Traffic Safety in Japan and Germany – Success, Deficiencies, Future Potentials

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Outline

Both Japan and Germany have achieved great success in road traffic safety. Awareness now focuses on safety deficits which have become noticeable. Improvements in the safety of the road environment and of specific road user groups together with new vehicle safety systems is promising substantial progress. This publication is based on a presentation given at the IATSS Workshop in September 2012.

1 Why does this topic make sense?

Why does it make sense to compare traffic safety in Japan and Germany? Japan is an island country situated in East Asia and Germany is a country situated in the center of Europe.

The two countries are very different not only geographically, but also culturally and historically.

Are we going to compare apples and pears?

There are several good reasons to compare the two countries:

- Japan and Germany have achieved great success in the improvement of road traffic safety within the last 40 years.
- Japan and Germany share much in common in the process of (post-war) motorization and road safety intervention.
- Japan and Germany are facing an aging society, and
- Automotive industries of the two countries are in the front line of developing the world's most advanced and safest vehicles. Here, competition serves as a driving force of progress.

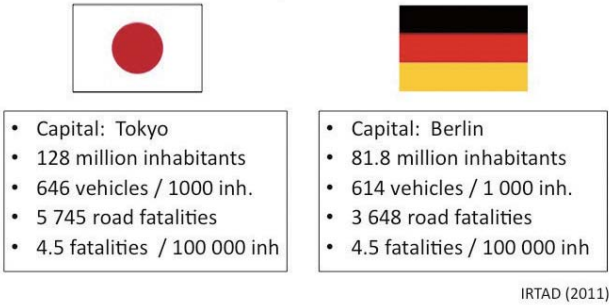

Figure 1 Similarities in motorization and road safety in 2010

Figure 1 shows that Japan is much bigger in population than Germany, but the level of (per capita) motorization and road traffic fatalities is very similar.

2 Success in fatality figures and reasons for safety improvements

Both Japan and Germany achieved a great success in reducing the negative consequences of road traffic.

In the last 20 years:

- Fatalities dropped by 60% and 67% respectively
- Fatalities per capita dropped by 62% and 68% respectively
- Fatalities per mileage driven dropped by 67% and 74% respectively

Germany achieved larger reductions in the fatality figures compared to Japan. However, when you consider that the growth in motorization was much larger in Japan, we can conclude that Japan has done even better than Germany.

		1990	2010	% change
Fatalities	J	14 595	5 745	- 60 %
	G	11046	3 648	- 67 %
Fatalities / 100 000 inhabitants	J	11.8	4.5	- 62 %
	G	14.0	4.5	- 68 %
Fatalities / billion vehicle-km	J	23.2	7.7	- 67 %
	G	20.0	5.2	- 74 %
Motorization (mot. veh. / 1000 inh.)	J	216	646	+ 299 %
	G	529	614	+ 116 %

IRTAD (2011)

Figure 2 Downward trend in road traffic fatalities

How can we explain the great success in traffic safety we have experienced in the past?

There are many many reasons for road traffic safety improvements that have been already achieved:

We can classify all the relevant measures into 4 groups, this is the so-called 3 E's - Engineering, Education and Enforcement - plus the legal measures. Emergency Medical Service also plays an important role.

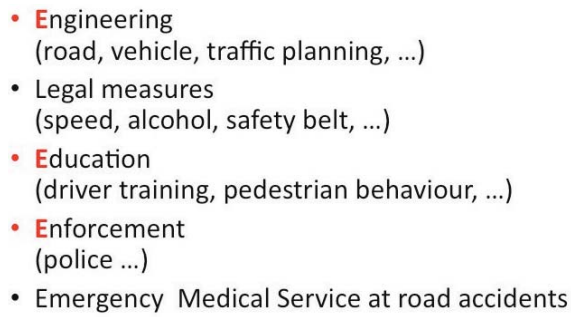

Figure 3 Reasons for safety improvements

It is almost impossible to make a list of all the measures taken in a country over the years.

Traffic safety measures are often interacting. In most cases the implementation of the measures cannot be controlled like in a quasi experimental design. Therefore we usually cannot trace back and determine the effect of a certain measure.

However, there is a positive example:
On August 1, 1984, the use of safety belts in the front seats became mandatory in Germany. It was monitored that on this date the use of safety belts in cars jumped from 60% to 90%. The evaluation using a special time series analysis showed that within one year 1200 deaths and 11000 severe injuries had been avoided. Without the increased seatbelt use one could have expected 28% more deaths and 21% more severe injuries. In this case there was one measure (the belt law), there was a clearly monitored effect on the intended behaviour (the belt usage rates) and there was a control group (the pedestrians) which was not influenced by the measure (Ernst and Bruehning, 1990).

