
How dreams can become reality
Vision Zero
20 years
Hanna Lindberg
Maria Håkansson
INNOVATION
BY EXPERIENCE

How dreams can become reality

Vision Zero 20 years

Hanna Lindberg
Maria Håkansson

Author: Hanna Lindberg
Editor: Maria Håkansson
Photographer: Carolina Byrmo
All photos are taken by Carolina except for those on page 17, 20 (Photo: Magnus Rolands), 21, 23, 38, 40 and 46 (Photo: Adrian Ulander).
Illustrations: Karl Jilg, page 23 and 25
Publisher: ÅF, Maria Håkansson
Graphic design: Stina Tiselius, Jimmy Lindroos
Print: CA Andersson
Edition: First edition, April 2017

Contents

This book is about how dreams become reality. How the vision of something better could also be realized.

Sometimes, the political sphere succeeds in something that felt impossible at first. Different parties can agree on issues that are absolutely crucial to thousands of people. The decision of the Swedish Parliament in 1997 to adopt the Vision Zero was just such an occasion. The goal of zero deaths and serious injuries in traffic was said to be impossible to achieve. An empty utopia. Oh, how wrong they were.

Now, 20 years on, we can confirm that Sweden has made considerable progress. And that others have begun to follow our lead around the world. Country after country, city after city and company after company are embracing the Vision Zero approach and making it their own. It's not a matter of a law or any government decree. The Vision Zero is not owned by anyone. It's a standpoint: life and health must come first, even in traffic.

What also makes me happy is that road safety is now understood to be an important and natural part of sustainability work. Agenda 2030, the UN's goals for the future, includes road safety in the sustainable society of the future. Clean air, fossil-free, noise-free, accessibility to all and road safety are all important goals that are not pitted against each other.

This book is about how dreams become reality. How the vision of something better could also be realized. Nobody knows exactly how many lives the Vision Zero has saved to-date. But we know that the dreams that laid the foundation of it have made a difference – and continue to make a difference every day.

Now is the time to take the next step in this work so that nobody will have to die in traffic. It demands a great deal from those of us who are responsible for the systems – innovation, a drive for implementation and policies.
We at ÅF are ready.

Nyamko Sabuni
Sustainability Director, ÅF

The crash that opened Claes Tingvall's eyes

There was something about the crash on the E4 motorway just before the off-ramp to Ikea in southern Stockholm in 1995 that Claes Tingvall couldn't let go of. From all appearances, it was a completely regular crash, no matter how tragic the consequences were. The car began to aquaplane and slid until the roof collided with a concrete foundation and was crushed in.
Five young people died.

As the newly appointed Traffic Safety Director at the Swedish Road Administration, Claes Tingvall was of course familiar with these kinds of tragedies. Accustomed to fatal crashes on Swedish roads claiming between 500 and 600 lives every year. Nonetheless, this crash refused to become a figure in the statistics.

Claes Tingvall called the Regional Director in Stockholm up to the head office in Borlänge, an unusual step, and asked what he thought of five young people dying in a collision with a concrete foundation that the Road Administration had put there to hold a lamp post. The answer from the Regional Director was anything but encouraging – another concrete foundation of exactly the same kind was to be put up again.

The responsibility for the crash rested squarely with the driver of the crashed car.

The attitude was clear: the drivers had to follow the rules of the road and if they crashed, it was their own fault.

"Removing the foundation would be tantamount to admitting guilt. I was shocked over the mentality that prevailed. That crashes were subject to moralization and the cause was always sought in the actions of the victims. That the driver was driving too fast or too recklessly or was drink driving," says Claes Tingvall today.

"It was an eye-opener."

The thoughts and questions piled up. What actually is an "acceptable" level of lost life in traffic?

Is it reasonable to believe that a person never makes a mistake?

Who is responsible – really?

Saving lives is the most important

Imagine that you're a doctor. You're responsible for your patients, regardless of their lifestyle.

Sending home the intoxicated man who fell down and hurt himself would be unthinkable.

The same would be true of not giving the best possible treatment to the woman who got cancer although she ignored earlier warnings that smoking can harm your health.

As a professional, you have people's lives and health in your hands.

Of course, you take responsibility.

Or turn this perspective around and view the problem from the user's point of view for a minute. You board an airplane to go on holiday.

Although the ticket you got a hold of was incredibly cheap, you're not the least worried that the airline might have compromised on safety and put just one pilot in the cockpit.

You expect that those responsible, the airline and the aviation authorities, have taken responsibility for your journey. That the system is safe and works for everyone.

This is roughly what Claes Tingvall and the small network around him were thinking in the mid-1990s. Roger Johansson and Lars Stenborg at the Swedish Road Administration. Maria Krafft and Anders Kullgren at the Folksam Insurance Group and Anders Lie, a consultant for Folksam, who later became an employee at the Road Administration in autumn 1995.

Why doesn't road traffic work the same way?

Why do we place the blame on the drivers – instead of engineering out what is dangerous?

Saving human life has to go ahead of everything else.

Claes Tingvall

There was a lack of precedent in the area. As early as 1965, the U.S. lawyer and activist Ralph Nader accused car makers of working against improvements in safety in the book Unsafe at Any Speed: The Designed-In Dangers of the American Automobile. Nader's efforts came to be of great importance to automotive legislation in the U.S. for a few years, but then not much more happened.

Thirty years later, there was one single guide word that governed how the Swedish Road Administration allocated its multi-billion dollar appropriation from the state in Sweden.

The balance.

All investments should be taken into consideration to find a balance between different goals like safety, the environment, accessibility and budget.

Claes Tingvall and the group around him protested against this approach and said: no, everything is not equally important. Saving human life has to go ahead of everything else.

The Swedish Road Administration had of course worked with road safety for many years. The death rate on Swedish roads had been decreasing since the 1960s despite growing traffic. But the Road Administration still considered it to be its job to work to prevent crashes, mainly by influencing the behaviour of road users. Claes Tingvall felt that it was important to go further and actively integrate the knowledge that actually existed around various crash factors, identify the connections and let them affect the design and function of roads, vehicles and traffic.

He wrote down a few basic points:

1. **Life is more important than anything else.**
2. **We are responsible for safety.**
3. **We know what to do.**

One day in January 1995, Claes Tingvall was called to a meeting with Ines Uusmann, the newly appointed Minister for Communications, who was visiting the Swedish Road Administration in Borlänge. The minister asked what goals Sweden should have in terms of the road safety work.

"There should be zero deaths," answered Claes Tingvall.

He noted how the minister's face changed. For a few long seconds, it was absolutely silent in the room. Everything balanced on a knife edge. Then, Uusmann responded with a short:

"Good."

Later that same night, the Director-General of the time, Per Anders Örtendahl, sought Claes Tingvall out in his office to talk just the two of them.

"The Traffic Safety Director who says zero deaths won't be here long," said Örtendahl.

Still today, Claes Tingvall remembers the Director-General's tone.

It wasn't malicious. Rather, a cynical, objective statement.

The new approach was controversial, almost to be seen as a paradigm shift. It didn't take long for the criticism and negative reactions from industry colleagues to be expressed.

"It's almost incomprehensible today, but saying that we who worked with this, who designed the roads, had a responsibility was like cursing in church. Many in our surroundings found it both shameless and cocky," says Claes Tingvall.

The Swedish Road Administration and the Swedish Rail Administration were merged in 2010 to form the Swedish Transport Administration

But the ball was already rolling. Despite the chilly reception, the increasingly close knit group continued its work. They wrote a report in the name of the Swedish Road Administration and turned the document over to the so-called Transportation Committee, led by Staffan Widlert, who was preparing a bill on road investments.

This is how the Vision Zero ended up on the Government's desk.

In 1996, another ministry report was circulated for comment.

And on 22 May 1997, the Government presented Bill 1996/97:137 to the Swedish Parliament.

At this point, most of the referral bodies found it to be a good idea on the long term to aim for zero deaths and serious injuries in traffic. But it was still not a foregone conclusion. The KTH Royal Institute of Technology in Stockholm and the Swedish National Road and Transport Research Institute (VTI) were strongly critical.

But the Swedish Parliament passed the bill in October 1997. And the work of identifying the largest sources of fatal crashes gained speed.

One of the worst was high-speed collisions. Up to that point, the solution had been to gradually build out sections of road with many crashes by converting them to divided motorways. An extremely costly, time-consuming and far from universally suitable method.

Shouldn't it be possible to find an easier way?

Shouldn't it be possible to place a barrier in the median?

Engineers are excellent at delivering technically advanced solutions to society's problems. But the most expensive and most sophisticated designs are rarely the most suitable from a budgetary perspective. By trading a motorway for a significantly simpler solution, it would be possible to engineer out life-threatening head-on collisions at a substantially faster pace.

