

Non-technical measures for influencing traffic behaviour

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Recommendations based on Dutch experiences and projects in the
period 1990-1995

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Summary

This report discusses legislation, police enforcement, information campaigns and citizen participation as instruments in a behaviour oriented approach to road safety.

The acronym 'BITE' is used to summarise the general behavioural approach to problems of traffic safety. 'BITE' stands for: Behaviour, Intermediary, Target and Evaluation.

Behaviour

In the problem analysis phase, the traffic safety problem should be defined in terms of human behaviour. Legal measures and police enforcement are potentially strong instruments for influencing road users' behaviour. In this study we discuss these instruments in relation with their effects on behaviour.

Intermediaries

To reach the target groups and to change their behaviour, it is often necessary to mobilise intermediary parties (e.g. schools, neighbourhood councils, church, municipality) that can assist in changing behaviour in traffic. For instance, to improve the road safety behaviour of young children we will need the co-operation of school governors and teachers and of parents. This report addresses the possibilities to use intermediaries in a behavioural approach to traffic safety problems.

Target

In the problem analysis phase, the desirable target behaviour and target groups should be described. A very important instrument to reach a target group is a publicity and information campaign. We discuss this instrument in relation with speeding behaviour.

Evaluation

We evaluate in order to assess the ongoing process of the project and to assess the interim and end effects of our activities. Instead of evaluation after the introduction of a measure, it can be decided to involve citizens and road users in an early stage when measures are not yet taken and are only in a preparatory planning stage. If citizens and road users have the possibility to contribute to the planning of traffic safety measures, this will likely increase the acceptance of these measures. This report illustrates how the interaction between engineering planning and citizen involvement can contribute to road safety.

The BITE-approach presented here is very general. In the paper we will focus on specific instruments that can be part of this general approach: legal measures, police enforcement, publicity and information campaigns, and citizen participation will be discussed.

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1. Introduction

There is a variety of technical and non-technical measures to improve road safety, e.g. engineering measures, legal measures, and enforcement measures. Whether we are changing the physical characteristics of a traffic situation, or are organizing police road controls, or are publicly informing road drivers about specific road safety dangers; all these activities have in common that they are aimed at changing behaviour of road users. The success of all these activities is measured by behavioural change and in the longer term by a change in traffic injuries.

The acronym 'BITE' is used to summarize the general behavioural approach to problems of traffic safety. 'BITE' stands for: Behaviour, Intermediary, Target and Evaluation.

Behaviour

In the problem analysis phase, the traffic safety problem should be defined in terms of human behaviour. For example, road accidents where pedestrians are involved may be discussed in terms of unsafe behaviour of car drivers (speeding, overtaking, accelerating) and unsafe behaviour of pedestrians (crossing the road at an unsafe location, crossing without looking to right and left). Focussing on the behaviour of the pedestrian, we may distinguish different levels. On a general strategic level, there is the question of route choice: is the route of the pedestrian's walk to work or to school the best route in terms of safety? Also on the strategic level the question is whether pedestrians choose the right crossing location on a particular route. On the tactical level (manoeuvre level of behaviour), we may ask whether pedestrians show adequate, safe crossing behaviour: do they look left and right before crossing and do they cross the street in a straight line? Especially with young children, errors in correct performance of crossing behaviour may be observed.

Legal measures and police enforcement are potentially strong instruments for influencing road users' behaviour. In *Sections 2 and 3* we discuss these instruments in relation with their effects on behaviour.

Intermediaries

To reach the target groups and to change their behaviour it is often necessary to mobilise intermediary parties (e.g. schools, neighbourhood councils, church, municipality) that can assist in changing behaviour in traffic. For instance, to improve the road safety behaviour of young children we will need the cooperation of school governors and teachers and of parents. *Section 6* addresses the possibilities to use intermediaries in a behavioural approach to traffic safety problems.

Target

In the problem analysis phase, the desirable target behaviour, and target groups should be described. For example, our primary target group may be young children, aged between 6 and 12 years who have to walk from home to school and back daily. The target behaviour, for example, may be:

- children know which is the safest route to school and will choose that route;
- children will choose the safest crossing place on the route;

- children will walk together in groups of four or five to enhance visibility;
- children will display safe crossing behaviour;
- children will walk with highly visible clothing.

A very important instrument to reach a target group is a publicity and information campaign. In *Section 4* we discuss this instrument in relation with speeding behaviour.

Evaluation

We evaluate in order to assess the ongoing process of the project and to assess the interim and end effects of our activities. Process evaluation concerns the following questions:

Did we choose the right strategy? Did the implementation of the strategy work alright? Did we actually reach our target group? What was the opinion of target group about our intervention?

The effect evaluation pertains to the following questions: Were there any changes in knowledge or attitude? Did we bring about changes in behaviour? Were there any changes in accidents, or injuries? In a broader sense, which were the social consequences of our interventions (costs and savings for the community)?

Instead of evaluation after the introduction of a measure it can be decided to involve citizens and road users in an early stage when measures are not yet taken and are only in a preparatory planning stage. If citizens and road users have the possibility to contribute to the planning of traffic safety measures, this is likely to increase the acceptance of these measures. *Section 5* illustrates how the interaction between engineering planning and citizen involvement can contribute to road safety.