3 Rural roads in Germany

Let us now have a look at deficiencies – First on rural roads in Germany.

Figure 4 shows big differences between Japan and Germany in the distribution of fatalities by road type. In Germany 61% of all fatalities are registered on rural roads, as compared to 43% in Japan.

This is because:

Population in Germany is less concentrated in big cities as it is the case in Japan, therefore, a larger part of the total vehicle mileage is driven on rural roads in Germany.

In Germany road design and layout of rural roads often does not comply with modern design standards.

There is a general speed limit of 100 km/h on rural roads, but drivers often go faster. Beside of this, vehicle speeds on rural roads are often not adapted to the actual local conditions which may require a much lower speed.

This means that safety on rural roads is a big problem in Germany.

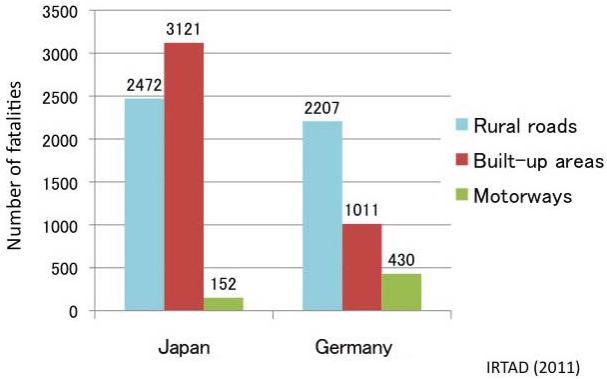

Figure 4 Fatalities by road type / location in 2010

For the action area “Rural Roads” the German Road Safety Programme 2011 demands:

- Preventing accidents involving a collision with a roadside obstacle
- Motorcycle-friendly safety systems
- Providing additional overtaking lanes to prevent overtaking accidents
- Enhancing road safety at junctions
- Deploying speed monitoring at accident blackspots
- Evaluating measures to prevent accidents involving wildlife

We cannot discuss all these requirements in detail, but we would like to concentrate on collisions with roadside obstacles.

Figure 5 Tree-lined roads in Germany

Roadside obstacles pose a big problem on rural roads. In most cases a tree is the roadside obstacle.

In Germany about 20% of all fatalities and 30% of fatalities on rural roads are so-called “Tree Accidents”.
Especially in the northern part of Germany old trees are growing near the edge of the paved roadway. In the northeastern Federal States of Germany, about 40% of all fatalities are caused by tree accidents.

Of course: never jumped a tree on the road – it is always the driver and in some cases the vehicle that causes the accident.

Tree accidents are run-off-the-road accidents caused by
- Inappropriate speed
- Alcohol
- Inattention or distraction of the driver
- Slippery road
- Technical defects

On road stretches where many tree accidents happened, action has to be taken:

Depending on the speeds driven, the traffic volume, the distance between the obstacle and the road and other parameters, various measures are available, which are selected according to the local situation.

In the example shown in Figure 5, guard rails have been installed to avoid direct crashes into trees.

The spectrum of possible measures ranges from the installation of crash barriers, through traffic management measures taken by the road traffic authorities, to the removal of the obstacle.

4 Safety of Pedestrians and Cyclists in Japan

In Japan build-up areas pose special problems.

Figure 4 shows that in Japan 54% of all fatalities are registered in built-up areas. This is a very high percentage compared to western OECD countries.

Among the fatalities registered in built-up areas the share of pedestrians and cyclists is about 63% in Japan, as opposed to 56% in Germany.
Safety of pedestrians and cyclists therefore needs to be put in the focus of interest.

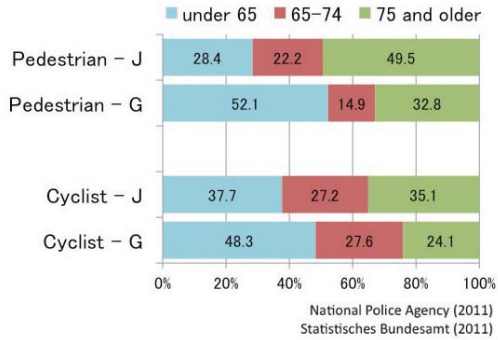

Figure 6 Fatally injured pedestrians and cyclists by age group in 2010

In Figure 6 we can see that in Japan the „silver ager“, i.e. persons aged 65 and older are of special concern. Sixty two per cent of the fatally injured cyclists and 72% of the fatally injured pedestrians are elderly people.

