

Swedish road safety and the traffic safe society



Investigation and analysis of possible measures



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Summary

Many road-users today have a very low degree of awareness when it comes to risks and dangers. Thorough changes to increase road safety and to diminish risk-taking on our roads must be implemented if we want to reach the Swedish parliament's goal from 1997 – "Vision Zero – A safe road traffic concept". In order to be able to achieve this goal it is vital that current and future regulations are accepted more widely among road-users:

- Compulsory basic traffic education is a good investment. This education should start *already in preschool* and continue throughout the Swedish nine-year compulsory school and high school. The gains in terms of road safety are obvious regardless of *whether* the person in question intends to get a *driving licence or not*.
- The education of drivers must be improved and the standards must be raised to be able to save lives. The quality of the education as well as the compulsory parts of the education must be revised. The same standards should apply for all instructors. Private instructors should also meet set standards of theoretical knowledge.
- Besides the changes in the education system, attention must be paid to measures *after* passing the driving test. These measures will contribute to a long-term positive influence on young drivers.
- Regular follow-ups of the education of drivers every tenth year should be introduced without delay in order to create increased safety on our roads.
- Total abstinence from alcohol consumption for drivers should be the norm as we often find ourselves in situations where we take decisions that not only concern our own life but also that of others. A zero limit should be introduced without delay in order to be able to achieve "Vision Zero".
- The police need more resources so that they are able to give priority to a deeper commitment where road safety is concerned. A considerably increased visibility of the police force is both a well-documented and effective measure.
- Relevant technical improvements of our vehicles should continue as before, but also taking into account that the technology is liable to generate offsetting action by drivers.
- The ongoing work to improve the traffic networks and systems must be continued.

Up to the present road safety work has been almost exclusively concentrated on passive safety, i.e. measures that do not influence the probability of the accident occurring, but only reduce the extent of the subsequent damage. In the future we will need to investigate the underlying causes of accidents, e.g. record of previous accidents, the road-user's experience, state of mind, education etc.

We must create a traffic culture that can be passed on to the next generation in a continuous process, built on mutual consideration, personal responsibility and judgement. It is not acceptable that any human being should be killed or injured due to fellow road-users' lack of consideration or lack of will to follow traffic regulations or due to questionable decisions from our decision-makers.

Introduction

Every day we see road users driving against the red light, ignoring the stop sign or keeping too short a distance from the vehicle in front. Although the law has been strengthened there are drivers who do not give way to pedestrians at unguarded pedestrian crossings. Not to speak of the brutal contempt of his fellow human beings, which the drunk driver shows. Speed is often discussed, however not often or rather more likely never as a safety aspect, i.e. speed rightly adjusted to the different situations that the traffic demands. There are drivers who cross over to the wrong side of the road and push their way forward and then boast about their irresponsible driving and especially about how fast they drove.

Let us make a comparison with the pilot, who needs to follow the air traffic controller's directives to the last detail and the locomotive driver who needs to follow the signalling and regulation system to avoid accidents. If those persons do not follow the rules they are immediately declared unfit for their profession. What would happen if the air pilots caused one or more accidents a week by breaking the rules which have been set up to guarantee safety?

Why then do we not react in the same way faced with death on roads and streets? Is it reasonable that nonchalance, conscious risk taking and an overconfidence in one's own ability results in people dying and getting hurt in the traffic? Of course, the answer to the question is no.

But the questions is:

What changes are needed to increase traffic safety and reduce risk taking on our roads in order to achieve the "Vision Zero" the government's latest traffic policy from 1997, i.e. no deaths and no serious injuries in the traffic?

The only way to come closer to this goal is to combine measures that strengthen one another. This can be done by improving the driving tuition, introducing a general education for road users emphasising high risk awareness and organising various kinds of information campaigns. It is also of the utmost importance that we all - politicians, authorities and road users - take our responsibility.

Sweden and Europe

Travel

Travel between different countries, mainly to and from members of the European Community, will most probably affect the numbers of accidents negatively. It is more and more common that business men and women as well as tourists take the aeroplane or the train and then rent a car at the foreign destination, where they then try to drive in an entirely new environment with different traffic behaviour, traffic signs and traffic rules.

Traffic and regulations

Let us take a few examples:

Left hand turn where the oncoming vehicle is also turning left

In France this means that they pass each other before they turn. In Germany, however they turn in front of each other. In Sweden both alternatives are allowed.

Traffic lights

In nine of the countries of the European Community the traffic lights change directly from green to red and from red to green. As we all know there is a third colour in Sweden, the amber light.

Alcohol

In the majority of countries in the European Community the lower penalty limit for drunk driving is 0.5 mg blood alcohol concentration, whereas England, Ireland, Italy and Luxemburg allow a blood alcohol concentration of 0.8 mg. This can be compared with the Swedish limit which is currently 0.2 mg.

Other factors

In the year 2000, 230 million vehicles were running in the European Community. At present there are eleven different languages and fifteen different ways of driving. High traffic density is another problem that contributes to the difficulties encountered when driving across the borders.

Traffic accidents outside Sweden

During the Gulf war in 1991 Europe lost some couple of dozen soldiers whereas 6000 people were killed in the traffic during the same period. In 2001 Greece had the largest death figure; 180 dead per million inhabitants. (Source CARE, national data). In the United States the death rate per inhabitant is about half of that in Europe. The reason for this is probably both that traffic safety is given much attention on a federal level and that there are special organisations and research units at the universities. Apart from that there are special road patrols which supervise the traffic. Furthermore all traffic signs and traffic regulations are almost identical in all states.

