

## **GOVERNMENTAL STATUS REPORT, SWEDEN**

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Swedish National Road Administration  
Governmental Status Report

### **ABSTRACT**

The safety situation in Sweden has improved the last decade but the positive trend has levelled out the last few years. The parliament has taken interest in the problem and has formulated the "Vision Zero" as a new strategy. The Vision Zero claims that it is not acceptable to have fatalities and injuries leading to long-term problem in the road transport system. The government has further focussed the work by a special 11-point program for traffic safety and an investigation how to establish legislation giving all system designers larger responsibility for the safety level in the road transport system. New better knowledge is needed to support the new strategy. Changing the focus from accidents to preventing severe injuries will help to solve the problem. More co-operations between the various traffic safety disciplines are urged for in the design of a crashworthy road transport system, where vehicles, infrastructure, speed and human failures are handled simultaneously.

### **FATALITIES**

The overall long-term safety objective within the road transport system was settled in 1997, when the Swedish parliament voted for the "Vision Zero". This vision states that ultimately no one should be killed or seriously injured by the road transport system. Sweden has had specified quantitative targets for road safety since the late 1980ties. In 1994 the national group for traffic safety co-operation proposed a target at maximum 400 fatalities for year 2000. The government in 1997 adopted this target. However this highly demanding target was not reached and in the year 2000, 600 people died in the Swedish road traffic. With 600 fatalities per year Sweden is still one of the safest countries when it comes to road traffic, with a level of 6,5 fatalities per 100.000 inhabitants. The current target for the traffic safety work is set at maximum 270 fatalities year 2007. This target was decided in 1998.

### **ROAD SAFETY ORGANISATION**

The Ministry of Industry, Employment and Communications is responsible for the traffic safety work in Sweden. The ministry is limited in size and the Swedish National Road Administration (SNRA) handles most of the practical work. The SNRA is responsible for the national roads but also issues related to vehicle and driving licensing. SNRA also has the responsibility to fulfil the traffic safety targets and to monitor and stimulate other actors within the road transport system. To help in this work a co-operation group is formed by SNRA and the other two main actors. These are the local councils (in built up areas) and the police. The National Society for Road Safety a non-governmental organisation, which works to improve road safety, is active in the co-operation as well.

### **POLITICAL DECISIONS**

#### **The 1994-2000 National Road Safety Programme**

In October 1994 a National Road Safety Programme for the period 1995-2000 was introduced. The SNRA, the police and The Swedish Association of Local Authorities representing the local communities developed the program as a joint effort.

The main components of the programme are 10 different road safety reforms for each of which quantitative goals are formulated. The main characteristics of the programme are considerable efforts to increase the importance and valuation of road safety on all levels of society, to follow up all actions, and to reinforce the co-operation between all actors to reach the goals. The ten reforms were:

- Increased appreciation of the importance of road safety.
- Reduction of drunken road users.
- Fewer speed offences.
- Fewer infringements of other traffic rules.
- Safer traffic environment in urban and rural areas.

- Increased use of safety equipment fitted in the vehicles. (Belts and child seats)
- Increased crash worthiness of vehicles.
- Increased visibility especially in road traffic.
- Increased use of helmets when cycling.
- Improved rescue operations, medical care and rehabilitation.

Even if the 1994 National Road Safety Programme has come to its end, the reform areas are kept as important performance indicators in monitoring the traffic safety work. The partners in behind the program are continuing the co-operation in the national group for traffic safety.

### The Vision Zero

In 1995 political activities started to develop a new traffic safety policy. It was decided by the parliament in 1997 as the "Vision Zero". The parliament decided that the long-term target for the road transport system should be that no one should be killed or receive long-term disablement by the system. The Vision Zero is an attempt to change the traditional philosophy to reduce the number of fatalities and injuries by primarily changing the behaviour of the road user. This has been done by legislation, information and education in order to force the road user to adapt to the general principles of the system. In the new strategy the system designers are identified as important bodies and they should have responsibility to develop a safe road transport system that is tolerant to human failures. In a broader sense, the safety of the system has been traded off to mobility, where the mobility has been allowed to be higher than the system can tolerate. In the Vision Zero decision it was clearly stated that the mobility should be a function of the safety level of the system.

### 11-point Programme for Improving Road Traffic Safety

As a result of the Vision Zero decision the Swedish Government in 1999 put focus on the traffic safety work by settling an eleven-point program. The program clearly defines the priority areas for the traffic safety work. The eleven points are

1. Special safety measures for the most dangerous roads
2. Better road safety in urban areas
3. Emphasis on road-user responsibility
4. Safer conditions for cyclists
5. Quality assurance for transport services
6. Compulsory use of winter tyres
7. Better utilisation of technology
8. Greater responsibility placed on road traffic systems designers

9. Handling of traffic offences
10. The role of voluntary organisations
11. Alternative forms of financing new roads

The 11-point program has been the focussing document within the SNRA for the last years and some of the effects are discussed below.

