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**SAFE SPEEDS AND CREDIBLE SPEED LIMITS (SACREDSPEED): A NEW VISION FOR
DECISION MAKING ON SPEED MANAGEMENT**

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ABSTRACT

Speed is an inherent characteristic of mobility and a hazard to safety. Several approaches exist of how to manage speed. In the Netherlands, the emphasis has mainly been on harm minimisation during the last decades, due to the implementation of the Sustainable Safety vision. Speed management remains a core business in this vision, by means of an integral approach of speed management measurements.

A request from a number of regional authorities to assist them in developing a decision support system for speed management was the starting point for elaborating SWOV's vision on safe speed and credible speed limits (SaCredSpeed) into an algorithm. This vision and algorithm are presented in this paper.

The SaCredSpeed algorithm uses input data of design, image and traffic characteristics of a particular stretch of road to assess a safe speed and speed limit for that particular situation. This safe speed is related to the real speed (V90; optional), and, depending on the fit, the credibility of the speed limit, the enforcement situation (optional), the network function of the road, the condition of the adjacent roads, and the priorities the decision maker wants to set, SaCredSpeed offers suggestions for adaptations. These can consist of a) speed limit adaptations, b) road design adaptations or c) additional enforcement adaptations. This integral approach to speed management from the view of safety and credibility can be a good addition to other speed or safety instruments that exist. The paper concludes with suggestions for further research and international cooperation.

1 INTRODUCTION

Speed is a central issue in road safety because there is a strong link with the cause as well as with the severity of crashes. Given a particular road, only a small change in the average speed would have a substantial effect on number of crashes and the consequences of a crash (e.g. 1). For this reason, speed management is very important for road safety policies. In the decision making process of speed management, it is important to start by defining the traffic speed to aim for. Paragraph 1.1 discusses different ways to deal with this issue. Once the desired speed has been defined, an assessment of the situation is required, which is then followed by appropriate speed management measures to achieve the desired speeds. There are several ways to influence the operating speed: regulation via speed limits, enforcement and communication are effective, but so are the layout of the road and road environment. The general view is that for all these measures, it is easier to help push speed behavior into the desired direction if speed limits are 'credible'.

The speed management approach that is presented in this paper is based on SWOV's vision on safe speeds and credible speed limits (SaCredSpeed; 2, 3). The elaboration of SaCredSpeed is meant to support the decision maker in assessing problems related to road safety in general and speed in particular, and devising solutions. The reasons for starting an assessment can be very diverse, but the primary approach is directed at safety and credibility. Other speed related issues, such as traffic flow and environmental problems, are not yet part of the vision but may be added later. SaCredSpeed provides insight in the issues that should be taken into account when defining the desired speed system, as well as suggestions about how to manage the current speeds by means of coherent or credible measures. Paragraph 1.2 describes the motivation behind the development of a decision support instrument and the general characteristics of the underlying reasoning.

1.1 Speed management approaches

The basis for speed management is the speed limit system. Generally, one of the following three approaches is used (4):

- Engineering: speed limit system based on engineering and traffic characteristics (design speed); safety considerations are taken into account but not always explicitly.
- Drivers' choice: speed limit system based on the (V85) speed that is driven on the road; safety as well as a kind of credibility are taken into account.
- Economic optimization: speed limit system based on the optimal trade-off between costs and benefits of different speed related issues and policy fields; safety is one of the many issues that is or can be considered.

Others sometimes add some more approaches, such as harm-minimization, whereby human trauma as a consequence is considered unacceptable, and the expert-system approaches (5). Nevertheless, all these approaches have a certain overlap, but they provide an interesting framework to discuss differences among countries in setting speed limits. Below, the approaches to setting a speed limit system are discussed for Australasian countries, the United States of America and for the Netherlands.

The Australasian approach of economic optimization

The Australasian speed limit system (and the decision support program LIMITS) is a combination of approaches (5), with travel time as important element. A recent study (6) on the impact of lowering speed limits in urban and metropolitan areas in Australia for safety reasons concluded that this is likely to have positive effects on traffic safety without serious negative effects on travel times. Achieving community acceptance and support for speed limit reductions are identified as critical factors as well as the need to encourage better safety awareness by changing attitudes toward speeding. New research has been initiated by Monash University to investigate these critical issues.