Traffic safety work of the European Community

The traffic across the borders increases every year, especially since the inner borders of the European Community were taken away in 1993. Considering the seriousness of the traffic safety problems in Europe the European Commission has the task of presenting an action programme for road safety with the main objective of creating the pre-conditions for common traffic safety work, with the aim of reducing the number of deaths and injuries in the traffic.

Amongst the member states who have worked actively with this, Great Britain, the Netherlands and Sweden have achieved the best results. Sweden has worked with target oriented traffic safety programmes for a long time with "Vision Zero" as the overriding objective (i.e. zero injuries and deaths caused by traffic accidents.)

In the White Paper COM (2001) 0370 issued by the European Community, dated 12.9.2001 in Brussels, which deals with European transport policies, one can read about the intention of the European Community to harmonize the rules that regulate controls and penalties where usage of alcohol, narcotics and medicines are concerned as well as the harmonization of traffic regulations. Furthermore the objective is to halve the number of deaths caused by traffic accidents by the year 2010.

In the *European Road Safety Action Programme* COM (2003) 311 final of 2.6.2003 published by the European Commission, the call for mutual responsibility is strengthened and the Council also views this as positive. *However, no decision has been made yet.*

The Commission states, that in spite of the fact that the deaths in road accidents have been reduced by half during the last 30 years and in spite of the fact that there have been more than 50 directives about technical standardization, there seems to be considerable reluctance for introducing common concrete limit values amongst the member states. *In this context it can be mentioned that the introduction of a common maximum level of alcohol in the blood has been discussed amongst the member states for twelve years.*

Sweden must continue to work actively for a common European policy for road safety.

This work should be speeded up so that one can benefit from the resulting safety advantages without delay

The European Road Safety Observatory

The Commission intends to set up a European Road Safety Observatory. This Observatory will coordinate all Community activities in the fields of road accident and injury data collection and analysis. It will also be a centre for exchange of information on best practice and ultimately, organise and manage Community best practice guidelines. It could also take on the task of improving the dissemination of the findings from research projects on how improved road safety can be achieved.

Accidents in Sweden

Accidents in Sweden steadily decreased from the change to right hand traffic in 1967 until 1982.

Measures carried out

In the beginning four important measures contributed to the reduction of accidents:

- The speed limit system of 110-90-70-50-30 km/hour.
- Compulsory safety belts in the front seats.
- Dipped headlight even during daylight.
- Compulsory helmets for moped and motorcycle drivers.

Furthermore continuous improvements of the permanent road environment have been carried out to prevent accidents:

- Construction of tunnels alternatively fly-overs only for cyclists and pedestrians as well as an augmented pace of construction of special pedestrian and cycling paths to improve the safety of unprotected road users even further.
- Dangerous 4-way junctions have been replaced by roundabouts or split level junctions.
- A useful alternative to the split-level junctions, where the traffic has been fairly evenly spread, is the 4-way stop.
- Barrier steel cable rails separating the lanes have been constructed on 2 +1 roads. (Alternating 2 and 1 lane in each direction) to avoid accidents with on-coming vehicles. More recently pipe sections have also been used on the central reserve.

Unfortunately the accident process is made worse for the motorcycle driver as he hits the sharp poles into which the cables are mounted. Computer simulations show that if the poles are fitted with plastic covers this would result in a less serious accident for the motorcycle driver.

The situation today

We are far from achieving the objectives set by government in 1997 where the reduction of accident frequency is concerned.

Traffic accidents are estimated to cost the government about 19 000 million SEK per year. In this sum human suffering is not included as no price tag can be set on this.

One aspect which has come to dominate many drivers' view of accidents is that they themselves have not been the cause of the accident. Throughout the years one has been able to read newspaper notices where the actions of the drivers do not seem to have been of any significance for the accident:

”Aquaplaning took 5 lives.”

”The sudden cold and slippery roads caused 2 deaths.”

Here the media with its far-reaching penetration carries a large responsibility, as it has the opportunity to get us road users to understand that in the end it is our behaviour and way of driving which decides whether we are involved in an accident or not.

Moped – driver training

Where demands for a driving licence for EU-mopeds (class 1) are concerned, DN Motor (motor section of large daily newspaper) for example has expressed the opinion that the driver training neither needs a teacher nor a classroom. According to them the most important thing would be to get the theoretical knowledge by means of known questions. Furthermore the former member of the traffic committee of the Swedish parliament was of the opinion that the demand for theory lessons by professional instructors should be dropped for EU-mopeds. This should lead to improved road safety. To claim that no in-depth theoretical knowledge is needed to get a driving licence for the EU-moped cannot be justified. Insufficient theoretic knowledge, for example not understanding the meaning of the answer to a theoretical question, will in many cases lead to catastrophes for the people involved. We need to make demands and actively work for all drivers of mopeds getting both a theoretical and practical driving instruction which enables them to handle the risk situations that can arise in the more and more complex traffic.

The voluntary motorcycle corps “Frivilliga motorcykelkåren”, FMCK in Stockholm provides complete basic moped training which consists of good theoretical training and advanced practical instruction in how to handle a moped. After a short supplementary training has been passed a licence for EU moped class 1 will be issued. The only thing that is missing is the important driver training in traffic. Remarkably this is not yet allowed in Sweden according to the rules of the Swedish National Road Administration. The Moped School, which also provides driving tuition for moped drivers, works actively to provide drivers with good theoretical and practical driving tuition.

