

**Summary:**

# **Evaluation of road safety and environmental reforms**

## **Background, problem and method**

The Swedish Government asked the Swedish Road Administration

*“to make an overview and an evaluation of the present road safety and environmental reforms in order to present the relation between countermeasures/reforms and effects on road safety and environment. The evaluation will constitute an appendix to the road safety and environmental strategy that the Road Administration should present to the Government October 1., 1999.”* Moreover the evaluation should make *“conclusions as to the effects of the countermeasures in achieving the reform targets and the general targets.”*

The project has three main purposes:

1. To compile information on general targets, reform targets and implemented countermeasures.
2. To show the degree of which the general targets and reform targets are achieved.
3. To evaluate the efficiency of the countermeasures.

The project is based on research literature on road safety and environment, Swedish policy documents in this fields, as well as interviews with people working in the field in Sweden. The Swedish Road Administration is regarded as a total in this project. For financial reasons it was not possible to evaluate targets and countermeasures within each of the 7 regions of the Road Administration.

## **Road safety – general targets**

The general road safety target of Sweden, called the “Vision Zero”, is:

*“that nobody should be killed or seriously injured because of road accidents. The construction and function of the road transport system should be adapted to the consequential requirements.”*

11 reform targets are set on the basis of the general target:

1. Road safety attitudes
2. Sobriety on the roads
3. Less speeding
4. Fewer offences of traffic rules
5. Safer road traffic environment in built-up areas

6. Safer road traffic environment outside built-up areas
7. Use of safety devices in vehicles
8. Safer vehicles
9. Conspicuity in road traffic
10. Use of bicycle helmets
11. Post injury management

Relating the reform targets to international research literature and existing knowledge, shows that all reform targets are important in achieving the general road safety target. The interviewees generally agree that the reform targets are right.

The number of casualties in road traffic depends on traffic volumes, accident risk and the risk of being injured. All reform targets apply to the latter two factors. Restrictions on the traffic volume or even the growth of road traffic are probably so difficult to implement that it is better to put efforts into the first two factors. It is, however, possible to reduce road traffic by making the use of motor vehicles more expensive, e.g. by road pricing or fuel levies.

The reform targets may be too many, and some priority between them would make the implementation easier.

## **Road safety – reform targets and countermeasures**

The interviews indicate that the management system, consisting of general targets, reform targets and countermeasures is somewhat outdated. This is confirmed by the fact that the reforms are not mentioned in documents from the Swedish Road Administration for the period 1999 – 2002. The reforms seem to be abandoned as management principles, even if this has not been stated officially.

In the examination of the reforms and the countermeasures the concepts direct – indirect, short term – long term, specific and general are used. The countermeasures described in the National Road Safety Program 1995 – 2000 seem to be too general, indirect and long term to reduce road accidents considerably for a 5-6 year period. In later documents from the Road Administration, the need to put efforts into short-term effective countermeasures is emphasized.

## **Road safety – implementation of countermeasures**

In the Road annual safety reports of 1996 and 1997 the countermeasures are described according to the reforms, and the relationship between reforms and countermeasures is quite clear. In the Road safety report 1998 countermeasures are not described according to the reforms, and consequently it is difficult to see what countermeasures are supposed to support each reform. The countermeasures described in the Road safety reports for 1996, 1997 and 1998 are mostly long-term and indirect such as workshops, development of measuring methods, the identification of deficiencies and experiments with new speed-limit systems. Some direct countermeasures are mentioned, such as campaigns against drinking and driving, campaigns for the use of bicycle helmets, increasing speed and seat-belt

surveillance as well as reducing speed limits by 20 km/h on 400 km of roads. The police report more than one million alcohol tests carried out in 1998.

Long-term countermeasures are important to create acceptance for countermeasures presently being too radical or as a basis for new countermeasures, in order to reduce road accidents in the long run, but they cannot be expected to have immediate effect on road accidents.

It is difficult to differentiate between proposed or planned countermeasures on the one hand and approved or implemented countermeasures on the other hand from the Road safety reports. In general the authorities seem rather conservative in implementing new legislation, increasing the surveillance or physical countermeasures with well-documented effects. Cost-effective specific and short-term countermeasures are, however, focused in the plans for the years 1999-2002.

