

REDUCING CAR SPEED NATION-WIDE
- THE EFFECTIVENESS OF MOBILE SPEED CAMERAS IN DENMARK

Lárus Ágústsson, M.Sc. Project Manager and Sofie Ottesen, M.A,
Danish Road Directorate, Danish Ministry of Transport,
Niels Juels Gade 13, DK-1059 Copenhagen K, Denmark
E-mail: lag@vd.dk/mso@vd.dk



In Denmark mobile speed cameras have been given a key role in the fight against speeding cars. A pilot project resulted in significant speed reduction and has led to a political decision to implement mobile speed cameras nation-wide.

1. INTRODUCTION

Studies show that a combination of engineering measures, information and speed enforcement is the most efficient way to solve the problem of speeding cars. In Denmark all three measures have been used extensively for the last decade. Mobile speed cameras have also proven to play a key part in the overall strategy to reduce car speeds nation-wide.

This paper deals with mobile speed enforcement and how it is carried out in Denmark. Specifically how the roads for speed enforcement are chosen and the problems involved with evaluating the effectiveness of this particular type of speed enforcement.

A key part of the implementation of mobile speed cameras is to inform the public of the speed enforcement. Consequently, this paper will also discuss the importance and methods used in Denmark to enhance the effect of the speed enforcement by way of communication.

2. ROAD SAFETY IN DENMARK



Figure 1: Danish state roads:
App. 800 km motorways and app. 800 km rural and urban major roads. Total road length in Denmark app. 70.000 km. Number of road authorities: 290.

In Denmark 5.2 million inhabitants live on 44.000 square km. The road network is 70.000 km and 2 million vehicles drive approximately 44 billion kilometres each year.

The speed limit is 50 km/h in cities, 80 km/h on rural roads and 110 km/h on motorways. Approximately 40% of the drivers respect the speed limits in urban areas, and app. 50% in rural areas.

As in the majority of the western European countries, we have seen a great reduction in the number of accidents in Denmark over the past 30 years (figure 2). The overall goal of the first Danish Road Safety Action Plan from 1989 was to reduce the number of fatalities and casualties by 40% from 1986/1987 (in average) to the year 2000. The Action Plan did not entirely reach that goal, however, a 30% reduction in casualties is considered very satisfying.

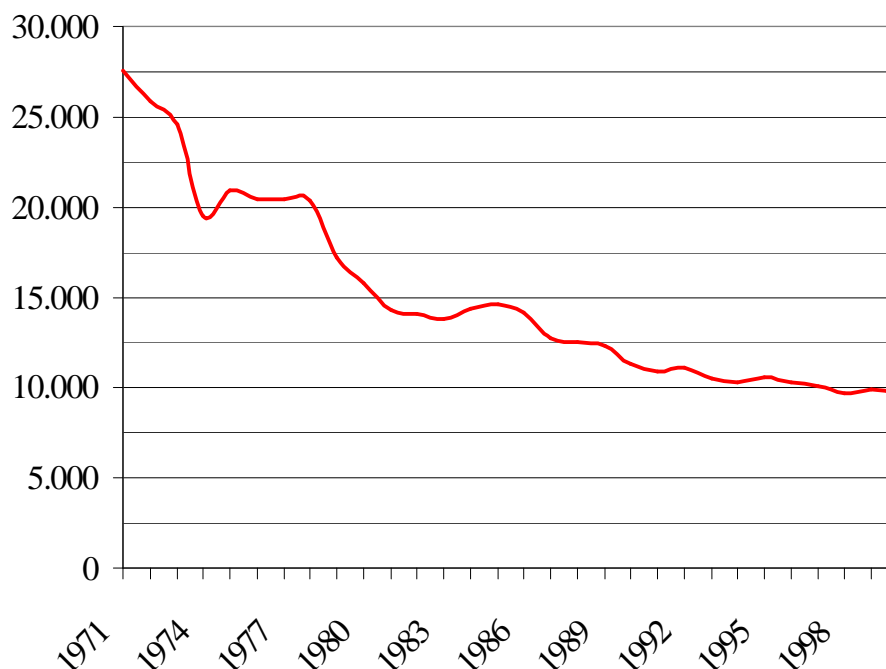


Figure 2: Accidents in Denmark 1971 – 2000. In 1971 the number of road fatalities was almost three times as high as in 2000. During the same period the traffic grew from 22 to 44 billion vehicle km. A great reduction in the frequency of accidents has taken place – road traffic is now approximately five times safer than it was 25 years ago, /1/

The goal of the Danish Road Safety Action Plan from 2000 is to reduce the number of fatalities and serious casualties by 40% from 1998 to the year 2012, /2/. This plan is ambitiously entitled "Each Accident is One too Many".