If the goals set by the government 1997 are to be realised, the insight and knowledge about traffic hazards must be improved by better instruction and should comprise all moped drivers. Furthermore if the media reporting is factual and also reports the background to why the accident has occurred we will have come quite some way towards a safer society where traffic is concerned.

What more can we do to realise this goal knowing that many road users have a very low risk awareness? One condition for reaching the goals of Vision Zero is that we must combine rules and regulations in such a way that they find acceptance amongst road users. Our vehicles should be fitted with technical improvements enhancing traffic safety as a standard but bearing in mind the offsetting actions by drivers. Improvements of the permanent traffic environment must be made continuously. Apart from these measures and not forgetting a personal commitment, there needs to be further education at regular intervals for drivers, for example every tenth year, to guarantee improved road safety.

Alcohol and drug policies in Sweden

Ever since the first statutory penalties in 1923 and to the present day, Sweden has successively legislated about lower and lower limits for alcohol blood concentration. Currently the maximum blood alcohol concentration is 2 mg/litre and 1 mg in the breath. This

limit was voted through in parliament in the spring of 1990 as a result of a growing public opinion which demanded effective measures against drunk driving. In the government declaration of 1991 it can be read that

”the rules for drunk driving should be reviewed with a view to lowering the limit for blood alcohol concentration and to heavier penalties for gross violation as well as for increased consistency in the implementation of the law.”

This showed a new will and direction and also gave rise to high expectations of how the law would be implemented, both by legislators and amongst experts and other interested parties. Unfortunately the law proved to have serious deficiencies. For example, courts were to pay attention to special reasons which would argue for a prison sentence, which caused uncertainty and confusion. The result has been that the different courts of the country judge differently. The unwillingness to see that the prosecuted person suffers alcohol problems leads to treatment and rehabilitation alternatives not being used efficiently.

Measures

It needs to be made clear to each and everyone that consumption of alcohol in connection with driving of a motor vehicle is a crime and will be punished. On 1 July 1999 a zero limit was introduced for driving a motor vehicle having taken narcotic substances. It is just as self-evident that a zero limit should be introduced for consuming alcohol in connection with driving a motor vehicle. It can be mentioned in this context that the Baltic States have already introduced a zero limit where alcohol and traffic is concerned.

Naturally penalties must be combined with measures for treatment and rehabilitation according to the need of the individual. Sufficient resources should be allocated for this, as it has been shown that a person who has committed a drunk-driving offence and regained his driving licence with the condition of submitting to medical follow-up often avoids driving influenced by alcohol. For informative purposes, the rehabilitation process should discuss the tragic consequences of the traffic accident both for the victim, the relatives of the victim as well as for the drunk driver and his family.

To be entirely sober in traffic should stand to reason in the same way as we take it for granted that the airline pilot is not influenced by alcohol, especially as in many traffic situations we make decisions which do not only affect our life but also that of others.

Local traffic safety work

In order to achieve a continuous influence on attitudes and a good adherence to the traffic rules and regulations, traffic safety work needs to be established on a local level.

Special traffic safety councils

Already in pre-school, special traffic safety councils governed by the local traffic safety council should be set up. Teachers, parents and children should all be part of these councils. They should all work together which would result in an increased number of concrete proposals for improvements that could be handed over to the local traffic safety council for appropriate measures. Thereby we will create an early and continuous influence on attitudes amongst the younger generation. The engagement and involvement of the local authorities should also increase as the proposals are already approved amongst the people in the area.

Accident investigations

The Insurance Companies Traffic Safety Committee (TRK) started experimental work in the years 1976 to 1978 which was very promising. Its aim was to map the course of events and causes where road accidents were concerned. The ensuing statistics that were collected should according to TRK be a useful complement in the continuing traffic safety work, as they could reveal amongst other things obvious accident and injury factors and be the source for new ideas etc.

The Swedish Traffic Safety Authority decided in 1990 to start experiments in Karlstad and Stockholm. The work started in 1991 and the aim in Karlstad was to establish how often and in which way elderly road users were involved in accidents and in Stockholm it was decided to study accidents occurring at cross roads and junctions. In the Karlstad-project one used what is referred to as the "on-the-spot" technique, which means that one starts the investigation a couple of days after the accident, unless it was possible to interview the involved persons at the accident site, and in Stockholm the "on the scene" technique, which meant that one could be on the accident scene about 10-20 minutes after the accident occurred. It was recommended that the experimental work should be continued with the "on-the-spot"-technique, which had shown promising results and proved to be less costly.

The Swedish Road Administration has worked with traditional accident statistics for a considerable period of time and since 1997, when a central decision was made, has carried out thorough studies of each fatal accident. When investigating these accidents, one has taken account of the fact that traffic must be seen as an interplay between road users, vehicles and the permanent traffic environment. From available reports on fatal accidents, it can once again be confirmed, that the "human factor" is the major reason for the accident and also for how serious the outcome will be.

Accident investigations have in recent years been regarded as an important tool, which can result in measures which increase traffic safety. The traffic safety work has, however, mainly been concentrated on passive safety i.e. measures which do not influence the probability of the accident occurring, but reduce the extent of the damage. What is missing in this context is

the investigation of the reasons for the accident occurring such as the person's previous record of accidents, experience, state of mind, education etc. As Hans Erik Pettersson of VTI claims, one should increase the interest for the pre-crash course of events, i.e. what happens immediately prior to the collision; *"The knowledge we gain from this kind of investigation will be useful for knowing what we can do to prevent accidents happening."*

It might be controversial to believe, but not at all impossible, that in the not too distant future persons with a high accident frequency will undergo personality tests. How this can be done without violating personal integrity is worth thinking about before such an initiative is introduced.

