

Demands on accident research for optimization future traffic safety

It is my great pleasure and honor to welcome you on behalf of the German Federal **Highway Research Institute to the 6th ESAR conference.**

This conference exists for more than 10 years already and succeeded in becoming a platform for the international exchange of knowledge on traffic accident research. It opens the opportunity for scientists from many countries to present their studies in this important research area.

Therefore I am quite happy to underline that BAST has a special relation to this conference, which was initiated in 2002 by Prof. Otte.

Prof. Otte - together with your team – you have been doing accident research on behalf of BAST for more than 40 years and you have done a great job on promoting In-Depth Accident Investigations all around the world. You are one of the best known experts in this field and I would like to take this opportunity to express my great gratitude to you and your team for all this excellent work.

We at BAST are convinced that In-Depth Traffic Investigations is one of the most cost efficient tools to further enhance vehicle and traffic safety – and - for the ministry of transport - it is an important source of knowledge for road safety policy.

Hence BAST will certainly continue contracting In-Depth Investigation together with our colleagues from the German Research Association of Automotive Engineering.

It is only two years ago that I had the opportunity to speak to you at the 5th ESAR conference. My speech was on “identifying priorities for vehicle safety”.

Vehicle safety in this regard belongs to terms of self- and partner protection. Focusing on the protection of vulnerable road users, I meant in particular the enhanced protection of pedestrians and cyclists.

When I speak about “accident research demands for future traffic safety” today, this prioritization is still valid.

Moreover – looking at the overall statistics of road traffic fatalities – the safety of pedestrians and cyclist becomes more and more important every year.

Whereas the number of road traffic victims dropped considerably during the last decade, the number of seriously and fatally injured cyclist could not drop at the same rate. It is in particular distressing that cyclists feel more and more unsafe in road traffic. This is what came out of the Cyclist Monitoring Survey 2011, where only 50% answered that they feel safe on German roads when riding a bicycle.

In 2009 it was 67% feeling safe. This downward trend should not be acceptable for a country with 70 million bicycles. It means that more efforts have to be taken to make cycling a comfortable means of transport. Besides infrastructural and behavioral aspects it is necessary to exploit technical solutions placed on motorized vehicles. In this context, I cannot retrace the discussion concerning the obligation to wear a helmet. A penalty imposed for traffic offences was needed for safety bells to become a success.

Whereas regulations play an important role, it is first of all the duty of the automobile industry to develop technical solutions and to put them on board of the vehicle fleet. This is especially true because 75% of car to cyclist accidents are caused by the passenger car; - and almost 80% of the truck to cyclist accidents are caused by the truck.

Examples of promising technical solutions can be

- systems which can avoid accidents caused by opening car doors,
- systems which assure a proper distance when overtaking a cyclists
- Autonomous Emergency Brake Systems
- Blind spot assistance for trucks

When I was talking to this audience 2 years ago, we faced a very special situation in Germany. For the first time – since the years of the German re-unification 20 years ago – the number of fatalities on German road has been increased from one year to the next.

Whereas the number of road traffic victims was 3.648 in 2010, it was more than 4.000 fatalities in 2011. This raised public concerns and some people suspected already a change of trend.

Looking at the national road traffic statistics from 2012 and 2013 we can see that those kinds of fears turned out to be baseless.

In 2013, based on estimates of BASt, 3.300 people died on German Roads. This is the lowest number of road traffic fatalities since the introduction of the statistics in 1950.

This is – however – no reason to lean back. Every day ten road users die on German Roads and more than 1000 get injured. To measure the human harm associated to these events there is no means. BASt has estimated the socio economical costs of road traffic accidents to about 30 billion Euros in 2012. This is about 1% of the German GDP.

Let me come back to the situation in early 2012, when we had to notice an increase of road traffic fatalities by 10 %. By now, we are able to explain this situation. We know that weather conditions in 2009 and 2010 had stimulated a very rapid decrease in the number of road traffic fatalities. As a result the figures of 2011 created the impression of being worse; however looking at the general trend they only have been slightly increased.

One question remaining is how we can avoid such over- interpretation of singular events. How can we make sure that the general trend is still intact?

Or to put it differently:

What are the respective demands on accident research?

A fundamental demand on accident research is the request or need of reliable data. Only such data will enable us to have a differentiated view on the road traffic accident situation.

In-Depth data can provide sound figures, but are limited to some specific investigation spots.

In order to have a more general view national road accident statistics are necessary. Within these police recorded data, all important circumstances of all national road accidents are reported. These data build the basis for traffic safety research on a general level and also play an important role in deriving road safety policy.

National data is however very limited with regard to the specification of personal damage. Casualties are only reported on the basis of three levels:

- Persons killed
Being all persons who died within 30 days as a result of the accident
- Persons seriously injured
Being all persons who were immediately taken to hospital for impatient treatment of at least 24 hours
- Persons slightly injured

Being all other injured persons

It is in particular the category of seriously injured road users which covers a wide range of injury severities, ranging from mild concussions to paraplegia.

