

# DUTCH LONG-TERM POLICIES ON NON-MOTORISED TRAFFIC

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## INTRODUCTION

Road safety has always been high on the political agenda of The Netherlands. The policy plans of recent years have increasingly expressed the idea of an integrated approach to road safety viewed from the perspective of traffic participants, vehicles, the road and how to organise these and bring them together in a coherent fashion. Focusing on the pre-crash phase to prevent road accidents is considered to be more effective than trying to improve the crash situation and the post-crash phase.

Apart from developing a safer road infrastructure, the focus over the last two years has been directed more towards the options available for directly influencing the behaviour of road users. Consideration has been given to risk groups in traffic in general and to vulnerable road users in particular. The main underlying principle here is that all road users should have the necessary knowledge, skills and motivation to be able to participate safely in traffic.

Another important principle is that strong and well-equipped road users have a responsibility towards vulnerable and less well-equipped road users, such as children, the elderly and the disabled. This principle is reflected in the legislation on liability, among other things, which holds the driver of a motorised vehicle primarily responsible in the event of an accident involving a vulnerable road user.

## REGISTRATION OF ROAD TRAFFIC ACCIDENTS

Road safety information, especially about accidents, is vital to both road safety policy and its evaluation. A reliable picture of the total number of accidents is necessary for policy and its implementation. Road accidents are recorded on the basis of forms completed by police officers and the following problems can be identified with regard to the recording of road accidents by the police.

### Definition

Not every accident on the road is recorded as a traffic accident. In general, single pedestrian accidents (stumbling, slipping, tripping or falling) will not be recorded as a traffic accident, whereas single vehicle accidents are recorded as traffic accidents.

### Level of recording

Police accident reports are not complete. The lack of completeness has increased over the years. If enough were known about the extent and nature of accidents, we would be able to estimate the real scale of danger on the roads.

### **Representativeness**

Police records of accidents are not spread evenly across all types of accidents, and therefore not representative. It is known that the level of recording falls in proportion to the seriousness of the accident and type of vehicle. There are also local variations with regard to representativeness.

### **Stability**

Neither the extent of incompleteness nor representativeness remain constant across the various categories over a number of years. The extent to which records fluctuate is not known.

### **Vulnerability**

The current provision of information is made vulnerable by our dependence on the police as the most important recording body.

### **Comparative studies**

Various studies in The Netherlands have shown that:

- road accident records are not complete; only about 24% of road accidents involving injury are recorded, and the level of recording falls as the accidents become less serious;
- 48% of accidents involving injury attended by the police are not recorded;
- 60% of accidents involving admission to hospital are recorded; however, there is a steady decline in the number of these accidents being recorded;
- only 16% of accidents are recorded where the victims require treatment in a hospital A&E department;
- only 11% of accidents are recorded where the victims require treatment by a GP or physiotherapist, etc;
- for the largest group of accidents, those which only involve material damage, the level of recording is estimated at 20%; no study has been carried out on the representativeness of this group but it is likely that car accidents are overrepresented (because of insurance matters).

The problems referred to above in the recording of road accidents make it difficult to make a reliable estimate of the scale of the problem when it comes to road safety for non-motorised traffic. The underreporting is greatest for this group. To be able to give an indication some European figures are provided here.

In the European Union 99% of all transport fatalities are road traffic related. According to ETSC (1998) the number of fatalities is:

Road	42,500
Rail	108
Air	109
Water	100

If we consider the risk of a fatal accident by transport mode and over time spent in traffic, this results in the following for Europe (ETSC, 1999):

	Per 100 million person km	Per 100 million hours
Motorcycle/moped	16	500
Foot	7.5	30
Bicycle	6.3	90
Road total	1.1	33
Car	0.8	30
Ferry	0.33	10.5
Air (public transport)	0.08	36.5
Bus and coach	0.08	2
Rail	0.04	2

These figures clearly show that walking, cycling and moped use in traffic is far more risky per kilometre covered than car driving. This means that special measures are needed to protect these vulnerable groups in traffic. Therefore it is necessary first of all to have relevant background information about these groups.

This paper will provide some background information about the knowledge, attitude and behaviour of young cyclists based on recent research.