The local responsibility, which has been described earlier in the form of special traffic safety schools within the school, together with objective reports of the course of events at the accident, should contribute towards making our roads safer. It is important that the media take an active part in this work and report the actual course of events. Newspaper headlines such as "Slippery roads took three lives" will probably disappear if the reasons for the accident are described in a more balanced way.

What role does the police have in traffic safety work

The politicians must make further resources available to the police if they are to have time to engage actively in traffic safety questions. Increased visibility, through increased patrol on the streets, both by foot and by car, is a well-documented measure which has reduced crime. While studying different behaviours the police can also provide information to the road users – positive feedback if the road user has acted in exemplary manner when for example approaching an unguarded crossing or road works with workers; or in a polite manner give constructive advice on how they should have acted in a given situation. This form of interactive supervision should lead to a better cooperation between the police and the general public. By increasing personal responsibility we can most probably also achieve an increased understanding for following the traffic rules and regulations.

Naturally the police should also prosecute any inappropriate behaviour of road users which leads to accidents and human suffering. The tolerance limit should therefore be lowered even further in this respect so that traffic morality is increased and the respect for other human lives and health is augmented.

Driving test and training

Test and theoretical tuition – past and current

A few examples:

- In 1907 it was sufficient to have knowledge of the construction of the car to get a driving licence.

- In 1912 there were three oral questions to be answered. One of these questions had the following wording: What fuel is used in the car?
- In 1953 the Road and Waterway Bureau released detailed instructions for written tests. These were supplemented in 1958 with an oral test.
- In 1973 one went back to having a written test only which was divided in two parts, traffic regulations and vehicle know-how. The reasons for this was the wish to create greater uniformity and increased objectivity. The weakness of the test was that it did not say much about the learners' understanding of the meaning of the answer.
- The practical test was previously regarded as a random check. Driver training at a traffic school would guarantee a good education and therefore only a limited number of tests were carried out.

From 1953/54 until 1989, when the new theoretical test was introduced, those who sought to take a driving licence only got routine theoretical training based on quantity rather than quality. The theoretical test, which had the objective of guiding the candidate towards a higher level of insight meant that the learner driver was forced to acquire a more thorough knowledge about the traffic regulations, the human limitations, hazardous traffic situations as well as influence of road traffic on the environment. This also resulted in the driving schools being forced to invest in tuition involving a more profound learning process. It was no longer sufficient to learn just for the test and this showed in an increased demand for theoretical tuition at the driving schools.

Unfortunately one has gone back to a much easier theoretical test. The result of this has been that the less scrupulous driving schools and many "private" learners once again only learn for the test. One has lost the understanding of why things happen. This lack of understanding means that the driver has more difficulty in making a quick and correct decision in new and complicated traffic situations. Often this lack of understanding also leads to a lower degree of risk awareness and thus even more unnecessary situations will occur, where the driver is a risk to himself and others.

Driver training step by step

In 1997 the government commissioned the Swedish Road Administration to investigate the possibilities of introducing a step-by-step driver training program STEFUS. The idea with the program was that new drivers should start their driving at considerably lower risk level than today. An ambitious and well thought-out proposal with far reaching demands was referred to some 40 bodies for consideration. The proposal contained three main objectives:

- Preparatory training – for both pupil as well as the driving instructor.
- A training programme divided into three steps – with check-ups between each step and spread over a minimum period of 12 months.
- A follow-up period of two years after passing the driving test.

The results of the proposal, which were presented to the Government in 1999, were unfortunately considerably watered down by the statements of the referral bodies and media debates. The demand for dual controls for private learner driving did not win ground. Instead of this becoming compulsory one needed to "increase the knowledge of the impact of emergency braking by using the dual controls on traffic safety" by studying the matter in more detail in trial projects.

In the original proposal it was recommended that private instructors should go through a preparatory course as a condition for obtaining the learner driver and private instructor permit. From these recommendations it was only considered necessary to improve the information material provided to the private instructor. The then minister of trade and industry, Björn Rosengren, declared that STEFUS would not be implemented in full. However he thought that some of the suggestions could be used after having been revised.

The Swedish Road Administration has, within the framework of the national shared concern around traffic safety questions, submitted certain proposals for measures to increase traffic safety. Which of these measures can be driven further is highly uncertain. One proposal for compulsory training for the private instructor is being processed. The proposal means that the private instructor and the learner driver together should go through the training content at an early stage of the driver training.

General education of road users

Since 1993 young learner drivers have had the possibility to start their training for driving a car already at the age of 16. *The question is when does theoretical knowledge come into the picture and how is it taught, if at all?*

It can be feared that theoretical training is non-existent and that the learner driver instead sits in front of the computer and learns the right answers to a number of questions to be able to pass the theoretical test. Therefore it should be self-evident that general road user training should be introduced. It should form part of the social studies both in the compulsory and secondary schools. The gains that will be achieved where traffic safety is concerned are obvious, whether or not the pupil intends to take a driving licence. The opportunity of creating insight and influence attitudes at an early stage increases through "general education for road users" as this training can be integrated with subjects like physics, social studies and environment – just to name a few. Discussions that make young people more conscious of their responsibility to the world around them need to be held continuously and need to direct the traffic safety work from the "cradle to the grave".