So-called 2+1 roads were virtually unknown in Sweden at the time. But they proved to be excellently suited to be built on regular 13-metre wide roads where they could also be equipped with a protective median barrier that would prevent head-on collisions.

Nonetheless, Claes Tingvall's suggestions met with a less-than-enthusiastic reception.

"They said that people would drive into the barrier and that the roads would be ruined since everyone would drive in the same lanes. Or that people would be crushed to death. But we believed in the idea the entire time."

Claes Tingvall gathered courage, went to the newly appointed Director-General Jan Brandborn and explained that he wanted to convert a section of road to a 2+1 road on a trial basis. The idea of roads

FROM GOVERNMENT BILL 1996/97:137

"In this bill, the Government proposes a new direction for road safety work based on the so-called Vision Zero. The long-term goal for road safety is proposed to be that nobody will be killed or seriously injured as a result of traffic crashes in the road transport system."

The card said:
"I would be dead without you."

Claes Tingvall

COST

Cost of a motorway
SEK 20–90 thousand per metre

Cost of a 2+1 road
approx 2–5 thousand per metre

Source: ÅF

divided by a median barrier existed as early as 1934, but this was the first live proposal of one in the world.

"The Director-General didn't want to go against the idea, but he made one thing clear: if the trial went wrong, it would cost me my job," says Claes Tingvall.

The E4 north of Gävle was chosen for the trial. The section of road was extremely crash prone with no less than 21 fatalities in the previous eight years. Drivers had fallen asleep at the wheel or slid out of control, crossed the centre line and collided with oncoming traffic.

As the plans became known, criticism grew. Dagens Nyheter wrote a stinging editorial. The National Society for Road Safety (NTF) thought the trial was "horrendous" and when the Swedish people were asked about 2+1 roads in an opinion poll, a paltry 0.3 per cent said that it sounded like a good idea.

The inauguration, a chilly day in June 1998, was anything but festive. No minister, county governor or regional director was there. Claes Tingvall had to cut the ribbon himself. Some local journalists, who had defied the unusually cold early summer weather, asked what would happen when "the bloodbath ensued".

Claes Tingvall remembers the time that followed as a nervous wait. There were many people who were watching how the traffic on the rebuilt road flowed.

One day, something unexpected happened. Somebody sent a cake to the Road Administration in Borlänge.

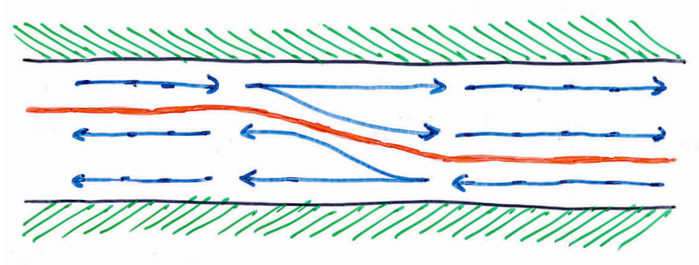
It turned out that a woman had turned around in the car since her dog was whimpering uneasily in the back seat. The crash happened in a second. She lost control of the car and collided with the median barrier on the rebuilt section of road, which prevented a head-on collision in the oncoming lane.

The card said:

"I would be dead without you."

Things turned around overnight. And neither the actors in the industry nor the media were slow in jumping on the bandwagon. NTF, which had called the first trial "horrendous", even chose to symbolically report the Swedish Road Administration's Director-General to the police. Why? For not expanding the 2+1 roads fast enough.

THIS IS A 2+1 ROAD
A 2+1 road is a road that has alternating single and double lanes in a given direction, and a flexible median barrier, such as cabling or a beam.



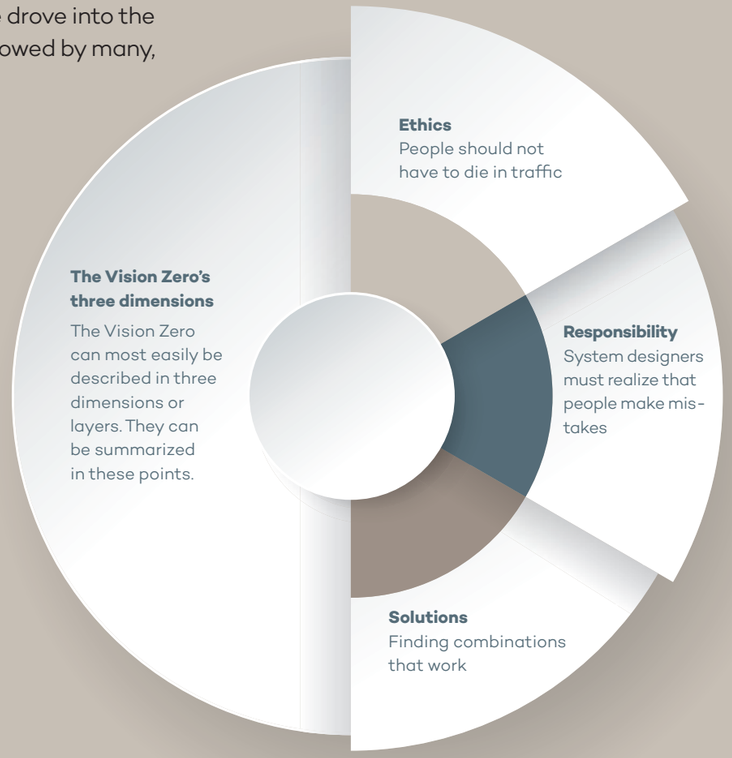
Original sketch from 1995

Vision Zero
– a timeline

- **1995** Vision Zero is born
- **1996** Euro NCAP, the European consumer crash test programme, is created
- **1997** Vision Zero is passed in the Swedish Parliament
- **1998** The first 2+1 road is opened
- **1999** 30 km/h speed limit enters use in urban areas
- **2001** Skvallertorget is rebuilt in Norrköping
- **2002** Euro NCAP gives points for cars with seatbelt reminders
- **2003** The first study of electronic stability control systems is carried out
- **2004** The UN publishes a global report on road safety
- **2006** New speed cameras are set up with the goal of fining as few people as possible
- **2008** Speed limits based on the Vision Zero are adopted
- **2009** Volvo Cars launch their Vision 2020: No one should be killed or seriously injured in a Volvo 2020
- **2010** EU suggest that by year 2050 we reach "close to" 0 deaths on European roads.
- **2011** Sweden cut the number of traffic fatalities by more than half between 2001 and 2010 and has the lowest traffic fatality rate in world
- **2012** The global traffic safety management standard ISO 39001, based on Vision Zero, is launched
- **2014** New York's Vision Zero plan is presented by the city's mayor
- **2015** The UN adopts Agenda 2030 where road safety is included for the first time and the Vision Zero is the basis
- **2016** The Swedish Transport Administration and the Swedish Transport Agency report to the Government on how gradual goals towards Vision Zero 2030 and 2050 can be achieved
- **2017** Volvo lets families test self-driving cars in Gothenburg

The results:
thousands of lives saved

Twenty years later, the success of the Vision Zero can be summarized in one simple sentence: fatalities on Swedish roads have been cut by more than half in spite of the growing traffic and are now among the lowest in the world. The woman who was saved when she drove into the median barrier on the E4 was followed by many, many more people.



ETHICS

People should not have to die in traffic

The economic benefit of traffic and mobility to society should not have to take place at the price of people's lives. Systems cannot and should not be designed to avoid every crash. But they should keep people alive and in full health. It is not acceptable that people die. This is the most fundamental aspect of the approach.

RESPONSIBILITY

System designers must realize that people make mistakes

Those who plan and build roads and vehicles must always count on and take responsibility for people making mistakes. Protective filters are built around the person in traffic. The car is one such filter, to varying degrees, depending on the model. As well as the physical traffic environment. Are there barriers that protect people in cars from sliding into an oncoming lorry? The better the filters, the higher the speed that can be permitted on the road. This way, the entire speed limit system should rely on the Vision Zero.

SOLUTIONS

Finding combinations that work

When developing solutions, one must realize that combinations are what almost always work rather than individual measures. A car can never be safe unless the passengers use seatbelts. A road is never safe for the wrong speeds or drink drivers. If the whole system is to work, a number of different measures are necessary that allow us to drive at the right speed, protect us in the right way and ensure that we are always sober. It also demands road users who are both knowledgeable and motivated. And laws and technology to remind us to do the right thing.

The Vision Zero locally – three examples

Ask a regular Swedish road user today what he or she associates with the Vision Zero – and the answer is probably 2+1 roads. The median barrier divided roads, with their alternating lanes, have become the symbol for the Vision Zero. The roughly 4,000 kilometres that have been built are estimated to save around 100 lives a year.