## **KNOWLEDGE, ATTITUDE AND BEHAVIOUR OF SECONDARY SCHOOL CHILDREN**

It is well known that young people are often involved in road accidents. In The Netherlands this is mainly young cyclists in the age range 12 to 15 and young moped riders aged between 16 and 18. Young people make around 55% of their trips by bike, more than twice as many as the average Dutch person. The majority of secondary school students, i.e. 89%, go to school by bike.

To find out more about the knowledge, attitudes and skills of schoolchildren in the first two years of secondary education in The Netherlands, research in the form of a questionnaire to be completed was carried out in 26 schools among 1681 students. The questionnaire covered the following subjects: traffic rules, danger recognition, shifting perspective, alcohol and drugs, dealing with peer pressure, physical aspects (e.g. braking distance, bicycle quality), personal ethics, and a number of facts like age, sex, modal split, duration of journey, accidents.

**\* Cycling accidents**

The proportion of secondary school children who had had one or more accidents resulting in injury over the previous two years was 11%. The proportion requiring medical treatment was 9% and the proportion of children treated in hospital was 2%. Scaled-up to the size of the population in question this amounts to rather more than the official figures would suggest. The scale is even greater for accidents involving damage: over the past two years around 34% of the school children had been involved an accident with a bike which had resulted in damage.

Children mainly ascribe road accidents involving injury to others (45%) or themselves and the other party (22%). In accidents involving material damage they were more inclined to admit that they were the cause (28%).

**\* Knowledge of the rules for right-of-way**

It is mainly in the first year of secondary education that some attention is given to teaching children the traffic rules. When the standard is set at 80% familiarity for knowing the rules for right-of-way, then more than half the students fail to meet this target. The encounter between bike and moped and how to apply the rules in complex traffic situations, in particular, are highly troublesome.

However, there is no relationship between not being sufficiently aware of the rules of the road and involvement in accidents. This can be explained by the fact that children generally adopt a self-defensive strategy when confronted with right-of-way situations. Analysis of their incorrect answers shows that they will generally let the other road user go first even when the cyclist has right-of-way.

**\* Understanding of road and traffic signs**

This part of the study concerned the basic knowledge of road and traffic signs. In the situations presented half the schoolchildren answers all the questions correctly; three quarters of them has at least correct answers. Their understanding improves with the number of school years. Here too, there is no link between knowledge of road and traffic signs and involvement in road accidents. In this area, road safety lessons do have a positive effect: schoolchildren who had had lessons on this subject in the first year score better.

**\* Understanding the factor of braking distance**

Many schoolchildren do not realize that the load which a vehicle is carrying enlarges its braking distance (only 45% do). The students generally manage to give the right answer here (more than 80%). Boys understand the factors which influence braking distance better than girls, more correct answers are given with increasing age and number of school years. Lessons on physical phenomena appear to have no impact on the correctness of the answers. There is also no relationship between knowing about braking distance and involvement in road accidents.

**\* Understanding the purpose of traffic rules**

When asked what the most important principle is of the traffic rules most children (almost three quarters) opt for the rule: "you should behave in a way which does not endanger yourself or other road users". This means that a large proportion of schoolchildren take the spirit of the Road Traffic Act as their guide when thinking about road safety.

**\* Estimation of own knowledge and skill on the road**

The schoolchildren estimate their practical skills as a cyclist to be better than their knowledge of the theory. Two thirds of them think that they would pass a practical test, while only a third think that they would pass the theory exam. Nevertheless more than three quarters consider that they know enough about the rules to be able to operate safely in traffic. This could mean that many schoolchildren think that a large part of the theory they have to learn does not match what they need to know for practice. Clearly, they feel that they are expected to learn too much non relevant content.

**\* Attitude towards the road safety rules**

Roughly two thirds of the schoolchildren think that it is good or reasonable that there are many rules, so that you know what you have to do. Also two thirds say that they always or usually stick to the rules. At the same time, about 40% think that the rules can sometimes be broken, particularly if they are awkward, or if breaking them causes no harm to others or the traffic flow. About a quarter of the schoolchildren think that the traffic rules are not really necessary, and roughly 30% take no notice of the rules of the road. Girls generally have a more positive attitude towards the rules than boys although as they move up through the lower secondary school their positive attitude declines. Schoolchildren who have had lessons which address the subject of attitude towards the rules have a slightly more positive attitude than those who have not received any teaching on this.

There is also a link between road accidents and attitude towards road safety rules. Children who have a positive attitude towards the traffic rules have slightly fewer accidents or near accidents. In view of the relationship between this aspect and accidents, more schoolchildren need to have a positive attitude towards the traffic rules. Particularly in the middle and upper school years there is a large gap between their actual attitude and the attitude we would wish to see.