A traffic culture can thus be created and be passed on to the next generation in a continuous life-long education process based on mutual respect, personal responsibility and judgement.

Driving school training

The number of approved theoretical tests for pupils attending a driving school was 80% on a national level in 2002 and the pass rate in the driving test was 73%. (Source: The unit for driving tests, Swedish Road Administration.)

The driving schools need to look after their business and continue investing in a quality driver training and provide professional training that justifies the name. Furthermore the driving schools should hold discussions which influence young people in a positive direction towards realising their responsibility towards the surrounding world as an integrated part of their training. This work should permeate the work both where theoretical and practical driving instruction is concerned. Positive influence on attitudes and an improved ability to solve problems can be achieved if the instructor brings this to the fore through more pronounced personal commitment

- Interactive aids should be used both in the theoretical and practical driving instruction.
- Alcolocks should be fitted in the learner driver cars for pedagogic reasons.
- Apart from a qualitative improvement of the theoretical instruction a quantitative change is also desirable. The learner driver without experience needs approx 20 lessons of 45 minutes each.
- Compulsory first aid training should be included with a minimum of 4 lessons.
- First aid training should even be given in driving instruction for other vehicles - especially to those who apply to take a driving licence for heavy-duty vehicles. It must be unsatisfactory that this particular group is exempted as these drivers will probably drive for longer distances than most and thus could make an important contribution at the scene of a traffic accident.
- Knowledge and understanding of the limitations to human ability and the tendency of overrating one's own ability to handle critical situations, needs to be brought to the fore.
- More light needs to be shed on the risks when using alcohol, drugs and other preparations that lower the physical and pshychological functions. One aspect of doing this is to engage people who in some way have been the victims of drunk driving by letting them relate their experiences in front of a class of learner drivers.
- The pupils also need to get in touch with real life by learning about the accident process, course of events and consequences. Here a public relations officer of RTP (The Swedish Association for Traffic and Polio Victims) can be helpful by illustrating this comprehensively.
- Driving schools should offer courses for private instructors and their pupils where risk awareness, pedagogy and personal relations and cooperation are included.
- The number of failed driving tests should not be allowed to be more than 20%.

Further education of driving instructors

It was not justifiable either for the individual or for public finances, to change the education requirements for driving instructors from having been on a secondary school level to high school level i.e. an 80-point high-school course. Especially bearing in mind that many potential driving instructors after a short while in the profession realise that this was not quite the right choice for them. Driving instructor education has today been replaced by courses at the municipal adult education centre. This education I think should be seen as a first step. After duly completed practical training and authorisation as a driving instructor, he should work as a full-time driving instructor for a period of two years. During this time he should have in-service training in subjects such as traffic safety and EcoDriving. Training in EcoDriving is necessary as it is well-known that correct driving techniques reduce fuel consumption and exhaust discharges. In this way the driving instructor is able to show his pupils that using these techniques adapted to the environment and requiring low fuel consumption can be one contribution towards a better environment. After this "acclimatization" period the driving instructor should continue his studies at high-school level so that he/she has the same competence as the teachers at secondary schools. The subjects should naturally include traffic psychology, ethics, moral, education objects and education planning as well as education about the environmental aspects.

Through an education system successively built up in the way described above we would probably get driving instructors who continue in the profession. As the competence of the driving instructor is based on a greater personal commitment of each individual driving instructor, it will eventually lead to a qualitative improvement of driver education which in the end will benefit the pupils. This must be regarded as a good investment both for the individual instructor, the driving school and last but not least society.

Private training

Private learner driving

The reason for allowing private learner driving in Sweden was according to the legislators, that people living in a sparsely populated area might be a long way from the nearest driving school (50 – 100 kilometres) and therefore could not be forced to attend a driving school. Regrettably, private learner driving is increasing especially in and around big cities, just the opposite to the intention of the legislators. What is the reason? Probably this is due to the harsh economic climate where a driving lesson costs about 10 SEK per minute and that education in densely populated areas is longer due to the more complicated traffic environment. This means that more and more pupils choose to learn driving privately often in places with little traffic.

Quite a few go to smaller towns where the lack of a complicated traffic environment makes it impossible to test all aspects of the pupil's competence. This is a problem that needs to be discussed and solved.

The competence of the private instructor

It is very probable that many of the private instructors today have deficient or incorrect theoretical knowledge. There are many reasons for this. One of them is of course that many persons who act as private instructors today took their own driving licence when theoretical training was more or less non-existent (see Test and theoretical tuition – past and current).

Pupils who already have a driving licence often come to traffic schools to learn to drive another vehicle. They fulfill the present rules issued by the Swedish Road Administration to become a private instructor for private learner driving but many of them lack the risk awareness which is necessary in the traffic society of today. It is obvious what results it will have if such persons teach someone else to drive, when their own risk awareness is low and the deficiencies there will be when it comes to applying the rules for giving way. The ability to be able to communicate risk awareness to the learner driver must be minimal.

A typical example:

The person in question may pass places with unforeseeable hindrances at such speed that they will not have time to stop, with the comment "but nobody came".