In the first point a focus is set on the **most dangerous roads**. Following the Vision Zero decision the work is aiming at diminishing the fatalities and serious injuries. This has led to in part new safety solutions. On wide, approx 13m, roads median barriers are introduced. Before these roads were used as two lane roads with relatively wide lanes. Now they are changed into three lane roads with physical median barriers. From the driver perspective the road is in some parts a one-lane road with no possibility to overtake, and in some parts a two-lane road with overtaking possibilities. The experience so far, with some 200km of road distance, is very positive. The very dangerous and injury producing head on collisions are in practice eliminated. Much work has also been put into safer side areas either by clearing dangerous obstacles away or by putting up side guardrails.

About one third of the fatalities occur in **built up areas**. For these areas the local councils have the responsibility. Much work has been done in applying 30km/h as speed limit in areas where unprotected road users and cars are mixed. An analysis method "Lugna gatan" ("Calm streets") has been developed. This method gathers most actors around the development of a network suitable for unprotected road users as well as for cars, buses, rescue vehicles etc.

In a developed and safe road transport system **the road users have their responsibility**. The focus has been on three areas, drunk and driving, keeping the speed limits and seat belt use. Information to the road users and targeted police work are important in this work.

**Safer conditions for cyclists** are needed if the general trend to encourage bicycles as transport mean is continued. To some extent this is done in the activities to adapt the cities by 30km/h speed limits and separation between cars and unprotected road users. But an increased bicycle helmet use is also essential. In Sweden voluntary bicycle helmet use is increasing especially in the larger cities. But the introduction of bicycle helmet legislation is also under consideration.

A large proportion of the total transports on the roads are commercial. **Quality assurance for transport services** is one way to influence these and to improve the safety level of the road transport system. Many

bodies in society can add traffic safety as an important quality of transports being bought or sold.

**Compulsory use of winter tyres** has been introduced from the winter season 1999-2000. The legislation states the cars should have winter tyres under winter weather conditions between 1<sup>st</sup> of December and 31<sup>st</sup> or March. The rate of cars with winter tyres was very high in areas with frequent winter conditions already before this new legislation.

**Better utilisation of technology** can be one way to achieve better safety in the road transport system. This does not necessarily mean new technology. Sweden has been very active in investigating the potential in seat belt reminders to diminish the number of unbelted in crashes. About 50% of the fatally injured in Sweden are unbelted. A specification for a light and sound based system has been developed together with researchers and car industry. Another important area for development is systems to help the driver to follow the speed limit. A research project is looking at the effect of intelligent speed adaptation systems (ISA) by installing 6000 cars in four cities with speed reminders. Alcohol interlocks are studied as a tool for quality assurance. Trials are being made within freight, a bus and a taxi company. In the quality assurance systems for companies, seat belt reminders, speed adaptations systems as well as alcohol interlock systems are important cornerstones. Sweden is a sponsor of the Euro NCAP crash test program aiming at giving the consumers valid information of the safety level of new cars.

The Vision Zero concept implies a **greater responsibility placed on road traffic systems designers**. One way to achieve this is legislation about responsibilities. The government has initiated a special investigation that is discussed more below. A commission of inquiry is reviewing existing rules concerning **traffic violations** and will propose changes from the perspective of Vision Zero and of ensuring due process of law.

The final two points (The role of voluntary organisations, Alternative forms of financing new roads) are of a more national interest and are not discussed more in this presentation.

### **The Committee Work on Responsibilities of Road Transport System Designers**

A committee work was initiated in 1999 since one of the main ideas in the Vision Zero concept is to add responsibilities to all bodies in society that influence the safety level in the road transport system. The committee proposed the initiation of a new authority, a Road Traffic Inspectorate.

The proposed inspectorate should have four main tasks:

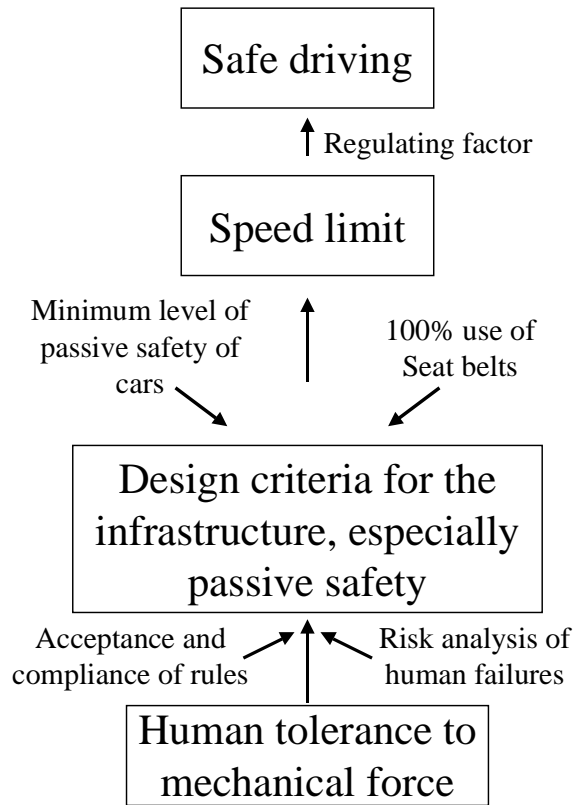
- To carry out general and specific evaluations and enquiries
- To ensure that the system designers conduct accident inquiries of high standard of all fatal crashes, and also undertake adequate and effective measures
- To draw up rules and regulations concerning requirements on a quality assurance system for road traffic safety
- To initiate a certain degree of research and development