**\* Attitude with regard to obstructing other road users**

The schoolchildren were asked what they would do if in a certain situation they should adapt their behaviour to another traffic participant and how they would feel if they had obstructed someone else. The youngsters were also asked whether they considered themselves to be the type of person who take the road situation or others into account.

Approximately 60% of the children say they find it unpleasant or very unpleasant to obstruct other people; conversely 20% do not find it unpleasant. The majority also says that they wish to behave correctly in traffic, while 40% are less interested or take no notice of the traffic situation.

Girls clearly find it more unpleasant to obstruct others or fail to take others into account. As they get older children find it less unpleasant to obstruct others. There is a relationship between the attitude towards obstructing others and road accidents or near accidents. Schoolchildren who are less inclined to obstruct report fewer accidents.

**\* Taking other road users into account**

This aspect relates to general behaviour in traffic or specific behaviour in relation to certain groups such as young children or the elderly which shows whether other people are taken into account.

Almost 60% of the students take others into account to some or to a large extent, while 14% show little or no consideration for others. Once again, girls score much better than boys. Consideration of others declines with increasing age of the schoolchildren.

There is a relationship between the attitude towards showing consideration for others and accidents or near accidents. Those who are more inclined to take others into account report slightly fewer accidents.

**\* Awareness of danger**

Of the situations described the schoolchildren consider holding onto a truck stopping at a red traffic light to be the most dangerous (74% consider this extremely dangerous). This is followed by turning left on a busy road without looking (53% think this is very dangerous). Next comes allowing yourself to be pulled along by a fast moped rider (51% consider this very dangerous).

However, 53% considers it not very dangerous to turn left without looking on a quiet road, while more than half think that cycling next to each other as a group of three is quite dangerous. When sitting on the rear of a friend's bicycle the risk of falling off backwards and hitting one's head is considered the most dangerous and the risk of getting one's feet caught between the spokes the least dangerous.

More than half of the young people appear to be aware of the dangers, and 14% are not sensitive to danger. Girls are slightly more sensitive than boys. Their awareness of danger declines with increasing age.

Two thirds say that they never or only occasionally take risks. Willingness to take risks increases with school age. There is a link between road safety and willingness to take risks. Youngsters who are more inclined to take risks are also slightly more often involved in road accidents or near accidents.

**\* Alcohol and drugs in traffic**

More than a third of the young people say that they do not drink alcohol and a third never cycle after drinking. Almost a quarter may sometimes cycle after drinking too much and 19% say that they may do this even when half drunk. Boys drink more often than girls and more often bike after drinking too much.

It is disturbing to note that 46% of the 12 year olds say that they already drink alcohol and 2% of this group say that they regularly cycle when drunk.

More than three quarters of the 15 and 16 year olds drink alcohol and 11 and 20% respectively say that they regularly cycle when half drunk. More is drunk, and children more often cycle when under the influence of alcohol in schools where lessons are given on the effects of alcohol and drugs.

About half the youngsters think that you may drink up to two glasses of alcohol. At least 20% say that they do not know what the limit for drinking and cycling is.

Lack of awareness about the effects of soft drugs (30% do not know what effect they have) and XTC (24% do not know its effects) is even greater. Most of the schoolchildren did know that drug use has a negative effect on road safety and 84% knows that alcohol and drugs

combined is most dangerous. There are quite a few misunderstandings about the effects of alcohol and its breakdown in the body. It does appear, however, that understanding increases with age and school year. It also seems that knowledge about alcohol and drugs improves as a result of teaching on the subject.

The attitude towards being under the influence of alcohol in traffic is reasonably tolerant. A third of the schoolchildren, for example, think that someone who has drunk too much can still cycle home; only 40% do not agree. The attitude towards riding a moped while drunk is much stricter; more than 70% think that you should not do that. However, this still leaves a group of 17% with a clearly irresponsible attitude.

Students with a responsible attitude are also less inclined to take risks and less often involved in road accidents. Girls have a clearly more responsible attitude towards drinking and driving than boys do. It applies in general that the sense of responsibility declines as age rises and at the upper end of the school. Lessons on the subject of drugs and alcohol have no impact on this sense of responsibility.