Gunlög Stjerna, responsible for public relations, at the National Association of Swedish Driving Schools (STR) has compiled statistics over accidents during private and professionally led learner driving, where accidents with light lorries and motorcycle are also included. Quote: "What is discussed within STR is how much more dangerous it is to learn driving with a private instructor with insufficient knowledge, compared with learning to drive with professionally led instruction. "

During the period between 1997 and 31 August 2001, 22 persons were killed during private learner driving, which constitutes 100% of all accidents during learner driving. During the same period private learner driving stood for 89% seriously injured persons and 83% with minor injuries.

We should not forget however, that there are private instructors who have obtained an up-to-date theoretical knowledge, that is required in today's traffic, and who through this knowledge have large possibilities to convey good insight into the traffic.

As it is highly probable that the first category is more numerous it stands to reason that higher demands are set on private learner driving.

Further measures

Further measures are needed to ensure that the private learner driver gets the required knowledge for solving safely the complicated traffic situations which might arise. Therefore higher demands must be set for the private instructor. To be authorised as a private instructor one should have to go through a short theoretical and practical training, where one of the main objectives is to convey the ability of foreseeing hazards in the traffic. While waiting for such compulsory training for private instructors the driving schools and organisations working with traffic safety should set out to market short private instructor courses.

Additionally the learner vehicle should be equipped with the aids that already exist today, i.e. extra rear mirrors and dual control for cars. Where motorcycle instruction is concerned the private instructor should ride on the same bike or have radio communication with the learner driver.

The private instructor

- Should together with his pupil attend a short theoretical course which should lead to an increased understanding of the problems and risks that may arise during learner driving.
- The certificate that shows that the course has been passed should only be valid once and only for a close relation.
- The private instructor should follow the curriculum as set by the Swedish National Road Administration.

It must be seen as unsatisfactory that the competence of the private instructor does not need be verified in any way, whereas at the same time it is recommended that the professional instructor should have high-school qualifications.

The learner driver

- The inexperienced pupil should participate in a theoretical course with a minimum of 20 lessons of 45 min each. Attendance at each lesson should be compulsory.
- Compulsory instruction in first aid should be included with a minimum of 4 lessons, if the pupil has not gone through such training earlier.
- Compulsory training in EcoDriving.

The learner vehicle

- Should be equipped with extra rear mirrors for the instructor together with a dual control for the brakes. For motorcycles the private instructor should ride on the same bike as the learner driver, alternatively have radio communication with him.

The written test

- The syllabus together with the proof of attendance at the theoretical course including the compulsory first aid training should be shown to the Swedish Road Administration as a condition to be able to take the test.

If the suggestions listed above can be realised we can expect a considerably higher percentage of approved tests, than those for the year 2002. 55% passed the theoretical test and 43% the driving test. (Source: The unit for driving tests of the Swedish National Road Administration.)

A higher percentage for passing the driver test would also result in more well-trained and therefore safer drivers on our roads. Furthermore it would enable the resources of the Swedish National Road Administration to be re-allocated. The waiting time for the driving tests could be reduced and each driving test could be longer.

After passing the test

It has been established that young drivers between 15 – 24 years constitute a high risk factor in the traffic. Several negative concurrent factors, such as insufficient experience, more pronounced risk-taking and less respect for traffic regulations are the reason for this. They do not only pose a risk to themselves but also to other road users. To reduce the risks in the first years (the trial period), additional measures apart from the preliminary driving licence are discussed in the following.

Discussion topics

Below you will find some suggestions that it might be worthwhile to discuss.

Learner Driver's sign

- During the trial period a sign should be mounted on the roof with a single fixture.
- During the trial period the motorcycle should be fitted with two permanently fitted signs in the front and back.

The visibility increases, so that fellow road users, not only those coming from behind, have a good chance of spotting the beginner and predict his action and when necessary also "help"

him. The learner driver's sign should also put pressure on the learner so that he continues to show proper behaviour in the traffic. The police will have greater possibility, for supervision purposes, to check the learner driver's continued will to follow the existing rules in order to enhance traffic safety.

Speed

- During the trial period the driver may not drive faster than 90 kilometres per hour.

Other

- If the driving test has been passed during the light summer months in Sweden a special night driving course should be completed before the end of the trial period.
- A restriction on driving on Friday and Saturday evenings should be introduced for young drivers, as the accident rate is at its highest at this time for this group.

Education based on insight, should together with the above measures contribute to long-term positive influence on young drivers, thus creating the conditions for a safer traffic society.

Improvement of the roads, vehicles and environment

Suggestions for further improvements

Concrete proposals are needed for improvements and measures to reduce the risks related to the permanent traffic environment, vehicles and the environment.

Roads

The European Community will probably in 2008 at the latest have a navigation instrument comprising a network of satellites covering the entire world (the Galileo-programme) which will increase safety in the air, on the sea and on our roads. In addition to an improved traffic safety factor with a more flexible traffic flow this will also benefit the environment.

- A new speed limit system ought to be introduced based on flexibility and taking account of the environment, road conditions, road standards and traffic volumes.
- Clearing of the roadside areas.
- Repair work with poured asphalt before pedestrian crossings and junctions, as well as before and in sharp bends, should only be of a temporary nature. The risks for falling off when riding two-wheel vehicles and thereby being hit by another vehicle coming from behind, is considerably higher as the gripping power on these spots is very low especially in wet weather.

Vehicles

The development of traffic safety techniques.

Different technical systems, which improve our chances of perceiving the traffic environment correctly, already exist. Various electronic systems in our cars and alongside the road will reduce traffic congestion as information about alternative routes will be sent to us in the car. The technology that will warn us when we come too close to a permanent or mobile obstacle also exists. The consequence will be that it will be more difficult to maintain our privacy as these systems give society an unlimited surveillance option to know where we are at every moment.