The missing accuracy in the definition of personal injury has a detrimental effect on making cost efficient road safety policy which is not only focused on fatal accidents. This has also been recognized by the European commission. As a consequence - starting in 2015 - all EU member states are requested to provide more detailed data on the injury status of road casualties, with special regard to the group of seriously injured.

Accident researchers use the AIS classification to distinguish critically injured from moderately injured persons. This classification has been taken over by the expert group on European level. From the beginning of next year, each member state will therefore provide a number of surviving road casualties with AIS coding exceeding level 2.

This group of critically injured road users is also very important when it comes to cost benefit questions, related to the justification of some newly introduced regulation. Studies done by BAST have shown that the socio economical cost associated with 3 critically injured road users is comparable to the cost associated with 1 fatality. Each critically injured road user represents a burden of about 400.000 €.

Based on these considerations it might be necessary to re-think about measures which did not show a reasonable cost benefit relation in the past, but might do so today.

These considerations will also change the view on acceptable injury risks. Whereas in the past, life threatening injuries have been focused it is now also multiple rib fractures, open fractures of the lower extremities and moderate CCI's [cranio-cerebral injuries] which will rightfully be placed on the red list of unacceptable injuries.

To make it clear, changing the view on seriously injured road users is one of the challenges which will substantially contribute to the optimization on future traffic safety.

But there are certainly many more challenges.

It is not only legislation, which wants to see the benefit of newly introduced regulations. It is also the automobile industry, which needs justification for the introduction of new safety systems.

Let me just touch on all current efforts to estimate the benefits of active safety systems, which - by the way - might just be the first step towards the safety assessment of automated driving. The dynamics of that development can hardly be pictured by conventional accident data, only.

To overcome this problem a couple of computer simulation based tools have been developed

- GIDAS Pre Crash Matrix
- VW Rate Effect
- BMW SAFER tool

just to mention a few of them.

In a different attempt, accident researchers have tried to combine national data from many countries – sometimes called the MUNDS approach - to get a better understanding of the real world performance of such innovative safety systems.

Both attempts are a **typical bottom-up procedure**, which have many advantages. They are pragmatic, can rapidly produce results and are budgetary friendly.

However – on a midterm perspective – questions need to be raised what data sources and tools will be necessary following a **Top-Down Approach**.

Conventional accident data will always be essential. But what will be required

- For the definition of unbiased testing scenarios
- For the characterization of False-Positive Scenarios
- For the identification of risk factors for automated driving and
- For the understanding of human machine interaction processes within normal driving as well as close to a critical event?

At this stage there are some promising candidates of data sources available, which could be

- EDR data, which shall be available in a broader extent in the near future.
- Data from ECU (Electronic Control Unit)
- Data from Traffic surveys and traffic counting including information on velocity profiles.
- Naturalistic Driving Studies and Field Operational Tests.

Especially these last two mentioned data sources are very promising approaches. They are required to obtain detailed data about driver behavior in real traffic situations.

This enables us to gain insight into normal as well as critical driver behavior and - as a result – it will enable us to deduct functions estimating the increase or decrease of accident risk associated with certain behaviors or vehicle functions.

In order to enable the introduction of highly automated driving functions in the future, such data is urgently needed.

And only by these means the safe interaction of drivers with advanced driving functions can be proved. We strongly recommend that joint efforts of the public as well as private sector should be taken in this direction, so that future far-reaching decisions can be taken with confidence founded on a sound data basis.

It is now the duty of the scientific community to ask the right questions, to develop a methodology and to merge all these data sources into a common framework for the assessment of future traffic safety innovations.

Certainly this is a complex task. And certainly this cannot be achieved solely by automobile industry or solely by governmental entities. To reach the goal a network of excellence is required and this is what makes conferences – like ESAR - so important. Conferences like ESAR shall be the focal point to start the discussion, to form groups of common interest and to drive the scientific progress.

In that respect I wish this 6th ESAR conference a big success, innovative thinking and fruitful discussions.

AND -

In order to already prepare the next step I would also like to take this opportunity to invite you to Bergisch Gladbach in November this year, where BASt will host the

“European interdisciplinary conference on ageing and safe mobility”.

This will be a common initiative from

- The Forum of the European Road Safety Research Institutes (FERSI)
- The European Conference of Transport Research Institutes (ECTRI)
- The European Transport Research Alliance (ETRA)
- The European New Car Assessment Programme (Euro NCAP)
- The Forum of European National Highway Research Laboratories (FEHRL)
- The Human Centred Design for Information Society Technologies Network (HUMANIST)

The conference will focus on the road safety problems of elderly road users. The convention will aim at elaborating policy recommendations concerning implementation of available road safety evidence based on research results.

Participants are invited to take part in four sections:

- Human Factors
- Infrastructure
- Vehicles engineering
- Traffic Management Systems

The two-full-days conference will be held at the German Federal Highway Research Institute (BASt) in Bergisch Gladbach, Germany, on 27-28.11.2014.