#### **\* Attitude towards peer pressure**

Almost a quarter of schoolchildren are inclined to follow the behaviour of the group in traffic (give in to peer pressure), while a third do this hardly or not at all. Boys do this more than girls and as they get older children become more inclined to conform to the group. Schoolchildren who follow the group are also more inclined to take risks and more often involved in road accidents.

#### **\* Bicycle safety**

This aspect concerns lights, the quality of the brakes and retroreflective clothing. Half the young people sometimes cycled on a bike with bad brakes. Only a quarter of them always cycled in the dark using operative lights, front and back. Girls more often cycle on safe equipment than boys. The bicycle or its use becomes less safe as the children get older and move up the school. Unsafe bikes or bike use is related to a greater tendency to take risks and being involved in more accidents or near accidents on the road.

#### **\* Safety of the environment**

The children themselves believe that further improvements can be made in the traffic environment. More than half of them indicate that when they are on the road they come across at least one confusing junction or awkward crossing.

#### **\* Conclusions from the research carried out among schoolchildren**

In general, it can be stated in relation to the knowledge elements that awareness of the right-of-way rules is below par, understanding of road and traffic signs is slightly better, awareness of the effects of alcohol and drugs on the road leaves a lot to be desired and only on the matters of braking distance and the blind spot is there any awareness.

The number of road accidents involving children between the ages of 12 and 15 in lower secondary school gives great cause for concern, particularly if we take their own reports of cycling accidents as a source of information. To reduce the number of road accidents more attention will have to be given to both infrastructural measures in the cycling environment (dangerous junctions and crossings) and behavioural measures (standards for knowledge, skills and attitudes in traffic).

Young people's behaviour on the road and having an understanding of the consequences of their own actions in traffic are significant factors in improving road safety.

It appears that scant attention is given to road safety in the present lower secondary school curriculum. A previous study by SWOV has shown that on an annual basis two hours per school year on average is devoted to the topic of road safety in lower secondary school. This study reveals an average of no more than 2.5 hours per school year. Despite the modest amount of road safety instruction it does appear to have a positive effect on certain behavioural aspects; mainly understanding of road signs, the attitude towards traffic rules, knowledge about alcohol and drugs. There is a relationship between some of these behavioural aspects and involvement in accidents. A better understanding and a better attitude in particular could lead to a reduction in road accidents.

Not by increasing factual knowledge, but by investing in better attitudes, raising ethical standards and improving behaviour, education can have most effect on reducing cycling accidents. For example, lessons about following the group (peer pressure) compared with making independent decisions, wanting to behave properly and why it is necessary, attitude towards road safety rules and estimation of their own behaviour on the road, having more consideration for other people, speaking to people about their behaviour and reducing willingness to take risks. Furthermore, it is necessary to point out the importance of a safe bike and its safe use. This approach offers a different perspective than the present one of transferring knowledge which has been the route taken thus far.

Age and gender are hampering contra-indicators, particularly in the all-important aspect of attitude. Girls and children in the first year clearly have a better attitude. It would therefore seem to be useful to invest in this aspect in the second and third school years and to see to what extent girls could serve as a role model or exercise influence over the attitude of the boys.

Based on this study arguments could be put forward about why it is important to include road safety education in the lower secondary school curriculum and options can be identified which will be useful when formulating goals, emphasis and didactic content.

## **STUDY OF BEHAVIOUR AND COUNTERMEASURES**

Beside the study reported on above covering knowledge, attitude and behaviour, research has also been carried out on possible new behavioural measures in traffic and whether they would be accepted or not.

The underlying principle is that as long as road users retain a degree of freedom, it is possible and likely that they will exhibit risk-taking behaviour which will lead to road accidents. And road users behave in this way because they believe that the risks are acceptable. Either because they are not aware that their behaviour is risky or because they think that road accidents are always unavoidable or the result of processes which cannot be influenced. And according to a repeated biennial questionnaire survey on road safety, it is indeed the case that most road users think that road accidents cannot be prevented.

At an individual level road users therefore find the level of road safety to be generally acceptable. However as a society we do not find this to be acceptable at all. If, as a society, we want to do something about road safety then we will have to get people to act more safely than they themselves consider it necessary to be.

But how can we tackle this? The best way, of course, is to arrange the infrastructure in such a way that risks can no longer occur, and where they cannot be fully excluded, to reduce their consequences. But you cannot rule out all the risks in this way. Road users always have freedom of choice which they can always use in a way which is unsafe.