The development is going very rapidly and new technical traffic safety advices are coming into being. By installing broadband in new cars the net standard will get a much higher performance. Sensors and other car electronics can be connected to the net and can thus handle at least 5Mbit/S with a guaranteed delay and fault-tolerance which makes it possible to meet the requirements for installing new safety systems, so called integrated control modules.

More than 10 years ago English researchers started developing an electronic box called "Drago". This black box provides information about the speed of the car, the acceleration, breaking, skidding and what lights were switched on. This information is stored in the memory and is available in the case of accident as an aid to investigating the cause of the accident. General Motors has installed this box as a standard in thousands of Swedish and American cars. This has so far only resulted in protests from American citizens rights movements which claim that this violates personal freedom. The installation of a "black box" in Swedish cars has not yet met with any great resistance from Swedish car buyers.

Volvo and SAAB are far advanced in their safety work in which they have improved both the internal and external safety through various tests results. Amongst other things they have succeeded in creating car seats in the front which have reduced whip lash injuries by nearly 50%. The European New Car Assessment Programme Euro NCAP was started in 1996 and since January 2002 it is divided into six classes. Advanced tests are performed with the aim of developing even safer cars where one tests both protection in the car as well as protection for pedestrians. Euro NCAP's aim is to influence and promote better vehicle safety as well as giving detailed safety information to the consumers. The car manufacturers themselves perform tests to reduce whip lash injuries. This is missing in Euro NCAP's testing work. As Euro NCAP's objective is to promote development it should be within their field of activities to perform tests to establish if further changes in the design of the car's front seats could reduce the risk for whip lash injuries even further. The development work to find refined testing methods should continue to support the development towards even safer vehicles.

Offsetting action

New studies show that technical traffic safety improvements in our vehicles do not always lead to increased traffic safety. We are talking about an offsetting action which means that the knowledge that the vehicle is equipped with certain technical safety devices lowers the driver's preparedness and he relies more on the car. One device that has come up for discussion is the alarm which warns against fatigue. In some cases the driver uses the device as an alarm clock rather than stopping and taking the rest he needs.

Of course it is important that the work with technical traffic safety improvements in our cars continues at the same pace as previously and if we also put more focus on how we solve the consequences of the offsetting action we have come a considerable part of the way.

Ongoing or future technical traffic safety devices or measures

- More stringent demands on exhaust emissions as of year 2005, Directive of the European Community.
- In Euro NCAP's crash test, protection in the car should require 5 stars and protection for pedestrians should require at least 4 stars. Tests on how well a child is protected and the protection for collisions from behind should also be performed.
- Speed limiting devices which help the driver to keep to the right speed. The Swedish National Road Administration experimental work, Intelligent Support for adjusting to the right speed (Intelligent Speed Adaptation (ISA) shows that the technique exists already today. To get a higher acceptance amongst road users a flexible speed limit system should be introduced which takes into account the environment, road surface, road standard and traffic volume.
- Automatic alarms, for example "On Call" with a variety of functions. One of these functions provides the exact position of the vehicle in the case of an accident.
- Xenonlamps, with a blue light which gives up to 60% better illumination in darkness and which adjusts itself to the direction of the car when it turns. (Accessory swivelling lights were available already in the 70s.)
- New fuel systems which reduce emissions.
- Better designed car fronts that minimise injuries to pedestrians during collisions.
- Alcolocks, which prevent the driver from starting the car when influenced by alcohol. The alcolock should be connected to the car's mobilizer, or if this does not exist, to the electrical fuel pump, or in older vehicles to the starter motor.
- A trip computer which helps the driver to drive economically where fuel consumption is concerned.
- During the summer of 2002 the system "Safe by wire" will be introduced. It will connect airbags, safety belts and other sensors in a network
- "Brake by wire", where the pedal pressure is transmitted electronically to a computer which transmits signals to the brakes on each wheel on exactly how much force needs to be applied to achieve the right braking effect. This information is derived from the car's steering system, brakes and shock absorbers which will be computed through the car's own data network. .
- At a later stage "Steer by wire" will also be introduced. A system where the driver steers the car with commands that are sent via the car's data network.
- All recently manufactured cars should have been equipped with the braking lights placed at a high level in order to reduce the risk of a collision from behind when sudden stops occur.

- Cars should be equipped with a "black box" as standard - similar to the black box on aeroplanes. Such a black box makes it possible to:
 - Check if there have been any technical causes for the accident. This information is of course very useful to the manufacturer who in this way gets the necessary information to remedy any technical safety faults and thus improve the relevant car model.
 - Assess how the driver has acted just before and during the accident process. Thus it can be determined if the driver himself has caused the accident or not. The information could also help solving conflicts. Additionally it is very likely that the knowledge that one's manoeuvres are recorded will lead to greater responsibility which means that more people will drive within the legal limits and thus reduce the number of accident.
 - Safety belt reminder in all vehicles.
 - Equipment which prevents the wheels from locking should be standard on all newly registered *motorcycles*.
 - A simple measure which can save lives is to make it compulsory for each vehicle to be equipped with a first aid kit. This is essential when trying to help a person who has been injured in accident.

However safe we make the cars we must still ourselves learn to utilise the technical devices in the correct manner. The driver's judgement and risk awareness is of primary importance. How many of us, for instance, think that it is important that the safety belt is firmly tightened, to achieve maximum safety?

