STATUS REPORT OF FRANCE

Dominique Cesari
INRETS
France

INTRODUCTION

Since the end of 2002, road safety has become a national priority and this was followed by a national programme including local actions.

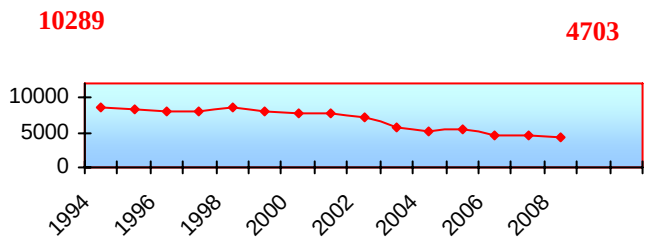


Figure 1. Evolution of road traffic fatalities in France over the past 15 years.

During the last four years, the number of road fatalities has decreased by more than 35%, ranking France in the group of high road safety countries; however, the decreasing of casualties is not identical for all road users:

Figure 2. Evolution of road traffic fatalities in France for 3 road user categories

If the number of car occupants killed in an accident has clearly dropped regularly during the last five years, motorcyclists and pedestrian fatalities have remained high from 2003.

ROAD SAFETY POLICY

The Authorities' Actions

The Interministerial Committee decided on new measures structured around the following topics:

Actions to the benefit of young people

1) plans of action when leaving nightclubs or discotheques (breathanalyser and drug tests, commitments by the management of these establishments by signing charters with the relevant authorities);
2) driving licence for €1 per day;
3) new procedure for organising test for school road safety certificates (ASSR).

A plan of action for motorised cycles

1) fight against removing the speed restriction (increased penalties for selling and riding an "unrestricted" motorcycle);
2) check on mopeds.

A plan of action for the systematic use of seat belts

1) the driver's responsibility to be extended to all underage passengers carried in the vehicle;
2) the 2003 European directive transposed into French law.

Mobilising participants

1) The theme of the road safety week in 2005 was devoted to short daily journeys;
2) the Association of French Mayors and the State have signed a road safety charter broken down at departmental level;
2) the second meeting of the road safety authorities at national level was held on 20 October 2005.

Control-penalty system continues to be rolled out. Some 1,500 radars were installed at the end of 2006. The sites selected for installation are those which were submitted by the prefecture in order of priority, in accordance with the installation criteria, taking into account the accident-generating elements of the sites, the implication of the speed factor in accidents, the difficulty in carrying out normal checks, as well as an itinerary logic so that the equipment

could be installed in a standard fashion all over the country.

Various developments took place in 2005, particularly those making it possible to enter settings for the distance between radars, remote maintenance and improved signalling using yellow and black reflective bands.

Automatic control as applicable at present:

This control was set up by an interministerial order on 13 October 2004. The automation enables permanent controls to be carried out either from radar sets fixed and incorporated into the infrastructure, or from mobile sets. The first phases in the control chain (recording offences, statement of the data and their transmission to the processing centre) are now entirely automated. The transmission systems use dedicated telecommunications networks (most frequently the broadband networks) with encryption of the data. The phases concerning processing of offences and collection of fines are carried out by a computerised processing operation, the only one of its kind worldwide.

Qualitative, quantitative and financial results of the programme

1) The financial commitment came to €134 million;
2) the fines generated revenue of €217 million (of which €13 million in increased fixed fines);
3) in 2006, a special appropriation account was set up (CAS) with an amount of €140 million collected, for a budget of €120 million allocated to the radars, €11 million for the road safety operations and €9 million to renew the driving licence file;
3) 8,671,540 offences were recorded (1,048,489 of which were by foreigners),
4) these offences gave rise to 4,257,541 notices of offence;
5) 60 % of payments were made within 15 days;
6) 1 % of the notices of offence were deposits,
7) 15 % notices of offence resulted in another driver being designated and 6% in letters of objection.

Various support measures were implemented :
1) systematic means of informing the public (road signs, notices in the local press, map of radar installation on Internet);
2) a call centre was opened to reply to users' questions (2,500 calls per day);
3) letters received are systematically and rapidly managed (3,500 letters per day);
4) payment by Internet and telephone (13 % of collections).

Current actions

1) Foreign vehicles
They represent approximately 12 % of offending vehicles. Bilateral co-operation agreements are being negotiated with neighbouring countries. (Luxembourg, Spain, Germany, etc.).

2) Heavy goods vehicles, distances between vehicles, traffic lights.
Studies are being carried out on these new topics.

3) Motorcycles
At the end of 2005, 47 % of radars were installed to check on the rear registration plates of vehicles.

4) Assessment of the automated control-penalty system
In 2005, the ONISR (National Interministerial Observatory for Road Safety) carried out an assessment of the automated control-penalty system, with the collaboration of the expert committee in the National Road Safety Council, the SETRA (Roads and Motorways Technical Study Department), the INRETS (National Institute for Research into Transport and Safety) and the Normandie-Centre CETE (Centre for Technical Studies on Equipment), to find out what impact this system had on road safety. It appears from this work available on the site of the National Road Safety Council, that the automated control-penalty system has made it possible to intensify speed control substantially. A considerable reduction in speed has resulted from this. The assessment established that three-quarters of the decline in the number of accidents and deaths can be attributed to this reduction in speeding.

INFORMATION

Setting up departmental Road Safety Observatories

Since 2005, departmental Road Safety Observatories are being set up gradually. They will take action in three complementary areas:
1) applications to find out what the dangers on the road are with, in particular, the quality and operation of the accident file, measurements of exposure to risks, and observance of behaviour (speed and seat-belt wear);
2) an analysis of accidentology at department level (diagnoses, studies of the issues at stake, assessments of local actions);

3) dissemination of this information (publications, promotion and capitalisation of knowledge, responses to requests for studies).

The road safety expert committee

This committee was set up in October 2001, at the same time as the National Road Safety Council.
It has two assignments : to assist the CNSR and to validate the publications of the National Interministerial Observatory for Road Safety.
During 2005, work carried out by the expert committee was particularly oriented towards:
- an assessment of the effect of the automatic control on road safety,
- an assessment of the effect of the daytime use of headlights on road safety,
- the method for presenting the results after the change in the definition of seriousness of accidents.
For more information, refer to the NRSC site: www.securiteroutiere.gouv.fr/cnsr

The changed definitions of severely injured victims

Since 1st January 2005, the definitions of severity in the national file of accidental injuries was harmonised with those adopted by almost all developed countries. This harmonisation concerns the definition of a person killed (which went from six to 30 days), the removal of serious injury (hospitalised for more than six days) replaced by injury with hospitalisation for more than 24 hours.
During 2005, the monthly publication of accident statistics which depend on rapid feedback, continue to give the provisional statistics on deaths within six days, directly comparable with the statistics for 2004. It was only since the beginning of 2006 that data on the basis of the new definition of deaths within 30 days have been published.
Furthermore, a new coefficient on the changeover from deaths within six days to deaths within 30 days has been calculated : it comes to 1,069 (instead of 1,057 calculated in 1993).

Partnerships

A certain number of charters were signed with professional organisations and a Code of Good Practices for the prevention of professional road risks was drawn up.
A charter for receiving the families of the victim of road accidents was circulated to encourage health-care establishments to develop a personalised reception for families.

THE LOCAL ROAD SAFETY POLICY

The specific features in the local policy on road safety are oriented towards:
- the road safety houses which are being developed : 20 have already been inaugurated;
- Road Safety Week, centred on risks in daily life.

THE ROAD

Checking the safety of road projects is in progress on the state-owned network in accordance with the provisions of circular 2001-30 dated 18 May 2001. In 2002, 2003 and 2004, about three hundred inspectors were qualified in the inter-regional vocational training centres.

The improvement in the existing road network requires other methods which were tried out on 15 pilot routes (SURE approach). Maps of the accidentality on the national road network, since 2004 have been regularly published on Internet.

Furthermore, actions have been undertaken to improve the relevance of road signs.
Finally, State-Region contracts have made it possible to commit more than €300 million to work to improve safety over five years.

ROAD EDUCATION

The "€1 per day licence" system makes it possible to spread the cost of the licence over several months, thanks to a zero-interest loan by which the State pays the interest, through an agreement entered into with the financial institutions. The driving schools undertake to abide by a quality charter.

International activities

At community level, negotiations continued between the Council of Transport Ministers of the European Union and the European Parliament on the draft third directive on driving licences.

With regard to the International Commission for driver testing (CIECA), the conclusions in the three large studies were handed over and shared by all the parties concerned: Towards a European standard for Testing (TEST) which shows the differences in the evaluation of the applicants' services at the time of the driving tests, Novice Driver Scheme Evaluation (NOV-EV) which showed the value, on the road safety level, of post-licence training, finally Minimum European Requirements for Driving Instructor Training (MERIT) which decided on the

skills essential for any driving instructor so that the training given also includes emphasising an awareness of risks taken by novice drivers rather than just handling the vehicle.