The US approach of drivers' speed choice

The speed limit approach of the USA is particularly based on the drivers' speed choice (the V85 speed). The US speed limit decision support system USLIMITS is limited to motorways and primary roads. Reasons for still setting limits, even though these are based on the speeds of most road users, is to give clarity about what limit is seen as acceptable. Drivers can hurt others with unacceptably high speeds and they underestimate hazards and the controllability of their vehicle as a result of their speed most of the time. Recently, USLIMITS was updated (USLIMITS2) to improve the transparency of the process towards the final recommendation (7). In a number of expert-meetings, two heuristics were chosen to be used in the system, depending on the amount of data that is available. In both heuristics, safety-related measures are taken into account (real crash data or surrogate safety measures) to adapt the current speed limit with a maximum of 5 mph. Since the system makes use of the driver's speed choice, it in some way takes the speed limit credibility into account.

The engineering and harm minimization approach of the Netherlands

In Sweden and the Netherlands, two of the world's safest countries concerning road casualties, the approach of the speed limit system is (at least partly) on harm minimization. This approach is mainly based on the road safety visions of these countries, respectively known as 'Vision Zero' and 'Sustainable Safety', and particularly elaborated in engineering measures. However, also economic optimization is taken into account, in which safety measures and effects have an important weight. In the Netherlands, there is not yet a decision support instrument for speed management, but there are some general rules. These rules are mainly linked to the function of the road: 30 and 60 km/h on respectively urban and rural access roads, 50/70 and 80 on respectively urban and rural distributor roads, and 100 or 120 on through roads. In the Netherlands, the emphasis on safe speed limits via implementation of Sustainable Safety is most visible in the large scale introduction of 30 km/h zones in urban areas and 60 km/h zones on rural access roads during the last decade. The implementation of these speed limit zones is largely based on car-pedestrian crash-test results and the probability of fatal outcome (e.g. 8). The implementation of these speed limit zones was particularly promoted during the Start-up program of Sustainable Safety (9, 3). The 60 km/h speed limit on rural access roads was a political compromise between the 30 to 40 km/h that was recommended from a sustainable safety point of view, the original speed limit of 80 km/h and some other considerations, such as travel time.

Deviations from this system are allowed when the road design or other issues provide reasons to do so. The past few years environment and health, for instance, have become important. This was the primary reason for implementing speed limit zoning (80 km/h) on some motorways. In these cases, safety improvement was only a secondary anticipated effect. This also shows that there may be very different reasons for setting speed limits. These reasons are not necessarily compatible with each other.

1.2 About SaCredSpeed

Although the Netherlands is one of the safest countries in the world, speed management remains one of the core issues to reach even better safety levels. Speed management is not only a concern of the national government; decentralization of (road safety) policy has made a large part of this issue a concern of the regional and local authorities. The provinces of Friesland and Flevoland took the initiative to cooperate in the development of a transparent instrument to support decision makers in setting safe speeds and credible speed limits. Several other parties joined: the provinces of Zeeland and Limburg, the national government (DVS), a consultancy firm (VIA) and SWOV as a research institute. The first step in the process was to concretize the speed management vision of SWOV to enable a decision support instrument to run.

This paper presents the initial elaboration of the speed management vision on safe speeds and credible speed limits SaCredSpeed (2, 3). It is an algorithm that can be used for a speed management decision support instrument. The content of the algorithm is based on (scientific) knowledge about safe speeds, speed management and credibility, and focuses on the issues that are considered to be most relevant in this. Other speed related issues, such as traffic flow, environment, health etcetera are not part of SaCredSpeed.

The SaCredSpeed algorithm can cover all road types, from motorways to local roads, and can be used by a wide variety of authorities dealing with road safety. Since SaCredSpeed uses an integral approach towards speed management measures, it can also be useful for consultations between different road safety stakeholders. Currently, some pilots are executed, using real data from a number of regions.

Next paragraph introduces the overall structure of SaCredSpeed, making a distinction between the decision support instrument and the underlying SaCredSpeed algorithms. The following three paragraphs discuss the SaCredSpeed algorithms in detail. Paragraph 6 describes the output of SaCredSpeed, including measures to take and issues to consider for safe and credible speed management. Paragraph 7 presents the conclusions followed by a final discussion.

2 STRUCTURE OF SACREDSPEED

2.1 Elements constituting the decision support instrument

A clear distinction is to be made between the decision support instrument itself and the underlying SaCredSpeed algorithms. The basis of the decision support instrument consists of three main parts: input, algorithm and output.