The idea is that fatalities and casualties should not be accepted, neither by the road authorities nor by road users. The Swedish zero vision inspired this idea.

The main areas of action are accidents caused by speeding, accidents caused by intoxicated drivers, accidents involving bicyclists and accidents at intersections. To reach the goal, 62 actions have been suggested. Among others the use of speed management, speed zones and automatic mobile speed enforcement.

3. THE CHOICE OF MOBILE SPEED CAMERAS

In 1996 the preparation of a pilot project on automatic speed enforcement was initiated. Mobile speed cameras were preferred to fixed cameras because we wanted to reduce speed nation-wide and not just on specific sites. By examining the international experiences with introducing speed enforcement technology we found that the mobile speed cameras would be most effective in achieving our goal. In several countries fixed cameras have made the drivers reduce speed near the spots where the cameras were put up. However, in Victoria, Australia, this effect had seemingly been avoided by placing the speed cameras on mobile units and continually changing the sites for speed enforcement. The Danish decision-makers were interested in trying out this new method of speed enforcement technology.

The pilot project was carried out in the metropolitan area of Copenhagen and in large areas on the island of Funen. The pilot project was successful. It ran from April 1999 to April 2000 and has led to a political decision to enforce the speed limits by introducing mobile speed cameras on all roads in Denmark.

4. METHOD OF ENFORCEMENT

Speed cameras are placed on the rear end of a van. This enables the police to move the equipment between several sites during the day.

The police primarily enforce speed limits on roads and streets where many accidents occur. But also streets near schools and other institutions, roads with ongoing roadwork and major roads passing through small villages are subject to speed enforcement. In addition hereto, it is recommended that roads where the local residents have expressed concerns about high speeds will be given high priority.



By making these type of roads a top priority it is expected that the introduction of mobile speed cameras will serve several purposes. Not only will the speed enforcement reduce the average speed and the number of traffic accidents; it will also create a large sense of safety for the local residents who use the road-network on a daily basis. Thereby we hope that the Danish public will come to consider speed enforcement as a community service rather than an inconvenience.

Figure 3: Mobile speed enforcement technology. The camera is placed in the back of the van. The picture is taken of the front of the oncoming car.

The local authorities and the Danish Road Directorate prioritise the road network in co-operation with the local police. However, the police are entitled to enforce speed limits on

any road on the road network, which they feel pose an acute threat to traffic safety. The roads that are chosen by the Road Directorate and the local authorities are only to be considered as a guideline for the police. Therefore a successful introduction of speed enforcement technology in Denmark depends very much on the ability of the authorities to co-operate.

The Danish rules require that photos taken by the speed camera show the licence plate and the face of the driver. A fine including the photo is sent by mail to the owner of the car. According to the traffic code the owner is obliged to disclose the identity of the driver. This rule is made to ensure that it is in fact the speed violator that is fined.