In Japan, almost 50% of all fatally injured pedestrians are even 75 and older.

This cannot be explained by the fact of an „aging society“ alone.

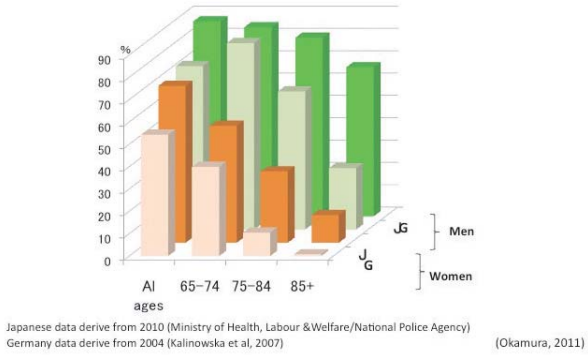

Figure 7 Proportion of driving license holders by age and gender

Figure 7 illustrates an important background condition: In Japan the proportion of driving licence holders is very low among elderly people, compared to western countries. This is true for both women and men. The differences shown compared to the German figures would be even larger when updated figures were available for Germany.

The percentage of driver licence holders in a population means a lot for two reasons:

(1) Without driving licence you cannot take part in motorized traffic. Mode of choice is limited to walking and cycling. Fewer driving licences mean more pedestrians and cyclists.

(2) Owners of driving licences have more opportunities for education and experience about traffic behaviour. They know better how to behave correctly and they are able to anticipate what to expect from motorists.
This is a very important point.

Furthermore, there is another specific characteristic in Japan: Pedestrians and cyclists share the same space on the street, when there is no bicycle lane. There are not so many bicycle lanes in Japan. Usually there is no space left on narrow streets for introducing bicycle lanes.

Cyclists do not merge with motorized vehicles.

As the use of cycles has been growing, accidents between pedestrians and cyclists are increasing. While the (large) number of bicycle injury accidents decreased by 18% in the time period 2001 – 2011, the (smaller) number of injury accidents between pedestrians and cyclists increased by 55%.

An unsolved problem in Japan. This problem is not a new one. But this problem has attracted attention more than before.

Around the years 1970-75, when the number of road traffic fatalities was very high in Japan, cyclists have been allowed to ride on pedestrian space to reduce the accidents between bicycles and motorized vehicles. Since that time, bicycle lanes have been constructed, but not enough. In other cases bicycle lanes have been created by dividing the pedestrian space by a white line.

This safety problem is now under discussion in Japan.

It is necessary to discuss and solve this problem from various aspects. Urban - rural, fast bicycle - slow bicycle, children - adults - old people.

One more problem with the safety of bicyclists: Most bicycle riders do not like to wear a helmet. This is a problem in most countries, including Japan.

Figure 8 Bicycle crossing on a main arterial street in Tokyo

In this example bicycles are given an extra lane for crossing this main arterial street. However, this lane has no continuation. From my own experience I know that some of the bikers go rather fast among the pedestrians.

It is good to know that Japanese people generally behave very considerately. But, can you always be sure? Cycling has a positive image. Everybody is in favor of increasing the use of bicycles.

The Pillar 1 of the Japanese Traffic Safety Programme refers to publicity campaigns to improve cyclists' manners and behaviors.

In Germany many cyclists do not like to obey the traffic law. They behave like vehicles, but they may suddenly swerve onto the pedestrian path. Often they do not respect traffic lights, many cyclists ride without light at night. In spite of this, when police started special enforcement campaigns on cyclists, there was a lot of protest.

And there is another alarming aspect:
In Germany a very high level of Blood Alcohol Concentration (BAC) is registered at alcohol-impaired bicycle riders involved in injury accidents: 89% of the registered BAC was higher than 0.11%, and of 59% was higher than 0.16% (2010). Is it similar in Japan? If yes, than there is need for action!

The Japanese Traffic Safety Programme has 3 strategic objectives and 8 pillars:
The 3 strategic objectives are:

1. Safety for elderly people and children,
2. Pedestrian and bicycle safety,
3. Ensuring safety on roads serving the community and on main roads.

Among the 8 pillars are:
1. Improvement of the road traffic environment,
2. Dissemination and reinforcement of traffic safety messages,
3. Safe driving.