The BITE-approach presented here is very general. In this paper we will focus on specific instruments that can be part of this general approach: legal measures, police enforcement, publicity and information campaigns, and citizen participation will be discussed. For the sake of consistency, many of the examples are chosen to illustrate the approach, concern traffic problems caused by speeding.

2. Laws and rules

2.1. Introduction

In traffic, as in other areas, laws (are intended to) regulate behaviour. The function of road safety laws is to save lives and prevent suffering. Thus, they should be generally accepted by the public, provided that the public is well informed about the beneficial effects of these laws and regulations. In our view, a road safety regulation is likely to be accepted if that law is generally considered to effectively reduce an unwarranted road safety risk against acceptable social and/or personal costs.

Whether road users choose to comply with or to violate traffic rules depends on the benefits and disadvantages they associate with compliant behaviour. This process of choice, from a theoretical point of view, is often represented as a process of rational decision-making in which the pros and cons of behaviour and behavioural alternatives are weighted and summed and compared.

In practice, many choices will not conform to the criteria of the fully rational model. In traffic, as in other spheres of life, people tend to make shortcuts in mental functioning, relying on habits, on incomplete information, or on 'hunches', 'intuitive judgments', or use 'mindless' imitation of other people's behaviour to make certain choices. It follows that failure to follow an existing or a new traffic regulation should not be automatically ascribed to indifference to the rule or to road safety. It may be that a rule does not agree easily with the information-processing capabilities or habits of road users. This brings us to the cognitive-informational conditions for the behavioural effectiveness of a law or rule (*Section 2.2*). Revision and deregulation of road safety legislation is one strategic option to further enhance traffic law acceptance (*Section 2.3 and 2.4*). In the end, the factors that decide whether a law or rule is accepted may largely reside in social processes of imitation, communication and the setting of standards amongst road users (*Section 2.5*).

2.2. Conditions for the effectiveness of law

The behavioural effectiveness of a law depends upon a number of factors. First, the law or rule and its associated meaning should be known to road users. Second, it is vital that, besides having an abstract or concrete knowledge of the laws, road users understand the importance of the law or rule for their own road safety or that of others.

For the knowledge aspect, it is important that the law should fulfil certain inherently correct qualifications, e.g. (Noordzij, 1976):

- the law is easy to understand for all road users;
- the law is easy to obey;
- the law is not in contradiction or conflict with other laws;
- the law is not in conflict with situational prerogatives;
- the law makes it easy to identify any violation.

Road users tend to develop habitual behaviour that uses a minimum of information processing time. Therefore, a rule should be easy to understand and give clear prescriptions for behaviour. Knowledge and understanding of the law should be accompanied by some notion of the intrinsic or communal value of the law or rules. That is, the road user should have a personal or social interest in displaying compliant behaviour. The one condition that is paramount in this respect is that the law has a clear relationship to road safety.

Both from a scientific point of view and from a driver's subjective point of view, it would be ideal if it could be established exactly to what extent compliant behaviour contributes to road safety. Knowledge about the safety benefits of rules is important for several reasons. First, this knowledge can be used to convince the public of the importance of the law. Second, on the basis of this knowledge, an informed decision can be made about the level of secondary support for the law (publicity/enforcement/education). Third, this knowledge enables us to weigh the law in terms of costs/benefits and against possible alternatives.

From a strictly scientific point of view, it often proves a difficult task to verify the exact relationship between the behaviour of road users and road safety. Even for drink-driving, which is generally considered an important cause of accidents by professionals and lay people alike, the danger can only be roughly estimated. In general, it is often difficult to disentangle the contribution of one rule or measure from other simultaneous 'system' inputs.

Not only on the basis of scientific evidence, but also from a layman's perspective, the relationship between behaviour and road safety is difficult to verify. As Fuller (1988) points out, the set of rules which the driver brings into the driving situation may be inconsistent with the contingencies - the antecedent behaviour-outcome links - which the driver actually experiences. 'An example would be a driver for whom time was valuable who slowed down in a speed-limit area but experienced no safety or other advantage from the behaviour. The rule to reduce speed seems at variance with the actual contingencies' (Fuller, 1988; p. 532). In other words, road users learn the use of the road mainly by experience, but they must learn safety by less direct means, because accidents or near-accidents are rare events that do not provide road users with sufficiently frequent direct feedback.

2.3. Revision of legislation

Many countries have sets of laws and rules that were conceived several years ago. A revision of traffic law legislation may be used to enhance the acceptance of traffic laws. According to Noordzij (1988), the effectiveness of any set of traffic rules can be improved in a number of ways, starting with the revision of separate rules. Each rule should be checked to assess whether the situations to which it refers are outdated, whether the arguments for the prescribed behaviour still hold and whether this behaviour can be prescribed in more detail.

For each traffic behaviour it has to be decided whether a small number of simple rules is adequate, or whether the number of rules must be extended to distinguish between different groups of road users and specific situations. While the first option has the advantage of being simple, the prescription of the behaviour has to be either general and vague, or more precise but rigid. The second option results in a more comprehensive set of rules, each of which is better suited to the diversity of actual traffic situations.

A more fundamental decision pertains to the question of whether traffic rules should continue their function as the most comprehensive and authoritative set of prescriptions for the behaviour of road users. If this function is to be continued, several improvements can be made (Noordzij, 1988). Rules could be made more accessible by presenting them in separate sections, based on different modes of transport and different types of roads. They could be presented more convincingly by starting with a number of articles explaining the intentions of the rules in general terms and by providing arguments for individual rules.