THE VEHICLE

Technical regulations

The main technical regulations, in line with EU and UNECE regulations passed in 2005 concern:
- a limit in the maximum speed at the time of construction, extended to public passenger transport and heavy goods vehicles of between 3.5 and 12 tonnes;
- label indicating the CO2 level and fuel consumption for private cars;
- the determination of conventional fuel consumption and dioxide emissions extended to vans;
- the end of vehicles' useful life.

Technical inspection

In 2005, 18.60 million inspections, of which 16.01 million were initial visits, were carried out in the 5,190 approved inspection centres (4,771 specialised centres and 419 auxiliary centres). The 16.01 million initial visits made can be broken down into : 13.92 million for private cars and 2.09 million for light utility vehicles. In 2005, the percentage of private cars showing no elementary alternations in the classification came to 16.6% in 2005.

RESEARCH

The PREDIT Programme

Predit must develop its role as a cooperation and action platform linked to the three research incentive levels, which are:

The regional level: link with regional research, supported within the context of State/Region development agreements, and elaborated in the field of technologies for land transport through a network of regional poles (RT3 network: a charter signed in 2001 by Nord-Pas-de-Calais, Alsace-Franche Comté, Haute-Normandie, Midi-Pyrénées, Poitou-Charentes et Rhône- Alpes).

The national level: Predit is a vast programme, but it is also one among sixteen statefunded networks of research and technological innovation. It revolves more particularly around networks, telecommunications, software technologies, fuel cells, micro-nano technologies, materials and processes, land and space.

The European level: increasing links with the 6th framework programme and the Eureka initiative, promoting the cooperation between France and Germany in transport research.

Programme organization PREDIT 3 is headed by Jean-Louis Léonard, deputy in Charente maritime and mayor of Châtellaillon-Plage. The Steering Committee, together with the Chairman and the six promoters of the programme, decides on the reorientations to be given, global conditions of development, assessments to be done. The Orientation Council debates twice a year on the general priorities and the programming. Operational groups are in charge of defining and implementing actions, including the follow-up and the development. Under their respective Chairman’s authority, and Steering Committee if necessary, the groups are responsible for the organization and programming conditions: direct orders of research, calls for proposals, reception of spontaneous projects… Through these various paths, they propose projects to the financing bodies, then ensure the follow-up and the development. Their secretariat is ensured by representatives from the public financing bodies most involved in their respective fields. Funding is provided by four ministries and two agencies. A permanent secretariat ensures the management of this device.

Among the operational groups, two are dealing with safety issues: GO3 relates to improvement of knowledge in safety and G04 to the field of technological developments for safety.

GO3: "New Knowledge for Safety"

The Operational Group 3 "New Knowledge for Safety" is devoted to producing new knowledge intended for public authorities, manufacturers, and individuals, on the stakes in transport in terms of personal safety, and also on how political decisions in this area are effective. It is aimed at creating an enlarged collective of researchers in order to better analyse the conditions (i.e. actions, opinions, information, training) under which those problems can be treated more efficiently.

Its works are particularly focussed on the socio-political and epidemiological dimensions and it is in close relationship with the GO4 "Technologies for Safety".

In compliance with the orientations given by public authorities, and especially with the CISR's decisions taken on Dec. 18, 2002, road safety is a priority issue, and the partnership with car manufacturers has been reinforced. A call for tenders including 5 main directions was launched in 2003 .

Thirty nine collaborative projects related to Operational Group 3 were sponsored by the PREDIT programme; twelve of them were in the field of public policies development and evaluation, six related to accident data bases development and analysis, twelve were in the area users behaviours in relation to safety, height in the approach of safety through health issues and the last one relates to transport of dangerous goods.

GO4: "Technologies for Safety"

The objective of this group is to contribute, through technological innovations, to reducing transport-related risks within a context of predictable increased traffics. Three main issues are under study: global systems of flow regulation, road systems safety and driving aids towards a "natural" safety.

This group particularly follows through two projects which are essential for its activity, namely ARCOS 2004 and LAVIA, launched within the PREDIT II programme.

ARCOS project
The aim of the ARCOS project is to significantly reduce the number of accidents. Some fifty partners contribute to this work.

Under a global approach, the project aims at enhancing driving safety on the basis of four safety functions :
1. controlling inter-vehicle distances;
2. avoiding collisions with fixed or slowly moving obstacles;
3. preventing lane crossing;
4. alerting upstream vehicles of downstream incidents or accidents.

Building those four functions is the heart and originality of the project. ARCOS is structured around eleven broad themes which enable to integrate inputs from engineering sciences, human and social sciences:
1. perception techniques; 2. other measurement techniques: visibility and adherence; 3. data processing and command development; 4. transmission and communication; 5. simulation/evaluation and accidentology; 6. man-machine system; 7. individual and social acceptability; 8. other collective social and technical aspects; 9. experimental means; 10. functions management, technical assistance; 11. development for trucks.

LAVIA project
The LAVIA project is testing and evaluating a speed limiter which adapts to the current speed limit on the road, in partnership with French car manufacturers. The device, tested onboard the vehicle, is a driving aid equipment which can operate according to various modes:

- the informative mode: at any time, the driver is informed of the speed limit in force in the location where he is driving. If he overruns this speed limit, an alert sets off.

- the active mode: the driver cannot overrun the speed limit; this is made possible by the fact that, beyond this allowed speed, the accelerator is deactivated

- the "kick-down": in the active mode, the driver can use a device (known as "kick-down") which allows him to temporarily switch off the system. The system will be reactivated as soon as the vehicle speed is below the authorized speed again.

The main objectives of this project are:
1. to test the system in operation and its acceptability to users;
2. to evaluate changes in individual behaviours;
3. to measure its effectiveness in terms of individual risk and also to detect and evaluate any adverse effects;
4. to conduct simulation in order to evaluate overall collective safety impacts.

In addition, the Operational Group 4 sponsored fifteen projects, three being in the area of driver information and awareness, two in safety in tunnels, five related to road vulnerable users (pedestrians and motorcyclists), safety of rail transport concerned three other projects, and the two remaining ones were in the field of driving simulator and drowsiness.

This group has to coordinate its research work with the actions taken within the 6th R&D Framework Programme, especially with those projects selected in the E-Safety area at the first call.

The research actions of the group are supported by the French Ministries in charge of Transport and Research.

EUROPEAN ENHANCED VEHICLE SAFETY COMMITTEE (EEVC)

France provides a strong support to EEVC, actively participating in all working groups, and providing chairpersons to its steering committee and to two working groups. Throuhg EEVC, France is also supporting the set up of the new international forum for vehicle safety research.

GOVERNEMENT STATUS REPORT - POLAND

Wojciech Przybylski
Instytut Transportu Samochodowego

INTRODUCTION

The following report contains information on the progress achieved in Poland with regard to aspects of road traffic safety since the time of 20th ESV Conference (Lion, 2007). This period is generally characterised as the intentional effort towards the traffic safety items within all its main system fields taking into account priorities drawn from analysis of domestic and international accident statistics. The current accident statistics for last ten years are given on Figure 1, and in Table 1.

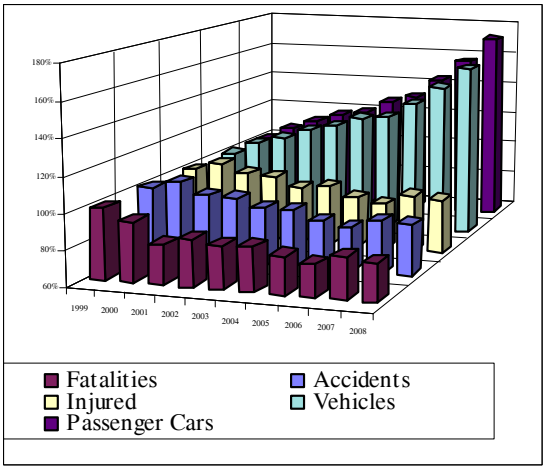


Figure 1. Road Accidents and Vehicle Stock Percentage in Poland in the Period 1999-2008 (1999=100%)

By: Anna Zielińska Motor Transport Institute

From the accident statistics deeper analysis it still appears that in the majority of cases the human behaviour is the reason of majority of road accidents. Two main groups of road users – drivers and pedestrians are sharing this fatal record in the rate of 5 to 1 being involved as causal factor in more than 97% of accidents.

THE PROGRESS IN THE FIELD OF VECHICLE RELATED FACTOR

In last 2 years we made adequate progress in accepting next changes in European and internationally agreed technical requirements and putting them into legislation of our type approval system, which is already unified to the extend possible. It is to be stressed that the current harmonisation level of Polish technical vehicle requirements was reached by the date of EU accession and all important safety and environmental items regarding motor vehicles are already in force. Moreover there is also a visible progress of accreditation action inside the research and testing domestic third party laboratories harmonising their quality systems with future European Standards.