A great number of possible measures are outlined in detail. If you read the programme in detail, every aspect of traffic safety is mentioned.

In reality it is not easy, of course.

Photos: Nishida (2012)

Figure 9 Improving road traffic environment - Small streets in a residential area near a school

These pictures show two small streets in a residential area near a school in Tokyo.We can see a lot of road markings, traffic signs and some barriers to separate pedestrians from motor vehicles. For some hours a day motor vehicles are completely kept out.

These treatments must have improved traffic safety here. However, the basic problems remain: too little space and light poles blocking the pedestrian path. While in Tokyo a lot of such measures have been taken, much more has still to be done outside Tokyo.

With the help of the Japanese Traffic Safety Program it might be possible to solve the present speed limit problem in built-up areas. The general speed limit is 60km/h. Lower speed limits need to be posted by traffic signs on every street. A zone speed control would be helpful.

This chapter about the safety of pedestrians and bicyclists in Japan has shown that there is still more safety potential for future improvements.

5 Fatalities caused by alcohol-impaired drivers

Alcohol is tolerated in many societies in the world, including in Japan and Germany.
In Japan shochiu is the preferred alcoholic beverage, in Germany it is beer.

Alcohol-impaired drivers, bicyclists and pedestrians cause many accidents. Consequences of alcohol related accidents are more serious than the average.

Both Japan and Germany have lowered the legal limit of BAC for drivers significantly in the past.

Both countries have achieved great success in the fight against „Drink-Driving".

Alcohol-related road fatalities:

- **Japan: 6.0 % of all fatalities in 2010**
- **Germany : 9.4 % of all fatalities in 2010**

Japan compares well in the percentage of alcohol related accidents in international comparisons.

However, when we speak about alcohol in Japan we have to take it into consideration that a large proportion of the Japanese population can not drink alcohol like everybody else in the rest of the world, because of the lack or inactivity of a particular enzyme in the body.

When we consider that only 50 to 60 % of the population can drink alcohol in higher quantities, there may be no real difference in alcohol related road fatalities statistics between Japan and Germany in the year 2010.

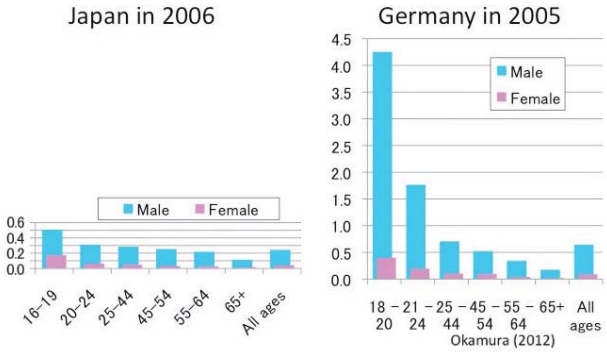

Figure 10 Alcohol-impaired drivers involved in crashes per 1 000 driving licenses

The characteristic of alcohol related accidents differs much between Japan and Germany.

Figure 10 shows large differences in the age of alcohol-impaired drivers.

In Germany young drivers pose a big problem. Therefore, the zero tolerance law on alcohol for novice drivers (i.e. drivers on probation or <21 years) was introduced in August 2007. A detailed analysis showed a decrease of -9% in the following 12 months as an effect of this legal measure. Nevertheless young drivers are still significantly overrepresented.

In Germany to a large extend accidents of alcohol-impaired young drivers happen on weekends and at night time. These are mostly joy rides, often to discos far away from home.

In Japan you do not have such a structure as a consequence of differences in the lifestyle of young people.

This is an example that the same problem – here alcohol-impairment – can look very much different in different countries. Consequently, effective measures must be adapted to the country‘s situation.

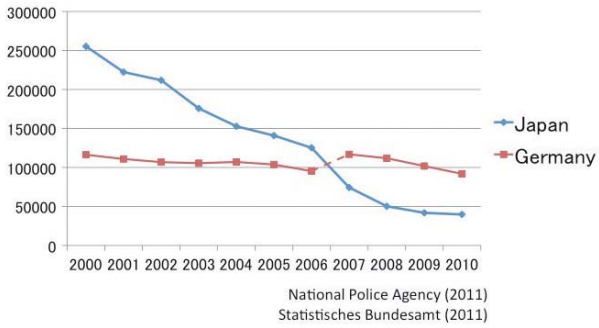

Figure 11 Trend in the number of convicted alcohol-impaired drivers

Figure 11 shows what happened in the decade from 2000 to 2010. The diagram illustrates that in Japan 10 years ago the situation was much worse than now.