This could be supplemented with some form of priority ranking, which is likely to lead to better compliance with the most important rules. It could even be considered to include rules that do not carry the threat of a penalty if violated. Compliance could be further improved by translating the legal rules into action patterns that can be trained.

2.4. Planned approach to the introduction of new laws

The introduction of new rules or legal measures should be based on an adequate problem analysis and be explicitly guided by a plan. Without a planned approach, the quality of the decision-making process will be less and the operations designed to support a law or rule may take on a haphazard character.

In general, compliance with a rule can be achieved by addressing groups of road users, organised on a sliding scale according to their willingness to comply. Specifically with regard to their behavioural response to a new rule or law, the following groups of road users may be distinguished (Noordzij, 1996):

- a. One group of road users will immediately show the desirable behaviour as prescribed by a rule or measure.
- b. One group of road users will be fairly indifferent to the rule or measure but nevertheless seek to avoid trouble with the authorities.
- c. One group of road users will be disinclined to follow the rule spontaneously, but will do so if some evidence of enforcement is given.
- d. One group of road users will think they can avoid enforcement of the rule or measure or will tend to test the limits of enforcement.
- e. One group of road users will accept a small risk of punishment for rule infringement.
- f. One group of road users will be almost completely indifferent or insensitive to the law, enforcement, or punishment.

A planned approach to increase the acceptance of a law or rule can take the following consecutive steps (Noordzij, 1996):

1. Recommendation or rule

Even if there were no rule, there will always be a group of road users who already comply with the proposed rule, either because they feel this is the right thing to do, or because they do not feel the need for other behaviour. A first step to increased compliance is the introduction of a formal rule. Based on the authority of the government, this may be reason enough for some road users to comply, as long as the rule does not interfere with personal interests. For others, public information is needed to explain why compliance with this rule is in the interests of road safety. These road users are convinced by argument; for them, the threat of a sanction is irrelevant.

2. Punishment for violation

More road users will be convinced of the need to comply if a sanction is associated with violation of the rule. Simply put, they want to stay out of trouble. For this group, actual enforcement is not yet necessary as long as they realize that the police is able and willing to enforce the rule if they have to.

3. Evidence of enforcement and punishment

The next group of road users will need proof of actual enforcement before they are willing to change their behaviour and comply.

4. Enforcement with random probability of detection for all road users, and certain punishment following detection.

For some road users, mere evidence of enforcement activities is not enough to deter them from violating the rules. For this group, law enforcement has to pose a greater threat, for example by making it more unpredictable.

5. Stronger enforcement (more punishment)

Finally, we are left with a group of road users with a great interest in violating the rules, who can only be made to comply if stronger enforcement is present. Apparently, this group of road users will repeatedly test if the level of enforcement is really as high as they are made to believe or if they can predict when and where to expect actual enforcement activities.

6. Changing the rule

After widespread compliance with the law or rule has been realised, it may be considered whether the rule should be further specified or intensified so that additional safety effects can be realized. This last step only makes sense if the previous steps (threat of enforcement, actual enforcement, optimization of enforcement) have been successful. If there is still widespread non-compliance with the general rule, it does not seem worthwhile to further specify the rule.

Thus, a step-by-step approach can be used and the effect of each measure can be evaluated before considering a new measure. Before a new rule or measure is introduced, the size of each of these groups should be known and the extent to which the expected safety benefits of a rule or measure might be reduced due to the non-compliance of a small minority. The size

of the different groups of road users can be estimated on the basis of a population survey.

After each measure, it should be seriously considered whether the next step is still necessary. For instance, it can be asked whether establishing and enforcing a rule is necessary when a large group of road users is already showing the desirable behaviour. Two reasons for taking the next step are:

1. A relatively small group can still cause a disproportionately large road safety problem by not complying with/adhering to a rule or measure.
2. There are indications that without further intervention, the number of offenders will increase.

The level of enforcement needed may be difficult to calculate in advance. But it is clear that the level of enforcement depends on the steps that have already been taken to realise compliance with a traffic rule. Stepping up the level of enforcement is not likely to be effective as long as earlier steps have not been taken carefully. Increased enforcement will not be very effective if it has not been made unpredictable or if this fact is not well known to the public.

2.5. Traffic law acceptance and social standards

If the relevance of a traffic law or rule is difficult to demonstrate, both from a scientific perspective and on the basis of personal experience, it may often be the case that social communication and the development of social standards will ultimately decide the question of relevance and acceptability.

In a European survey study, it was concluded that differences in preferences for laws and measures closely followed actual differences in legislation (SARTRE, 1995). 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 laws? Or did public experience with the law and its results lead to endorsement of its underlying message?

Following the lead of several authors (e.g. Andenaes, 1977; Snortum, 1988), we surmise that both these processes were involved. In the words of Snortum: 'law is both a cause and an effect of "moral climate"' (Snortum, 1988; p. 206). Generally, there will be a base of social support for a measure before its actual enactment; after its implementation, social support for the measure may grow even stronger as a result of experiences with related enforcement.