Other life-saving measures are less known, like lowering the speed from 50 to 30 in urban areas. And setting up speed cameras, not to "catch" speeders, but to get them to slow down.

The Vision Zero would have never been so successful at saving lives to-date – nor will it ever be able to do so in the future – without the committed and often laborious work locally, in each one of Sweden's 290 municipalities.

Some municipalities led the way in the work of identifying hazards and finding specific solutions for every single traffic situation. Solutions that might not necessarily have been especially spectacular or costly, but proved to work "on the floor" – and have subsequently inspired cities in the work of carrying out the Vision Zero in Sweden.

Gothenburg 1990s
A safe way to the bus

Today, Lars-Erik Andersson is a traffic engineer at ÅF and one of the people who works at breaking down the Vision Zero and making it work in reality. His experience goes back more than 25 years in the past. In the 1990s, Lars-Erik Andersson worked with road safety in Gothenburg. An important aspect was about identifying particularly hazardous situations and vulnerable groups. The unprotected road users quickly proved to be a particularly crash-prone group.

One of the most dangerous situations was when pedestrians were to cross a street on the way to a bus or tram stop.

"People are often running and focused on catching the bus rather than on the cars that are passing by," says Lars-Erik Andersson.

The solution in Gothenburg was a strategy to address the passengers on the way to the stops, including elevated cross-walks that forced the cars to slow down. Something that was relatively new in Sweden at the time. Previously, a cross-walk had mostly consisted of painted white lines and a "mister walker" sign.

Even if the crashes didn't entirely disappear, they became less serious.

Lars-Erik Andersson

Already from the beginning, we were looking for solutions other than the traditional traffic solutions with roundabouts.

Helena Hasselberg

Lars-Erik Andersson also began to project plan a new kind of tighter roundabout. In contrast to the older kind of roundabout, which was entirely focused on the car's accessibility, the new roundabouts succeeded in slowing speeds markedly. The results were a substantial decrease in the number of serious crashes.

"Even if the crashes didn't entirely disappear, they became less serious. That was also our intention. People should not have to die or be seriously injured on the way to the bus," he says.

When Lars-Erik Andersson later moved to Stockholm to work in Solna and Järfälla, he was surprised at how far behind the capital was in terms of road safety for unprotected road users. Most things were still about the car's accessibility. For the past six years, Lars-Erik Andersson has been a traffic engineer at ÅF and works, among other things, with safety and accessibility – even in Stockholm.

"Now, we have come farther, but bicyclists and pedestrians still don't get the space they deserve. My driving force is to create a more human transport system," he says.

Norrköping 2000
The square that lost its traffic lights and became world famous

In 2000, Norrköping Municipality was faced with the following scenario: part of Linköping University's campus was to move to the city, which meant that a large group of students would need to go between campus and the city centre and then pass by the square, Skvallertorget, the five-way intersection in the middle of town that was the scene of many crashes. The intersection, which was controlled by traffic lights and only governed by road rules, was heavily trafficked with frequent car traffic in a north-south direction and large flows of pedestrians and bicyclists who moved perpendicular to this, in an east-west direction.

It received attention as a dangerous place.

"Prior to the campus move, it was clear that something had to be done," says landscape architect Helena Hasselberg, who was given the assignment of sketching out a working solution.

The challenge was partly to make Skvallertorget a nice place for people to spend time and partly to increase safety and reduce the number of serious crashes.

"Already from the beginning, we were looking for solutions other than the traditional traffic solutions with roundabouts," says Helena Hasselberg, who at the time worked as a designing landscape architect and project manager at Norrköping Municipality's Streets and Parks Office.

After having analysed the situation, the municipality opted for a surprising measure to say the least: to remove the traffic lights and all rule signs. There were strong reactions in the local press and sentiments were running hot. Many warned of chaos on the square if the lights and signs disappeared.

But the work continued. And the plan was about more than just depriving the square of its traffic lights. The asphalt was torn up and replaced with a completely new covering of small paving stones. The idea was that road users would be forced to slow down to get an overview, interact and think along new, social lines. And in this way, create a different kind of control. Skvallertorget was thereby a departure from a century-old principle, namely the one of separating cars from pedestrians to provide road safety.

Skvallertorget in central Norrköping is an old square from the 18th century that is located at the point where the roads Kungsgatan, Bredgatan and Västgötegatan meet.

"It becomes a false sense of security. The drivers speed up when they are separated from pedestrians and we wanted to avoid that," says Helena Hasselberg.

The results silenced the prophets of woe. The road users actually began to behave in a new, social manner. The average speed dropped significantly. Pedestrians and bicyclists became the main actors that the cars had to adjust to instead of vice versa, a principle that is now spreading.

"There have been incidents even after the conversion, but not a single serious crash that I know of," says Helena Hasselberg.

"A certain sense of insecurity is necessary to get the road users to behave safely," says Maria Håkansson, former traffic engineer at Norrköping Municipality and today Assistant Regional Manager at ÅF.

Skvallertorget is a world-renowned example of what the industry calls shared space, and has drawn many study visits over the years.

"The success factor was that work was based on this particular place when it was redesigned, creating a solution that worked there, and the courage to go all in," says Maria Håkansson.

Leksand 2016

Basic roundabouts on National Highway 70 increase safety

Between eight and ten times a year, the alarm used to sound at the Rescue Service in Leksand for the same reason. That there was a crash at the intersections of the northern and southern approach – again.

When the bridge Leksandsbron was to be closed for repairs in 2016, those in charge were afraid that the increased traffic through both of the approaches would lead to even more crashes.

Something had to be done to lower the speeds, however. The question was what.

The solution was almost provocatively simple: create provisional roundabouts by putting out a number of car tyres. But it worked and speeds slowed. And the fear that the emergency vehicles would have problems getting through never came up since not a single alarm sounded during the period August 2016 to January 2017.

The residents of Leksand are now hoping that the provisional roundabouts will become permanent, but exactly how it will turn out remains to be seen.

"The roundabouts have shown that even very simple solutions can be very effective. Nonetheless it may be difficult to get the simpler designs through since the norm is to build as "correctly" as possible," says Maria Håkansson at ÅF.

Sweden has the lowest number of fatalities among children aged 0-17 per 100,000 compared to all countries that report to the International Road Traffic Accident Database (IRTAD) for 2004-2008. In the 1960s and 1970s, between 100 and 200 children died in traffic in Sweden every year. Now this figure is 2 to 3.

Source: Swedish Transport Administration

The Minister:

"The Vision Zero is more important and more relevant than ever"

Anna Johansson
Sweden's Minister for Infrastructure

Twenty years ago, when the Vision Zero was born, Anna Johansson worked with union issues in Gothenburg. Today, she has her office at the Ministry of Enterprise in central Stockholm.

As Sweden's Minister for Infrastructure, she bears utmost responsibility for road safety in our country. And for ensuring that the work towards zero traffic fatalities continues.

"The Vision Zero has been an incredible success story in the work on road safety. And it continues to be of great importance," she says.

In autumn 2016, the Government decided on a new start to Vision Zero. An effort that the Swedish Transport Administration is now responsible for coordinating.

"After working at it for 20 years, there's a risk that the passion will die out. This is a way to ensure that the work continues to be prioritized," says Anna Johansson.

So what then does this Vision Zero 2.0 mean?

Today, Vision Zero no longer comprises just road traffic, but has been expanded to also apply to rail traffic. According to Anna Johansson, it's about continuing to prioritize the known measures that have proven to be most effective to lower the number of traffic fatalities. Building 2+1 roads, putting fences along railways and building alco-gates at the exits from our ports.

In some areas, more work is needed than what is done today, according to Anna Johansson.

"If we are to be able to achieve the goal of no traffic fatalities, we have to look more closely at special groups. Above all, we need to have greater focus on unprotected road users, pedestrians and bicyclists. And the problem of drink driving," says the Minister.

The continued work on the Vision Zero will also focus to a greater extent than before on shifting to a transport system that is sustainable.

"Society is dependent on transports. But they have to take place in a more climate-smart way than today. This is also an important part of Vision Zero," she says.

Do you believe it's possible to achieve the ultimate goal, no traffic fatalities?

"Yes, with the technical development we see now, I think it's possible. But it will require unwavering, goal-oriented work," says Anna Johansson.

In 1911, there were around 1,000 cars in use in Sweden – and 148 people died in traffic. In 2015, there were around 4.7 million cars – and 259 people died.

Source: Transport Analysis

The principle – to take responsibility

Anyone who works with road safety is faced sooner or later with an educational challenge based in human biology: we perceive potential energy as a threat, but not kinetic energy.

The explanation is probably evolutionary; we've developed a fear of heights that has protected us from falling from trees and down mountains. Travelling at high speeds is, however, something new for mankind and consequently, no corresponding respect for horizontal kinetic energy has developed.