The relationship between reform target and proposed or implemented countermeasures is weaker than the relationship between the general targets and the reform target.

## **Problems in road safety work**

Most of the interviewees think that economic resources have not been the main problem in implementation of countermeasures, but money may become a problem with the expected reduction of the budget.

Even if surveys show a wide acceptance of road safety measures in the population, several interviewees think that acceptance is a problem. The managers of the Swedish Roads Administration may use acceptance in the population as a pretext for not implementing road safety measures. The survey results on acceptance of countermeasures should therefore be disseminated more thoroughly, in order to avoid that protest from small, but conspicuous interest groups be taken as protest from the population in general.

The interviewees agree that acceptance in international bodies is not a big problem. On the opposite, foreign interest in the vision-zero stimulates the implementation of countermeasures in Sweden.

Approximately one half of the interviewees think that countermeasures are accepted within the Road Administration and other responsible bodies, though thinking that there are differences between different countermeasures and different parts of the organizations. The other half considers acceptance within the organization as a problem.

Weak or poor management, deficiencies in cooperation and deficiencies in implementation of countermeasures are mentioned as causes of deficient achievement. Deficient knowledge is also mentioned. Nevertheless, there is a wealth of knowledge on the effects of road accident countermeasures, and the problem must be dissemination of knowledge rather than generating new knowledge.

Several interviewees emphasize that there is a short-term conflict between mobility and safety, but that this conflict can be solved on a long-term basis. Others emphasize the strong tradition for road construction and maintenance within the

Roads Administration, but a weaker tradition for safety, that it is difficult to have reduced speed limits accepted, that there is a conflict between road construction and maintenance on the one hand and safety and environment on the other, or that there is a conflict between safety and mobility in terms of travel speed or availability.

Most of the interviewees want a stronger management and stronger commitment to road safety from their leaders. Even if the vision Zero seems generally accepted in Sweden, there countermeasures are undoubtedly regarded in many different ways, and it seems difficult to cooperate in implementing them.

## **Environment – general targets and stage targets**

The general environmental targets are deduced from international and national targets as well as from existing knowledge of the contribution of the road sector to the environmental problems. Several general targets have been set up for the transport sector and for the road traffic, such as:

*“The Road Administration should work to establish an effective and environmentally adapted road transport system that meets the requirements of road safety and regional balance.”*

For the environment this means that:

*“The Road Administration should continuously reduce the environmental and barrier effects of roads” and “The goal is that the total amount of carbon dioxide from the road transport system should be reduced as well as the amounts of nitrogen oxides, carbon monoxide and carcinogens in built-up areas.”*

Over the years the Road Administration has been working systematically to specify the general targets into step targets. In the “Special Plan for Environment and Road Safety” from 1995, the problem areas are described:

1. *The use of energy and the discharge of carbon monoxide*, where the target is to stabilize the discharges from fossil fuels at the 1990 level within the year 2000.
2. *Discharges of nitrogen oxides, carbon monoxide and sulfur dioxide*, where the discharges from the former two should be reduced by 50 per cent within the year 2000. The discharges of sulfur dioxide from road traffic has already been reduced to only 2 per cent of the total Swedish discharges.
3. *Air quality in built-up areas*. The Environmental Administration’s limit values for carbon monoxide, sulfur dioxide, soot and particles should be reached within 2000, and the discharges of carcinogens should be reduced by 50 per cent within the year 2000.
4. *Noise disturbances*, where the target is that the noise should be within the Environmental Administration’s limits for noise levels.
5. *The pollution of soil and water* from construction and maintenance of roads. There are general rules, but no quantified targets or time limits.
6. *Land use and encroachment* are governed by the Natural Resources Act, but no specified or quantified targets exist for the development of the road network.
7. *Road environment and road design*. No macro-target is set up, but more attention is paid to this field.

8. *Ecological adaptation.* EU standards are referred to and the Government has asked the Road Administration to produce plans for this field.

In the Road Administration's "Environmental Program" from 1996 the same problem areas are used with the following addition:

- *Metals*
- *Renewable resources, nature types, biotopes and species*
- *The use of final resources such as rock and gravel*

The targets correspond well to the international targets and international knowledge. The step targets are specified to different degrees. In the areas where the knowledge is more developed, such as air pollution, environmental poisons, noise and health, there are more time limits. Targets related to natural and cultural values, ecological adaptation etc. are more general and therefore probably more difficult to follow up in practice.