The input concerns all kinds of data to be collected on relevant issues for the particular stretch(es) of road(s) to be assessed. Data is required about road construction, road layout (e.g. road and lane width, availability and type of cycle lanes, density of speed reducing measures etc.), the legal traffic situation (mixture of traffic modes, allowance of agricultural vehicles etc.), posted speed limit, existing police enforcement method(s) and effort, and

speed data if available (see 10 for more details; in Dutch). The V90 speed is taken as a default because the algorithm part considers at most 10% of violating drivers to be acceptable. This choice is arbitrary and adaptable, for instance to the V85, which is very common, or to the V95 for stricter outcomes.

The algorithm part consists of the elaboration of the SaCredSpeed vision, and will be discussed in more detail in the paragraphs 3 to 5. These paragraphs describe the translation of relevant knowledge on safe speeds, credible speed limits and enforcement into logical rules to be used in the algorithm of SaCredSpeed. Given the input data, the logical rules are applied, resulting into the recommendations for decision makers (see paragraph 6), being the final output of the instrument. This output consists of: 1) an indication of the safety of the speed limit and operation speed (V90; optional) 2) and indication of the credibility of the current speed limit on a road section 3) a set of measures to be taken to (further) improve the safety and credibility of the speed limit. The recommended measures take into account other relevant issues such as the function of the road network, the layout and speed limit of adjacent roads, and the costs and benefits of possible measures.

2.2 General algorithm of SaCredSpeed

The general algorithm of SaCredSpeed consists of three separate algorithms for safety, credibility and enforcement of speed limits. The safe speed and speed limit algorithm (paragraph 3; Figure 1) is based on the traffic situation in combination with the road construction. It is recommended and optionally possible to also assess the relationship between the operation speed (V90 as default) and the safe speed for that situation. Assessment of the operation speed gives extra insight in the problem that may exist.

If the speed limit and/or operation speed are higher than the safe speed limit, there is something to worry about and the credibility of the speed limit is to be assessed by credibility algorithm. This algorithm assesses the match between the speed limit (and operation speed) and the road layout (paragraph 4; Table 1). The credibility assessment could also be done voluntary if no problem has become apparent in the safe speed assessment. In case operation speed data is available, the enforcement situation is assessed in the enforcement algorithm of SaCredSpeed (paragraph 5; Figure 2). Finally, the outcome of the three algorithms is combined resulting in possible directions for speed management.

3 SAFE SPEEDS AND SPEED LIMITS - THE STARTING POINT

The SaCredSpeed safety algorithm is based on SWOV's speed management vision (2), which is part of the advanced Sustainable Safety vision (3). One subject in this advanced vision is developing a system of safe speeds, largely similar to and partly based on the Swedish vision (11). SaCredSpeed has taken the principles of how to come to a safe speed as a basis for defining the safe speed limit for different situations. This means that, depending on the legal traffic situation and further road design details, safe speed limits are defined (Figure 1). Pedestrians and/or cyclists mixing with motorized traffic is used as the basic situation in the safe speed assessment. In this situation, a maximum of 30 km/h is considered to be a safe speed (based on 12). Only when vulnerable road users are physically separated from the motorized traffic, higher speeds than 30 km/h are found to be safe. Speeds of 80 km/h and more are only considered as safe for motorized traffic if a sufficient forgiving road side and separation of driving directions are present (11, 13). Also, safe speed related to possible side impacts are considered (13).

There are two reasons for using a general fit between traffic and road design situation and the posted speed limit rather than actual crash data to define safety levels:

- Crashes (particularly severe ones) occur relatively seldom. It would take too many years of data collection to have sufficient data to make assessment of the safety situation reliable. In the meantime, the situation has to remain unchanged. Because the number of casualties continues to decrease in the Netherlands and road design and enforcement measures change over time, this approach would fail to work. Furthermore, with the general decrease in casualty numbers, the number of black spot locations also decreases, leaving the more general hazards of the road traffic system. This makes it hard to predict where the next crash will occur. This supports the argument for a more generic approach, which means that all situations are made as safe as possible to decrease the probability of a (serious) crash.