The consequences in traffic are extremely tangible. The same person who feels an aversion to boarding a safe airplane would without a doubt jump in a car dangerous in traffic – even if he or she knows the probability of having a crash on the road is larger.

"In purely intellectual terms, we understand that a head-on collision with another car, or driving into a tree, will subject us to enormous forces, but this is not perceived as a tangible threat," says Claes Tingvall.

What distinguishes the Vision Zero is the application of scientific methods, that new solutions are developed and implemented. What is necessary, rather than what is possible, should decide. The work is continuous by nature.

Maria Krafft, Director for Sustainability and Traffic Safety at the Swedish Transport Administration, likes to talk about the special way of thinking that characterizes all work on the Vision Zero.

A central idea is to encourage people to do the right thing. Something that is clearly illustrated by the speed cameras, the intention of which is to fine as few speeders as possible, an attitude that has led to raised eyebrows internationally.

"We're not interested in disciplining and fining. It should be easy to do the right thing in traffic," she says.

Maria Krafft wants to continue the process away from the old kind of thinking that was based on the idea that the citizens – especially the children – should be educated and trained in road safety to a focus on technical solutions and a system that also protects the road user who is not perfect.

"Safety must be a part of the urban planning," she says.

Most fatalities still occur in cars, but the percentages have changed in the past 20 years. Ever fewer people dying in cars, a result of both safer vehicles and harm prevention solutions like the 2+1 roads, is good of course. At the same time, Maria Krafft believes that other groups, such as bicyclists and pedestrians, have had to step back.

"They have not received a safer traffic environment to the same extent that they deserve," she says.

One solution that can improve matters for pedestrians and bicyclists is impact dampening asphalt, a Swedish innovation that is now being tested in a lab environment.

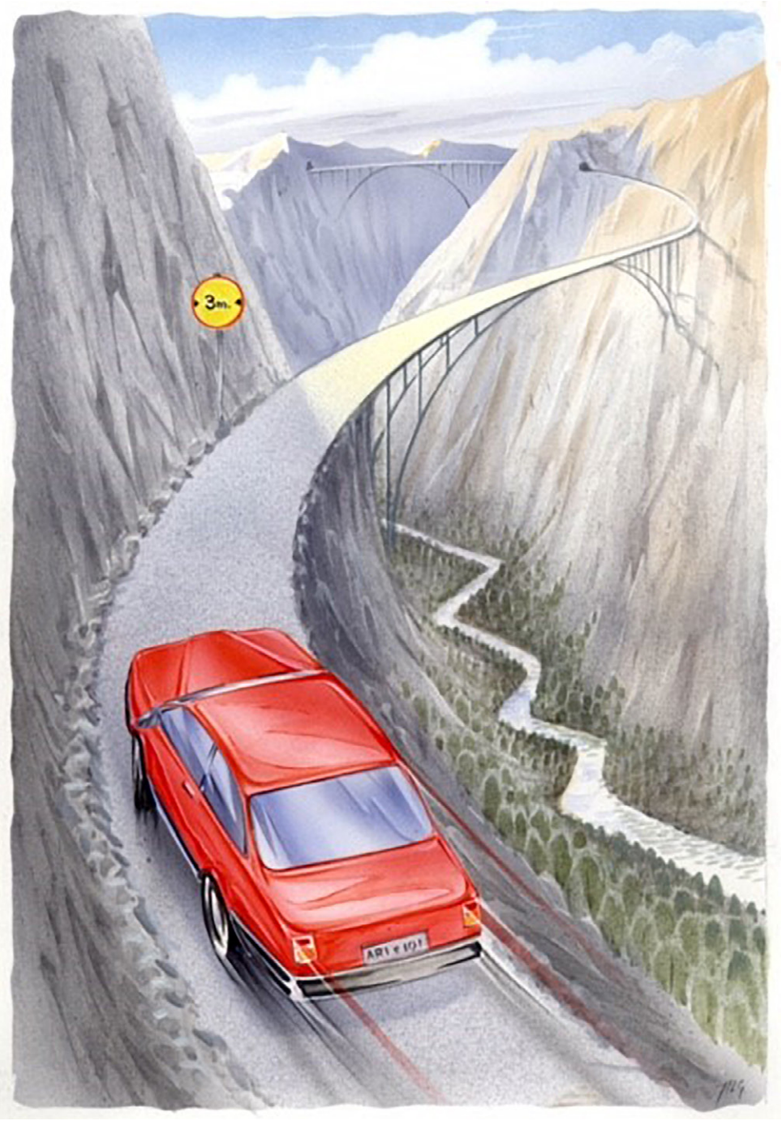
The idea, explains Maria Krafft, is that the asphalt will be soft and less harmful to fall on for unprotected road users. At the same time, it cannot be too soft, making it like bicycling in sand.

"In seven to ten years, it might be a reality to a greater extent and not just a demonstration project," says Maria Krafft.

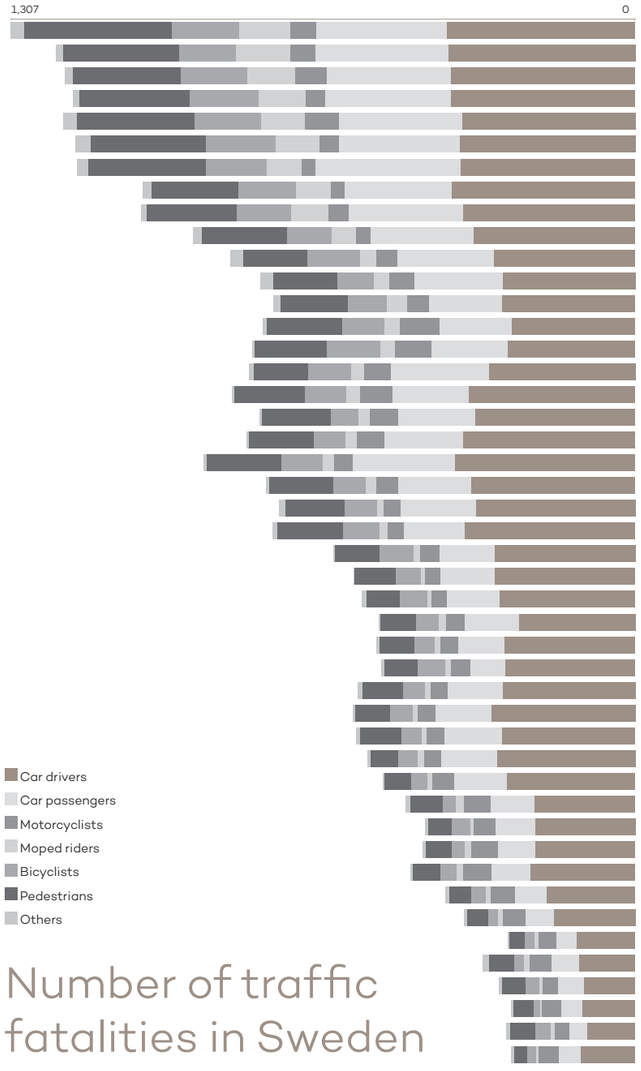
Motorcyclists remain a major challenge in traffic. The combination of high speeds and non-existent protection continues to be extremely dangerous.

"They are incredibly vulnerable and have a 25 times higher risk of death," says Maria Krafft.

> *Safety must be a part of the urban planning.*
>
> Maria Krafft



This illustration shows the importance of speed (kinetic energy) translated to height (energy of position).



Number of traffic fatalities in Sweden

People killed in Sweden in road traffic crashes reported to police

	Total	Car drivers	Car passengers	Motor-cyclists	Moped riders	Bicy-clists	Pede-strians	Others
1970	1,307	393	275	53	108	141	308	29
1971	1,213	391	278	52	115	118	243	16
1972	1,194	385	260	66	101	138	226	18
1973	1,177	385	264	40	100	144	231	13
1974	1,197	362	257	72	92	139	247	28
1975	1,172	367	253	41	91	147	240	33
1976	1,168	364	305	29	73	127	247	23
1977	1,031	383	225	29	73	121	181	19
1978	1,034	360	240	42	78	114	189	11
1979	926	337	216	32	50	94	178	19
1980	848	295	203	43	34	112	133	28
1981	784	277	185	53	32	76	135	26
1982	758	278	153	47	41	82	142	15
1983	779	258	151	84	31	90	157	8
1984	801	266	161	75	32	111	152	4
1985	808	306	205	57	26	91	113	10
1986	844	347	160	68	30	85	148	6
1987	787	334	162	59	24	58	144	6
1988	813	359	166	57	24	66	136	5
1989	904	377	213	40	24	87	155	8
1990	772	342	154	46	22	68	134	6
1991	745	333	157	37	12	68	125	13
1992	759	356	129	33	17	76	138	10
1993	632	294	114	42	14	70	94	4
1994*	589	293	115	31	10	52	86	2
1995	572	283	111	32	9	57	71	9
1996	537	243	113	40	14	49	74	4
1997	541	273	98	36	13	42	72	7
1998	531	271	74	40	12	58	69	7
1999	580	277	115	36	12	45	86	9
2000	591	301	116	39	10	47	73	5
2001	583	278	121	38	9	43	87	7
2002	560	289	116	37	12	42	58	6
2003	529	268	110	47	9	35	55	5
2004	480	210	92	56	18	27	67	10
2005	440	209	82	46	8	38	50	7
2006	445	208	79	55	15	26	55	7
2007	471	218	82	60	14	33	58	6
2008	397	185	66	51	11	30	45	9
2009	358	170	59	47	11	20	44	7
2010**	266	122	43	37	8	21	31	4
2011	319	116	59	46	11	21	53	13
2012	285	106	56	31	8	28	50	6
2013	260	110	45	40	3	15	42	5
2014	270	100	37	31	8	33	52	9
2015	259	113	46	44	5	17	28	6