Environment

Now when we invest in reduced fuel consumption of our vehicles and improvements in the road environment, we must also act forcefully to reduce the atmospheric pollution caused by traffic. In different environments the problems vary. In urban areas the health problems caused by hydrocarbons and particles are dominant. In the countryside it is the acidification from nitric oxide that is most troublesome. Globally the dominating problem is the carbon dioxide, as it contributes to global warming which can prove to be disastrous for the human race. The ozone layer that is more than 15 kilometres above the earth's surface in the stratosphere, acts as a protective shield against harmful ultraviolet radiation. If this shield continues to get thinner more UV-radiation will reach our planet and the risks for skin cancer and eye defects like cataracts will increase. Also we must not forget, that we who live in the industrialised countries with our materialistic life style, alone use up almost the entire supply of oil. In this context there is a moral question:

Who carries the responsibility of providing the countries of the third world with a transport system and what will we do when the oil runs out in approximately hundred years?

Mutual efforts to create a better environment are however not too far away. The European Commission has proposed to replace 20% of the conventional fuels with alternative fuels by 2020. Already today there are vehicles around the world that run on alternative fuels. At the same time we should not forget that we ourselves can influence the consumption of fuel by driving in an economical manner.

“Green Driving schools”

The project “Green Driving Schools” started in 1996 induced by a telephone call from the Swedish Society for Nature Conservation to Ronny Bergman of the National Association of Swedish Driving Schools, during which conversation the hope was expressed that the driving schools would teach their young drivers more about Traffic in relation to the Environment. This gave birth to the idea of “Green Driving Schools”. Michael Koucky from the organisation “Green Drivers” has provided invaluable assistance to this project and the concept of green driving schools has started to gain ground in public opinion. All driving schools should take their responsibility and obtain an environment certificate as soon as possible to reduce their own influence on the environment.

EcoDriving

EcoDriving was started by two Finnish driving instructors. The first course began in 1997 and the method has since then been developed both in Finland, Sweden and Norway.

Under the auspices of the National Association of Swedish Driving Schools where Jan Alexandersson has driven the project forward, about 7000 drivers have been trained in EcoDriving. The Swedish National Road Administration Environment Unit has also taken an active interest in EcoDriving and several millions have been invested in this project. The Western Region of the SNRA works together with Volvo Logistics in order to develop and carry out driver training that is adapted to the environment. Work to be able to optimise the freight of lorries to minimise the number of vehicles travelling empty is also carried out in order to improve the environment.

- EcoDriving should be integrated into driver tuition with the aim of teaching the drivers of coming generations to drive a vehicle as economically as possible and thereby have a minimum negative impact on the environment.

Environment and Quality Assurance

The Federation of Private Enterprises in Sweden, have developed a Quality and Environment Management System FR 2000, which is based on interpretations of the ISO standards 9001 and 14001. This is a standard for smaller businesses. It should have the least possible impact on the environment and at same time assure and improve the quality of the business. The National Association of Swedish Driving Schools has also integrated the working environment in AFS 1996:6

- A FR 2000- certification of all driving schools in the future should be good for both the business sector and the general public.

Conclusion

In a not too distant future we must create the right conditions to improve the safety on our roads. If this is to be an option a new education system for drivers as well as general education for all road users, where high risk awareness is emphasised, needs to be introduced.

There should be more compulsory parts in the driving instruction and the same standards should apply to all instructors. By encouraging responsible behaviour in the traffic, safety will be improved and lives can be saved. Information campaigns of various kinds must be carried out to gain the acceptance of the public. On top of this there should be continuous check ups of drivers for example every tenth year, also with the aim of creating a safer traffic environment.

If we start at the beginning at the local level and the proposal about "special local traffic councils" gains a hearing, we may achieve the continuity and cooperation between the home and the school which is needed if our young people should grow up into responsible citizens. Thus we will also re-enforce one of society's fundamental values "security".

It is not acceptable that any human being should be killed or injured due to fellow road-users' lack of consideration or lack of willingness to follow traffic regulations or due to questionable decisions from our decision-makers.

Appendix

A few technical functions which are controlled by the vehicle network.

AUM	Audio Module. Controls the audio equipment.
BCM	Brake Control Module. Controls the functionality of the brake system (replaces ABS).
CCM	Climate Control Module. Regulates heat and air conditioning
CEM	Central Electronic Module. The trigger unit of the network
DDM	Driver Door Module. Takes care of the functionality in the driver door.
DIM	Driver Information Module. Controls the functions of the combination instrument.
ECM	Engine Control Module. Controls the injection system.
ETM	Electronic Throttle Module. Controls the throttle (applicable only for petrol engines)
PDM	Passenger Door Module. Takes care of all the functions in the passenger door.
PHM	Phone Module. Controls the functionality of the mobile phone.
PSM	Power Seat Module. Controls the position and functionality of the driver's seat.
RTI	Road Traffic Information Module. Controls the function for Traffic Information..
SAS	Steering wheel Angle Sensor Module. Collects information on the steering wheel angle.
SRS	Supplemental Restraint System Module. Controls the vehicle's crash safety system.
SWM	Steering Wheel Module. Receives signals from the circuit closer in the steering wheel and from controls around the steering wheel.
TCM	Transmission Control Module. Controls the automatic gear box where applicable.
UEM	Upper Electronic Module. Controls functions such as roof hatch and rear mirrors that reduce reflection.

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