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Volvo working towards accident free future

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In the quest for a traffic accident free future, Volvo Car Corporation's short-term target is that no one will be killed or injured in a new Volvo car by 2020.

"Zero is the one and only solution for us. As the leader in car safety we can't accept that people are killed or injured just because they want to transport themselves from A to B," says Jan Ivarsson, head of Safety Strategy at Volvo Cars. "Our aim is to come so close to zero that one single car accident is defined as a disaster, not an acceptable part of our daily lives."

Focus on preventing accidents

Working towards zero has been the main safety route for Volvo ever since the company was founded back in 1927. The aim has always been to make every new car model safer than the previous one.

"In recent years, focus has shifted from protection to prevention and we are making continuous progress. New technology in Volvo cars such as Collision Warning with Auto Brake and City Safety can warn and help you mitigate or avoid an accident completely," says Jan Ivarsson.

Volvo Cars' strategy includes a broader view of safety than the traditional focus on accidents. The safety experts apply a holistic perspective where the safety aspects can be divided into five phases:

- Normal driving - The driver is well informed and can stay alert.
- Conflict - Technology helps the driver to handle the difficult situation.
- Avoidance - The car acts automatically to avoid a collision if the driver fails to react.
- Damage reduction - The car's safety systems help to reduce the crash energy in order to minimize the effect on the occupants.
- After collision - The car automatically calls for assistance.

Volvo's main challenge is to keep the driver in the normal driving mode. To reach Volvo's zero vision, Volvo has to deal with most of the potential issues at this stage, and help the driver back to normal mode if a critical situation occurs.

Intelligent warning and braking technologies

Modern Volvos can be equipped with a number of intelligent technologies that detect potential dangers and help the driver deal with them - either through a warning or, if necessary, by automatic braking.

"When you introduce an automatic system you have to make sure that you don't create a more dangerous situation than the one you want to prevent. It is not hard to make the car brake automatically. The challenge is to know when it must brake. The detection technology must be reliable," says Jan Ivarsson.

Volvo prioritises the issues that are the most common and dangerous in real-life traffic situations. Volvo has already introduced a number of preventive systems that detect moving and stationary vehicles in front of

the car and, next year, Volvo will offer customers a new feature that detects pedestrians.

"Speaking" cars

In the future cars must be able to communicate and exchange information with the infrastructure and other vehicles on the road. In principle, a future Volvo will be able to "speak" to an oncoming vehicle, potentially communicating: "You and I are about to collide head on. If our drivers don't react we have to do something. Let's steer clear of the danger."

The major challenge to make this scenario possible is to find a common language. A Volvo has to be able to communicate with vehicles of other makes and all vehicles have to be able to exchange information with the traffic environment.

"We believe that the key is to use systems that are already available for other purposes. The air around us is already charged with communication, most of it used for pleasure or convenience. Adding traffic safety communication to this existing architecture is a far more sensible route than trying to invent and agree on a completely new "language" for communicating in the traffic environment," says Jan Ivarsson.

Co-operation with other players

The quest for an accident free future also includes a close co-operation with other players in society. Volvo Cars is working with the Swedish Road Administration to promote the co-operation between vehicles and the infrastructure.

"They also have a zero vision, so we have mutual interests. We are co-ordinating our efforts and research projects in order to maximise the results," says Jan Ivarsson.

There are two interesting trends that have significant implications of the development of a safer traffic environment:

The growing number of elderly drivers with an active lifestyle and a higher demand for individual mobility than previous generations.

The development of more support systems in the cars.

Volvo is building up valuable knowledge in both these areas through major research projects within the company and in co-operation with other players.

Study of older drivers at intersections

Volvo Cars' Senior Safety Advisor Thomas Broberg is behind a research project at the Swedish National Road and Transport Research Institute (VTI) to study elderly drivers visual search behaviours at intersections.

"There is nothing in the study that indicates that an older person is a more dangerous driver at intersections. However, there is a difference when it comes to handling the situation, for example how to position the car and how the driver moves their head and eyes. These findings are valuable for us when we design our cars and develop new safety systems," says Thomas Broberg.

Camera equipped Volvos in European field test

Volvo is also part of the European project euroFOT (Field Operational Tests). One hundred Volvo V70 and XC70 cars are equipped with technology that monitors the driver's behaviour. The aim is to gain more knowledge about how we react as human beings in complex traffic situations.

The cars are equipped with cameras that record the driver's head and eye movements, together with a data logger that records the information from the safety features in the car. Other cameras will film the driver's view of the road. The signals and the videos are saved on a hard disk from where the researchers can analyse the driver's head and eye movement patterns.

"This helps us to better understand the interaction between driver, car and the traffic environment. The interface between human and machine (HMI) is one of our key research areas. All instruments and functions must be easy to understand and use. It is vital that new information and support technology in our cars is designed and co-ordinated in the right way. The information must help the driver without stealing attention," says Jan Ivarsson. He adds: "A couple of years ago, we introduced a basic information management feature, IDIS, which blocks incoming phone calls when the driving demands full attention. Our aim is to refine the technology so it can manage information to fit each driving situation."

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