Source: Swedish Transport Agency

* In 1994–2002, people who also died as a result of disease are also included

** As of 2010, excluding suicide

This illustration shows the importance of speed (kinetic energy) translated to height (energy of position).

The challenge:

professional traffic

The Vision Zero has achieved major success – but there is one area where it has not made the same breakthrough: professional traffic.

It is not only the state, municipality and vehicle industry that should perform and provide better results, but also the leadership for professional traffic – and everyone who drives for an organization or company, according to Claes Tingvall.

"A company should buy the best possible vehicles and guarantee that they are driven safely," he says.

This is the essence of the Vision Zero, and it is a part of ISO 39001, the global management standard for road safety.

A taxi that drives too fast is accordingly not just a matter for the driver, the management of the taxi company, the taxi organizations, the union, the supervising authority and the police.

"First and foremost, it is you as the customer who has the right to travel within the framework of the law," says Claes Tingvall.

"Here, I think we have failed."

It's enough to go out to the street, he says, to realize that things aren't done properly today.

"If you take a taxi to Arlanda Airport, you see extremely short distances between cars and the speed is often too high. It's not a matter of getting angry with the individual driver, but a question of leadership. The taxi company's CEO is reasonably the person who should make sure that the trip is safe and legal. After all, that's how all other services and products work in our society. And it should also work that way for all transport services too."

The hunt for the perfect car

How would the British do it? The car model Mini, which in Sweden is commonly called the "dog house", was a British icon that has been made in the millions since 1959. Now, the British research institute TRL crash tested it on behalf of the country's Department for Transport. And the results were frightening: the test car was so badly damaged that it wasn't even possible to extract the dummies without sawing apart the whole car. At the time, in the mid-1990s, thousands of Brits were driving around in a death trap.

Was it really possible to tell the British public about this?

Challenging the auto industry entailed risking the ire of very strong forces. Doing so alone wasn't so enticing. But what if several European countries joined forces?

In 1996, one year before the Vision Zero was adopted by the Swedish Parliament, the European road safety collaboration body Euro NCAP was formed. The foundation was laid by Sweden and the UK, but in the years since, several countries and organisations have joined.

Claes Tingvall and Anders Lie were involved from the beginning and were able to see how the auto industry began to act differently shortly after the crash tests began. Many car makers had been all too passive to traffic injuries for a long time. Now, several makers began putting an entirely different focus on safety.

"As soon as a benchmark is applied to safety, things happen very quickly. Old cars stopped being made because of this and several brands made huge improvements," says Claes Tingvall.

The car models tested by Euro NCAP receive a total score that is then converted to a star rating, between one and five. And the star rating in particular has become a sales argument that increased the car makers' incentives to become more innovative in terms of safety.

"We've done this on the market's terms," says Anders Lie, who, besides being Sweden's representative in Euro NCAP, is also an expert at the Swedish Transport Administration and adjunct professor at Chalmers University of Technology.

Anders Lie's work centres on creating safer cars. And over the years, Euro NCAP in particular has gained an increasingly important role for the Vision Zero in Sweden. Today, the tests are done in state-owned laboratories throughout Europe, such as the giant facility AstaZero outside Borås, whose name is an allusion to the Vision Zero.

"The collaboration in Euro NCAP began with crash testing cars, but has been expanded and become increasingly broader. Today, we also test autonomous emergency brakes (AEB), electronic stability control (ESC) systems and seatbelt reminders on the various car models," says Anders Lie.

He talks about a number of milestones in the work to make cars safer: from seatbelt reminders that secured almost 100 per cent use of the seatbelt to electronic stability control systems.

Things are also happening in terms of drink driving: Sweden's municipalities require breathalyser interlock systems for transport services for the disabled and school transports. And the transport market responded quickly by installing the systems.

"We saw how sickness absences initially went up on Mondays since the drivers understood that they couldn't drive then."

Developing the vehicles is crucial if Sweden is to be able to continue the work towards no traffic fatalities. Work that demands the auto makers' money, innovative capacity – and courage.

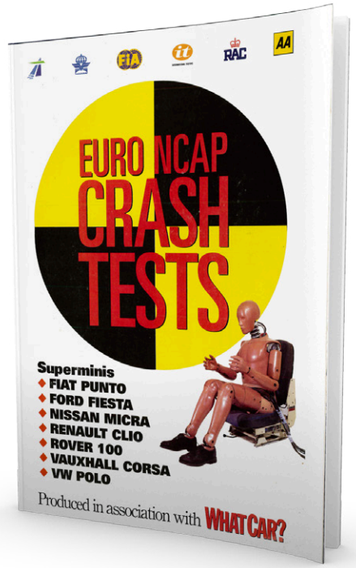
> *We saw how sickness absences initially went up on Mondays since the drivers understood that they couldn't drive then.*
>
> Anders Lie

In 2009, Volvo set up the goal that nobody would be killed or seriously injured in a new Volvo after 2020. Time will tell whether this goal is too bold. It is clear that it is entirely in the spirit of Vision Zero.

And the Mini, how did the story end?

When Euro NCAP was formed, the decision had already been made to not publish the pictures. Claes Tingvall assures that a similar decision would not have been made today.

"There have been times that the results have been slightly delayed to give time to investigate certain things more closely, or to let the manufacturer develop a solution. But of course, one can never withhold significant information from the citizens. It would be devastating in a number of ways and the credibility of representing the best interests of the consumers would be ruined, and rightly so," he says.



“Well, you have to count on a few people dying, don’t you?”

It could be said that the most radical aspect of Vision Zero is not its ambitious end goal – but the actual paradigm shift. Moving the responsibility for safety from the road users to those who actually build the systems.

Life has to take precedence over a joy of driving. Everyone who has not had to die, that’s what drives us.

Claes Tingvall

For many years, road safety in Sweden was about the government creating the perfect road user through education and monitoring. Lives would be saved – by placing the responsibility with the road user. A responsibility that everyone was expected to be able to accept. Already in primary school, children would be drilled in traffic dangers and learn how they should be cautious to not get hurt. So it wasn’t so odd that the Vision Zero was perceived by some to be disruptive, even provocative.

To begin with, there were many who got hung up on the actual number “zero” in the Vision Zero and said that zero fatalities was an empty utopia. Instead of realizing that there were things to do here and now.

The criticism of the Vision Zero has been expressed in many other ways in recent years. Some drivers have reacted to the limitation of freedom, as the 2+1 roads mean that the driver can no longer decide when to pass.

A completely different group has reacted to the exaggerated safety thinking and believe that it creates a so-called “nanny state” where society’s exaggerated care means that people don’t mature and learn to take personal responsibility.

A third group believe that it is too financially costly to engineer out traffic fatalities and would rather prioritize other efforts, such as healthcare.

As Vision Zero has “delivered” and the death rate has dropped on the roads, much of the criticism has fallen silent. The criticism of the median barrier divided roads is negligible today.

But new measures continue to incite resistance. The auto industry is indeed no longer an enemy in terms of traffic safety. The problem today is rather that we still don’t let safety set the limit for the design and speeds and that solutions in various areas do not work together, according to Claes Tingvall.

“It’s hard sometimes, but you have to have a long-range thinking. Life has to take precedence over a joy of driving. Everyone who has not had to die, that’s what drives us,” he says.

Vision Zero – a dimension of sustainability

The climate issue is, by extension, also a threat to human life. We can say this with significantly greater certainty today than 20 years ago. This is why it's not especially surprising that the Vision Zero has been broadened over time and is now included in a wider sustainability perspective. Road safety in actuality forms one of many dimensions in the sustainable society.

