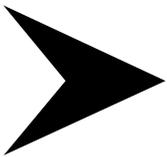


ROAD SAFETY

Vision Zero on the move





Vision Zero

is the image of a future in which no one will be killed or serious injured.

Vision Zero

is also the basis for the work conducted on road safety in Sweden. This was ratified by Parliament, which has resulted in changes in road safety policy and the work approach taken.

Vision Zero

is both an attitude to life and a strategy for designing a safe road transport system. It establishes that the loss of human life in traffic is unacceptable.

Road safety in the spirit of Vision Zero means that roads, streets and vehicles must be much more adapted to human capacity and tolerance. The responsibility for safety is shared between those who design and those who use the road transport system.

Since Vision Zero was established in Sweden there have been fewer people killed on roads. The ideas behind Vision Zero have also made an international breakthrough.

Serious injury - lifelong disablement

In this brochure and in other Vision Zero contexts, the term "serious injury" is used.

It is used to mean a physical injury that the victim will not recover from in a reasonable time and might entail lifelong consequences for the person afflicted.





Vision Zero challenges traditional thinking

When Vision Zero was first introduced in 1995 it represented a whole new way of viewing the problems concerning safety in road traffic – including how those problems should be solved.

Vision Zero emphasises that the road transport system is an entity in which the different components such as roads, vehicles and road users must interact in order to ensure safety. Never before has there been this kind of overall perspective.

Vision Zero alters the view on responsibility. Those who design the road transport system bear the ultimate responsibility for safety: road managers, vehicle manufacturers, road transport carriers, politicians, public employees, legislative authorities and the police. It is the responsibility of the individual person to abide by laws and regulations. Prior to this, practically all the responsibility had been put on the individual road user.

Vision Zero is composed of several basic elements, each of which affects safety in road traffic. These concerns ethics, human capability and tolerance, responsibility, scientific facts and a realisation that the different components in the road transport system interact and are interdependent.

BASED ON ETHICS

Vision Zero is based on the ethical standpoint that no one should be killed or seriously injured for life in road traffic. The only

acceptable figure for the number of fatalities and serious injuries in traffic is zero.

The moral basis of Vision Zero means that views on safety within the road transport system must correspond to safety values in society at large. For example, it is obvious that nobody should die through an accident at work or in connection with rail, sea or air travel.

MISTAKES SHOULD NOT BE PUNISHABLE BY DEATH

The road transport system is not adapted to the fact that people sometimes make mistakes. There is no perfect human being. In road traffic it is all too often a case of simple mistakes being punished by death.

The work conducted on road safety in compliance with Vision Zero is based on doing everything to prevent road deaths or serious traffic injuries. While effort is being made to prevent accidents, the road transport system must be designed from the realisation that people do make mistakes and that traffic accidents can therefore not be avoided completely. Vision Zero can accept that accidents occur, but not that they result in serious human injury.

ADAPTATION TO THE HUMAN BODY

Human limitations are an important basis upon which to design the road transport system. This must be done through taking into account biological tolerance against external violence – in other words what the human body can stand. In this regard, there are scientifically established limit values based on the design of modern vehicles and roads:

30

- Most people **survive** if they are hit by a car travelling at 30 km/h.

50

- Most people are **killed** if they are hit by a car travelling at 50 km/h.



50

70

- **A safe car protects** occupants at speeds up to 65-70 km/h in a head-on collision and at speeds up to 45-50 km/h in a side impact collision, assuming of course that everyone is wearing a seat belt.

A SYSTEM WHERE EVERYTHING IS INTERRELATED

An accident that results in serious human injury means that the components in the road transport system were not functioning well together. Vision Zero emphasises the fact that all elements in the system are interrelated and affect one another.

This system perspective has changed the direction of the work on road safety. It has pointed out the importance of harmonising such things as the development and design of vehicles and road environments, and that this must be done on the basis of human limitations.

THE SYSTEM DESIGNERS HAVE THE MAJOR RESPONSIBILITY

Since we can never escape the fact that human beings are not infallible, the road transport system must be designed so that any mistakes will not cause serious or fatal injury. This approach means shifting a major share of the safety responsibility from road users to those who design the road transport system. System designers primarily include road managers, the automotive industry, the police, politicians and legislative bodies. These



are the ones responsible for providing a system that can deal with the mistakes that road users will undoubtedly be making. However, there are also many other players who have a responsibility for road safety: transport carriers, health services, the judicial system, schools and road safety organisations such as NTF (National Society for Road Safety).

It is the responsibility of individual road users to abide by laws and regulations.

DRIVING FORCES FOR CHANGE

People's demands on being able to use the road transport system without putting their life and health at risk is a key driving force for achieving Vision Zero. For example, safety performance can be a decisive factor in a customer's choice between two cars. Good consumer information on safety systems can help increase market pressure, which in turn accelerates developments.