One of important safety legislative solution related to vehicles is that in Poland starting from April 17th 2007 it is required to drive with lights on for the whole year long. It was the response for results of road safety statistics and also the consequence of programme started in 1991. The latest statistic data shows the following improvements after this new regulation:

- the number of daytime accidents fall down in the accident categories predicted (ie. frontal collisions, priority breach, pedestrians and vulnerable road users crashes),
- in general vehicle to vehicle collisions the resulted fall down was 6%;
- in frontal collisions – 8%
- in frontal collisions with the involvement of heavy trucks – 15%

Further, more complex statistical analysis of this specific aspects are under preparation.

With regard to international vehicle construction requirements Poland continues to present the opinion of the suitability of 1998 Global Agreement, recognizing it as an effective way to harmonize world-wide important technical requirements for road vehicles. Having continued with a membership of EEVC from the beginning of 2003, we accept the initiative to establish the worldwide after IHRA solution, enabling better global harmonisation of vehicle technical requirements. Our membership in EEVC Steering Committee is continued in activity in four Working Groups i.e. WG 19: HMI, WG 21 Accident Statistics, WG 22 Virtual Safety and WG 23 Bus Frontal Collision. It is worth mentioning also the participation in international co-operation of Polish in virtual safety WG in the frame of EU Commission activities.

With regard to the system of Periodic Technical Inspection of in-use vehicles, we are also in the process of introducing permanent improvements to its quality and objectivity of checks. Our presence in

CITA working groups and new EU Commission WGs gives us on one hand the possibility to make positive input to international activities enabling better standards for PTI and in return to have access to latest achievements of CITA members works. The PTI checking equipment continues to be in Poland under certification and we perform with the basic level course and advanced training skills of PTI inspectors. In result of more stringent requirements regarding the personnel qualification and equipment quality, the rate of traffic accidents due to bad technical state of vehicles, is in our estimations keeping the level of around 0.6%. Moreover, there are already around 1000 PTI stations of highest technical level having the care agreement with Motor Transport Institute and Polish Chamber of PTI, based upon which they receive the latest available data and information regarding professional items. The decision on the accession of Poland to the UN 1997 Agreement, on the international PTI, had been taken.

THE PROGRESS IN THE FIELD OF HUMAN RELATED FACTOR

Our National Road Safety Council pays the greatest attention to the problem but had, by now, succeeded in limited number of fields. The most important result was achieved in reducing the relative rate of accidents caused by drunken road users by around 5,6%, during last 2 years. Even if we reach good 3rd position among 18 evaluated countries.(see **Figure 2.) t**his is still not satisfactory enough and leads towards more stringent legislation.

Figure 2. Road Safety Performance Index

The other activity in the field of human factor realised in the last 5 years, was aiming at road education of children, promotion of safety of non protected road users, improvements of driver training and scientific co-operation in ROSE 25, Slow (ETSC project), EUCHIRES, DRUID, CLOSE TO, ERIC, SARTRE 4 (DaCoTa if starts), as well as accident database IRTAD and CARE.

The specific new programme (based on diet law) relating to speed control has been launched at the beginning of 2009. According to its rules next 400 fotoradars will be mounted on our roads and special centre for collecting the related information will be organised in few months.

THE PROGRESS IN THE FIELD OF ROAD RELATED FACTOR

W noticed some progress in this field but still being far from our expectations. We have still so far a low rate of classified motorways, which is being 0,15 km /100 km², while in the "old EU" countries it is 1,58 km/100 km², this figure speaks for itself!

Fortunately there are some signs of spring in this specific area. During last five year period the road maintenance service, managed to improve some 25% of Polish existing road network classified as „national" (38 000 km in total according to EU classification). Taking into account more or less

stabile growths of number of vehicles on the roads it is not enough by far.

Now some information on the specific national road safety programme named "Roads of trust" which was started in 2007. The strategic aim of the programme is to reduce by 2013 the number of deaths on national roads of 75% in relation to 2003. One of the activities in the programme is called 8-8-88 as it was started on national road no 8 which is currently the longest and most dangerous route in Poland. Next "8" in the definition is related to the decision that in 2008 next 8 national roads (no 1 – 9) was included. The last figure "88" says that there is still 88 national roads which need to be improved in next years. The programme collects infrastructural improvements like bypasses of villages and towns, better information of current state of traffic and road safety campaigns direction to specific hazardous areas. It is also to be mentioned the lastly prepared in scope of EU Euro RAP programme the map of international roads safety risk in Poland (www.eurorap.pl).

This sort of items is however strongly related to private investors and local authorities (traffic control solutions) and still needs more careful attention of economy decision makers including UE support.

CONCLUSION AND FUTURE AIM

The overall road traffic safety in Poland seems to be waived during last 2-year period, based on statistical data given below. These changes does not mean good in comparison to our society needs. Taking into account the EU road safety policy goals to reduce by half the number of fatalities on European roads we are continuing the national road safety programme called GAMBIT which is aimed at:

- vulnerable road users (pedestrians, bicyclists),
- people commonly ignoring traffic regulations, such as speed limits, drink-driving or not using restraint systems,
- traffic risk on major roads outside built-up areas (on the 6 % of the length of the road network, 25 % of all accidents, 40 % of all killed, 27 % of all injured, severity of accidents: 18 fatalities / 100 accidents),
- young drivers aged 18 – 24 (20 % of all involved in road accidents),
- intoxication of drivers and pedestrians.
- quicker exchange of the oldest part of vehicle stock

We hope that Polish participation in EEVC Working Groups, UN ECE, ESV, EU Commission and Council Working Groups together with ETSC and CITA activity will result in optimal use of our limited resources.

I would like to wish all of you a good co-operation and fruitful exchange of knowledge during this very important scientific international ESV conference being one of the important bases for improvement of everyday life – improvement of vehicle safety and thus road traffic safety.

Table 1. Accident Data in Comparison with the Vehicle Stock and Population in Poland in the Period 1999-2008

Year	No. of accidents	No. of fatalities	No. of injured	No. of vehicles (thousands)	No. of passenger cars (thousands)	Population (thousands)	Fatality factor (No. of fatalitie/1 mln of inhabitants	Accident severity factor (No.of fatalities/100 of accidents)	No. Of passenger cars/1000 inhabitants
1999	55 106	6 730	68 449	13 169	9 283	38 654	17	12	240
2000	57 331	6 294	71 638	14 106	9 991	38 644	16	11	259
2001	53 799	5 534	68 194	14 724	10 503	38 632	14	10	272
2002	53 559	5 827	67 498	15 525	11 029	38 219	15	11	289
2003	51 078	5 640	63 900	15 890	11 244	38 191	15	11	303
2004	51 069	5 712	64 661	16 701	11 975	38 174	15	11	314
2005	48 100	5 444	61 191	16 816	12 339	38 157	14	11	323

2006	46 876	5 243	59 123	18 035	13 384	38 126	14	11	351
2007	49 536	5 583	63 224	19 472	14 589	38 116	15	11	383
2008	**49 054**	**5 437**	**62 097**	**21 127***	**15 974***	**38 116****	**14**	**11**	**419**

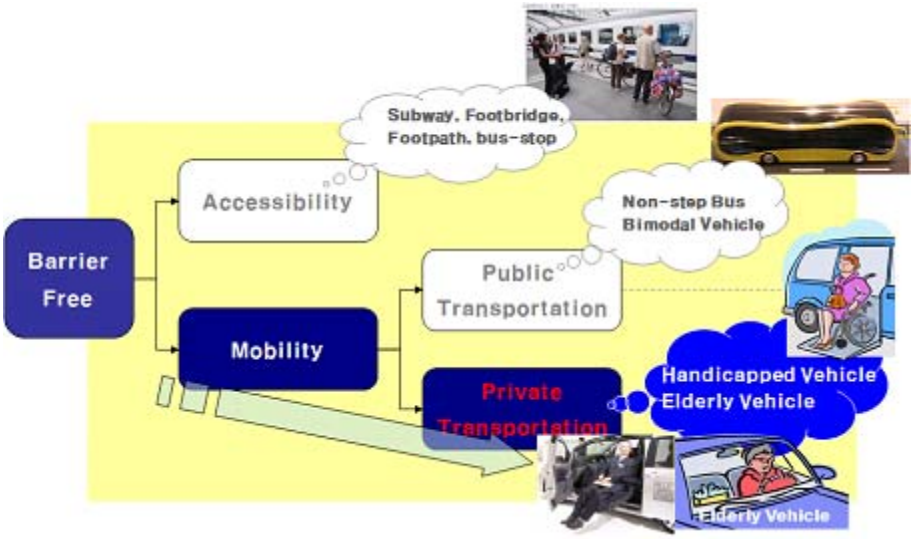
* Estimated by Motor Transport Institute
** Central Statistical Office as of June 30, 2008