Maria Krafft, Director for Sustainability and Traffic Safety at the Swedish Transport Administration, says that the authority has targets today in four areas: the environment, health, road safety and accessibility. What is important, in her opinion, is a holistic approach, where the various targets do not pull in different directions, but work together to create the sustainable transport system we want.

"The UN sustainability objective Agenda 2030 has been of great help when we have worked to define the broader vision of a sustainable transport system," says Maria Krafft.

She believes that we have to begin by asking ourselves the question of what society we want to have, and not stare blindly at the technology.

"Even if an environment is road safe, it's not necessarily sustainable if it's not also perceived as a secure and pleasant place to be," she says.

An important aspect of the sustainability work is to create an urban environment that is based on people and not cars.

"The Vision Zero also builds on making it pleasant and secure in the cities; it's not just about safety on the roads, but also that the air and the environment are good," says Maria Krafft.

In recent years, a large part of her work has been about integrating the mind-set and method of Vision Zero with other sustainability aspects, like the climate issue, and to stimulate people to do something.

"We used to just think about road safety, now we see the whole picture in a completely different way. Society as a whole has matured," she says.

At the same time that a lot of progress is being made, congestion in the major cities is a growing challenge. Maria Krafft works with projects to remove heavy traffic and use the street space more efficiently, around the clock.

"Cargo can be moved around in small boxes instead of heavy lorries. Then, transports can also be made at night," she says.

The hidden global catastrophe

Every year, around 1.2 million people die in traffic worldwide. This is more than die in war and conflicts.

The World Health Organization (WHO) has defined traffic injuries as a global catastrophe and, among young people between 15 and 29, traffic is the most common cause of death, worse than infectious diseases like HIV and TBC. Yet, until now, the problem has only been whispered about.

How often do you read about global road safety issues in the newspaper?

Just like in Sweden before Vision Zero, traffic fatalities have been viewed as a regrettable, but unavoidable fact.

But things have begun to move even in the rest of the world. When the UN General Assembly adopted the 17 new global sustainable development goals in September 2015, road safety was an important part. For the first time, the UN set a concrete goal for the number of deaths and serious injuries in traffic – that the figure should be cut in half by 2020.

An ambitious goal to say the least. A goal that requires significant efforts to become a reality. Especially in large emerging market countries where traffic is growing quickly, like India and China.

If nothing is done, traffic fatalities will be the seventh largest cause of death worldwide by 2030, according to one forecast from the WHO.

"To turn the negative trend we are seeing worldwide, many more countries have to adopt a vision zero approach and work holistically to achieve it. It's important that we share the experiences we have from various solutions. But it's even more important that we provide the whole picture and also share our experiences of choosing a vision, and making sure that all of the different players commit to it and contribute to achieve it," says Maria Håkansson.

Vision Zero

– a potential Swedish export success

It would be an exaggeration to claim that the rest of the world embraced the Swedish Vision Zero from the very beginning. Or even paid it much attention at all.

Insofar as it received any attention, it evoked the same kind of critical questions as here at home:

Zero traffic fatalities? That's not possible anyway, is it?

The traditional way of reducing the number of traffic crashes continued to be information and monitoring. But slowly, and as the figures on the number of traffic fatalities came in, the attitude began to change. Our sparsely settled country with its long country roads, dark and snowy winters and wildlife crashes had a traffic death rate that was among the lowest in the world. Perhaps there was something to learn after all.

The first countries to become interested in the Vision Zero were, perhaps not surprisingly, the neighbouring countries of Norway, Denmark and Finland.

But now, Vision Zero is spreading around the world. And growing numbers of countries are going from viewing traffic crashes as an individual problem to a system problem.

2004 was an important breaking point. It was then that the UN General Assembly talked about traffic injuries in the world for the first time. A world report was prepared that showed that this is a gigantic public health problem and the responsibility was spread to the World Health Organization (WHO) and other UN bodies. The report gave traffic injuries a completely different status in the world.

At a ministerial conference in Brazil in 2015, Sweden together with the EU, Australia and the USA was given an opportunity to organize a side event on Vision Zero.

The actual course of action differs from country to country. What is spread above all is the ethical approach: to no longer consider it to be acceptable that people die or are injured when travelling from A to B.

Not all countries want or dare to adopt a name with the word "zero" in it. In Australia for example, they have chosen to call it the "Safe system". In the U.S., however, "Vision Zero" is spreading from New York to other major cities and states, and during Barack Obama's presidency, a "Road to Zero" was launched at a federal level.

But it may be in the emerging market countries with rapid urbanization that the need for Swedish know-how is the greatest. China, Brazil, South Africa, Chile and Mexico are all examples of countries with high growth that are now seriously realizing the challenge of building a sustainable and safe traffic system.

Swedish technology companies might not have realized how large the market, and the potential for exports, really is. Minister for Infrastructure Anna Johansson believes that other countries have much to learn from Sweden in terms of road safety.

"We see a large and clearly growing interest abroad for what we have achieved in the scope of the work with the Vision Zero," she says.

Number of traffic fatalities per 100,000 residents (2015):

Sweden	2.8
Germany	4.3
Australia	5.4
USA	10.6
India	16.6
China	18.8
Nigeria	20.5
Brazil	23.4
South Africa	25.1
Iran	32.1
Thailand	36.2

Source: WHO

The Swedish “nice camera” shocks the world

It’s no exaggeration to say that the world has embraced the Swedish Vision Zero today. Moving the responsibility in traffic from the road user to the systems builders is no longer considered utopian thinking. And the Swedish 2+1 roads are gaining a following in many countries.

But one Swedish innovation still evokes questions: our speed cameras. Why aren’t they on all the time? And why do we tell drivers where they are – then nobody will get caught, will they?

The answer: we want as few people as possible to get fines.

When the speed cameras first came to Sweden, they were commonly referred to as “sheet metal cops”. They were grey boxes with a round hole and a black camera lens that seemed to stare at the drivers. The police, who at the time were responsible for the cameras, tried just like in the rest of the world to issue as many fines as possible.

But the system worked poorly. Drivers became angry and vandalism of the cameras was extensive.

In 2003, the former Swedish Road Administration and the Swedish Police agreed on a joint restart of the use of speed cameras. The cameras would be rebuilt to support the Vision Zero and contribute to a better and safer traffic environment. But how?

The responsibility for the effort ended up with Anders Wiman, a one-man consultant with an unusual background for the industry. He had quit school and started his first company, which built special-purpose vehicles, at the young age of 18 to then devote himself to developing ambulances, which were noted for being designed based on the demands of healthcare rather than the driver.

The innovator, who calls himself an “entrepreneur and creator in the corridors of the state”, began by tackling the problem at the right end. If everyone in Sweden obeyed the speed limit, traffic fatalities would be cut in half. The purpose of the cameras, he reasoned, must accordingly be to reduce speeds. Not fine drivers.

He took this reasoning one step further and realized that the long-term goal must rather be the opposite of the former goal: zero fined drivers.

“The grey boxes pissed people off; there were even websites and clubs against the cameras. A culture where many people did everything they could to trick the system and the state. You can’t develop something that everyone hates. A change was needed,” says Anders Wiman.

The innovator sketched out an entirely new camera that was round and had a kinder shape. The black hole was removed and the hoods were painted blue, a “nicer” colour, the same as the one used for traffic information. At the same time, an information campaign was developed on the theme “Sweden’s new lifesavers” that was rolled out in parallel

It's about a crucial shift. Do we believe the Swedish driver is an evil person who has to be punished or a good person who needs help to do the right thing.

Anders Wiman

with the establishment of the cameras in the mid-2000s. The idea was that all drivers would be reached by positive information about the cameras before they encountered them along the roads.

"The police were initially sceptical to the changes," says Anders Wiman. Especially to the fact that we would put up signs before every camera and distribute digital information on where the cameras were. And at first, people wrote angry letters. But the work progressed," says Anders Wiman.

Instead of fining as many as possible, the cameras would be a little reminder to not drive too fast.

"It's about a crucial shift. Do we believe the Swedish driver is an evil person who has to be punished or a good person who needs help to do the right thing," he says.

Between 2005 and 2007, the new cameras began to be put up. And the results must, yet again, be called a success.

Opinion polls in Sweden before and after show that the drivers have really understood and accepted the cameras, not just as a way to bring in fines. And, most important of all, the speeds have dropped, which has provided better road safety and many saved lives as a result.

In many other countries that work with cameras in the old way, millions of pictures are taken per year. In Sweden, one hundredth as many.

"Today, people talk about a support system for those who want to drive safely and legally. This and the median barrier have been some of the most powerful activities in the Vision Zero," says Anders Wiman.

Next year, around another 200 cameras will be set up.

"When we tell about it today, we get letters where people write 'we also want a camera on our road, people drive way to fast there'. The system is designed in a respectful manner and it is no longer seen as a form of control."