The law may even create a new social standard. The creation of such a new standard is certainly not an automatic process, but depends in part on the degree to which the law is perceived as reasonable, how it is promulgated by legitimate authority, and is impartially administered (Andenaes, 1977). Traffic laws always constitute a compromise between the public interest and individual freedom. It should be clear for all road users why a particular law is the best compromise. If road users envisage one or more alternatives for an existing regulation, the regulation can lose

its legitimacy. Especially in the case of speed limits, it is difficult to convince road users that the existing speed limit is the best compromise between freedom and safety.

For some laws, e.g. the obligation to use daytime running lights or a standard speed limit of 30 km/h in residential areas, the base of support is strong in some specific countries, but very weak in many others (SARTRE, 1994). In practice, an initial base of support for a particular law would have to exist before a political 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 support for a certain law can be enhanced by persuasive communication or by experiences with, or feedback about, the positive results as a consequence of the new measure. An example is the experience with the introduction of a 30 km/hr limit in the Austrian city of Graz as described by Wernsperger & Sammer (1995). Many road users will follow the behaviour of other road users because they see others as an important source of information on how to behave on the road in a normal or intelligent way. Initial compliance with a law or rule will tend to elicit further compliance, provided this behaviour is associated with positive experiences.

The other side of the coin is that laws supported by the majority 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 experiencing any repercussions, they may come to doubt the necessity or the reasonableness of the new or existing regulation. As one researcher put it: 'Normative behaviour becomes attractive if road users perceive that most road users comply with it, and that those who do not comply are confronted with the negative consequences.' (Rothengatter, 1991; p. 93.)

Obviously, there is a limit to what we can accomplish with new legislation and stricter sanctions. Legislation and regulations handed down by central or local government do not always have the desired effect. If road users do not assume some personal responsibility with respect to the legislation, regular violations of the rules may be the result. If the police are unable or unwilling to effectively enforce legislation, the policy will probably not be very successful. This brings us upon the subject of police enforcement which will be dealt with in the next section.

3. Police enforcement

3.1. Introduction

Police enforcement of traffic laws is intended to influence the behaviour of road users in such a way that their risk of becoming involved in an accident or causing an accident decreases (Zaal, 1994). It is generally accepted that traffic law enforcement influences driving behaviour through two processes: general deterrence and specific deterrence. General deterrence can be described as the impact of the threat of legal punishment on the public at large, while specific deterrence can be seen as the impact of actual legal punishment on those who have been apprehended. Thus, general deterrence results from a perception of the public that traffic laws are enforced and that a risk of detection and punishment exists when traffic laws are violated (Armour, 1984; Zaal, 1994). Specific deterrence arises from actual experiences with detection, prosecution and punishment of convicted offenders.

The general assumptions underlying enforcement are:

- Police enforcement should primarily be aimed at general deterrence.
- The enforcement strategy should be a mix of general and specific deterrence activities.
- General deterrence is first and foremost achieved by increasing the subjective risk of apprehension.

These assumptions have led to the following ground rules of enforcement. Police enforcement of traffic rules should be (Goldenbeld, 1995):

- accompanied by publicity, specifically aimed at increasing the subjective risk of detection;
- unpredictable ;
- directed at times and locations that simultaneously maximize the chance of detection of actual offenders and maximize the scale of feed-back to potential offenders;
- a mix of highly visible and less visible enforcement activities;
- continuous over a longer period of time.

In short, police enforcement is aimed at the behaviour modification of road users and deterrence is seen as the central influence process. Aside from deterring road users from committing violations, the police may also increase the acceptance of traffic laws in a number of other ways. They may do so by giving the right example in traffic and by actively informing the public about police policy in matters of road safety and the reasons behind specific police activities. Furthermore, the police should invest some time in informal communication with road users and pay attention to complaints or suggestions about road safety. Also, they can give practical or symbolic support to actions or activities of other road safety organizations. Last but not least, the police may substitute traditional punishment with alternative sanctions that may appeal to the public and encourage them to change their attitude.

3.2. Enforcement of speeding

Police enforcement of compliance with the speed limit requires a great deal of effort. Only with very regular enforcement, accompanied by information campaigns, more long term effects for the control of driving speeds will be achieved. Since traffic policing resources are scarce, this implies that the choice of whether or not to apply enforcement at certain locations or roads should be a well-calculated decision, based on the advantages and disadvantages expected from the intensity of effort demanded.

If speeding offences occur on a large scale, the question arises as to whether police enforcement of driving speed should also be performed on a broad scale. But the matter is not that simple. Widespread speeding offences on a certain road are not in themselves sufficient reason to intensify the police enforcement of driving speeds on these roads.

The Dutch handbook 'An integrated approach to speed on 80 km/h roads' (Wildervanck, 1993) lists a number of useful considerations as to whether or not to apply enforcement as an instrument to influence driving speed:

- A. "The first question that should be answered is whether many people drive too fast on a road. If this is the case, it should first be examined whether the existing speed limit is suitable for the road in question. The imposition of a higher speed limit could be the solution. If the limit cannot be increased, it should be considered whether the physical character of the road and the road environment do not make speeding too attractive. In that case, radical infrastructural measures could be required to change the road design.
- B. If the road does not really tempt people to speed, then we arrive at measures along the line of minor infrastructural interventions, enforcement, and information campaigns. With the combination of enforcement and information campaigns, it should also be considered how much emphasis should be placed on the two. 'If it is shown, for example, that many road users are not familiar with the area and drive too fast unknowingly, then in any case the initial emphasis can be placed on publicity. If that does not help, or if people are in fact aware that they should not drive faster than 80 km/h on that road, then more time should be invested in enforcement.'" (Wildervanck, 1993; p. 16).