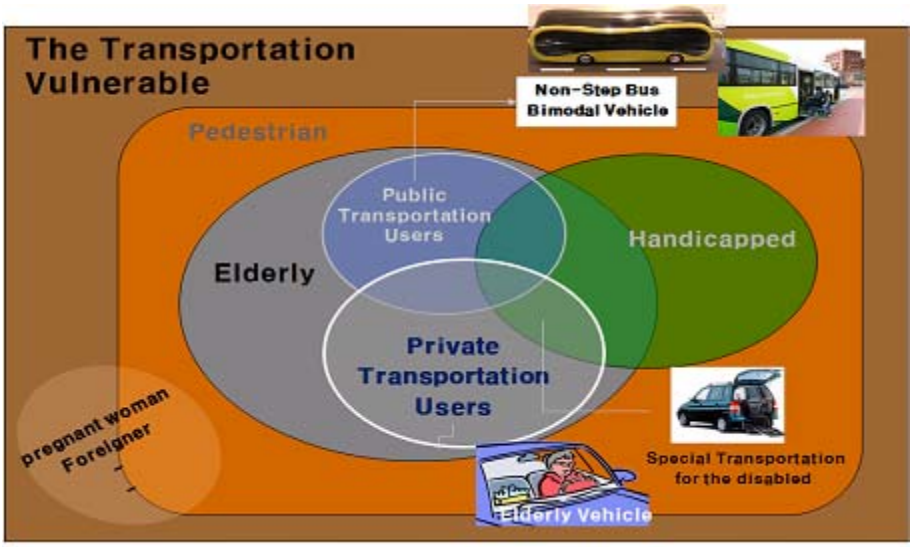
Elderly Friendly Vehicle Project : Safety and Convenience

Objective

Because of the global trend of the societal aging with more than 20% of elderly population, auto manufactures in the advanced nations such as US and Japan concentrate their endeavors on the development of the technologies for the elderly vehicle (elderly-friendly vehicle). The forecast in reaching the aging and highly aging domestic societies is also 2018 and 2026, respectively. Therefore, Korean government and domestic auto makers are putting their enormous efforts to develope key technologies for the elderly vehicle. This research, coupled with the CTIP's 1st stage basic plan for the comfort improvement of the transportation with vulnerable people, preparing the aging society, consists of the following 5 categories that will provide a safe and convenient transportation to elderly population.

1) Improvement of the transportational safety for the elderly and the study for technical prescriptions.
2) Development of the design technology for convenient driving and comfort riding devices by characterizing the driving features of the elderly and by utilizing the associated analytical human body model.
3) Development of crash injury criteria, analytical human body model, and safety restraint system for the elderly.
4) Development of the improved night frontal vision system for the elderly
5) Study on institutional system for the elderly vehicle and economical analysis





Task

Improvement of the transportational safety for the elderly and the study for technical prescriptions.

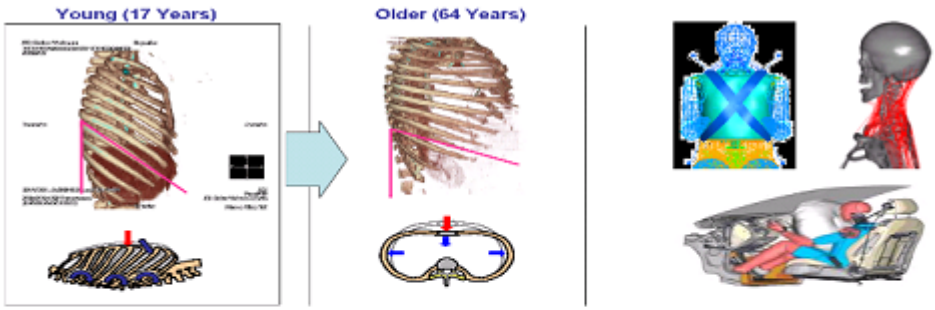
- Assessment and technical prescriptions for the safety improvement of the special ingress and egress devices that enhance the use of the elderly.
- The research and development for the supporting system with a ministerial policy.

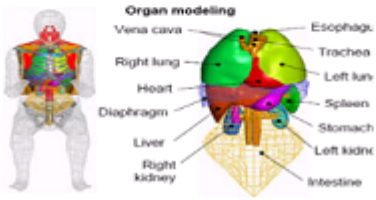
1) Development of the design technology for convenient driving and comfort riding devices by characterizing the driving features of the elderly and by utilizing the associated analytical human body model.

- Research and development of automobile convenience equipment technology : development of digital human model for elderly drivers
- Improvement of the maneuverability of the instrumental panel design for the enhancement of the elderly driving comfort and the development of ingress and egress devices
-

2) Development of crash injury criteria, analytical human body model, and safety restraint system for the elderly.

- Development of crash injury criteria and human body model in consideration of biological characteristics of the elderly
- Design the safety restraints such as seat belt system, airbag, head restraint for the elderly driver and occupant in order to reduce the crash injury risk.





3) Development of the improved night frontal vision system for the elderly

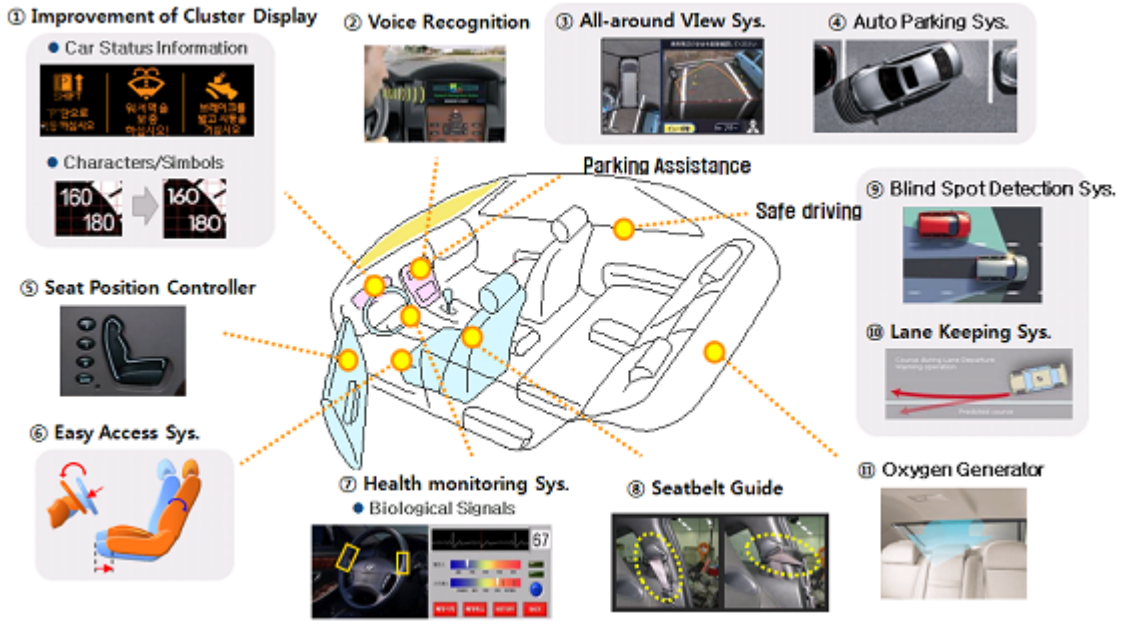
- For the accident prevention and driving comfort, improvement of vision system (head lamp and etc.) during the night and bad weather.

4) Study on institutional system for the Elderly vehicle and economical analysis

- Certification, standardization, supporting regulations of the Elderly vehicle for the construction of ministerial policy.

Output

• Assessment and technical prescriptions of special devices for the Elderly.
• Digital human model for Elderly drivers
• General characteristics of the aged drivers behavior
• Crash injury criteria for Elderly Occupant.
• Improved restraints such as seat belt system, airbag, head restraint for the Elderly occupant
• Auto Beam Switching(and Foul Weather Adaptive Auto-Convert) for the aged drivers
• Economic effect of technology development of the Elderly vehicle


① Improvement of Cluster Display
● Car Status Information
● Characters/Simbols
160
180
160
180
② Voice Recognition
③ All-around VIew Sys.
④ Auto Parking Sys.
Parking Assistance
Safe driving
⑨ Blind Spot Detection Sys.
⑤ Seat Position Controller
⑩ Lane Keeping Sys.
⑥ Easy Access Sys.
⑦ Health monitoring Sys.
● Biological Signals
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⑧ Seatbelt Guide
⑪ Oxygen Generator

STATUS REPORT, FEDERAL REPUBLIC OF GERMANY

President and Professor
Dr.-Ing. Peter Reichelt
Federal Highway Research Institute
Germany

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INTRODUCTION

Technical progress in automotive engineering focuses at the moment on two branches: improving safety and reducing energy consumption. While vehicle safety has been on the agenda for many decades by now, the emissions of greenhouse gases are a topic of the last years. The reduction of fuel consumption is driven by two issues. On the one hand CO_2 has to be reduced since it is seen as a major factor for global warming. On the other hand the resources of fossil crude oil will come to an end. The latter also will lead to increasing fuel prices in the long term future.