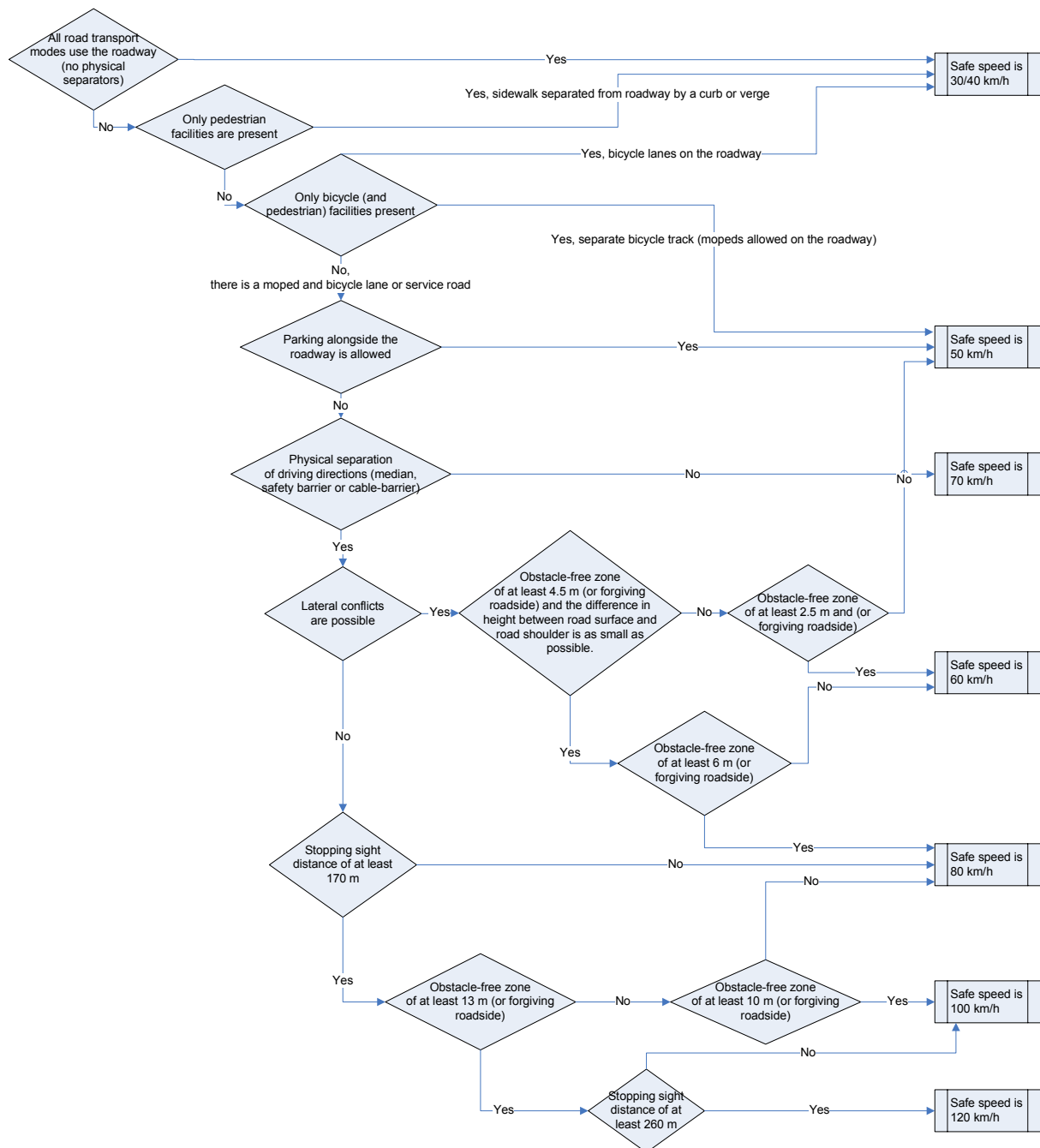


FIGURE 1 Detailed algorithm for the assessment of the safe speed and speed limit. For cut-off points, see references 15, 16, 17 and 18.