That means great success in Japan so far. Japan experienced a dramatic downward trend in the number of convicted alcohol-impaired drivers.

As for Germany, a long term moderate downward trend can be seen (The increase from 2006 to 2007 is a statistical artefact.)

In principal, alcohol-impaired crashes are avoidable. The society is against „drink-driving“, and alcohol-impaired drivers know before driving that they have been drinking.

One of the problems with „drink-driving“ is that there are a lot of people who regularly drink alcohol in high quantity. Even some of those who have already been punished and lost their driving licence continue „drink- driving“. In Germany we have the saying that they are „driving drinkers, not drinking drivers“.

The reasons are often:

- They are alcohol dependent or abusive
- They cannot avoid situations in business or private lives where they feel forced to drink

It is a challenge to the society to help these people out of the vicious circle. Effective rehabilitation programs are needed based on the latest findings of related research.

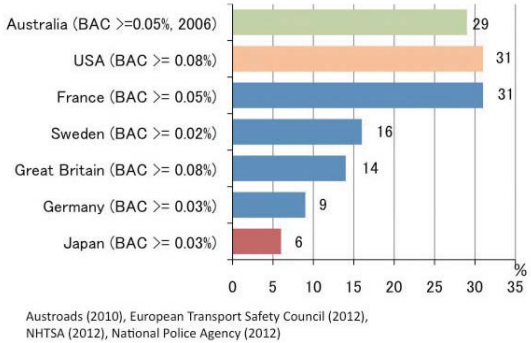

Figure 12 Proportion of fatalities caused by alcohol-impaired drivers internationally in 2010

Figure 12 illustrates that there are great differences in the percentage of alcohol related accidents on the international level. Definitions are not the same internationally, but it is sufficient for a rough overview.

Here you can see that Japan and Germany do not compare badly to other OECD countries.

It might be surprising for many of us that countries such as the US have a very high percentage of alcohol-related crashes.

However, we must not stop our efforts in Germany and Japan. There is still a relevant safety potential for future success in road traffic safety.

6 Emergency service at road accidents - Helicopter Emergency Medical Service

Emergency Service is one of the reasons for the historical success in traffic safety. It is an important means for mitigating the negative consequences of road accidents.

- Potential fatalities may be reduced to serious injuries.
- Rapid treatment of seriously injured may reduce the medical impact.
- Time required for in-patient treatment may be reduced.

Emergency service at road accidents in Germany:

- Arrival time of ambulance vehicle on the accident spot
  average = 9.0 min
  95 % < 18.4 min
- Arrival time of rescue physician on the spot by vehicle
  average = 12.0 min
  95 % < 26.6 min
- Helicopter Emergency Medical Service (HEMS)
  at 2.5% of road accident emergency cases

Rapid help is most essential. On average the ambulance vehicle in Germany needs 9 minutes to reach the accident spot. The rescue physician needs 12 minutes on average.

In Germany emergency service is operated by the so called “Rendez-vous system”. The ambulance vehicle and the medical physician start their operations at different locations and meet each other on the spot of the accident. On average the doctor’s “treatment on-the-spot” takes 32 minutes.
Since the 1970s a new primary care concept has required the fast transfer of the emergency physician to the patient, instead of the patient being transported to the emergency physician.

Figure 13 HEMS - Helicopter Emergency Medical Service in Germany

There are ca. 100 HEMS helicopters in Germany which are usually based at big hospitals.

HEMS serves for medical emergencies of any kind. But, it is usually not available at night time and very bad weather.

Who alerts the helicopter in Germany? The request for HEMS is always made by the rescue control center receiving the 112 calls (emergency call number). The dispatcher at the control center decides what kind of rescue is to be sent. The decision depends on the location and the information about the consequences of an accident.

HEMS is usually alerted when serious accidents happened. The physician arrives quickly on the spot and later, the patient can be transferred to hospital by helicopter, if necessary.

The advantage of HEMS is biggest at locations difficult to reach, e.g., on congested motorways and outside urban areas.

The costs of HEMS are usually covered by the health insurance.

In Germany it is said that hundred thousands of people owe their lives to the availability of fast air borne medical assistance.

Of course, HEMS is also available in case of a natural disaster.