And what about impressions from abroad? Well, they've actually begun to take notice of the strange Swedish cameras too.

"There is huge interest and many people want to learn and understand how this different system works," says Anders Wiman.

He believes that cameras will continue to play an important role until the day that the cars become self-driving and can independently communicate with the roads and the road authority.

What's your next assignment in the "corridors of the state"?

"It would be very enjoyable to create a system similar to the cameras, but for sobriety on the roads," says Anders Wiman.

LIST

Typical measures in the Vision Zero

Divided highways
4,000 km of median barrier divided roads of the 2+1 type have been built in Sweden at a cost of around SEK 10-12 billion. They reduce the death rate by around 80 per cent.

Rebuilt intersections
Roundabouts become the desired intersection type, even in rural areas. Thousands of intersections are being rebuilt and reduce the death rate by around 90 per cent.

New speed limit system
A new speed limit system based on what a human can handle with the cars of the future. 80 km/h will be the limit on roads without a median barrier.

Reduced speed limits
New speeds in urban areas, 30 and 40 km/h primarily apply.

Safer cars
The cars are improving in part through efforts by Euro NCAP. A car from 2017 has a death risk that is around one tenth of a car from 1995, which is a 90 per cent reduction in the death rate. On condition that they are driven responsibly and on safe roads.

Speed cameras
Readily visible speed cameras save around 30 lives a year. A new camera costs around SEK 300,000 to set up.

Road design
Safer cross-walks. Bumps, road narrowing, chicanes, etc. mainly in urban areas.

Management system
ISO 39001, the management system for road safety was completed in 2012 and provides all organizations the possibility to make traffic, roads and vehicles safer.

A regular day in traffic in 2037

The ultimate goal remains firm. Nobody should have to die or be seriously injured in traffic. Until this has been achieved, society and the auto industry have a responsibility to those afflicted and their relatives: to learn from each individual crash and do their utmost to keep it from happening again.

The fatal crash just before the off-ramp to Ikea in southern Stockholm in 1995 cost five young people their lives. But the dead did not just become figures in the statistics. The tragedy laid the foundation for an entirely new way of looking at road safety.

How many lives has Vision Zero saved in the past 20 years?

As always when it comes to prevention work, we have to satisfy ourselves with assumptions and rough estimates. What we can say is this: if the death rates would have continued at the 1997 levels, it is a matter of thousands of lives.

The figure is dizzying. But what drives the engineers and visionaries forward is rather the thought of the others, those who remain to be saved.

Twenty years ago, there were still many major victories to win with the help of simple, but effective measures. The median barrier, which removed 90 per cent of the head-on collisions. Electronic stability control systems, which kept the cars on the road. Seatbelt reminders, which increased seatbelt use to nearly 100 per cent.

In recent years, the reduction in the number of fatalities has levelled off. In order for the work towards the Vision Zero to not stop, continued hard work is needed, which the Swedish Transport Agency established in a press release in January 2017 when statistics over the number of fatalities on the roads last year were presented:

"For a positive development in the future, even more effective and goal-oriented measures will be needed."

So what kind of measures can this involve?

Maria Håkansson, ÅF, sketches on the sustainable traffic solutions of the future, with Claes Tingvall among others by her side.

It is a matter of progressive urban planning and technology that is so innovative that it may sometimes sound like science fiction – and that will undoubtedly bring life to the critics of Vision Zero just like 20 years ago.

"Many people say that it's unreasonable, but that's what they said then too," says Maria Håkansson.

The continued work towards the Vision Zero will entail tangible changes for the drivers. The direction is that 70 per cent of the fossil-powered cars will be gone by 2030. Walkways and bicycle paths will need to be widened in our cities, and the speeds have to be reduced.

"We cannot continue giving the cars the same given space they have today, nor can we continue to accept that they create a bad living environment," says Maria Håkansson.

Steering the car oneself will no longer be a given. The Transport Administration's expert, Professor Anders Lie, sees major possibilities

A joy of driving is not a societal interest. Extreme driving belongs on a racetrack.

Anders Lie

It is important that we are sensitive and really listen to and plan for all citizens rather than just a small part of the population.

Maria Håkansson

A car is used 2 per cent of the time and stands still 98 per cent of the time. parked cars take up one fourth of the street space.

Source: ÅF

with automatic speed control that makes sure that people do not drive too fast in the urban areas. In the longer term, he believes in cars that can be switched between a manual and an automatic, self-driving mode. Vehicles that move so quietly on electricity through the street space and are so safe that parents don't hesitate to let their school children go out and play.

"Anyone who, for example, drives over Slottsbron Bridge in central Halmstad or the approach to any of our other urban areas will no longer be able to step on the gas him or herself," he says.

That a few drivers might think that sounds dull is nothing to get hung up on, according to Anders Lie.

"A joy of driving is not a societal interest. Extreme driving belongs on a racetrack."

Another promising future area is fatigue warning systems that are based on sensors that discover if the driver is driving erratically or blinking often. In 2017, Anders Lie will start a work group to see how diminished driving capacity can be assessed in the scope of Euro NCAP.

"The technology largely exists already," he says. But there is a lot to think about: How should fatigue be identified? What should the car do when it discovers the driver is tired? And how can one as a driver be able to show the car that one is awake and alert again?

As the cars have become better, the unprotected road users have accounted for an ever larger share of those seriously injured. In the future, safety must be improved for them as well. Maria Krafft, Director for Sustainability and Traffic Safety at the Swedish Transport Administration, wants to prioritize the safety of bicyclists. This is a matter for instance of creating more stable bikes to be able to avoid single-vehicle crashes. An area of research falling behind.

"The bicycles need to get better so that people don't fall down as easily. It's not a matter of tricycles, but rather more stable bicycles," she says.

The maintenance of bicycle paths must also be improved so that dangerous gravel and ice are removed. A third area is the softer base. Even improved car safety can protect pedestrians and bicyclists.

"In the future, the cars must become kinder to them. One can think along different lines. Airbags outside the car. Or that the crash never happens since the car identifies pedestrians and bicyclists and applies the emergency brake," says Maria Krafft.

Maria Krafft also wants the technology behind the car's rapid development to be transferred to public transport, where development has not progressed as fast.

"In the future, we will see a more seamless journey with diversified public transport where a modern future taxi, the self-driving car, collects you and drops you off," she says. Maria Krafft points out the importance of not forgetting to meet the needs of groups with a weaker voice, such as the young and old, when we plan the traffic of the future. For example, we have created solutions that might indeed be safer for children, but at the same time have removed their possibility to move freely.

"Of course, children should be safe and secure and be able to move to thrive and be able to breathe clean air in the future transport system."

In Barcelona, a model with nine blocks is being planned where cars may only drive at 10 km/h. Heavy traffic is guided around in a different way.

"This is a clear example of an idea about what one wants a city to look like. We haven't come so far in Sweden. We would need more of the systematic approach," says Maria Krafft.

"If one dimensions things based on children and the elderly, others most often also get space."

Maria Håkansson at ÅF points out the trend that the car is increasingly seen as a service, rather than something one owns. There are already a number of models under development and more are on the way. This is a matter of being able to simply and easily plan and buy the whole journey at one time, regardless of the mode of transport, such as over an app on the phone.

"When the car is a service to a much greater extent, and when it can also drive itself, then we will have the possibility to give it much less space in the city," she says.

Street parking can be removed and the space used to improve accessibility for pedestrians, bicyclists and public transport. Product deliveries will be able to be unloaded in a much smoother way than today. With less need for parking, we can also build cheaper housing.

"There is no contradiction in many people who live in the countryside or small cities feeling a need to have their own car. But the car will be safe, noise-free and fossil-free," she says.

Maria Håkansson sees a major opportunity in creating significantly more attractive urban environments – if only we had the courage to make different decisions.

"We need to let go of the forecast-controlled planning and to a much higher extent work with goal-oriented planning. Just like we did with Vision Zero in the road safety area, we now need to think holistically and get all affected players to commit to working for tomorrow's society to be free from noise and fossil fuels and that the air should be clear," she says.

Society must also be accessible to everyone, regardless of age, finances, gender, or other factors that can play a role for the possibility of moving around.

"It is important that we are sensitive and really listen to and plan for all citizens rather than just a small part of the population," says Maria Håkansson.

Zero traffic fatalities – for real

Twenty years have passed since the Vision Zero was introduced. The death rate on our roads has been cut by more than half despite more traffic. The way forward is set – up to 2030, the Swedish Transport Administration is counting on yet another halving from today's level.

The Vision Zero is a dimension of sustainability. In order for it to continue to be successful, we have to make use of its strength, but also include additional areas.

Maria Krafft

A challenge that needs to be met in the same way as 20 years ago: through fact collection, analysis and innovation.