- Speed is a factor that is inherent in the hazards that are related to mobility. Given the fact that there is mobility, we can define speeds that have relatively low probability of having a serious outcome. For this definition, a 90% probability that a crash with that speed will not have a serious outcome is considered acceptable (11). Note that these safe speeds are only valid for crashes with cars as the strongest party. When trucks are involved, only lower speeds would be considered safe. Some additions were made for crashes involving mopeds (based on 14), because they have a combination of relatively low protection and high speeds. For interaction between road users, a choice needs to be made between homogeneity in speed and homogeneity in mass. In situations with high speeds, homogeneity in mass is leading: fast and slow traffic should be separated. Homogenous speeds are more favorable when the mixing of traffic with different masses is inevitable. Another issue is how to deal with motorcyclists. Although they are certainly vulnerable in relation to their speed potential, they are considered to be fast motorized traffic and not vulnerable road users. Motorcycling must be considered too hazardous to fit in a sustainable safe system. Information about safe road side construction and distances where gained from national guidelines for infrastructural design and additional research (15, 16, 17, 18).

4 CREDIBLE SPEED LIMITS - THE SECOND IMPORTANT STEP

When operation speed is generally higher than the posted and/or safe speed limit, there is a speeding issue. One reason for speeding could be due that the speed limit is not perceived as credible. A speed limit is credible when the limit in force conforms to what the road user considers to be reasonable for that particular road section. Drivers tend to better comply with speed limits when they are more credible, as was recently shown in a simulator study (19) in which a number of road characteristics (density of growth along the road side, road width, and type of separation of driving directions) were varied in order to vary the credibility of a rural 80 km/h road. The study examined the effect of these characteristics on spontaneous driving speed. It appeared that roads indeed evoked speeds that were less in accordance with the actual speed limit if they were assessed as less credible based on the variation of characteristics just mentioned.

Speed limit credibility is determined by a broad range of road design and road layout characteristics. Based on existing studies (20, 21, 22, 23), ten characteristics have been identified as having an effect on speed limit credibility (24). These characteristics, in one way or another, appear to influence driving speeds. Table 1 provides an overview of the influencing characteristics together with an explanation of how these characteristics can serve as a decelerator or as an accelerator. To take the row line as an example, the allowed mixture of pedestrians and motorized traffic serves as a decelerator: it raises the expectation of a low speed limit and people intuitively tend to drive slower. When pedestrians are prohibited, this serves as an accelerator: it raises the expectation of a high speed limit and people intuitively tend to drive faster. In a similar way, each of the ten road design and road layout characteristics could serve as either an accelerator or a decelerator.

Road design and layout characteristics	Decelerator	Accelerator
Pedestrian facility	pedestrians mix with other traffic	pedestrians prohibited
Bicyclist facility	cyclists mix with other traffic	cyclists prohibited
Parking facility	parking on the roadway	parking prohibited
Number of lanes	one carriageway	several lanes per driving direction with hard separator
Junctions	junctions at grade without priority indication	grade separated junctions
Straight stretches	short straight stretches	long straight stretches
Physical speed limiters	physical speed limiters	no physical speed limiters
Road/lane width	small roads/lanes	wide roads/lanes
Road surfacing	uneven surfacing	even surfacing
Density of road environment	dense vegetation or built-up area	sparse vegetation or built-up area

TABLE 1 Overview of the accelerators and decelerators influencing speed limit credibility.

In SaCredSpeed credibility algorithm, these general effects are taken into account. For each characteristic it is determined if it is likely to serve as an accelerator, as a decelerator or neutral. Subsequently, the overall effect is determined by adding up all influences, giving an equal weight to each characteristic. So if there is an equal amount of accelerators and decelerators on a particular road section, there is no overall effect, it levels out. When there are more accelerators present on the particular road section under review, it is likely that people tend to drive faster. As an output of the model one will be recommended to change one or more of the characteristics that provoke this speeding behavior.

For the development of the SaCredSpeed credibility algorithm, the general effects as addressed in Table 1 are made operational for each speed limit, mainly based on information from the national road guidelines, as they represent the most common features per road type (16, 18, 25, 26, 27, 28, 29, 30).

5 POLICE ENFORCEMENT – THE THIRD STEP

If speed data is available, the SaCredSpeed enforcement algorithm can assess the need for (additional) police enforcement. In general, this assessment (Figure 2) is based on the rule that generic prevention is preferred rather than specific prevention because generic prevention affects a larger number of road users than the specific prevention (31, 32). This means that enforcement methods in combination with additional road user information that result in high (subjective) probability of getting caught are promoted. This is worked out by the following methods:

- Average speed checks are seen as one of the methods that accomplish a nearly perfect probability of getting caught when speeding. A disadvantage is that it is only applicable on primary roads with low junction density.
- Mobile surveillance is seen as an additional, specific method to catch severe violators. It contributes less to a high general probability of getting caught and thus less to generic prevention.
- Two of the most frequently used enforcement methods (i.e. fixed and mobile speed checks) can improve generic prevention of speeding by 1) using these methods at road sections that have a reasonably credible design or will be adapted in the near future or 2) by increasing the enforcement efforts in time and location density.
- Additional information campaigns are seen as essential for creating a high generic preventive effect. Especially messages that warn drivers that speed checks are carried out, without unveiling the exact location and time, are seen as effective. Of course, this kind of information will only be credible and therefore effective if the speed checks are really carried out and not only used as a deterrent. The relationship between the amount of enforcement effort and the effect on road safety is perceived to be a negative exponential function (33).

For reasons of both the limited capacity of the police and not wanting to harm the credibility of police enforcement, increasing the level of police enforcement must be seen as a temporary solution to a speeding problem, bridging the period between the identification of the problem and the more structural infrastructural solutions.

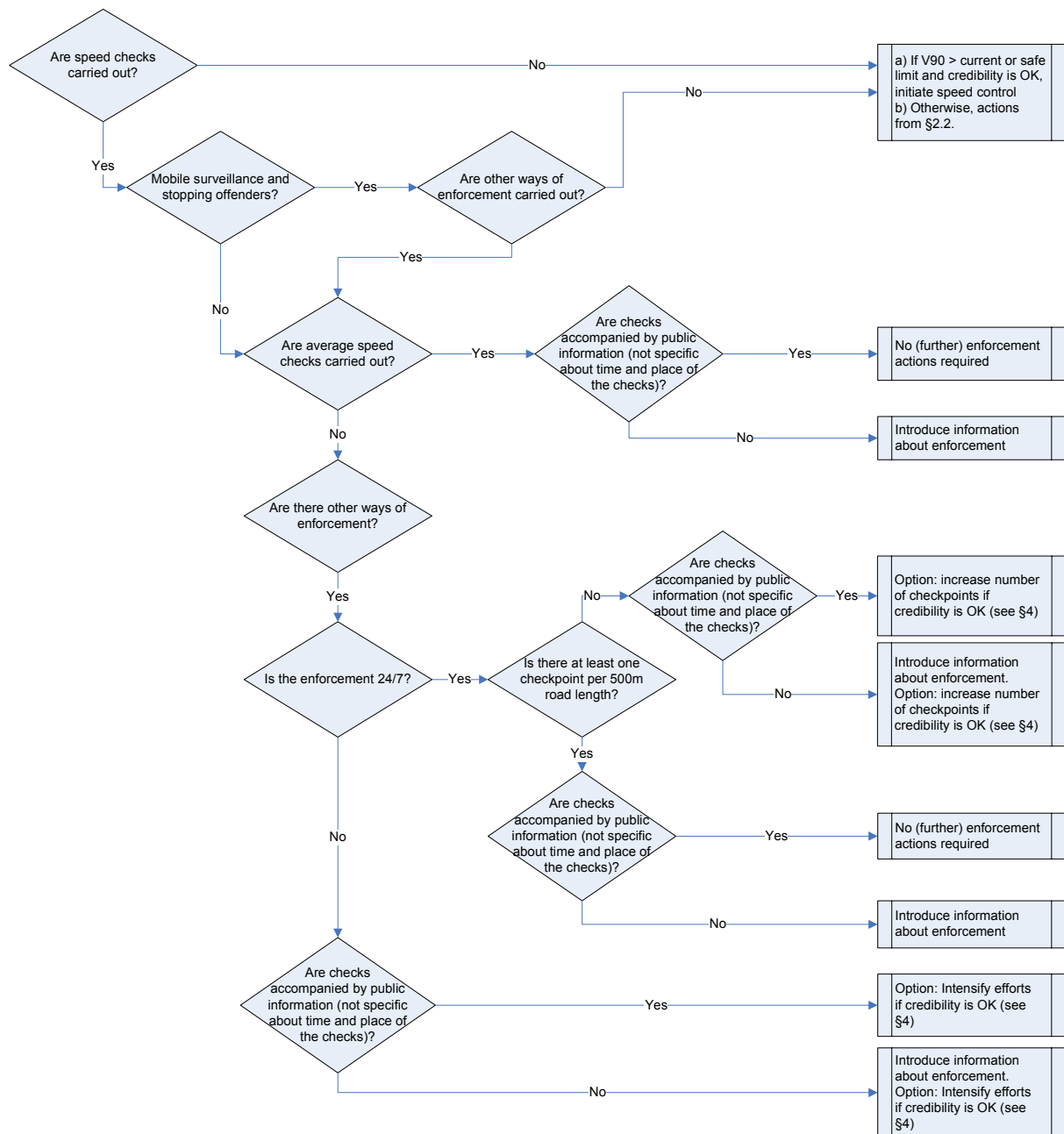


FIGURE 2 Detailed algorithm for the assessment of the police enforcement situation.