4. Publicity and information about speeding

4.1. Introduction

The motivation to use speed publicity and information campaigns can be threefold (OECD, 1993; Williams, 1994)

1. to support technical and non-technical speed influencing measures, e.g. police enforcement;
2. general agenda setting: drawing attention to the subject amongst a large public;
3. to provide in a specific need for information.

Information in support of police enforcement is intended to increase the subjective risk of getting caught, to provide information about the size of fines (at what point is your driving licence requisitioned, when is your car confiscated), to provide information about the importance of enforcement, and to provide information about the results of enforcement on social standards.

Information can also fulfil a more independent function. For instance, the information which is given to road users via roadside signs, is primarily intended to act as agenda setting. In this case the problem of speeding is explained in order to make people more aware. The effectiveness of these campaigns cannot be expressed in terms of a change in behaviour. It is only a measure that creates conditions from which no independent effect can be anticipated. Such information campaigns should therefore only be applied in combination with other measures, and only then if it has been established that it is necessary to heighten public awareness.

Aside from general agenda setting, it is also possible for information campaigns to harbour a very specific informative function, specially aimed at answering the specific questions or problems of the public. This information makes sense if there is a hiatus in knowledge and a (latent or public) need for information. In particular, recommendations for difficult situations and circumstances and for situations that have been subjected to an engineering modification and a change in driving speed are eligible. The information will have to clarify what the correct speed in the given situation is, and why. If this information campaign meets a certain need, it can also offer support to the social climate for speed control.

Rooijers (1988) has performed several field experiments into the effects of various information campaign strategies. The following strategies were evaluated:

- posters (both attitude and behavioural orientation);
- folders (both attitude and behavioural orientation);
- posters with electronic feedback;
- posters and letters combined;
- posters and folders combined;
- posters with letters and feedback;
- personal letters containing risk information;
- posters containing risk information.

An important conclusion from this study is the fact that information campaigns in the field of driving speeds are hardly able to bring about a change in the attitude of road users. The speed reductions achieved with the various experiments only lasted a short time. The best results were achieved by a direct and personal approach to the target group, with a message containing both concrete behavioural recommendations and risk information.

4.2. Information along the roadside

If we apply a broad definition to the concept of information, then the supply of information alongside the road can also be regarded as information.

With respect to speed inside the built up area, the following possibilities are important. Road users can be made aware of the set speed limit with static or dynamic warning signs. Static signs show a fixed text; dynamic signs light up only in response to speeding offenders (also referred to as electronic speed influencer). Its use in enforcement is further considered under the heading 'Police Enforcement'.

Dynamic information systems could offer an important aid in learning how speed should be adapted to circumstances, such as a traffic jam, fog, slippery conditions, or a change in the type of road surface.

Static warning signs only have a brief effect on driving speed, if at all. Dynamic warning signs have more effect, particularly if it is indicated why a lower speed is required at that location. Apart from finding support for this method in international literature, this was also confirmed by experiments conducted in the Netherlands which were preceded by a publicity campaign:

- On roads in the vicinity of a school in the Dutch city of The Hague, where 3 types of signs were successively tested, the average speed dropped most with the dynamic signs which only warned offenders (drop in speed of 5 km/h). The long term effects of the system were not studied (Oei, 1988);
- At an intersection in the Dutch province of Friesland, where the speed limit on the rural road was lowered to 70 km/h locally and the road users were first warned with a static, and then a dynamic sign, the V85 of 96 km/h dropped to approximately 70 km/h. This effect proved to be still present one year after introduction of the system (Oei, 1994).

4.3. Information aimed at involving social relations

The above forms of information supply provided by central or local government - or on behalf of the government or organisations active in society - are aimed at the individual road user. The road user is also influenced by his immediate social environment, by other road users or persons and by organisations with whom he or she has a relationship to a significant degree (see also *Section 6* of this paper).

The social environment of the road user can be mobilised in order to influence his or her behaviour. Information about the behaviour of other road users can reinforce the standards of the majority. Very likely, the

majority of the overall target group is susceptible to such social control. Information alongside the road or via the mass media represents an instrument for transferring such information.

For business motives or social motives used to justify speeding, business and social relations will have to be involved in policy. The business community will need to be informed about the personal advantages of speed reduction and, if necessary, pressure methods can be applied to serve as a catalyst. A company course is recommended, because more influence can be exerted in this way than via information campaigns.

In the Netherlands, the influence of social relations has been tried to reduce drinking-and-driving, but not to reduce speeding. Together with anti-alcohol campaigns and changes in consumer patterns (non-alcoholic beers), improvements in enforcement strategy have contributed to a decline in drinking and driving between 1970 and 1991 (Noordzij, 1994). In that period, the proportion of drivers with a BAC above the legal limit steadily decreased from 15% to under 4%. It still has to be examined whether the successful developments with respect to driving under the influence (e.g. the Dutch campaign 'drinking and driving don't mix' and 'alcohol projects') can be translated to the speeding issue. Besides information campaigns, strict enforcement policy can also play a supporting role in changing social norms with regard to driving under the influence.

5. Citizen participation

5.1. Introduction

As we have observed in the general introduction, the approach to a traffic safety problem is dependent on a good problem analysis. A package of measures could be drawn up by a group of experts, based on an analysis of traffic problems inside a residential area or urban district.

