswijk.

### *2. Insurance companies' accident records*

The pilot investigations started in 1969, aimed at ascertaining to what extent insurance companies' claim forms might help to meet the need for accident statistics for scientific research, was completed when the report on Claim forms and accident records was published in Dutch in September 1972.

This study envisaged the possibility of insurance records forming the basis of an integrated accident recording system. Whether the data will be sufficiently usable in practice (as regards completeness and dependability) will be the subject of a separate study which will probably be made under the direct responsibility of the Ministry of Public Health and Environmental Hygiene and the Ministry of Transport and Waterways. (This dispenses with the part-project by SWOV, mentioned under 5).

### *3. Medical records*

Based on results obtained in the test project started in 1969 in collaboration with the Rotterdam Municipal Medical and Health Department, the police and a number of hospitals, it is being examined whether the 'Rotterdam' test is suitable for continuation and extension.

This project will also make recommendations on the measures required to bring about a permanent link between basic and police records and medical records. Use will be

made, inter alia, of an ambulance record system which is being started by the Ministry of Public Health and Environmental Hygiene in 1973.

#### *4. Records of accident, road and vehicle characteristics*

This part-project will consist mainly of the following activities:

- a. formulating theories and notional models from which motivations can be derived of importance in developing improved recording and coding systems.
- b. stimulating and co-ordinating the activities of road authorities, the state Road Traffic Department, police etc. in making systematic records of statistics relevant to road safety research based on the theories mentioned in a. above.

#### **Collection of basic data**

Collection, processing and analysis of basic statistics of road accidents, vehicle fleets, driving performance, constitution of traffic, driving speeds, personal characteristics and road users' quantifiable behaviour and characteristics was continued consistently during the year.

This Collection of basic data has been of very great importance in providing statistics for unanticipated short-term research.

## Other SWOV activities

SWOV participated in the work of the following international committees:

### **Organisation for Economic Co-operation and Development (OECD)**

Steering Committee for Road Research

Research Group S2. Lighting, Visibility and Accidents

Research Group S3. Driver Behaviour

Research Group S4. Scientific Evaluation of the Effectiveness of Safety Campaigns

Research Group S5. Road Safety at Junctions in Urban Areas

Research Group S6. The Effects of the Enforcements of Legislation on Road User Behaviour and Traffic Accidents

Research Group S7. The Effects of Speed Limits outside Built-up Areas

Research Group S8. Research on Accidents involving Young Drivers

Research Group S9. The Effects of Roadside Obstacles on the Frequency and Severity of Accidents

### **Ad hoc:**

Research Group T4. Road Design Parameters and Traffic Flow on Single Carriageways outside Built-up Areas

Working Party on Standardization of International Statistics

### **Semi independent:**

Research Group on Pedestrian Safety

Research Group on Crash Barriers

Research Group on the Effects of Alcohol and other Drugs on Driver Behaviour

### **International Road Research Documentation (IRRD)**

### **NATO-Committee on the Challenges of Modern Society (CCMS)**

Pilot Study on Road Safety

Accident Investigation Team

Project Group on Pedestrian Safety

Research into car drivers' observational and driving habits by SWOV in collaboration with the Institute for Perception TNO on 5th, 6th, 7th and 8th December at the Vaanplein Rotterdam. This formed part of the research project on Analysis of the driving task. There was an opportunity to use the ICARUS II, a new instrumented car.

In addition to the lectures and papers, the texts of which were published in 1972 (see list of reports, publications and articles), the following activities not directly related to the foregoing projects may be mentioned.

In Utrecht on 17th February 1972, there was a presentation of the film Submerging vehicles, attended by the Minister of Public Health and Environmental Hygiene Dr. L. B. J. Stuyt. Addresses were delivered by Prof. H. W. Julius, Th. J. Westerhout, E. Asmussen and W. van der Berg.

Part of the film was also shown on television, following which SWOV gave some further information, likewise on television, at a later date. The wide publicity received by the Submerging Vehicles film led to many requests for talks combined with the showing of this film. It was also used as the basis of one of the TV spots forming part of the Dutch Road Safety Association's safety belts campaign.

Another consequence of public interest in this film was that in 1972 the Foundation Film and Science SFW lent the film forty-six times and that it was shown three times abroad (in France and Australia), while thirteen copies of it were sold.

It is gratifying to note that the co-operation between the Foundation Film and Science SFW and SWOV has made it possible to present scientific research information to a wide audience.

In co-operation with the RAI, the Netherlands Bicycle and Automobile Industry Association, a congress was held in Amsterdam on 25th and 26th May. The chairman was E. Asmussen, who furnished information on SWOV's behalf at a press conference. The papers read at the congress by members of SWOV have meanwhile been published (see list of reports, publications and articles).

SWOV was represented on the Scientific Committee preparing the OECD Symposium on Road User Perception and Decision Making in Rome on 13th-15th November 1972. Papers for this symposium were presented by E. Asmussen, D. J. Griep and R. Roszbach (see list of reports, publications and articles).

As part of the Course on Road Traffic Engineering 1972 of the Royal Dutch Touring Club ANWB, H. G. Paar read papers on 'Danger zones on roads; research into crash barriers for bridges and obstacles' (light standards, roadside telephones, obstacle barriers).

Two films were made for this purpose, mainly from existing material ('Safety structures for bridges' and 'Collisions with several obstacles').

For the 52nd Annual Meeting of the Highway Research Board on 22nd-26th January 1972 in Washington, H. G. Paar wrote a paper on 'Crash barrier research and application in the Netherlands'.