At individual level the chance of being involved in a serious road accident is very small. Society multiplies the individual risks by the size of the population which makes the risk much greater, while the individual continues to see himself reflected in his own current low risk. Added to this, the road user also thinks that if something goes wrong there will be sufficient opportunity to steer the traffic process in the available time; but from the general viewpoint this possibility is very small.

The benefits to the individual of risk-taking often have a more personal dimension than a general one; for example, the sense of gaining time, the thrill of risky behaviour. The tendency to suppress cognitive dissonance means that the individual driver will play down the risks to himself. To get individuals to act more safely than they themselves consider necessary, it is necessary either to provide them with feedback and feed-forward about the risks or to force them to act safely by limiting their choices. Given the nature of the present system, it would be most useful to organise the feedback and feed-forward which controls the risk of an accident. This could be done by making direct reference to accident risks and providing additional feedback about other accident-risk correlated reasons in terms of rewards and punishments.

Influencing behaviour can only be usefully done if a feedback and feed-forward system is set up for individual road users in which they are directly, predictably and unavoidably faced with the consequences of risk behaviour (fines, restrictions and the risk of a road accident) and of safe behaviour on the road (lower insurance premiums).

The feed-forward system can be provided by parental guidance, education and public information about road safety, about safe behaviour choices and about the acceptability and consequences of poor road safety. The feed-forward system will have most impact if the behaviour becomes internalized and incorporated into a coherent system.

The feedback system should be linked both to direct information or steering either from inside the vehicle or the road situation, as well as external information or steering by information carriers, other road users and the authorities. Feedback will be most effective if it matches the feed-forward system, and is easy to understand, relevant and fair.

To influence individual road users' behaviour traffic policy on this subject should focus on:

- teaching risk recognition, desirable risk behaviour in risky situations and shifting perspective, influencing risk acceptance and reducing the illusion of control;
- accentuating the risks by making a stronger contrast between the risk situations and linking other motivations to safe and unsafe road behaviour;
- influencing behaviour choices at higher levels (safe routes, choice of mode of transport) and by holding road users accountable for their behaviour on the road;
- increasing the size of the group by addressing those who care for people other than themselves and requiring them to take regulating and facilitating measures.

#### **\* Pedestrians and cyclists**

There are only limited means for directly influencing the behaviour of pedestrians and cyclists. Given the present road system it would be difficult to implement an effective system to monitor behaviour and there are also no additional motives other than offering rewards in the form of comfort and no delay. This means for pedestrians and cyclists that the traffic system itself must be as well adapted as possible to their needs. It must be possible to safely accommodate unpredictable behaviour by pedestrians and cyclists.

The limited range of ways to develop risk avoiding behaviour should, of course, be utilized. These include:

- training in risk recognition, making choices to avoid risks and shifting perspective, as well as the development of anticipated regret as a result of risky actions;
- accentuating the risks by increasing the contrast between safe and unsafe choices, but also by removing the obstacles to making safe choices (e.g. give the elderly the opportunity to continue driving instead of cycling; give young people a public transport season ticket and reduce bicycle theft; reduce the risks of using the roads without lights);
- spreading the responsibility to include parents, schools, doctors and old people's homes; holding road managers accountable for their part and providing them with the instruments to be able to do something about the issue.

#### \* Moped riders

Monitoring the risk behaviour of moped users could be improved by fitting mopeds with vehicle registration plates (envisaged Dutch policy in 2003). Raising the age at which people can ride a moped (the intention is to raise it from 16 to 17 years) will also help to reduce the risks. Further motivators could include penalty threats but this will have a very little effect due to the very small likelihood of getting caught (even with the registration system). The main consideration here is that feedback should also be provided about the accident risks.

There are no obvious changes which can be made to the road infrastructure other than putting mopeds on the road and off the cycle path (a measure which became effective in the Netherlands in 2001). The positive effects will therefore have to come from influencing behaviour. The most effective method would be to persuade potential moped buyers not to buy a moped.

Measures which might be effective therefore are:

- training in risk recognition and shifting perspective, as well as the realization that skills training courses do not increase road safety (a practical driving test for moped drivers will only be effective if it creates a useful basis for learning to recognize risks);
- emphasizing the risks, e.g. by increasing the health insurance premiums for those who ride mopeds; not to influence the risks but to underline them to those who have a responsibility; another option would be to offer an attractive alternative at the moment that they start to consider buying a moped (e.g. a free public transport season ticket);
- increasing awareness by holding moped drivers and their parents accountable when they want to buy a moped;
- spreading the responsibility not only by holding moped drivers themselves accountable but also their parents, schools and role models in particular.