One problem with the compilation of such a package of measures is that often different versions are feasible, each of these versions having a different consequence for various road users (motorists, cyclists and pedestrians, heavy traffic). Another point is that traffic problems inside built up areas are almost always multifaceted: aside from the driving speeds inside the built up area, other problems often also play a role, for example: parking problems, an undesirable mixture of fast and slow traffic, traffic intensity etc. In concrete terms, this means that whatever the decision ultimately arrived at, some road users will experience advantages while others will encounter disadvantages. The various options for a package of measures to be proposed will have to be considered in terms of their possible impact on the different problems.

In view of the above, it should not be surprising to learn that the package of measures conceptualised by experts sometimes meets strong resistance from local residents, particularly when they are confronted by detailed plans like a bolt from the blue. In such cases, the local municipal council, roused by the booing of angry citizens, often wisely decides to keep the plans 'on ice' for a while.

This state of affairs is of course not desirable: much time and energy is invested in what is probably a good plan which is then criticised by a surprised population 'taken unawares', their rejection being perhaps on emotional grounds. Ultimately, all parties, administrators, planners, and citizens are left disenchanted. To avoid such an unpleasant situation, it is advisable to involve the various parties that are affected by the measures (individual citizens, organised neighbourhoods, interest groups, the local bus company) in the planning process. This has various advantages (Wildervanck, 1988):

- The local population can improve the quality of the plans by offering creative ideas.
- At an early stage, it will become clear which ideas meet resistance and which do not.
- Because the population is involved in the planning at an early stage, they will identify more with the plans.
- Participation results in more publicity, which can in turn lead to the inspiration of other residents.
- By becoming involved, the population has a better insight into the complexity of the matter, and the citizen is then prepared to see his own 'expertise' in a more unbiased light.

- Often, the residents realise that they themselves are responsible for part of the problem (excessive speeds, poor parking) during an inventory of the situation.

The realisation of an essential base of support amongst the population is often simple when a series of serious accidents is involved. With objective road hazard, people are more easily convinced of the need for infrastructural measures. It becomes somewhat harder if hard facts are lacking, however. With subjective road hazard, we see few to no road accidents in an objective sense, even though certain traffic situations are definitely considered hazardous. An extra problem in this regard could be that certain groups of road users feel less safe than others, so that there is less consensus on the issue.

Only when it becomes obvious where exactly the problem areas lie, then both supporters and opponents and those who are still 'sitting on the fence' can apply a process of evaluation to assess the potential measures envisaged for the neighbourhood.

5.2. Engineering measures and communication

The most effective way to apply engineering modifications is to involve the local population in the ideas on this subject at an early stage (Beke, 1995). This is effective, because the early involvement of local residents can prevent negative reactions and resistance, and hence saves time. Effective too, because the acceptance of plans by the local population will promote the adaptation of behaviour in traffic in response to the impending changes. In *Sections 5.2.1 to 5.2.3*, examples are given of methods to properly organise and utilise the involvement of local residents.

5.2.1. Comprehensive planning

An engineering approach to a speeding problem inside a built-up area does not stand alone. The successful introduction of, for example, a 30 km/h zone, depends to a great extent on the degree to which the local population supports such measures. A 30 km/h zone demands different - adapted - behaviour in traffic, which only becomes effective if the majority of road users keep to the given rules.

The Dutch advisory bureau Beke has conceived a strategy of action called comprehensive planning, intended to ease the introduction of engineering modifications and new traffic facilities in a district or municipality (Beke & Van Keken, 1994; Beke, Sprenger & Verhagen, 1995). This strategy has already been tried and tested for the construction of facilities to guide tourist mobility in the Dutch Veluwe tourist area, and for the development of the quay infrastructure within the Rhine-Waal region. Recently, this strategy has been applied for the purposes of introducing 30 km/h zones in municipal centres in the Dutch province of Zeeland.

With comprehensive planning, the local population is not confronted by detailed plans; instead, the plans have a temporary, general character. Smaller working groups from the district are then given the opportunity to further define the measures. Such working groups include experts and local

municipal officers, in addition to local residents. The plans for measures concerning the infrastructure are further defined and made concrete in close consultation with the residents. This allows a broad base of support to be created.

During the implementation of the handling strategy, four preconditions must constantly be safeguarded:

1. Target group differentiation

The various target groups, which can be divided into supporters and opponents of the measures, should be tackled on the basis of their own arguments. Ultimately, this will lead to the various target groups becoming more involved in the problem.

2. Involvement in the implementation of engineering modifications

If residents are involved in the implementation of engineering measures, the base of support for these measures will grow.

3. Information/publicity and the enforcement of compliance to traffic measures

During the participating discussions, information can be provided about the possibilities, effects and restrictions of enforcement and maintenance. Aside from regular police enforcement, other forms of enforcement should also be considered. Smaller municipal centres have far more potential to restrict speed via internal social controls, for example. Often there is a strong sense of solidarity between the inhabitants, and people can more easily correct each other's behaviour in traffic.

Another means of enforcement is electronic speed registration with an electronic reporting sign: this form of registration could be placed in a certain area and rotated amongst various municipal centres. The information supplied by this electronic enforcement can then also be reported in various regional media.