The second proposed responsibility, co-ordination of investigations of fatal accidents, will give new possibilities for system designers to achieve better knowledge. After the in depth investigation the system designers will have to propose adequate solutions and their plans to implement sustainable prevention measures. This is a possibility for all disciplines to have a more coherent view upon the road transport system. It will also allow the system designer to have an agreement how to solve traffic safety problems. The committee proposal has been reviewed widely in the society. An organisation committee is established to propose an adequate organisation of the new inspectorate.

### **THE CRASHWORTHY SYSTEM**

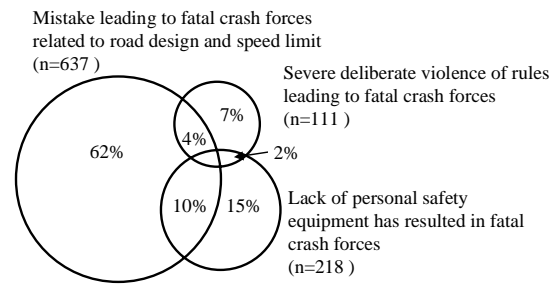
The Vision Zero concept is requiring a new more holistic perspective on the road transport system. The road users, the vehicles and the roads cannot be considered separately. Instead a system analysis approach is important. Even if this has been discussed before, little progress has been seen. In the new Vision Zero approach the aim is to build a road transport system designed for the capabilities of the human. Among other things this will put focus on injury prevention more than accident prevention. Avoiding accidents is only one strategy if fatalities and severe injuries are to be eliminated. By making the follow-up on the injury outcome instead of on the accident the problem will have another profile and new countermeasures can be developed.

An attempt to structure the problem is done in a multidimensional model for safe driving. (Tingvall 1997)



**Figure 1. Multidimensional model for safe travel in cars.**

This model has been used to analyse fatal crashes from 1998 and 1999. Every case has been classified in three groups. One group contains cases where the road user has made a mistake or misjudgement leading to the fatal accident. A second group contain the persons who have neglected to protect themselves by primarily seat belts. The third group has deliberately and widely overstepped the rules and regulations and therefore exposed themselves to a high crash severity beyond survival. The results are shown in fig 2.



**Figure 2. Classification of fatal crashes 1998 and 1999.**

The classification of the fatal crashes shows that harmonising the vehicle design, the road design and the speed can do major improvements. It also shows that illegal behaviour is a limited problem. However, minor offences of the speed limits are not detected in the collected material. Lowering the speeds to the posted levels can solve a substantial part of the safety problem.

## RESEARCH NEEDS

The Vision Zero concept is a new strategy for road safety. Hence new knowledge is needed. Some of the knowledge can be achieved by reanalysing existing data with fatalities and severe injuries in focus instead of crashes. But new research is also needed. Below some major areas of interest are discussed.

### Impairing Injuries

Vision Zero aims to eliminate fatalities and long-term consequences from road traffic trauma. A more substantial knowledge is therefore needed to pinpoint the diagnoses to eliminate. Furthermore must the long term handicapping effects of injuries be studied and understood. A general development is essential of injury scales such as AIS (Abbreviated Injury Scale), to encompass risk of long term consequences as well as fatality risk.

### Biomechanical Tolerance Limits

When injuries leading to long-term consequences are identified further knowledge of injury mechanisms and tolerance limits are needed.

## Whiplash

One injury of special interest is the whiplash. Whiplash associated disorders are one of the most predominant reasons for long-term impairment in the modern society. This is an injury that must be in focus and major improvements of the knowledge are needed. Better vehicle design can probably solve large parts of the whiplash problem.

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## CONCLUSIONS

- The road fatality risk in Sweden is one of the lowest in the world
- The Vision Zero concept is a new strategy to achieve safe road traffic in Sweden
- New very demanding targets (50% reduction in ten years) has been decided
- New responsibilities for system designers can improve the safety level
- A better understanding of the most serious injuries are needed

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