Public acceptance for one type of behavioural measure is much greater than for another. Measures which mainly involve consequences for the behaviour of other people (such as the theory and practical tests for mopeds and the novice driver's licence) can count on broad support, apart from among the groups affected. Measures where the behavioural consequences are fairly non-committal, such as more advertising and public information, will also be applauded. Measures which have a direct impact on the behaviour of large groups of road users, such as more electronic monitoring, mandatory crash helmets for cyclists or a mandatory speed limiter in the car, will be highly unpopular. If it is considered desirable to introduce such measures and ensure that they are widely implemented then a large investment of human capital and resources will be required.

## Conclusions

The most vulnerable road users are vulnerable because of the nature of their vehicles (which offer little protection and are often technically defective), the nature of the road system (pedestrians, cyclists and mopeds are often well down on the priority list when it comes to design and regulations) and the nature of being a human being (with physical, psychological and social weaknesses). This physical vulnerability can be compensated for by protective equipment and adopting a crash avoiding strategy. This requires a certain level of psychological ability and social acumen. These factors encompass knowledge and understanding as well as attitude, the group dynamic and psychomotor skills. Not all of these factors are specifically connected to behaviour in traffic but the road is just an area where they are required. Important elements in this context are recognition of danger, a sense of danger and anticipation of danger in relation both to oneself and to others (knowledge and understanding), the risk of deliberate rule infringement, vehicle equipment, the use of alcohol or drugs, and taking other people into consideration (attitude) as well as control of the vehicle itself, particularly in complex situations (psychomotor skills).

Besides current attempts to improve the quality of roads and vehicles, impose higher standards on the use of certain vehicles and improve feedback, it would also be possible to increase the level of psychological and social functioning through public information and education. It is important to make sure that this is closely linked to the situation as people perceive it and the capabilities of the novice road user and that when implemented the interventions should be incorporated into existing organisational structures wherever possible to increase the chances of success. To achieve this it will be necessary to set up a good framework for research on development and evaluation which can be used to steer efforts in the right direction.

## REFERENCES

Road Safety at the Start of the Third Millennium. Joop H. Kraay. Ministry of Transport, AVV Transport Research Centre. Paper presented to the congress "Traffic Safety on Three Continents" in Moscow, 19-21 September 2001. The Netherlands, Rotterdam, 18 September 2001.

Kennis, houding en gedrag leerlingen basisvorming. Resultaten en hoofdconclusies van een onderzoek naar verkeersveiligheid in relatie tot gedragsbeïnvloeding op school [*Knowledge, attitude and behaviour of lower secondary school children: results and main conclusions of a study on road safety in relation to influencing behaviour at school*]. Willem Vermeulen. Ministerie van Verkeer en Waterstaat, Adviesdienst Verkeer en Vervoer AVV [Ministry of Transport, AVV Transport Research Centre]. Rotterdam, 24 September 2002.

Aanzetten tot een vernieuwend gedragsgericht verkeersveiligheidsbeleid: veiligheidsfeedback. Eindrapport. TT02-17 [*Steps towards a new behaviour-oriented road safety policy: safety feedback. Final report*]. Ipe Veling, Jan Fokkema en Karolijne van der Houwen. Traffic Test bv. Veenendaal, 2002.

Aanbod van verkeerseducatie in de basisvorming [*Road safety education in secondary schools*]. Peter Levelt. SWOV, Leidschendam, 2000.

Crash risks in EU Transport. Newsletter European Transport Safety Council ETSC. Brussels June 1999.

Periodiek Regionaal Onderzoek Verkeersveiligheid PROV [*Periodical Regional Road Safety Research*]. Willeke Feenstra, Arlette Hazevoet, Karolijne van der Houwen en Ipe Veling. Traffic Test, TT02-52. Veenendaal, 2002.

Kwetsbare Verkeersdeelnemers [*Vulnerable Road Users*]. Rob Methorst. Ministerie van Verkeer en Waterstaat, Adviesdienst Verkeer en Vervoer AVV [Ministry of Transport, AVV Transport Research Centre]. Rotterdam, 2002.