4. Feedback of results in participating discussions

The residents should be aware of the precise influence of participating discussions on the policy ultimately chosen. Keeping local and regional media well informed plays an important role in the feedback of information for the inhabitants. It is of the utmost importance that those who are included in these working groups can link back their actions and results to their fellow residents, e.g. via a local door-to-door leaflet.

5.2.2. *The city of Deventer and the neighbourhood traffic circulation plans*

The district approach in the Dutch city of Deventer was the result of Social Innovation policy. As part of this district approach, an inventory was made of the problems encountered in all the local districts. This brought to the fore that 65% of these problems involved traffic issues. In response, 33 districts of Deventer have now drawn up their own neighbourhood traffic circulation plan (TCP). In a neighbourhood TCP, the inhabitants can indicate how their area should look, mainly with respect to traffic-reducing measures, such as 'sleeping policemen' and low posts.

The reason for the establishment of a local traffic plan could be the introduction of a 30 km/h zone, as well as possible initiatives for urban and village innovation, social innovation, the setting up of a municipal road safety plan and handling of incoming complaints.

The decision making process in Deventer involved six steps:

Step 1: Everyone who has registered to participate in drawing up the neighbourhood TCP receives an invitation for a working meeting from the district officer. Led by an expert project leader, the problems are defined, with a view to finding a solution to these problems. This results in a draft neighbourhood TCP.

Step 2: The draft plan becomes the subject of discussion during a neighbourhood participation evening. If there are few or no objections, the plan is adopted and forwarded to the mayor and aldermen and the district team. If there are more serious objections, step 3 follows.

Step 3: The working group meets again. Those who have objections to the draft plan also receive an invitation. It is intended to draw up a modified plan. If the working group is not in agreement about the proposal, only those measures for which agreement does exist are adopted.

Step 4: The definitive plan of the working group is exhibited, so that local residents can inspect it. Objections are no longer possible at this stage.

Step 5: The mayor and aldermen adopt the plan as it stands.

Step 6: The district officer informs the district team about the plan, and the latter determines whether extra funding can be made available for implementation.

Of course, administrative and organisational conditions are attached to the drafting of neighbourhood TCPs. For example, the formal leeway available to the inhabitants should be clearly indicated in advance by the municipal council, and the area must have a logical, clear organisation with an obvious main structure and access structure.

In the pilot project, the entire process was completed within eighteen months. The setup up of a neighbourhood TCP does require professional guidance and coordination, so that unrealistic situations are prevented. Often, it must be explained why certain ideas are not feasible. Furthermore, each district is unique and requires an approach specific to that neighbourhood.

Further experiences and recommendations are as follows:

- Many residents are enthusiastic and would like to take the initiative.
- Each neighbourhood is unique with respect to road structure and composition of the population.
- This approach enhances the base of support for the plans.
- The residents look more closely at their own behaviour in traffic and at that of their neighbours.

- Particularly for those districts that lie in the vicinity of local shops and where there are parking problems, it is difficult to reach consensus amongst residents and interested parties.
- The main road structure and the access structure should be defined before the residents can work on the further specification. Decisions on these matters are beyond the competence of the residents; rather, this is a matter for the municipal council.

5.2.3. *The Infralab method*

The Infralab method is an interactive way to analyse traffic problems and rapidly come to a feasible, sometimes innovative solution while maintaining a broad base of support (Kune, 1995; Rijkswaterstaat, 1995). This method, designed by the Dutch Ministry of Transport, consists of three phases that are each completed by an administrative decision, viz.:

- the Voting phase;
- the Agora (= Consultation) phase;
- the Action phase.

During the first phase, the Voting phase, the problem is defined. This is done by organising several meetings, where the largest possible number of interested parties are invited. The result of these sessions, i.e. the opinions about the causes and aspects of the problem, are verified through a survey held amongst a larger representative group of interested parties.

After administrative decision-making about the results of 'The Vote', the Agora (Consultation) phase is introduced to find solutions that have a high chance of success, through several sessions involving users and interested parties, together with experts. These potential solutions are then translated by a 'think tank' of experts into feasible projects. Again, the results of this phase, in this case the conceptualised project, are submitted to a broader public that is representative for the target group. The result of the 'Agora phase' is subject to an administrative decision-making process, where a choice is made for the project that will be definitively specified and implemented in the 'Action phase'.

The Infralab method has not only been applied to the problem of road users on busy roads, but also to the traffic problem within the built up area (Pruijs, 1996). It would not be correct to claim that this method has always led to original or innovative solutions, but it does offer a good insight into the question of which measures could rely on an strong base of public support with respect to resolving specific problems.

In short, the Infralab method, like comprehensive planning and the Deventer neighbourhood approach, represents a strong, two-directional method of communication. With all these approaches, it should be remembered that they are not only aimed at those people that are bound to air their views anyway, but more specifically at people from target groups who often do not think about airing their opinion. The representational value of the target group determines the value of these methods to a significant degree.

6. The role of intermediaries

There is a distance between individual citizens on the one hand, and central authorities on the other hand. Often state or provincial authorities are not well equipped to reach individual citizens or specific target groups, or to communicate with these groups. Between the extremes of central authority and individual citizen, there exists a social plane of intermediary parties, e.g. citizen groups, professional groups, commercial and non-commercial associations, schools, churches, companies etc. These intermediaries often play an important role in activities aimed at changing traffic behaviour. Intermediary parties can fulfil several functions. They may:

- provide information about specific traffic problems which confront certain groups, so that a better insight into traffic problems develops;
- transfer road safety information to their backing group;
- undertake specific activities to support a project, e.g. setting a good example, or giving practical advice;
- develop concrete activities or plans to assist in a project;
- financially support certain activities, programmes or plans.