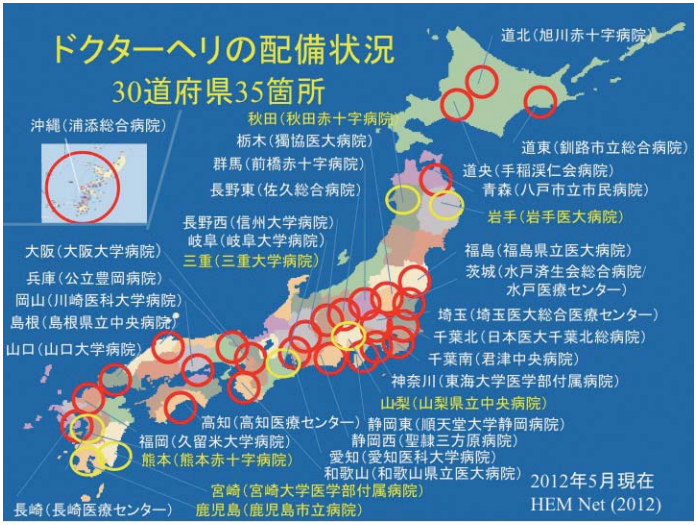

Figure 14 HEM-NET - Emergency Medical Network of Helicopter and Hospital in Japan

The Japanese map in Figure 14 shows the actual state of HEM-Net. (HEM-Net stands for Emergency Medical Network of Helicopter and Hospital. This is a nonprofit organization whose purpose is to promote and spread nation-wide emergency medical services utilizing helicopters.) The goal of HEM-Net is the deployment of Doctor Helicopter services all over Japan.

Currently as of September 2012, 35 Doctor Helicopters are deployed at hospitals located in 30 prefectures. There are 47 prefectures in Japan, which means that there is still more safety potential to be realized.

7 Progress in vehicle safety

In the field of automotive engineering, there has been great progress for road safety in the past through improvements of passive safety. The aim of passive safety is not to avoid an accident, but to reduce the seriousness of injuries of the persons involved.

Passive safety does not only serve the driver and passengers of a vehicle, it also aims to reduce the injuries of vulnerable road users, i.e. pedestrians and bicyclists.

Passive safety started more than 40 years ago with the invention of the Stiff Compartment Cell. Crumple Zones and the Airbag followed. Belt Pretensioner, Load Limiter, Multi-stage Airbags, Beltbags and "Soft" interior design are reflecting the state of the art at the moment.

At this time only the self protection level of vehicles for vehicle occupants is tested with the actual test procedures on the market.

A very high level of passive safety has been achieved.

For the next step, more demanding safety requirements are to be fulfilled, e.g., other crash-configurations such as full-frontal, small-overlap, modified side- and pole Impact.

Cross linking with systems of the Active Safety increases the benefit of Passive Safety

- Collision Mitigation means detection of an (unavoidable) head-on accident and initiation of a braking maneuver i.e., lowering the crash potential.

- Crashworthiness can be addressed by improving the occupants' kinematics. The optimization of occupants' kinematics parameters can be started earlier with improved accident-detection possibilities (more time available, higher chance for moving the "masses" of occupant and seat by adjusting the optimal

seating position and by optimizing positioning of the occupant towards the airbag). Appropriate pre-crash systems are on the market for more than 5 years now.

- Pre-deployment of the airbag provides more volume at lower deployment speed.

All this is possible because of the cross linking with systems of the active safety.

The conclusion is:

- Passive safety will always be of high relevance

- Future improvements of passive safety - will be significant, will bring substantial improvement, but not a new “dimension“

- For all phases before the crash the active safety systems will play the biggest role in reducing injuries and fatalities in the future.
  The active systems are the future!

8 Accident avoiding electronic (driver) assistance systems

Accident avoiding electronic (driver) assistance systems have been most promising.

- Antilock Braking System (ABS) was the first system that became widespread in the market
- Electronic Stability Control (ESC) was implemented first in 1995
- Brake Assist System (BAS) followed a few years later

There is no doubt that these systems have avoided or mitigated innumerable accidents.

Numerous studies have shown a special, very strong safety effect of ESC. The German Highway Research Institute (BASt) investigated the effectiveness of ESC on rural roads in Germany (Gail et al, 2008). It could be shown that ESC reduces the number of personal injury accidents with fatalities and injuries on rural roads for about – 28%.

ESC is the second best vehicle safety feature after the safety belt. It should have been made obligatory much earlier.