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Results of Vision Zero

In the years since Vision Zero was first introduced in 1995, Sweden has seen major changes both in terms of views on road safety and in the approach adopted to achieve it. An important milestone was the parliamentary resolution adopted in 1997 when Vision Zero became the foundation for road safety operations in Sweden.

In June 2009, the Riksdag also approved a new intermediate objective for traffic safety. This specifies that between 2007 and 2020 the number of fatalities is to be halved to no more than 220 and the number of seriously injured reduced by a quarter.

One obvious result of Vision Zero is the change in road environments in Sweden. Central median barriers and roundabouts have become much more common, as have different types of speed calming measures in built-up areas.

Nonetheless, it is still too early to draw any firm conclusions about what Vision Zero has meant as far as reducing the number of people killed or seriously injured in traffic. It takes a long time to implement improvements in roads and vehicles. Changes in the infrastructure occur at a slow pace. What has been seen, however, is a reduction in the number of road deaths in recent years, despite an increase in traffic.

NEW WAYS OF THINKING AND NEW SOLUTIONS

The following are some examples of what has happened:

Based on the concept of Vision Zero, the work on road safety has been aimed at preventing serious injuries. Previously this work focused primarily on preventing fatalities and accidents from ever happening.

The change in direction also entails changes in our way of thinking and calls for new solutions. One typical example to illustrate the difference can be found in the choice between traffic lights or a roundabout at an intersection.

- If the key objective is to reduce the number of accidents, then **traffic lights** are the best solution. There will be fewer accidents, but those that do happen often result in serious injury.

- If the key objective is to avoid serious injuries, **a roundabout** will provide better results. There will probably be more accidents, but the injuries will mostly be minor.



SAFER ROAD ENVIRONMENTS

Everyone who travels by car in Sweden can see how the roads have changed. This primarily involves investments that have been made to reduce the risk of serious human injury. Much of what has been done is due to the fact that the municipal authorities have taken a major responsibility to improve safety from the basis of Vision Zero.



- **Roundabouts** have become more commonplace at intersections, particularly in populated areas.

They are not a new phenomenon, but since the introduction of Vision Zero their key role in road safety has been highlighted. Roundabouts have a traffic calming effect.

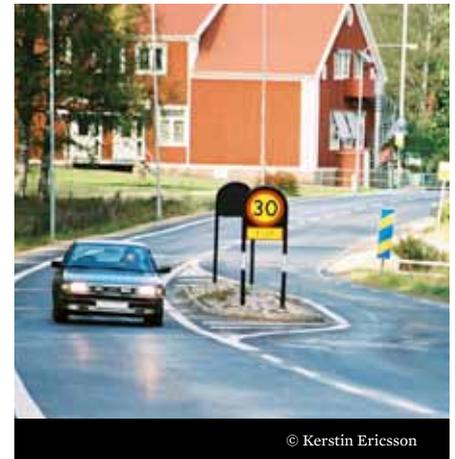
The consequences of a collision there are less severe than in a normal intersection due to the different angles of impact and lower speeds.



- A new and widely discussed innovation is the **2+1 lane highway with a median barrier**, a road type developed in Sweden.

The summer of 1998 saw the first such median barriers being installed on a road stretch where there had been many fatal collisions. Despite much initial scepticism, this trial solution was found to be highly successful in preventing head-on collisions.

Since the beginning of 2000 the construction of roads with median barriers has accelerated.



- One of the **first effects** of Vision Zero was that municipal authorities were able to establish a 30 km/h speed limit in built-up areas. This has been implemented on a relatively large scale, not least of all as a result of the ideas presented in the Swedish Association of Local Authorities publication entitled "**Lugna gatan**" (Calm Streets), which applies Vision Zero to urban environments.

This publication makes it possible to systematically analyse and design a transport system that guarantees good accessibility and a high level of safety for all modes of transport.

A speed of **30 km/h** in built-up areas is nothing new, but the work on turning Vision Zero into reality has emphasised that this must be the limit if pedestrians and cyclists are to survive a collision.



- **Speed limits** on parts of the road network have been reviewed in order to ensure that they reflect the safety standard of the road. For example, there are now few roads with a speed limit of 110 km/h that do not have a median barrier.



- Major investments have been made to **minimise the damage** ensuing from cars veering off the road. Guard rails have been erected, and potentially dangerous objects such as trees and boulders have been cleared away from roadside areas.

SAFER VEHICLES

Private passenger cars have become much safer, which considerably reduces the risk of being killed or seriously injured in new car models. This can in part be attributed to the European New Car Assessment Programme, Euro NCAP, which road safety experts at the Swedish Road Administration (SRA) were instrumental in setting up. As a result, consumers have access to information concerning the safety standard of different cars.