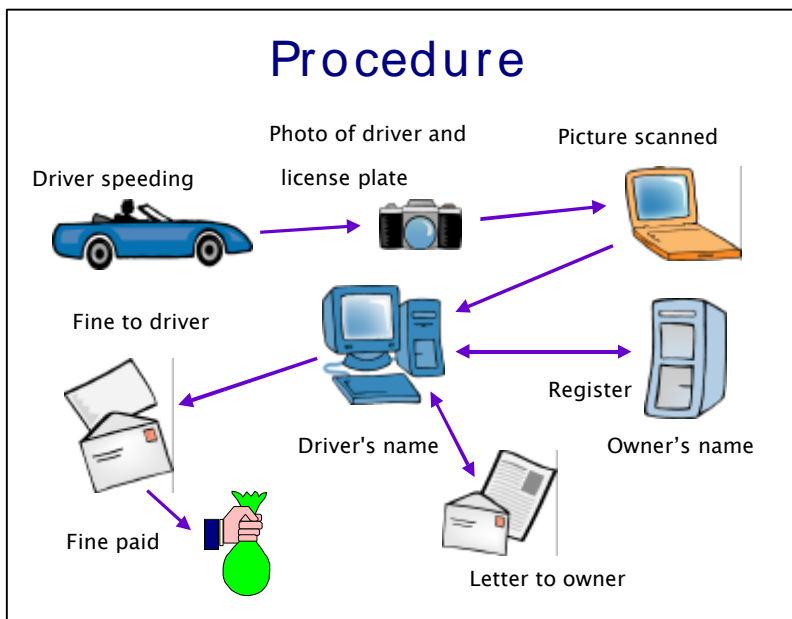


Figure 4: The Danish procedure. The police handle the enforcement and all administration involved with sending out fines, /3/

6. INFORMATION AND CAMPAIGNS

An important part of the project is information and campaigns directed to the affected groups. It has been necessary to prioritise information in order to get the general public to accept the intensive speed enforcement.



Figure 5: Part of the New Campaign is to put up posters on the Back of Busses. The Text Says: “We Develop Safe Roads”

The campaign strategy is to draw attention to the improvement in traffic safety that the use of speed enforcement technology is expected to have. The logo for the campaign is a camera with a flash on blue background. It is important that the logo is easy to remember due to its

potential preventive effect – especially when posters carrying the logo are put up on the rear end of busses or alongside the road. If the drivers are aware that the speed limits will be enforced, they will drive more carefully.

However, informing about the project involves much more than just putting up posters. It has been equally important to be of assistance to the press. Also, it has been very important to ensure that the local police and the local municipalities are informed about the project, since they are responsible for carrying out the speed enforcement.

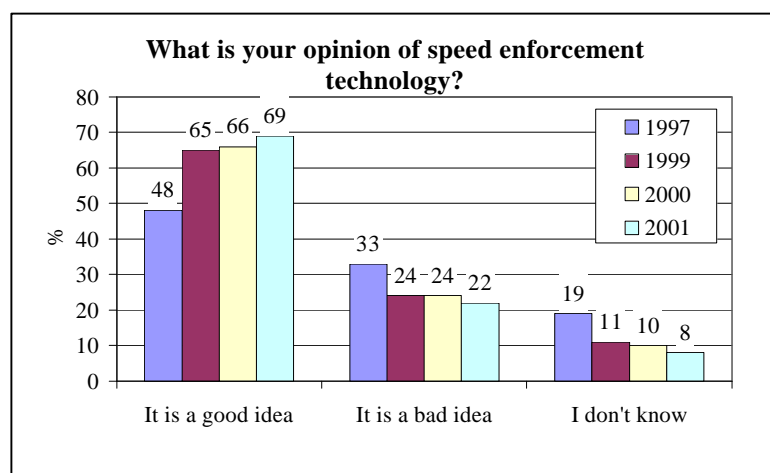


Figure 6: Opinion polls from 1997-2001. More and more people find the speed enforcement a good idea, as the time goes /4/.

This overall strategy has worked relatively well. The latest opinion poll shows that 69% of the Danish public finds the introduction of speed cameras to be a good idea. This result is considered good because the newspapers and some of the politicians have been very critical.

7. EVALUATION OF THE EFFECT ON SPEEDS

The evaluation of the pilot project is based on speed measurements at 20 chosen sites within the enforcement zones and at 10 sites outside the zones for comparison. The results show a reduction in speeds of 2,4 km/h in average within the zones and no changes outside the zones.