6 MEASURES AND CONSIDERATIONS FOR SPEED MANAGEMENT

The final diagnosis assesses the safety and credibility of the speed limit as well as the need for (additional) enforcement based on the algorithms as described in the previous paragraphs. In case the road section under assessment for example has a speed limit that is not safe, from the assessment it could be identified what elements are responsible for this and should be changed in order to improve the safety. In the same way countermeasures to improve credibility or the type of (additional) enforcement required, could be derived from the assessment.

The countermeasures suggested could be roughly divided into the following categories:

- Adaptation of the posted speed limit to make it safe and credible;
- Adaptation of the road design and its surroundings to increase safety and/or credibility of the current speed limit;
- Adaptation of the enforcement method and/or efforts and accompanying public information campaigns. This should be done in cooperation with the enforcement authorities.

Before recommendations can be given for specific measures to obtain safer speeds and more credible speed limits, the decision maker could define a target situation, being an indication of the level of ambition. In the most ambitious scenario, the decision maker will go for achieving the ultimate sustainable safe situation i.e.: all V90 speeds can be considered as safe and speed limits as credible. If this is not possible, smaller steps could be taken such as be to improve compliance with the current limit, that is: to reduce the V90 speed to maximally the level of the current speed limit. The reasoning behind this is that, given a particular road, each decrease in speed can be considered as a safety improvement, even if there still is room for further improvement. Independent of the ambition of the decision maker, SaCredSpeed always will be distinct about the ideal situation to aim for.

The decision maker's choice of which final situation to aim for, further determines the possibilities for solutions and the specific measures to reach the target situation. Next, the possible solutions are further determined by:

- The function of the road in the road network: if one of the scarce main roads of an area is under assessment, it is more likely to adapt the situation to be in line with the current road network function, rather than to downgrade the road because its design is not safe enough.
- The inconsistencies and discontinuities in relation to the adjacent roads in the network. This can be taken into account by the direction of the solution and the measures that can be taken. However, if inconsistencies and discontinuities are inevitable, the situation must be improved as soon as possible.
- Cost-effectiveness of the various sets of measure that offer a solution: the costs of implementing the measure(s) compared to the monetarised amount of saved road deaths and severely injured.

The decision maker is also supported in the prioritizing process by ranking the relative seriousness of the problems of the road(s) under assessment in combination with their traffic volumes. This should be done because a large mobility on a risky road will result in a relatively large number of victims than a risky road with nearly no traffic.

Finally, because several parties have vested interests in adjusting speed limits or changing road constructions and/or its surroundings, SaCredSpeed also indicates a number of potentially relevant actors who can and should be involved in the further decision making process. These actors are representatives of road user groups and neighboring residents, as well as police and adjacent road authorities.

7 PRELIMINARY RESULTS OF A CASE STUDY

The practical applicability of SaCredSpeed was tested in a first case study in one of the southern regions of the Netherlands. The test area comprised both roads inside and outside built-up areas. It appeared that, in the Netherlands, the data that is required to perform each of the steps has to come from different sources, including the responsible road authority at local, provincial and national level, and the police. Furthermore, additional data collection was necessary to get the information for assessing the credibility of the speed limit. In the case study, this was realized by means of video recordings of the road sections under study.

The results showed that in the region under study the vast majority of roads currently have a speed limit that is higher than the limit that has to be considered safe. Regarding the credibility of speed limits, it appeared that the number of accelerators clearly exceeded the number of decelerators. This was particularly true for roads outside built-up areas, but also applied for urban roads. Unfortunately, data on actual driving speeds and information about the current speed enforcement activities were largely missing. This means that it was not possible to come to conclusions regarding the safety level of the driving speeds nor regarding the potential improvements of increasing the enforcement level. Still, it was possible to identify those road sections that would need changes in

road design. For other sections, the enforcement information was considered crucial to come to a founded conclusion about the most promising measure. For none of the road sections under study, adaptation of the speed limit was considered an appropriate solution.