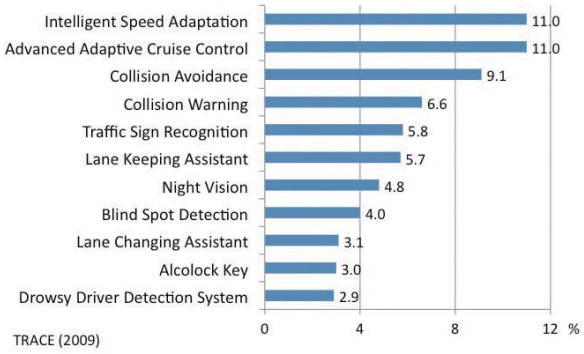

Figure 15 Evaluation of (driver) assistance systems – Reduction of serious injuries in the EU

It is not easy to determine the future efficiency of a new vehicle safety system. Real world does not always confirm what has been planned and calculated before.

In the EU-Project TRACE a consortium of 13 European research institutes evaluated safety benefits of 19 new safety systems.
Figure 15 shows the a-priori evaluation results for 11 of the studied safety functions, which were already available or in the roll-out stage in the year 2009.

These systems are on the market for some time now.

First results have been published by the US Insurance Institute for Highway Safety (IIHS) recently. And this is a headline of the IIHS Status Report, Special Issue CRASH AVOIDANCE, July 8, 2012:
“Forward collision avoidance systems, particularly those that brake autonomously, show some of the biggest crash reductions.”

Forward collision warning systems alert the driver if the vehicle is approaching the vehicle ahead of it so quickly that it is about to crash. Some of these systems are also equipped with autonomous braking, meaning the vehicle will brake on its own if the driver does not respond in time.

Forward collision avoidance systems offered on Acura and Mercedes vehicles, not being bundled with other safety systems, have been investigated: Insurance claim frequencies for Acura and Mercedes models were 14% lower when the vehicles were equipped with forward collision warning with autonomous braking.

Systems that do not include autonomous braking appear to lower crash rates, too, but not to the same extent as the versions that do include it. These systems rely on drivers to respond appropriately to warnings and cannot directly avoid crashes.

Reliable results about other safety systems are to be published in the future, not only from IIHS. From another source we know that very positive results will be published soon about Advanced Emergency Braking Systems (City, <50km/h).

These results based on accident data show once more that we can trust in a-priori evaluations on active vehicle safety systems. Here IIHS confirms some of the results that had been determined in the TRACE project.

9 How to increase the market penetration of driver assistance systems?

Making greater use of such systems can help to improve road safety on a long-lasting basis. (Some of the descriptions on this page derive from the German Road Safety Programme 2011).

Some driver assistance systems even have the potential to compensate for age-related restrictions in the psychophysical abilities of elderly drivers, thereby making it easier for them to perform their driving task. This potential must be exploited, to safeguard senior citizens' mobility. For instance, intersection assistants could help elderly drivers, in particular, to cope with complex situations at intersections in the future.

If the safety potential inherent in such systems is big enough, they need to spread rapidly. The example of ESC shows that optional fitment never reaches 100% of the vehicle fleet. Fifteen years after entering the market, the fitment rate of ESC on new vehicles, today is around 90% in Germany, Denmark and Sweden, and less than 40% in Greek and Italy, for example.

Inclusion of those safety systems into the international regulations for the type approval of vehicles is a long-term process.

Direct government incentives for specific, existing systems often result in market distortions and could inhibit further innovations.

However, in the EU further improvements on mandatory fitment of **Active Safety Systems** can be achieved at European level only, because of the degree of harmonization that has already been reached.

Year	System	Type approval for
1991	**ABS** Anti-lock Braking System	Trucks > 7.5 t
2009	**BAS** Brake Assist System	Cars
2011	**ESC** Electronic Stability Control **DRL** Daytime Running Light	Cars
2012	**TPM** Tire Pressure Monitoring System	Cars
2013	**AEBS** Advanced Emergency Braking System **LDWS** Lane Departure Warning System	Trucks > 7.5 t
2014	**ESC** Electronic Stability Control	Trucks > 3.5 t
2016	**AEBS** Advanced Emergency Braking System **LDWS** Lane Departure Warning System	Trucks 3.5 – 7.5 t
	AEBS Increased speed reduction	Trucks > 7.5 t
2016/17?	**ABS** Anti-lock Braking System	Motorcycles > 50ccm

(EU Directives / Regulations)

Figure 16 Mandatory Fitment Requirements for Active Safety Systems in the EU

Based on EU Directives or Regulations there are already mandatory fitment requirements for active safety systems in the EU.