However every cent for research in automotive engineering can be spent only once. Thus safety and CO_2 reduction somehow compete with each other. Rulemaking of regulations on ECE-level or directives on EU-level has to face this tension to an increasing amount. The mandatory introduction of safety measures has to be justified convincingly if higher vehicle masses or additional fuel consumption are accompanying the measure. So cost benefit analyses and impact assessments, which are already a prerequisite for legislation, will in the future not only focus on the effects of the safety measure alone but also on its side effects, especially with regard to CO_2-emissions. It can be expected that also primary and secondary safety measures will be weighted against each other in order to introduce the most effective measure with regard to safety, climate protection and costs. This third factor besides safety and CO_2, namely costs for the consumer, stepped into the foreground during the last months when sales figures of vehicles decreased. Only vehicles, which the consumer can afford, will be bought. Thus, it is an essential goal for automobile manufacturers, suppliers and legislators to enable market introduction of safety systems which are beneficial but cheap enough for high market penetration.

The Challenge of Demographic Change for Road Safety

Decreasing fertility rates and a continuous increase of the average life expectancy lead to a considerable medium- or long-term change in age structure in Germany as well as in other industrial nations. By 2030, current investigations predict a reduction of Germany's population of more than 5 million to about 77 million inhabitants. It is, however, not the long-term decrease in population but moreover the change in the population structure that is the real challenge. Compared to 2005, in 2030, for example, the percentage of children and young people will be reduced by a quarter. The number of persons of working age will also be reduced considerably by 15%. In contrast, the percentage of elderly people (persons older than 65) will increase by about 40%. In addition to that, it is expected that the development of the Federal States and regions regarding their total population as well as their economy will differ considerably.

This development means an increasing participation of elderly people in road traffic. In addition to that, the senior citizens of tomorrow will be more mobile than the ones of today. Elderly women in particular will increase their vehicle-mobility considerably compared to the situation as it is today. Consequently, in future, road safety aspects of elderly people will be much more important than today.

Effects on the other age groups are, however, expected as well. Based on the regional disparities, declining regions will experience - for instance - a decrease of schools and doctor's practices in number and density so that a long-lasting change in mobility thus in road safety is to be expected here as well. The demographic change thus represents one of the big challenges for the future work in the field of road safety.

Road accidents in Germany

The number of road accidents decreased continuously for many years until 2006 – by nearly 5% to 2,235,318 road accidents in 2006. Although 2007 was an extraordinary year with increasing accident figures for the first time in years (2,335,005 road accidents), on the long run, accident figures have still decreased. Moreover, the forecast for 2008 indicates once again a further decrease in accident figures (2008: 2.27 million road accidents).

The number of road accidents with personal injury has decreased by more than 12% since 2000, resulting in 335,845 road accidents with personal injury in 2007. For 2008 a further decrease of more than 4% to approximately 321,000 injury accidents is expected.

Casualty figures have also decreased, with lower reductions for slight injuries and higher reductions for severe injuries and fatalities. The total number of casualties has decreased by nearly 15% from 511,577 in 2000 to 436,368 in 2007. For 2008 a reduction of approximately 5% compared to 2007

has been predicted – to about 414,000 casualties in 2008.

Since 2000, the number of severe injuries has been reduced by 26% to 75,443 seriously injured road users in 2007 and the number of slight injuries has been reduced by 11% to 335,971 slightly injured road users. Fatalities have decreased by 34% from 7,503 fatalities in 2000 to 4,949 fatalities in 2007 – which is the lowest number of fatalities ever recorded by the national road accident statistics. For 2008, a further reduction to 4,500 fatalities has been predicted.

Vehicle population and road performance

Germany, with its 82.3 million inhabitants, is the most populated country in Europe and plays an important role for transit traffic. The number of passenger cars in Germany on 01/01/2008 was 41.2 million. Caused by a change in registration method (without temporary stopped cars), a comparison to the year before is not possible. Traffic intensities on the approximate 12,500 km of federal motorways in 2007 were about 49,200 vehicles per 24 hours on average (ADT). Figure 1 gives an overview of the distribution within the federal motorway network.

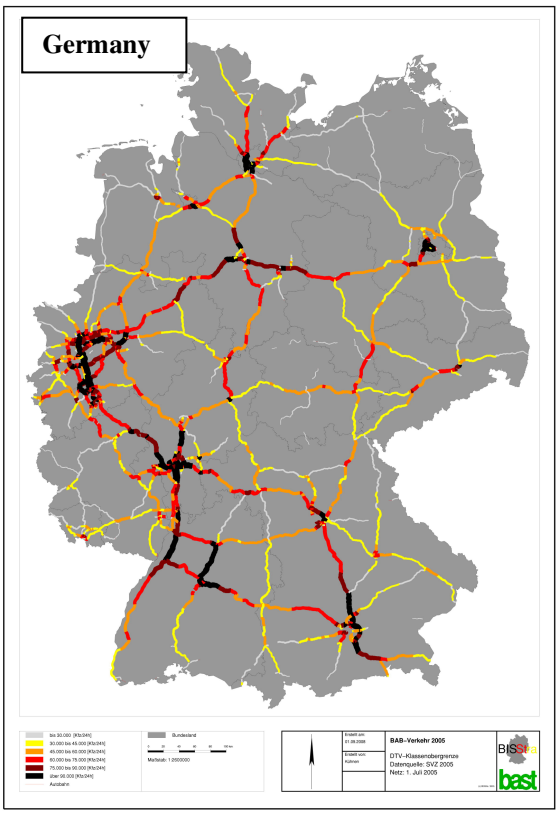

Figure 1. ADT of all vehicles on federal motorways in 2005

The ADT of vehicles with a permissible total weight of above 3.5 t was on federal motorways in 2007 about 7,600 heavy vehicles. Figure 2 shows the situation in the year 2005.

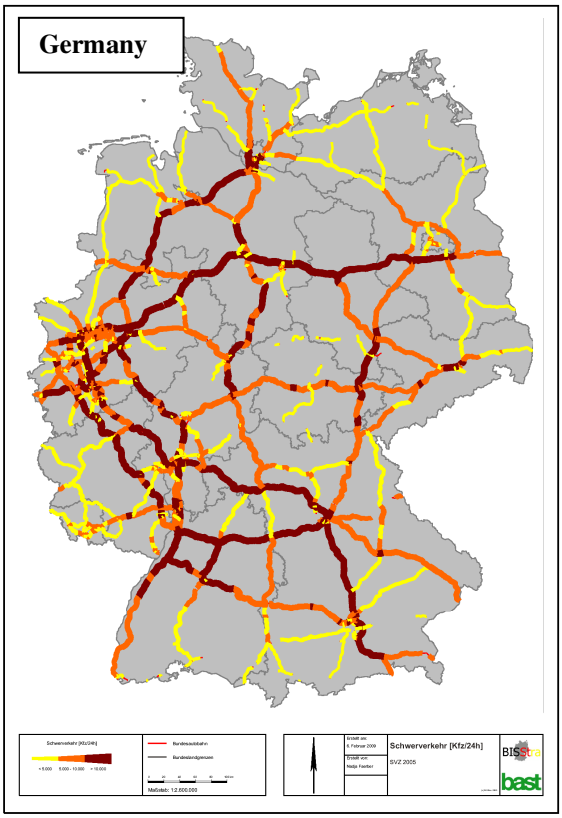

Figure 2. ADT of trucks > 3.5 t on federal motorways in 2005

The total driving performance of all vehicles in 2007 was about 692.0 billion vehicle-km, out of which over 30% took place on the federal motorways alone.

Freight Transport and Logistics Masterplan

A modern industrial and service economy based on the division of labour and a successful business location cannot function without an efficient transport system. Current studies forecast a growth in tonne kilometres of around 70 % between 2004 and 2025. Closely linked with this growth are environmental and climate change challenges. Today, already, transport is responsible for around 20 percent of CO_2 emissions and accounts for around 70 % of total petroleum consumption.
The Federal Government has responded to these challenges by publishing the Freight Transport and Logistics Masterplan in summer 2008. It describes the strategic transport policy direction and the key elements of the future course of action which are to be used to ensure the provision of efficient infrastructure and, at the same time, to reduce the amount of energy consumed by vehicles and make transport more efficient, cleaner and quieter.

The Masterplan contains a total of 35 concrete measures subsumed under the following six objectives:

- Making optimum use of transport infrastructure - shaping transport to make it more efficient

  The aim is to enhance the capacity of the overall transport system. Optimum use is to be made of existing transport infrastructure and the transport system is to be made more efficient. Measures to tackle congestion will be intensified and continued. In concrete terms, this means: road works management will be optimized, traffic management systems will be linked up and the provision of necessary parking areas for HGVs on motorways will be accelerated.

- Reducing the number of journeys - ensuring mobility

  The aim is to improve transport chains, for instance by optimizing transit traffic. Developing the European networks or making greater use of short-sea shipping can help to achieve this aim. An initiative for better logistics in urban areas is designed to make freight transport in towns and cities more efficient, thereby enhancing the quality of life in conurbations.

- Transferring more traffic to the railways and inland waterways

  Greater use is to be made of environmentally friendly modes of transport, such as the railways and inland waterways, for freight transport. To this end, the funding for combined transport will be increased from 62.5 million to 115 million Euros per annum. A support programme is to provide financial assistance to innovative handling technologies in combined transport. A strategy will be developed to take account of the European discussion on the internalisation of all external costs (e.g. for air pollution, climate change, noise or congestion). This will produce greater transparency regarding the nature and level of the costs to the economy of the individual modes of transport.