And zero traffic fatalities, will we ever get there?

"I am absolutely convinced that we will get very close in any case," says Anders Lie. *"By 2050, I believe that 90 per cent of the traffic fatalities that we see today will be gone. This may happen earlier. It's too early to tell when we will reach the absolute number zero. Only when we are close to zero will we know for sure what we have left."*

Many questions remain to be solved, but one thing is clear. The world has changed – and growing numbers of people are realizing that a modern society cannot let the price of our mobility be required to be paid in human life.

"Sweden has gone ahead of everyone else and today, we are seen as a role model," says Claes Tingvall. *"The next step is entirely about how we will get safety, sustainability and freedom to work together. And this time, the whole world will be involved, from the UN to the major companies and loads of cities and societies. This makes it feel better than ever."*

The Swedish Transport Administration's Director for Sustainability and Traffic Safety Maria Krafft comes back to the importance of a holistic approach, where the goal of road safety works together with other goals to create the sustainable traffic systems on people's terms that we desire.

"The Vision Zero is a dimension of sustainability. In order for it to continue to be successful, we have to make use of its strength, but also include additional areas," she says.

Maria Håkansson at ÅF is convinced that we must all work in a different way to achieve the goals that we have set. Just hoping for new technology to solve the problems instead of having the courage to tackle the tough and often uncomfortable decisions that have to be made is not enough.

"We have to be much clearer about what society we are striving for, what overall needs the new technology should satisfy and what the basic prerequisites should be," she says.

Those who plan the future traffic systems must at the same time create a greater understanding for how the technical development is taking place.

"The planning of society and infrastructure needs to be conducted integrated with the technical development. We need to get to the point that we do not allow vehicles to enter traffic other than those that are able to slow down or stop if somebody else does something. We also need to work much more with, for example, materials and operations and maintenance on our walkways and bicycle paths. If anyone falls, he or she should not have to get seriously hurt," says Maria Håkansson.

Maria Håkansson cannot imagine a more exciting job than to work with Claes Tingvall and all other competencies needed to continue the work towards the Vision Zero's final goal – that nobody should have to die in traffic.

"Being able to come to work every day and meet the large diversity of expertise in both societal and infrastructure development, as well as technological development is a privilege. It is so incredibly cool to be able to be involved and build a better society through innovation," she says.

Author's closing words

"Writing this book has been an eye-opener."

Early in the work on this book, I reached an insight. In my more than ten years as a journalist at some of Sweden's largest and most read newspapers and magazine, I had devoted extremely little time to road safety issues.

In all honesty, I have probably not written one single story in the subject.

Sure, I have reported on the crashes of course. About cars that drove into rock walls or over bridge railings, about mass pile-ups on the E4, about traffic jams that just grow and the greenhouse gases that are degrading our climate. I've reported about all of this as regrettable, but fundamentally unavoidable events that are rarely questioned.

The crucial work that has been done for road safety during this time has passed me by almost entirely unnoticed. Even though it involved work that has literally saved thousands of lives.

Unfortunately, I am hardly alone in this. We journalists are skilled at telling about spectacular news events, preferably negative such events, but less skilled at putting our fingers on the slower processes that change our society for the better.

Even though they are endlessly much more important.

Writing this book has been an eye-opener. I've understood what incredibly important work is being done for road safety and sustainability. I've been able to meet the heroes who devote their entire days to saving people's lives in silence. And at the same time creating a better traffic environment – yes, a better society – for me and my family. That means that my children can move around safely on the streets in our city and that the air they breathe is cleaner.

For me, the traffic as it looks today appears to be completely unreasonable. A system where people die that should be relegated to history. At the same time, I am dependent on transports just like everybody else.

If we are to be able to make the necessary decisions that are required to create a better society for everyone, questions about road safety and sustainability cannot continue to be in a media shadow. Then, we must tell about the important work that has been done and is being done – and the challenges that still remain.

My hope is that this book will constitute a small, but important step along the way.

Hanna Lindberg

References

People interviewed

Lars-Erik Andersson, Traffic Engineer, ÅF

Helena Hasselberg, Landscape Architect, Tengbom

Maria Håkansson, Assistant Regional Manager, ÅF

Anna Johansson, Minister for Infrastructure, Social Democratic Party

Maria Krafft, Director for Sustainability and Traffic Safety, Associate Professor, Swedish Transport Administration

Anders Lie, Expert at the Swedish Transport Administration, Adjunct Professor, Chalmers University of Technology

Claes Tingvall, Senior Consultant ÅF, Adjunct Professor, Chalmers University of Technology and Monash University

Anders Wiman, Entrepreneur and Corporate Leader

Other sources

Eugensson, Anders; Ivarsson, Jan; Lie, Anders; Tingvall, Claes: Cars are driven on roads, joint visions and modern technologies stress the need for co-operation (2011). 22nd

International Technical Conference on the Enhanced Safety of Vehicles (ESV).

UN: UN Global Goals – The Global Goals for Sustainable Development. http://www.un.org/sustainabledevelopment/sustainable-development-goals

Ministry for Communications: På väg mot det trafiksäkra samhället. [On the way towards the traffic safe society]. Ds 1997:13. Fritzes.

Nader, Ralph: Unsafe at Any Speed: The Designed-In Dangers of the American Automobile (1965). Grossman Publishers.

Leksand Municipality: Tillfälliga rondeller har höjt trafiksäkerheten rejält. [Temporary roundabouts have increase road safety markedly]. 11/02/2017 http://www.leksand.se/Nyheter/Nyhetsarkiv/2017/Tillfalliga-rondeller-har-hojt-trafiksakerheten-rejalt/

Nollvisionen och det trafiksäkra samhället [Vision Zero and the traffic safe society] Swedish Government Bill 1996/97:137.

Statistics Sweden: Statistic yearbook (2013). Transports and communications.

Tingvall, Claes: En visions framväxt. [Emergence of a vision]. Presentation at the Tylösand seminar 30/07/1996.

Tingvall, Claes: Europe and its road safety vision – how far to zero? The 7th European Transport Safety Lecture.

Transport Analysis: Road traffic injuries 2015 Statistics. 2016:12.

City of Gothenburg, Traffic Office Trafik- och resandeutveckling 2016. [Traffic and travel development 2016]. Message 2017:1.

Swedish Transport Administration: Översyn av etappmål för säkerhet på väg till 2020 och 2030, med utblick mot 2050 (2016:109). [Overview of stage targets on the way to 2020 and 2030, with an outlook towards 2050].

Swedish Transport Administration: Internationell statistik över omkomna barn [International statistics on child fatalities] (9/3/2017).

http://www.trafikverket.se/resa-och-trafik/Trafiksakerhet/barn-och-unga-i-trafiken/barn-och-narsamhalle/Fakta-om-barn-och-trafik/Internationell-statistik-over-omkomna-barn/

Swedish Transport Agency: Trafiksäkerheten i Sverige. Statistik över järnväg, luftfart, sjöfart och väg för 2016 [Road safety in Sweden. Statistics on railway, aviation, maritime transport and road transport for 2016] (2017) TSG 2017-32.

Swedish Transport Agency: 263 personer omkom på väg under 2016. [263 people died in traffic in 2016]. Press release 10/01/2017.

Swedish National Road and Transport Research Institute: Livlina på E4. Beslutsprocess för trafiksäkerhet [Lifeline on E4. Decision process for traffic safety] (2002). VTI report 484.

Swedish Road Administration: En idé om ett vägtransportsystem utan hälsoförluster. [An idea on a road transport system without health losses]. TR 80 96:75.

Swedish Road Administration: Nollvisionen

En idé om trafiksäkerhet, [Vision Zero. An idea about road safety], brochure.

Swedish Road Administration: Trafiksäkerhet vid shared space [Road safety in shared space] (2007). Tyréns.

WHO: Road traffic injuries: the facts (9/3/2017).

http://www.who.int/violence_injury_prevention/road_safety_status/2015/magnitude_A4_web.pdf?ua=1

WHO: Road traffic injuries Fact sheet (Reviewed November 2016).

http://www.who.int/mediacentre/factsheets/fs358/en/

ÅF: Så mycket bättre. Nu skapar vi intelligenta och hållbara transportsystem enligt FNs globala mål, [So much better. We are now creating intelligent and sustainable transport systems according to the UN's global goals], brochure.

INNOVATION
BY EXPERIENCE

ÅF is an engineering and consulting company with assignments in the energy, industrial and infrastructure sectors, creating progress for our clients since 1895.

By connecting technologies we provide profitable, innovative, and sustainable solutions to shape the future and improve people's lives.

Building on our strong base in Europe, our business and clients are found all over the world.

ÅF – Innovation by experience.

ÅF
tel: +46 10 505 00 00
info@afconsult.com
afconsult.com