8 CONCLUSIONS

This paper has presented the initial version of the decision support instrument Safe speeds and Credible Speed limits (SaCredSpeed) as well as the underlying algorithms. SaCredSpeed intends to develop the vision on safe and credible speed limits towards a practical applicable approach for decision makers. Relevant knowledge has been worked out into an algorithm to be used in practice by decision makers to assist them in speed management for their roads. The developed algorithms serve as an input for the programming of a software tool, to make knowledge easily accessible and a support in a more integral decision making process.

The SaCredSpeed algorithm uses data about the road design and road image, traffic characteristics and behavioral data (if available) to assess the safety and credibility of a road traffic situation. The algorithm makes use of scientific knowledge as much as possible. It offers the opportunity to make this knowledge and complex interacting factors available to decision makers and make it easy to understand and apply due to a transparent decision support instrument. To optimally benefit from SaCredSpeed, we recommend linking the instrument to the road maintenance schedules. This is a way of spreading the approach, incorporating the activities in maintenance that will be carried out anyway, and hence to take advantage of the maintenance activities and budgets. A number of pilots will now be executed with the presented SaCredSpeed algorithm.

9 FINAL DISCUSSION

The SaCredSpeed algorithm serves a similar purpose as the previously mentioned programs LIMITS and USLIMITS for Australasia and USA, respectively. The difference is that SaCredSpeed has taken harm minimization as a starting point for setting safe speed limits, rather than other approaches. Speed limit credibility is also explicitly taken into account in the SaCredSpeed algorithm, in order to stimulate decision maker's awareness of this issue.

Other interesting links in relation to SaCredSpeed are the Road Assessment Programs, such as usRAP and EuroRAP. In general, the SaCredSpeed algorithm has similarities with the Road Protection Score (RPS) from these programs (34, 35), in particular because of the link between road design, speed limits and safety level. However, SaCredSpeed and RPS also have their unique characteristics that may be combined in the future. The addition of SaCredSpeed to RPS could be the principles of Sustainable Safety (3) and the algorithm for the credibility of speed limits. Additions from RPS to SaCredSpeed are the more detailed considerations of a number of road design characteristics, such as median and roadside treatments. Other characteristics, such as the effect of road markings, the design and traffic situation of intersections and dynamic issues such as situation dependent features and dynamic speed limits, could also enrich the SaCredSpeed algorithm in the future.

However, adding more detailed information to the SaCredSpeed algorithm may not necessarily be an improvement of the algorithm. This appears when combining all the current knowledge that is taken into account in SaCredSpeed: a particular speed or speed limit may require opposite characteristics for safety in general and credibility in particular (see 10). Wide roads and obstacle-free road shoulders are, for instance, good for safety in a general way because crash objects are more distant to the road users. However, for speeding behavior, such a road image would provoke higher speeds, which is generally related to a higher crash risk. In this sense, the design elements that are required to provide a sufficient level of safety given a particular speed limit, may not always be in line with the requirements for credibility of that speed limit. This is just one example indicating that it is possible that a certain road characteristic has a positive effect on safety and a negative effect on credibility, or the other way round. It is important to bear in mind that, whenever there is a conflict in effect of a certain road characteristic with respect to safety and credibility, the interest of safety should master over the interest of credibility. First priority is to develop safe speeds and speed limits, a credible speed limit is a manner to contribute to speed limits compliance and therewith safer travel speeds. Further, research on speed limit credibility is still very limited. It is hypothesized, but not yet confirmed by research, that credibility is partly determined by general parameters consistent over different countries, but it seems to be also partly developed by learning, and thus depending on specific national and cultural road design characteristics. Another issue that needs further research is the relative contribution of road characteristics in combination with each other to safety in general and credibility of the speed limit in particular.

SaCredSpeed now focuses on harm minimization. It also includes some of the engineering approach and some of the driver's choice approach, as it takes into account the speed limit credibility. In some countries, economic optimization is preferred as a standard in policy making. For decision making, considerations other than safety related issues are also of interest in speed management. It may be interesting to see what decision is considered most favorable if all reasons for setting a speed limit are monetarised. Transparent decision making may show that the economic importance of safety considerations and safe solutions is underestimated.

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