There is no doubt that improvements have been implemented at a much faster pace than if legislation had been used for the same purpose. As it takes at least 10 to 15 years to replace an entire vehicle fleet, it will still take some time before the improvements will have full effect.

The automotive industry can contribute to positive developments in society through meeting consumer demands concerning their products and behaviour. Particularly important are demands set by governments, municipalities, county councils and private business.

SAFER TRANSPORTS

Since the introduction of the Vision Zero initiative, the Swedish Transport Administration has begun implementing quality assurance of transports as a means towards inspiring greater responsibility on the part of carriers and shippers. The Swedish Transport Administration is doing this in its role as government agency responsible for the traffic sector. The intention is that all private companies and organisations that either procure or operate transport services themselves will assume responsibility for the impact this has on the environment and road safety.

As a result of these initiatives, many companies and organisations have begun to place stricter requirements on vehicles and how they are used. We are seeing a growing number of those procuring transport services setting greater safety and environmental demands on these services, while more and more transport providers are showing a greater responsibility for how the transports are carried out. Swedish trade unions in cooperation with environmental and road safety organisations have developed a ranking system for heavy transports. This ranking system is called Q3 and is modelled on Euro NCAP. It is based on working environment, environmental and road safety requirements in connection with the procurement of heavy transports. As it is the clients who set the standards for the transports, they are the ones assessed.





IN-DEPTH STUDIES OF FATAL COLLISIONS

Since 1997 the Swedish Transport Administration (formerly the Swedish Road Administration) has conducted in-depth studies of all fatal accidents on Swedish roads. The purpose has been to gain knowledge about the precise circumstances and causes of the fatalities. These in-depth studies are part of the Swedish Transport Administration's quality management programme and also offer an opportunity for monitoring developments.

The in-depth studies have shown that shortcomings in the road environment are a common cause of road deaths, in addition to road users exceeding the speed limit, failing to wear a seat belt or driving while under the influence of drugs or alcohol.

In order to ensure that the conclusions drawn from an in-depth study are implemented in practice as road safety improvements, "OLA" projects are conducted. The acronym OLA stands for Objective data, List of solutions/actions and Addressed action plans. Subsequent to the study, the relevant system designers assemble to discuss possible solutions to avoid the same thing from happening again. This is followed by the implementation of concrete measures, confirmed in a declaration of intent signed by each player. System designers have been found to be enthusiastic about this way of addressing a problem.

OLA projects are also conducted at the national level through what are referred to as "theme studies". Examples of these are Moped-OLA, Bus-OLA and Youth-OLA (targeting young car drivers).



SEAT BELT REMINDERS

Seat belts must be worn in order for the in-vehicle safety system to work. Sweden has been actively involved in promoting the development of technical systems to increase the use of seat belts. Representatives from the automotive industry, research institutes, public authorities and insurance companies have reached a common stand on how to increase the use of seat belts through reminder systems.

Cars equipped with modern seat belt reminders are assigned higher ratings by Euro NCAP. Seat belt usage is close to 100 percent in new cars with seat belt reminders.

ALCOHOL IGNITION INTERLOCK

Alcohol related traffic accidents are all too common and often result in death or serious injury. An alcohol ignition interlock in vehicles keeps impaired drivers out of traffic. It is quite common in the USA and elsewhere to use interlocks to prevent any previously convicted drunk drivers from driving while under the influence. In Sweden, alcohol ignition interlocks have been introduced as a means to quality assure transports. Companies who have had interlocks installed in their vehicles can guarantee that their drivers will not be behind the wheel while under the influence of alcohol.

A growing number of players within the road transport system are cooperating on developing alcohol ignition interlocks that are inexpensive enough to be installed in all vehicles.



ROAD SAFETY CAMERAS

It is the safety standard of the road that dictates the speed limit. Drivers who exceed this limit put safety in the road transport system at stake. Speed surveillance using road safety cameras has been found to be an effective way to prevent speeding violations and to reduce the number of accidents that result in serious injury. These cameras have therefore become much more common out on Swedish roads. Attitude studies have revealed that most drivers welcome their support in traffic.



CYCLE HELMETS

Vision Zero stresses the fact that the road transport system must be designed on the basis of what the human body can stand. Cyclists are unprotected in traffic and there is a major risk of injury in the event of an accident. Head injuries are the most serious type of injury incurred by cyclists. Wearing a helmet can prevent this.

In 2005 it became compulsory by law for all children and adolescents up to the age of 15 to wear a cycle helmet when riding a bicycle. The hope is that wearing a helmet will become a habit past this age.



ROAD SAFETY – A WORK ENVIRONMENT ISSUE

Many serious road accidents occur in connection with work or when travelling to and from work. The Swedish Work Environment Authority and the Swedish Transport Administration have begun working more closely together in order to reduce the number of work-related traffic injuries.