A short discussion of the causation of accidents may further clarify the need to mobilise intermediaries in road safety work. Accidents are rarely the results of a single unique cause. Often there is a chain of events leading up to an accident. Let's take the case of an accident on a city road with high intensity of motorized traffic. Suppose an 8-year old child on the way to school is run over by a car driver who saw the child walking over the pavement but was taken by surprise by the child suddenly crossing the road. The immediate factors explaining the accident may be the relatively high speed of the car, and the unsafe behaviour of the child.

It is clear that less immediate factors are also involved when we consider questions like:

- Why did the child have to cross this road in order to reach school? Was it not possible to organize some safer walking route to the school?
- Why was the child walking alone and not guided by older children or by parents? Could not some guidance programme for young children have been organized by school authorities in cooperation with parents?
- Why didn't the driver decrease his speed upon first seeing the child on the pavement, so that he would be able to anticipate on unexpected movements of the child? etc.

If an accident can be seen as the outcome of a chain of causes, this also means that our prevention efforts can be directed towards multiple causes. To accomplish this it is necessary that different parties, each with different knowledge of the various causes, cooperate with each other to achieve safety results.

A project could be started, aimed at improving the safety of young school children who daily walk from home to school and vice versa. Soon a number of intermediaries come to mind. For example, school teachers could instruct school children about the safest walking routes to a school

and about safe street crossing behaviour. However, first the school teachers themselves would have to be informed about traffic safety and about specific unsafe behaviour of children. A traffic psychologist or traffic researcher may perform this task.

Second, the school teachers might need some instruction materials, e.g. coloured charts or drawings, to explain the route to the children. Also, it may be important that parents and schools work together: for instance, parents may exercise with their children to walk safely to school. Furthermore, the safest walking routes for schoolchildren may be specially lighted or specially marked by signs or colours. The financing needed for this may come from another intermediary: possibly the municipality itself. For this project still other intermediaries may come to mind.

In *Table 1* we present a general scheme of intermediaries and their role in a behavioural approach to traffic safety.

	Parents	Schools	Training schools and courses	Road Safety organisations and government	Police and Justice	Insurers, companies, and government
Type	upbringing	education	training	information	legislation and enforcement	special offers, reward programmes and company policy
Who	children	children	aspiring car/ motor cycle/ moped drivers, aged 50+, professionals	target groups	everyone or special target groups	employees, municipalities, students, insured persons
What	knowledge, skills, attitudes, behaviour	knowledge, skills, attitudes, behaviour	knowledge, skills, attitudes, behaviour	knowledge, attitudes, behaviour	behaviour	accident behaviour
Where	at home, guidance in traffic	at school, traffic education, guidance in traffic	theory lessons, traffic practice area, traffic	mass media, points often visited	in traffic	in the company, organisation, municipalities
When	from first moment of participation in traffic	'always'	if driving licence is required or at a certain age (16, 55+)	certain circumstances (e.g. fog) or new traffic rules	to prevent traffic offences	during professional phase, school age
With what	spoken word, books, games	spoken word, printed material, audio-visual material	spoken word, printed material, audio-visual material, lesson vehicle	advertisements, posters, stickers, TV ads, promotion teams	talk, ticket, obvious presence of control teams or control equipment	letters, folders, small rewards, money, social rewards
In what way	modelling, instruction, training, reward and punishment	instruction, training, reward, and punishment	instruction, training	instruction, 'reward', promise campaign	(potential) punishment, (sometimes) reward	reward and (sometimes) punishment

Table 1. *The role of intermediaries as part of the non-technical influence of behaviour.*

7. Conclusions

The lessons from various Dutch projects aimed at changing behaviour of road users can be summarised in the following points.

It is possible to conceptualise most traffic problems in behavioural terms and to state behavioural targets for our measures. Irrespective of whether measures are of a technical or non-technical nature, the effects on traffic behaviour should be considered and behavioural targets for later evaluation should be set.

The effectiveness of engineering measures in changing driver behaviour can be improved by a number of non-technical measures that support the understanding or acceptance of the new measure. In fact, some non-technical measures are always part of a technical approach, since the driver public has to be informed or consulted about the new measures.

If an accident can be seen as the outcome of a chain of causes, this also means that our prevention efforts can be directed towards multiple causes. To accomplish this, it is necessary that different parties, each with different knowledge of the various causes, co-operate with each other to achieve safety results.

In order to reach, inform, or influence specific target groups of road users, it should be seriously considered to enlist the help or support of intermediaries, such as schools, road safety organisations, commercial organisations etc..

Police enforcement of traffic rules should be grounded in clear and consistent legislation and should be planned in a step-by-step strategy.

The acceptance of traffic measures by the local population can be increased by involving the population into the decision-making process. Care should be taken, however, that lay opinions should not interfere with those areas of traffic expertise or planning that specifically require expert knowledge.

In order to learn from past experience, evaluation of a measure or project should be standard procedure. Evaluation should not only focus on observable or measurable effects in traffic, but also on the process of co-operation that led to these effects.

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