Figure 16 gives an overview:

- Today, new car types have to be fitted with ABS, BAS, ESC, DRL and TPM.
- From 2013 on fitment requirements for trucks will be on the agenda.
- ABS for motorcycles is in view for 2016/2017 (An important step as a reduction of fatalities in the range of -10 to -30% is to be expected).

AEBS and ESC together with LDWS will improve traffic safety, no doubt.

Then, what about active safety systems for cars?
There is no mandatory fitment planned!

In Europe the answer is Euro NCAP (European New Car Assessment Program). As a European program for assessing the safety of new vehicles, it is an important instrument that provides buyers of new cars with an objective decision-making criterion with regard to the safety of the vehicle.

The original assessment criteria – “adult occupant protection”, “pedestrian protection” and “child occupant protection” – have been supplemented by the

"safety assist" category since 2009, in which driver assistance systems, such as ESC and Seatbelt Reminder are assessed. In the future, further driver assistance systems are included in the Euro NCAP assessment if appropriate studies have proven their benefits for road safety.

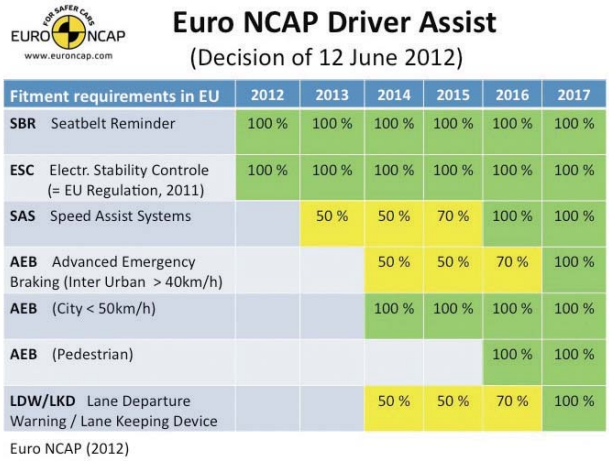

Figure 17 Euro NCAP fitment requirements for the coming years

Figure 17 shows the fitment requirements of Euro NCAP for the coming years. Euro NCAP will act as the motor for the fitment of safety systems.

In 2017, a 5star vehicle will be equipped with all those systems, wherever you buy it in Europe.

With more and more new vehicles entering the fleet, the safety potential of these systems will deploy its beneficial effect. More safety systems may follow, when they become convincing.

In this way, it will be possible to approach an unprecedented level of road traffic safety in the future.

10 Overlook

Japan and Germany have achieved great success in the improvement of road traffic safety over the past 40 years. There are quite a number of characteristic similarities but also differences between the two countries,

This paper throws light on segments of traffic safety with sharp reductions in the number of fatalities. These positive developments in most cases are related to road safety measures taken in the past: Road safety measures in the area of the so-called three E's, Engineering, Education and Enforcement, not to mention Legal Measures on road user behaviour and Medical Emergency Service for mitigating the consequences of road traffic accidents.

Both Japan and Germany have launched Traffic Safety Programs for the years until 2015 and 2020 respectively. Growing awareness now focuses on those segments which have not taken part in the general positive trend. These are special parts of the road network as well as specific groups of road users. These segments are different in Japan and Germany. While elderly pedestrians and cyclists are of special interest in Japan, accidents on roads outside urban areas have priority in Germany, for example.Traffic safety measures to achieve more safety are being discussed. In some cases one country can learn from the other.

Within the last 15 years, progress in traffic safety has more and more been influenced by improvements in vehicle safety. In the first years, passive safety and the crashworthiness of vehicles were significantly improved to mitigate the consequences of accidents. Later, starting with anti-lock braking, vehicle stability control and brake assist, more and more accident preventing driver assistance systems entered the market. Numerous studies have shown that those systems can make a major contribution to reducing the frequency and severity of accidents. Some systems even have the potential to compensate for age-related restrictions in the abilities of elderly drivers. When the safety potential of such systems becomes evident, they need to spread rapidly in the market. However, direct government incentives for specific systems can lead to market distortions. Inclusion of those safety systems into the international regulations for the type approval of vehicles is a long-term process. Euro NCAP (European New Car

Assessment Program) is making pace in Europe.

The overlook of some of the problem areas in traffic safety shows that there are still relevant deficiencies, but there is sufficient potential for substantial progress to make our roads even safer.

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