The ambition is to show that traffic injuries are also a work environment issue. By including road safety considerations when assessing the systematic work environment initiatives of companies and organizations, greater focus is placed on what employers can do to improve road safety.



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CLOSER COOPERATION ON ROAD SAFETY

The holistic perspective on safety in the road transport system that characterises Vision Zero has resulted in closer cooperation between system designers and other players. This cooperation is both formal and informal.

In August 2002 the Government instituted a national road safety assembly. The aim was better coordination of the initiatives taken by various players for a safe road transport system. The primary focus areas are speed, protection systems, alcohol in traffic as well as children and youth in traffic. Within the framework of the national road safety assembly, several players have pledged their commitment to improve road safety. For example, key road transport carriers have undertaken to work systematically on road safety at top management level.

The national road safety assembly has also resulted in regional and local road safety assemblies dedicated to the same purpose.

Other examples of closer cooperation are the OLA projects, the quality assurance of transports and the development of such technical systems as seat belt reminders and alcohol ignition interlocks.



Further steps towards Vision Zero

The work on designing the road transport system in line with Vision Zero is making a clear impression. Much has already been accomplished and road safety in Sweden has improved. But this is only the beginning. There is still a lot left to do.

The following are a few examples.

CHANGES IN LEGISLATION

Swedish traffic legislation places responsibility for safety in road traffic on the individual road user. It does not take into consideration the new shared responsibility between system designers and road users that Vision Zero signifies.

This means that legislation must be reviewed so that laws and regulations are also adapted to the direction adopted by Parliament for safety in the road transport system.

QUALITY GOALS FOR THE ROAD TRANSPORT SYSTEM

Goals for the road transport system should be converted into indicators that measure quality and are easy to monitor.

Road traffic, for example, could be quality assured with respect to speed, seat belt usage and alcohol/drug-free driving.

An example of quality assurance of road environments is the European concept for road tests, Euro RAP (European Road Assessment Programme). Within Euro RAP the safety standard of roads is surveyed and assessed. Road assessment tests were initiated in 2002 in Sweden, England, the Netherlands and Spain. It is still too early to draw any conclusions about the programme, but the intention is to classify road stretches according to their level of safety and then to assign star ratings. Anyone driving in a safe car on a road with the highest safety classification can travel with a sense of security – assuming that they wear their seat belt, they respect the speed limit and that they are sober. Euro RAP is to roads what the Euro NCAP crashworthiness programme is for cars.



ROAD SAFETY STANDARD

Safety and quality norms exist in most fields. The construction industry, for example, has standards for buildings and structures so that they will be able to withstand any critical situation – and not have to be reconstructed in the event of an accident. Such norms or standards are also needed for safety within the road transport system.

A reference model based on criteria for a safe road transport system should be developed. This model could, for example, be called "Safe Traffic" and be used as the starting point for all future road safety undertakings. Strategies must be developed and action taken to reduce the gap between the reference model and the current situation. It is the reference model that should be the starting point and not sporadic events in the road transport system.

In this way, safety initiatives in the road transport system can approach corresponding efforts in other sectors.

SAFETY IS A PRECONDITION FOR GOOD MOBILITY

Road safety initiatives have often been considered to limit access and mobility in road traffic. An important aspect of the work on Vision Zero is to demonstrate instead that safety is a precondition for good mobility. It is possible to design the road transport system so that it is safe, even at current speed limits. There are major advantages to be gained if automobile manufacturers and road designers were to coordinate their efforts to achieve this.

It would seem that cooperation remains a crucial issue for ensuring good mobility. Without coordination and cooperation between road users, the business community and the public sector, the optimum combination of investments required will never be possible.



Road deaths – a global problem

The road transport system is the cause of one of the greatest public health problems in modern society – traffic injuries. This is a global problem that exists both in developing and industrialised countries.

About 1.4 million people die in traffic every year. Road death is the ninth most common cause of death in the world according to the World Health Organisation, and the Red Cross describes traffic injuries as a global catastrophe.

There are no signs of a global decrease in road deaths. On the contrary. Forecasts suggest that the number of people killed on roads will rise to over two million. According to WHO, road in-juries will become the third or the fourth most common cause of lost health in the world. One contributory factor is the dramatic increase in traffic in developing countries.

But it is possible to change the trend. The EU has passed a resolution to halve the number of road deaths in member countries by 2020. The long-term focus within the EU is in line with Vision Zero and means that no European citizen need be killed or seriously injured on roads.

An international survey shows that the number of road deaths in Sweden is comparatively low. Per capita it is a tenth of that in the countries with the highest death statistics.





TRAFIKVERKET
SWEDISH TRANSPORT ADMINISTRATION

The Swedish Transport Administration, 781 89 Borlänge, Street address: Röda vägen 1
Telephone : +46 (0)771-921 921, Text telephone: +46 (0)10-123 50 00

www.trafikverket.se