- Upgrading more transport arteries and hubs

  Despite all the efforts to enhance efficiency, there are still bottlenecks in the transport infrastructure. For this reason, transport arteries and hubs are to be upgraded. This means a segregation of passenger and freight services by reducing pathing conflicts on the railways and by taking targeted action to remove bottlenecks on the railways and roads. This will require a higher level of transport investment, and this is reflected in the 2009 budget estimates and the Federal Government's medium-term financial planning.

- Environmentally friendly, climate-friendly, quiet and safe transport

  Alongside noise mitigation on the railways, the focus is on tightening environmental and safety standards in order to reduce noise and pollutant emissions and the risk of accidents and on shifting traffic to more environmentally friendly modes of transport. In addition, a strategy is to be developed for varying tolls according to the route driven and the time of day. Such a strategy would make it possible to charge a higher toll on busy sections of motorway at certain times of day, while reducing the toll at other times of day.

- Good working conditions and good training in the freight transport industry

  The conditions of working and training in the freight transport industry are to be improved. This includes a training initiative and regular monitoring of the working conditions in the freight transport and logistics sector, plus ensuring that sufficient checks are carried out to enforce compliance with social legislation in the road haulage sector.

German Presidency of the EU Council

The German EU Council Presidency has addressed the European Commission's eSafety initiative and organised a conference on this initiative on 5/6 June 2007 together with high-level representatives from the Commission's Directorate-General involved, from the Member States, national and European associations, the automotive and supplier industry, monitoring agencies, automobile associations and research institutions. Against the background of the White Paper, development prospects of intelligent mobility were discussed. Being of particular importance, the following thematic blocks were given special attention during the discussion:

- Block 1:
  Real Time Traffic Information (RTTI) / Communications - Enhancing Traffic Information

- Block 2:
  Human-Machine Interaction (HMI), including eSecurity - the human-machine interface to car multimedia systems, tamperproof technologies

- Block 3:
  Driver Assistance Systems (DAS) - legal situation and assessment, including the new role of motorists in partially automated in-car processes, plus EuroNCAP testing procedures for DAS

The eSafety Conference adopted conclusions regarding these thematic blocks. They were based on the results obtained at European level by the working groups, on the expert presentations from representatives of various Member States and European institutions and on the discussion result. The results of this Conference have been considered trend-setting by the European Commission [KOM(2007) 541, dated 17th Sept 2007]. Detailed conclusions are summarised below in the chapter research as topics "HMI", "RTTI", "legal issues of ADAS" and "eSecurity".

RESEARCH

Daytime Running Lights for Motorcycles

The problem of conspicuity of motorcycles during the day is also well known in Germany since many years and there are different national and international proposals to enhance conspicuity by improvement of the frontal signal pattern of motorcycles. In accordance with the application laws of many countries, motorcycles currently have to drive with activated passing beam headlamps. Additionally for multilane vehicles, it is already allowed in many countries to drive with dedicated daytime running lamps.

Figure 3. Motorcycle with passing beam

This is why the Federal Ministry of Transport, Building and Urban Affairs has assigned the Federal Highway Research Institute (BASt) with the task of investigating the conspicuity of motorcycles under daytime conditions more precisely. This research project was completed in July 2008. The results of the study can be summarised as follows:

One dedicated daytime running lamp on a motorcycle is better recognisable than the normal passing beam. Two dedicated daytime running lamps are better recognisable than a single daytime running lamp (see figures 3 and 4). Dedicated daytime running lamps with a high luminous intensity are better recognisable at greater distances than daytime running lamps with a low luminous intensity, whereas the differences in the conspicuity caused by different colours respectively colour regions of the daytime running lamps fade with greater distances.

Figure 4. Motorcycle with different kinds of dedicated daytime running lights, two of them illuminated

The research project into conspicuity of motorcycles has shown that under daytime conditions an improved perception of such vehicles equipped with daytime running lamps will be provided. Germany therefore sees an improvement for road safety by replacing the passing beam function by dedicated daytime running lamps on a motorcycle. This will increase the vehicle visibility and will be favourable for the lifetime of the light sources used in the passing beam headlamps of the motorcycles.

These results led to German proposals for amendments to ECE-Regulation No. 53 and No. 87 of the UNECE in October 2008.

Safety of Hydrogen Vehicles

Hydrogen is one of the future alternative fuel concepts that is attributed to have a great potential in the automotive sector. The new technology is very challenging for the vehicle sector and puts great demands on its safety. The storage of hydrogen in the vehicle or the crash-safety of these vehicles are good examples for that. To avoid an unlegislated area and to protect people of avoidable risks it was decided on an international basis to develop a GTR (Global Technical Regulation) for hydrogen vehicles. A completed GTR would enable the manufactures to easily introduce the new technology of hydrogen vehicles worldwide. The GTR for hydrogen vehicles contains environmental as well as safety aspects of these vehicles. The Federal Highway Research Institute (BASt) supports the Federal Ministry of Transport, Building and Urban Affairs with regard to safety matters of these vehicles during the development process of the GTR. In parallel to the development of the GTR the European Commission currently works on an EU-Regulation for hydrogen vehicles to enable the approval of these vehicles in Europe in a shorter timeframe. After coming into force the completed GTR should then substitute the EU-Regulation for the approval of vehicles in Europe again.

Elements of active vehicle safety for elderly drivers

Several systems and elements concerning active vehicle safety are offered on the market today. These are normally targeted at all drivers. With a view to the demographic trend it is appropriate to analyse the benefit of these systems especially for senior citizens. The aim of a research project carried out on behalf of BASt is to compile a catalogue of criteria for the evaluation of active vehicle safety devices with regard to the value added for elderly drivers.

Within the scope of this project some systems (e. g. brake assisting systems or active steering) are selected as examples out of a comprehensive demand and market analysis. Their effect on active vehicle safety will be then tested in driving tests with test persons between 65 and 80 years of age (see figure 5).

The findings which will be derived besides the driving tests from questionnaires and interviews will be used as a basis for the catalogue of criteria. Final recommendations will illustrate how such products have to be structured to suit the special requirements of senior drivers.

Figure 5. Driving test for the examination of brake assisting systems (BAS)

Periodical Technical Inspection of electronically controlled systems in road vehicles

More and more vehicles are equipped with driver assistance systems which are electronically controlled. Most of them are implemented to increase safety or decrease pollution, some of them are used for comfort reasons.

Especially the safety potential of advanced driver assistance systems is enormous. Remarkable examples are the ESC (Electronic Stability Control) system, the emergency brake system for trucks or easier systems like ABS or a simple traction control. All these systems help to increase safety during driving if they work properly. The problem is that these systems were not checked during the periodical technical inspections (PTI). Thus, on account of possible system failures, abrasion, unauthorised removal and manipulation, the original safety potential of modern vehicles can be reduced over the entire period of use (see for example figure 6). However for safety reasons, the benefit delivered originally by the electronically controlled systems should actually remain the same over the whole vehicle life.

Pursuant to article 5 of directive 96/96/EC, Member States may already include function and efficiency tests for advanced driver assistance systems in the periodical technical inspection of vehicles.

Figure 6. Manipulation of the level sensor for the rear axle of a passenger car

The German government in cooperation with PTI organisations and the automotive industry has designed the periodical technical inspection of electronically controlled systems. With the regulation pursuant to article 29 and annex VIII of the German road traffic type approval law (StVZO) the German government established that the following vehicles have to be checked with regard to certain electronically controlled safety devices during the PTI:

- all vehicles with a date of first registration before 1st of April 2006,
- all vehicle types (passenger cars, motorcycles, trucks and trailers)

All systems which can be allocated to eight relevant system classes are checked during the PTI (see figure 7).

Relevant vehicle system classes	
1	Braking system - Overall system
2	Steering system – Overall system
3	Headlights and lamps
4	Seat belts and restraining devices
5	airbag
6	Roll-over protection features
7	Driving dynamic systems that intervene with braking system
8	Speed limiters

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Figure 7. Relevant vehicle system classes

The data for the inspection of the electronically controlled systems are stored in a central database. For that reason the PTI organisations installed an institution (called FSD GmbH) in Dresden in 2004 which is responsible for the database. The data for the tests is delivered by the vehicle manufacturers and adapted to testing purposes by FSD. The data comprises information about relevant built-in systems, the identification features and testing methods. For carrying out a PTI and checking the relevant systems the test engineers have direct access to these data.

This new electronic test within the PTI in Germany which goes far beyond the minimum requirements for PTI in Europe can be seen as a pilot project for future testing procedures for electronically controlled safety devices to be regulated in the 96/96/EC.

At present, FSD together with the Federal Highway Research Institute of Germany (BASt) are carrying out a research project to validate the introduction of testing of these systems which will be finished in 2010.