As part of the activities for OECD Research Group S9: The Effects of Roadside Obstacles on the Frequency and Severity of Accidents, H. G. Paar wrote an important contribution on the research projects to date.

D. A. Schreuder was invited to give lectures in the 1972/1973 course on Road Lighting, for the final studies of Traffic Engineering at the Roads and Waterways Department of the Delft University of Technology.

The Director of SWOV, E. Asmussen, was asked for the 1972/1973 course to give instruction on road safety for the final studies of Traffic Engineering at the Roads and Waterways Department of the Delft University of Technology.

## Reports, publications and papers

Bermbeveiliging en lichtmasten. Dr. ir. D. A. Schreuder. *Verkeerstechniek* **23** (1972) 1: 22 t/m 25.

Enquête 'oog en bril' kritisch bekeken. Drs. D. J. Griep en drs. P. C. Noordzij. *Arts en Auto* **38** (1972) 3: 142 t/m 143.\*

Zwemmers in Nederland; Een vraag uit een oriënterende Omnibusenquête. SWOV (Mej. A. Kranenburg). Publikatie 1972-P1N. Stichting Wetenschappelijk Onderzoek Verkeersveiligheid SWOV, Voorburg, 1972. 23 blz., geïll.\*

Discomfort glare in street lighting. D. A. Schreuder. *Lighting Research and Technology* **4** (1972) 1: 47-48.

Internationaal ongevalsonderzoek van de SWOV, dank zij meldingen van politie en ANWB. Ir. L. T. B. van Kampen. *Algemeen Politieblad* **121** (1972) 5: 112 t/m 113.\*

Het strafpuntensysteem en de verkeersveiligheid. Drs. D. J. Griep. *Tijdschr. v. d. Politie* **34** (1972) 5: 126 t/m 129.\*

Roadside safety structures; Research and applications. B. Beukers & E. Asmussen. Report Question IV: The road in relation to traffic requirements. XIVth World Congress, Prague, 1971. Association Internationale Permanente des Congrès de la Route, Paris, 1972. 15 pp.

Mogelijkheden en beperkingen van de verkeersdeelnemer als uitgangspunten voor het gebruik van hulpmiddelen in het verkeer. Ir. E. Asmussen. Lezing op de Civieltechnische dag van het Internationaal Congres over Verkeerstechniek Intertraffic '72, Amsterdam, 25 mei 1972. RAI, Amsterdam, 1972, 20 blz.

Road user's possibilities and limitations as the basis for traffic aids. E. Asmussen. Paper presented at the Civil Engineering Conference of the International Congress on Traffic Engineering Intertraffic '72, Amsterdam, 25 May 1972. RAI, Amsterdam, 1972. 17 pp.

Nieuwe ontwikkelingen op het gebied van weg- en straatverlichting ten behoeve van de verkeersveiligheid. (Prof.) J. B. de Boer en (dr. ir.) D. A. Schreuder. Lezing op de Elektronische dag van het Internationaal Congres over Verkeerstechniek Intertraffic '72, Amsterdam, 26 mei 1972. RAI, Amsterdam, 1972. 43 blz.

New developments in road and street lighting with a view to road safety. J. B. de Boer & B(=D). A. Schreuder. Paper presented at the Electronics Conference of the Inter-



national Congress on Traffic Engineering Intertraffic '72, Amsterdam, 26 May 1972. RAI, Amsterdam, 1972. 41 pp.

Verkeersveiligheid. Ir. E. Asmussen. Voordracht gehouden tijdens de Algemene Vergadering van de Federatie van Onderlinge Verzekeringsmaatschappijen op 17 mei 1972 te Utrecht. Mededelingenblad FOB (1972) 260 (juni): 1097 t/m 1100.\*

De bepaling van verblinding bij openbare verlichting. Dr. ir. D. A. Schreuder. Elektrotechniek 50 (1972) 14 (6 juli): 583 t/m 589.

Ook in: Congresdag over openbare verlichting, gehouden door de Nederlandse Stichting van Verlichtingskunde (NSvV) op 19 mei 1971 in het Bouwcentrum te Rotterdam. NV Noord-Nederlandse Drukkerij, Meppel. Blz. 26 t/m 32.\*

Het capaciteitsbegrip op de helling. Ir. F. C. Flury. Verkeerstechniek 23 (1972) 7: 316 t/m 323.\*

Psychological aspects of driver behaviour; Papers presented to the International Symposium on psychological aspects of driver behaviour, held at Noordwijkerhout, The Netherlands, 2-6 August 1971. Volume 1 Driver behaviour (29 papers), Volume 2 Applied research (22 papers). Institute for Road Safety Research SWOV, Voorburg, 1972. (Price Volume 1 + 2: f 75,—).

The coding and transmission of information by means of road lighting. Dr. ir. D. A. Schreuder. In: Psychological aspects of driver behaviour; Papers presented to the International Symposium on psychological aspects of driver behaviour, held at Noordwijkerhout, The Netherlands, 2-6 August 1971. Volume 2 Applied research, Section II.1.B.1. Night visibility systems. 16 pp. Institute for Road Safety Research SWOV, Voorburg, 1972.

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Safety barriers and lighting columns. D. A. Schreuder. International Lighting Review 23 (1972) 1: 20-21.

Leiteinrichtungen für Fahrbahn­ränder und Lichtmasten. D. A. Schreuder. Internationale Licht Rundschau 23 (1972) 1: 20-21.

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