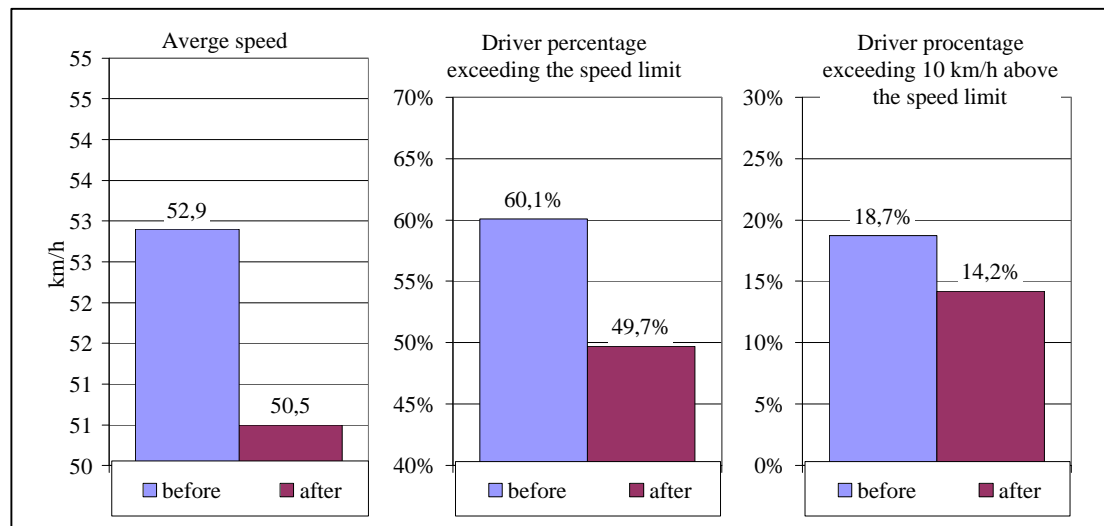


Figure 7: The result of the pilot project. During 12 months of the pilot project:

- Average speed was reduced by 2,4 km/h
- Driver percentage exceeding speed limit was reduced by 10,4%
- Driver percentage exceeding 10 km/h above the speed limit was reduced by 4,5%. /3/

Even though the reduction in speed seems small compared to international experiences with fixed speed cameras, the result is considered satisfying. Evaluating the effectiveness of the Danish speed cameras is made difficult since the cameras are mobile. It is not possible to measure the effect on the speed at each specific site subject to speed enforcement because the sites continually change. The evaluation of the effect on speed has to be based on general traffic counting and speed measurement devices placed on central roads in different areas of Denmark. This means that roads not subjected to automatic speed enforcement also are included in the average speed reduction of 2,4 km/h (figure 7).

The evaluation of the reduction of accidents is the most important component when evaluating the overall effect of the mobile speed cameras. However, other parameters effect the number of accidents and the number of traffic casualties. Also, the actual number of accident at each specific site is relatively low. For this reason it will take several years before we will be able to determine the exact effect of the speed cameras on the number of traffic accidents. An analysis of the traffic accidents in the area of the pilot project will however be made in the fall of 2002.

8. THE NATION WIDE INTRODUCTION

On the 1st of July 2001 the process of establishing the mobile speed cameras in all Danish police districts began. By February 2003 twenty-six vans with mobile speed cameras will be enforcing the speed limits nation-wide on approximately 2000 prioritised sites. The approach is similar to the one used in the pilot project.



Figure 8: Districts. Each of the regional offices will have three or four sets of equipment for enforcing the speed in an area of on average 5.000 km², with a total of on average 10.000-km of roads and streets. About 250 km in each district will be prioritised for the enforcement, /5/

The speed enforcement will be carried out from eight regional offices, which will be established one by one during the transition period of 2001-2003.

A major difference between the pilot project and the permanent implementation of automatic speed enforcement is the question of whether or not to put up signs. During the pilot project signs were put up in the test areas to alert the drivers about

the automatic speed enforcement. However, the idea of introducing the technology in the entire country is principally to ensure every single road in Denmark. Therefore no signs will be put up in the future. By taking this step the message to the Danish drivers is that if you are speeding, you risk getting caught on camera everywhere in the country. This is naturally a controversial issue and has been the subject of many public debates. In order to follow up on the debate, a campaign has been launched.

The preliminary effect on speed has given similar results since the process of introducing the mobile speed cameras in large areas of the nation started (similar to figure 7).

The goal of the introduction of speed enforcement technology nation-wide is to achieve a 5% reduction in the average speed and a reduction in casualties of 15% on the prioritised sites. Also we wish to generate a better

understanding of the danger of speed and acceptance of the speed limits near schools, roadwork, on large roads which pass through towns and on high-risk roads.

The decision to implement the mobile enforcement is to allow the possibility of speed enforcement by cameras on all roads. A clear message is sent to the Danish drivers – speeding is never acceptable.

9. LITERATURE

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