The Road Administration manages care of its responsibility for the sector through systematic follow-up on a superior level. Through this work the Road Administration gets a good overview of the achievement of the goals. "The Environmental Report" 1998 shows that great challenges remain. Good prognoses are indicated for two stage targets, whereas several are expected to aggravate.

## **Environment – reforms and countermeasures**

To specify its environmental work the Road Administration defined 10 reforms divided into three groups

1. *Road safety and environmental reforms*
  - Reduce traffic growth
  - Less speeding (and more gentle driving)
2. *Reforms to be coordinated with road safety reforms*
  - Increased considerations of the environment
  - Improved design of road environment
  - Environmentally friendly vehicles and fuels
3. *Environmental reforms*
  - Making better use of the car fleet
  - Fewer trips starting with cold engine
  - Better air quality
  - Less noise
  - Environmental adaptation of other vehicles

These reforms seem to be a mixture of means and target, specified to varying degrees. In "Special plan for environment and road safety" reforms for environment and road safety are described, but no countermeasures are described. In the environmental program of the Road Administration the reforms are described with efforts, partly related to the reforms. The work related to the reforms is very general, such as setting up a strategy, compiling problems, develop status measures, and they can hardly be called environmental countermeasures.

In the report "Specification of the environmental reforms of the Road Administration" new concepts such as "Countermeasure groups" and "Cooperation areas" are introduced. The latter are related to the reform targets. For each cooperation area several countermeasures and the relevant contributors are stated. Most countermeasures are based on contributions from participants outside the road sector.

Some of the interviewees were uncertain as to the reforms and their importance to the environmental work. Several interviewees said that the reforms were not the basis of their daily work. The seven regions of the Swedish Road Administration work independently with their own programs, and there seems to be a lack of central coordination, control or approval of the regional environmental programs. The fact that countermeasures are recommended from the headquarters, is referred to only to a limited extent.

On the one hand the reforms are regarded as having a clear relationship to the general targets, but on the other the reforms are general, and they are not satisfactorily related to the environmental problems or to the step targets. This means that target achievement and results cannot be properly controlled and that the regional offices of the Road Administration get ambiguous signals as a basis for their environmental work.

In the 1999 report "Analysis of environmental countermeasures in the road sector" 37 countermeasures against air pollution are described. The report outlines thoroughly the potential effects and costs of countermeasures, in accordance with international research knowledge. Nevertheless, the Road Administration does not seem to have emphasized the distinct relation between reform targets and countermeasures. The responsibility for the follow-up of the reform targets and the countermeasures have not been made clear.

The Road Administration puts great efforts into formulating reforms and countermeasures and developing a system for the following up results. At the same time new concepts such as stage targets, effort areas, cooperation areas, countermeasure groups etc, makes it difficult to carry out the work in the field. The participants do not always know what targets and rules that apply.

## **The regional work**

The regions are to a great extent independent of the headquarters. Some regions try to improve environmental work with a relatively large staff and strong control. Several interviewees think that the most important environmental work is carried out in the local communities and the most important task of the regions is to stimulate local activities through information, cooperation and by being a good example.

Large communities have both resources and know-how to manage on their own. To a certain extent they express that the Road Administration can be a problem, delaying environmental work.

Most regions have made their own regional environmental programs. Most regional programs were ready in 1998, and they have consequently not yet had effect on the environmental targets. The regional environmental programs are thorough, but they

contain specified action programs and proposal of countermeasures only to a certain extent.

## **Problems and conditions of the implementation of environmental countermeasures**

The interviews indicate a great commitment to environmental issues and a lot of activities within the Road Administration. Some of the interviewees express a doubt whether the most effective activities are carried out or whether only tasks which have met with little or no opposition are carried out. The interviewees emphasize the internal environmental work in the Road Administration and the importance of the Road Administration being a good example through their own activities. Outside the Road Administration it is sometimes regarded differently.

The interviews indicate that financial resources are not the biggest problem in implementation of environmental countermeasures. Nevertheless, physical countermeasures on the roads compete with road construction and maintenance for financial resources.