Pedestrian Protection

FlexPLI

A flexible pedestrian legform impactor that is being considered for implementation within global legislation on pedestrian protection (GTR) is currently being evaluated by a Technical Evaluation Group (FlexTEG) of GRSP (Working Party on Passive Safety) of the UNECE (United Nations Economic Commission for Europe). The impactor shows various significant advantages with regard to its biofidelic properties when being compared to the EEVC WG 17 pedestrian legform impactor that is used within the current European legislation. The final built level Flex-GTR is being expected to avoid dissymmetries and knee twists of the previous version that caused a partly high deviation in the ligament elongation results. The robust impactor so far proved the compatibility of current pedestrian protection packages of modern car fronts with the biofidelic properties of built level GT. Only the loads on the medial collateral ligament partly exceeded the proposed injury thresholds, whereas the cruciate ligament as well as the tibia criteria could be fulfilled from most of the so far tested European bumper structures. Due to the fact that no transfer function between the knee bending angle and the cruciate ligament results has been developed, their use as injury criteria has not finally been decided yet. On the other hand, new tentative knee and tibia injury threshold values have been proposed by JAMA and BASt. The evaluation of the final built level started in early 2009. BASt developed a new impactor certification method and was the first lab world-wide performing real car tests with the Flex-GTR. Subsequent to the publication of GTR No. 9 in the global registry of the United Nations a new GRSP informal group is expected to take over the FlexTEG activities in order to develop the GTR phase II.

Pedestrian head impact test procedure for the windscreen and the windscreen frame area

In a research project carried out by IKA Institut für Kraftfahrzeuge Aachen on behalf of BASt, new pedestrian head impact test methods for the windscreen and windscreen frame area have been developed. Those test methods use a combination of simulation and subsystem testing that allow a definition of more realistic test conditions regarding potential impact points and timing of the head. By combining simulation and dummy tests the analysis of vehicle pedestrian collisions of future vehicles with deployable systems will be possible. Tests with pedestrian dummies represent real world pedestrian accidents in a more realistic way such that the output of those dummy tests can be used for the further analysis of real pedestrian accidents. Simulations with human models and Polar dummy test results show a good correlation with respect to impact point and timing. As an extension of the test methods, further simulations could include FE human body models or coupling between FE and multibody models. Within a comparative study of the benefit of external airbag-equipped vehicle front structures to current non-activated ones HIC values, neck compression forces and neck moments show significant reductions. In a next stage, the test procedure is thought to be extended with respect to active pedestrian protection systems, including sensor systems.

Compatibility

Vehicle safety has been improved in Europe with the introduction of legislative and consumer testing. The reduction of road casualties over the last decade can be attributed to advances and improvements of self protection systems. Stronger occupant compartments and improved occupant restraint systems are evident in the higher assessments awarded in the Euro NCAP testing programme. However, in today's passive safety tests the role of the collision partner is not reflected. Significant evidence from previous research supports the conclusion that vehicle-to-vehicle crash performance is worse than single vehicle-to-barrier test performance, even when the collision partner is an identical vehicle model. This unfortunate fact means that new safety features do not perform as well as expected in real world conditions. This behaviour is a function of the incompatibility encountered in the vehicle fleet today. In vehicle-to-vehicle accidents, both the self and the partner protection are important for overall safety. Until vehicle-to-vehicle crash compatibility is controlled through objective test procedures, significant gains in road safety are not be addressed as specified in the EC white paper [1].

The relevance of vehicle compatibility cannot be ignored for improving road safety. As reported by EEVC WG15 to the GRSP in May 2007 [2], frontal impacts account for 16,000 fatalities and 122,000 serious injuries in the EU15 annually. Based on the work in VC-Compat [3], 14-31% of fatally injured individuals and 29-52% of seriously injured individuals would be affected by improvements in vehicle compatibility – these are significant figures, particularly when being extended to the EU25. The exact safety benefit to this target population could not be determined in the VC-Compat project and thus motivates a need to further pursue compatibility research to improve the outcome of a significant proportion of EU road casualties. The conservative estimates in VC-Compat concluded that an additional consumer cost of 300 € would be necessary to implement compatibility measures that would benefit this target population. These costs can be significantly reduced if new vehicle designs start with sound compatibility design and assessment approaches. Using a tight relationship with the automotive industry and safety researchers, this project proposal aims to develop concrete improvements in vehicle safety via improved compatibility performance. Some early estimates indicate that improved compatibility can reduce the annual cost of traffic injuries for society by € 2 billion per annum.

The proposed European research project FIMCAR aims at proposing an assessment approach (assessment approach describes test procedure(s) including the assessment; approach is used, as a suit of assessment procedures might be selected.) for vehicle-to-vehicle frontal compatibility which could be accepted by European research organisations and industry also taking into account the harmonisation with world-wide activities. This proposal will be a solid base for future regulation and would overcome the existing uncertainty that the European automotive industry has concerning vehicle-to-vehicle compatibility. In the process of developing test and assessment procedures for compatibility, the unified automotive industry in FIMCAR will be incorporating the fundamental knowledge needed to design and manufacture vehicles meeting or exceeding required crash compatibility performance. This research project and resulting assessment approach would thus lead to a reduction of road accident casualties and would strengthen the position of the European car manufacturers as vehicle-to-vehicle compatibility is a world-wide concern.

Based on previous research work towards compatibility (e.g., EUCAR Compatibility project, EEVC WG15, VC-COMPAT and other international and national research projects and working groups), the main issues for improving compatibility are:

- Compartment strength and stability
- Global force level matching
- Structural interaction

Although several test approaches have been proposed, no final decision has been taken for an appropriate assessment of compatibility in Europe, Asia or North America.

Within the EC funded VC-COMPAT project, two different tests have been developed to test a vehicle's compatibility performance.

- These is the first approach using an off-set test against a progressive deformable barrier (PDB) complemented by a full overlap test against the rigid wall and
- a second approach being a full width test against a deformable barrier (FWDB) supplemented by an off-set test according to ECE R94.

Both procedures use an off-set test and a full overlap test.

An additional test candidate has been developed that promises to be a long term alternative for testing compatibility. Research towards the assessment of compatibility by a moveable deformable barrier test has been initiated and mainly supported by the Alliance of Automobile Manufacturers. Activities in Europe are necessary to monitor the developments of this approach.

For frontal impact protection, at the GRSP meeting in December 2007 France made a proposal to amend Regulation 94 [4]. The main changes proposed in the amendment were:

- Obstacle
    - Current Offset Deformable Barrier (ODB) to Progressive Deformable Barrier (PDB)
- Test parameters
    - Test speed: 56 km/h to 60 km/h
    - Vehicle Overlap: 40% to 50%
    - Barrier ground clearance: 200 mm to 150 mm

This initiative may result in modification of the current European self protection test standards. It is however important that in the first place any change in self protection test standards must have regard to compatibility issues. Thus the FIMCAR project is timely as the introduction of compatibility test procedures must be initiated during the review of Regulation 94.

Child safety

In 2009 two BASt research projects in the field of child safety in cars are finalized.

One project dealt with the subject “Misuse of airbag deactivation when transporting children in child restraint systems". In all member states of the European Union the deactivation of a present passenger airbag is mandatory if a child is carried in a rearward facing child restraint system at the front passenger seat. Today there are a lot of different airbag deactivation “philosophies”. Solutions like dealer disconnection, an on/off-switch, or the automatic detection of a child restraint system may be mentioned as an example. Two types of misuse can occur: transportation of an infant while the airbag is (still) enabled and transportation of an adult, while the airbag is disabled. Within the project both types of misuse were analysed by two types of surveys among users. Additionally an accident analysis was conducted and some dynamic and static tests were conducted to examine the potential risk for present and future airbag generation.

The second project finalized 2009 addressed the “Changing body sizes and weights in the case of older children with respect to the testing, assessment and use of child restraint systems”. According to the German road traffic regulations children up to the age of 12 or a body height below 150 cm have to use approved and appropriate child restraint systems (CRS). CRS must be approved according to UN-ECE Regulation No. 44. The largest group within ECE R44 allows approving CRS for children weighting 22 kg up to 36 kg. Several studies show, that today many children reach the limit of 36 kg with a stature less than 150 cm. Within this project German anthropometric data from children was evaluated to determine the current size and weight distributions. Based on this data 4 dummies with different heights and weights were defined and built, based on the P10. Different child restraint systems were tested with respect to the ECE R44 regulation, using these dummies to determine the potential for protection in existing child protection systems for larger or heavier children.

Euro NCAP

<u>Child Restraint Systems (CRS)</u>

Germany suggested to change the current NCAP child protection assessment protocol, with the aim to clearly improve consumer information. It shall motivate the CRS industry to develop well performing CRS for smaller children (to become a “Top Pick” seat) and the vehicle manufacturer to develop robust interfaces with more than one seat in mind. It shall include new aspects such as e.g. misuse and it will be a clear challenge to the OEM to work on the protection of larger children respectively small adults on rear seats.