Countermeasures being widely accepted by the people, such as bicycle roads, better public transport and environmental streets, are easy to implement. Restrictions on road traffic or parking may pose a greater problem as to public acceptance.

International cooperation is no problem to the implementation of environmental road traffic countermeasures in Sweden.

Even if the interviews indicate a great commitment for environmental issues in the Road Administration, there is nevertheless a conflict as to the use of resources for environmental issues or for natural resources. Some of the people working with environmental issues at the Headquarters or in the regional offices feel isolated and that their arguments are not valid in other parts of the Road Administration. Several state that the traditional road construction and maintenance thinking within the Road Administration poses a problem to the implementation of environmental countermeasures.

Measuring effects of environmental countermeasures is difficult, because a number of factors contribute to changes in the environmental situation. Moreover, most of the countermeasures are long term. The knowledge of effects of environmental countermeasures is poorer than that of road accident countermeasures. Nevertheless, very few experiments are evaluated. Evaluation of environmental countermeasures should be an important task for the Road Administration. Today it is difficult to get an outline of countermeasures applied in environmental work. More formal reporting routines and an outline of countermeasures would be useful.

For the time being the countermeasures contribute to the targets to a limited extent, because countermeasures implying restrictions on the freedom to travel by car have not been implemented. Most countermeasures registered in this project will contribute to the reduction of environmental problems, but not so much as to counterbalance the consequences of road traffic increase.

## **Status and possibilities of improvement**

The targets are set on a national level by the Parliament, the Government or the Road Administration. The countermeasures are implemented locally by the regional offices, the police and the local communities. There are a lot more participants responsible for countermeasures than for the targets. Consequently, the implementation of countermeasures is more difficult than setting targets. Conflicts with other targets become clearer the more specified the work is.

The defined reform targets have great importance for the general targets according to existing knowledge and international research. It is more uncertain what kind of knowledge have been applied in the transition from reforms to countermeasures. Both the road accident and the environmental countermeasures defined, seem to be too general, indirect and long-term to produce considerable effects on a short-term basis. The question can be asked whether the implemented or proposed countermeasures are chosen because of their effects on the environment and the accidents or because they are accepted by the people.

What is meant by countermeasures is also difficult to understand. The reforms are not applied as management tools in the later documents for the years 1999 – 2002. Consequently, the reforms are reduced to result indicators.

The Road Administration has a great and important responsibility for the road sector, but it does not possess the necessary means. The Road Administration has consequently put efforts into the means they do possess, that is research and development, generation of knowledge, cooperation with others, environmental concern in road construction and maintenance and internal work to appear as a good example. These means can contribute positively to safety and environment on a long-term basis, especially in local areas. It is too early to state whether these countermeasures are sufficient to contribute to the national targets.

### **Further work?**

At present the most important point would be to make short-term wins, i.e. to implement some countermeasures reducing accidents or improving the environment rather fast. Central barriers in roads could be a good example, but more examples are needed. The implementation of effective countermeasures is urgent, preferably countermeasures having been researched and discussed for a long time. If such measures can be implemented, positive effects can be documented and the results disseminated to the people and the decision makers, an important step towards the general targets would be made.

The vision or the general targets for the environmental efforts are made, but the communication of the vision seems to be poorer than for road safety. For the environmental work it is important to collect the experiences of the regional offices and the local communities. Positive results would stimulate further work and inspire the less advanced regions and communities. Negative results would document the need for stronger means and countermeasures.



## **Are new management tools needed?**

The management system consisting of visions, general targets, reforms, countermeasures and status measurements seems well planned. Chances to achieve the general targets should be great, if this system is adopted. The system makes it possible to show the extent to which targets are achieved and where stronger efforts are needed. The system could perhaps be simplified – making fewer targets and some priority between the targets. This system seems, however, to be abandoned before it was implemented. Nevertheless, the important thing is not to conserve this particular system, but having a management system that everyone working with road safety and environment is familiar with.

Both in road safety and environment the Road Administration has applied “gentle” means, i.e. means based upon voluntary compliance, markets and social norms. If these means are sufficient, remains to be seen.

Only the Government or the Parliament can impose stronger means. If the “gentle” means do not suffice, the challenge for the Road Administration is to influence the Parliament and the Government to enact new and more powerful means.