The current Euro NCAP Child Protection Assessment has improved the vehicle’s – CRS interface,

but only a limited number of child seat manufactures and even less CRS models are affected (small, expensive segment). The impact on aftermarket and the added value for the consumer is small. It is doubtful, if consumers understand that the rating is valid only for this vehicle – CRS combination. There are limitations with regard to the biofidelity of dummies and biomechanical basis of criteria. The actual Euro NCAP Child Protection Assessment focuses on younger children only and does not adequately address real-world misuse. At the moment Euro NCAP makes demands on the OEM, the OEM makes demands on the CRS manufacturer, who will in effect be responsible for the Euro NCAP result. The protocol does not provide a clear incentive to promote rearward facing CRS. Within the dynamic Euro NCAP car tests, the young children should be replaced by older children. The CRS assessment for smaller children should be separated from car assessment and an independent CRS classification could include misuse, ease-of-use and dynamic results. From this a "Top Pick" list could be generated for a CRS - vehicle interface assessment. The child protection assessment for the car should be based on a CRS - vehicle interface assessment, the front/side dynamic score for older children and on the vehicle based assessment. Additionally a "shopping list" (seats fit to the car) can be developed from the interface assessment and published.

Light Commercial Vehicles

In addition Germany suggested the implementation of a new NCAP assessment to rate Light Commercial vehicles (LCVs). By now, Euro NCAP did not consider Commercial vehicles. The need to do so in the near future increases with the rising number of such vehicles on European roads. Whereas the number of passenger cars increased by 30% in the last 15 years (German figures) the number of Commercial Vehicles (GVW < 3.5t) has doubled. Because of their high crash weight, Light Commercial Vehicles need to have highly efficient energy absorbing crash structures. This conflicts the economic objective of maximizing cargo space. Accident data shows that there is a similar accident risk for personal damage accidents for Commercial Vehicles and for passenger cars (around 9 out of 1000 registered vehicles). Taking into account, that Commercial Vehicles are not driven by typical “high risk groups” - e.g. leisure trips by night and by young people - , the accident risk for Commercial Vehicles is high. Accident modes are different from those of passenger cars but dominated by pole impacts and crashes with trucks and other passenger cars.

Benefits are expected, primarily in the reduction of severe injuries to Commercial vehicle occupants as well as to their crash opponents. The application of Primary Safety Assessment will tackle about 40% of all Commercial Vehicle casualties. Primary Safety assessment is expected to have the greatest ad hoc impact on a short-term basis, since passive safety assessment is currently limited with respect to Commercial vehicles crash modes (e.g. truck accidents). None the less test procedures for compatibility as well as an adaptive pedestrian test for CV are intermediate-term issues. Improving self protection by short-term secondary safety assessment can however address another 20% to 30 % of all Commercial vehicle casualties.

The achievement of such expectations is well-grounded. Primary safety functions (BAS, ESP, ACC, SBR) are already an option and can be introduced at once. Justification to meet the anticipated advantages has been given by several efficiency studies (Gwehenberger, Kiebach, Zlocki et al.). Furthermore recent German studies (BASt, DEKRA) have shown that current Commercial vehicles are already able to pass the frontal ODB test. A similar result is expected for the pole test, which makes both tests realisable on a short-term basis. Pedestrian safety assessment has to be adapted on an intermediate-term basis.

German Field Operational Test on Car-to-Car- and Car-to-Infrastructure Systems (SIM-TD)

SIM-TD – Sichere, intelligente Mobilität - Testfeld Deutschland (“Save and intelligent mobility – field trial Germany”) is a project dealing with the development of a technology that allows communication between vehicles and an intelligent roadside infrastructure via air interface.

The aim of the project is the increase of safety and the reduction of congestion. For example, in case in-vehicle sensors detect black ice on the road or the tail end of a traffic jam behind a corner, the direct communication allows a prompt warning of other drivers around. This will help to prevent accidents. All information about traffic jams collected by the vehicles and transmitted into a traffic control centre can help to analyse the overall traffic condition very quick and precise. This is an important basis for measures to improve traffic flow which leads to a reduction of fuel consumption and helps the environment.

The costs for the project SIM-TD add up to 69 Million Euro. The Federal Government of Germany will fund SIM-TD with 38 Million Euro, which is split to 19.8 Million Euro from the Federal Ministry of Economics and Technology and 10,8 Million Euro from the Federal Ministry of Education and Research. The Federal Ministry of Transport, Building and Urban Affairs invests around 8 Million Euro in roadside infrastructure to support the field trial in a real world environment.

The Field Trial will be carried out by German automotive industry, component suppliers, tele-

communication companies and the public authorities of the Federal State of Hesse where the field trial will be located in the greater area of Frankfurt/Main. Six research institutes will support the project from a scientific point of view. The contribution of the industry to the project will be 23 Million Euro. The companies involved are Audi, BMW, Daimler, Ford, Opel und Volkswagen, Bosch und Continental Teves und Deutsche Telekom. The project has started in September 2008.

Research project AKTIV

The acronym 'AKTIV' stands for a German research initiative called „Adaptive and Cooperative Technologies for the Intelligent Traffic". This German project brings 29 partners together: Automobile manufacturers and suppliers, electronic, telecommunication and software companies as well as research institutions. The four-year cooperation will continue through 2010.

With the goal of improving both traffic safety and traffic flow in the future, the partners are working together to design, develop, and evaluate novel driver assistance systems, knowledge and information technologies and find solutions for efficient traffic management and C2C and C2I communication for future cooperative vehicle applications.

Basically three large subprojects can be identified within the research initiative Aktiv:

The project AKTIV-AS (Active Safety) deals with the development of driver assistance systems with a main focus on safety relevant applications. Within the project AKTIV-VM (Traffic Management) technologies are developed, which will contribute to improve the performance of the road network. The project CoCar aims at the development of cellular mobile communication technologies for cooperative vehicle applications (C2C and C2I). The subprojects are described in more detail below:

- Project Active Safety (AKTIV-AS)

  The vision of automotive research efforts in the long-term is the assisted and conducted safe driving including numerous support functions for the driver. The major objective of the AKTIV-AS project is to take out research on applications for active safety based on the promising results of the previous research initiative INVENT. Therefore prototypes for different left open challenges, such as emergency braking, continuous lateral control, intersection assistance and vulnerable road users, will be developed and tested for real traffic situations. The basis for advanced driver assistance systems is a robust and reliable environment perception and interpretation, which will even support the overloaded and inattentive driver. Missing or inappropriate actions will be detected and compensating measures will be taken by the system. These driver assistance systems shall be introduced into the market in a medium-term timeframe.

  Research is performed within the five AKTIV-AS subprojects:

  - Active Hazard Braking
  - Integrated Lateral Assistance
  - Intersection Assistance
  - Pedestrian and Cyclist Safety
  - Driver Awareness and Safety

- Project Traffic Management (AKTIV-VM):

  The interaction of intelligent vehicle systems and intelligent infrastructure units is the objective of the AKTIV-VM project. This novel kind of team work will create new modes of co-operation between automotive industry, road network operators and the ICT sector. But "Cooperation in traffic" also means a stronger interaction of technical processes which will be enabled by the use of new technologies, software and new communication media.

  The six AKTIV-VM applications combine traffic and information centres, road-side infrastructure and intelligent vehicles in a novel manner:

  - Network Optimizer
  - Virtual Traffic Guidance System
  - Cooperative Traffic Signal
  - Adaptive Navigation
  - Situation-Responsive Driving
  - Information Platform

- **Project Cooperative Cars** (CoCar)

  The CoCar project has already been accomplished. It aimed at taking out basic research in the field of Car-to-Car (C2C) and Car-to-Infrastructure (C2I) communication for future cooperative vehicle applications using cellular mobile communication technologies. Five partners from the telecommunication- and automotive industry developed platform independent communication protocols and innovative system components. They have been prototyped, implemented and validated in selected applications. Innovation perspectives and potential future network enhancement of cellular systems for support-

ing cooperative, intelligent vehicles have been identified and demonstrated.

European Statement of Principles on the Human Machine Interface (HMI)

Against the background of the "Commission recommendation on safe and efficient in-vehicle information and communications systems: update of the European Statement of Principles on human machine interface" (K(2006) 7125), the eSafety Conference, which was held in Berlin on 5/6 June 2007 (see INTRODUCTION, Results of the German Presidency of the EU Council), addressed the implementation and updating of this recommendation and reached the following conclusions:

- There are several ways for ensuring that the update of the European Statement of Principles is complied with and implemented. It states that voluntary self-commitments by the addressees of this EU recommendation (stakeholders) were, in principle, the preferred option among other possibilities (e.g. regulations, consumer protection requirements).
- Special attention has to be paid to issues relating to the safe integration and use of portable systems (so-called nomadic devices) when implementing the update of the European Statement of Principles.
- Given the need for a level playing field, it is especially important to achieve equal and balanced participation by all stakeholders in the voluntary self-commitments to comply with the update of the European Statement of Principles.
- The principles contained in the update of the European Statement of Principles which address issues relating to the prevention of misuse and manipulation are not sufficient to ensure this on a sustained basis. In addition to the creation of new technical standards that are independent of the European Statement of Principles, driver training and appropriate monitoring activities also have to be taken into account. There is a need for measures to ensure that there is no misuse or manipulation and expressly supported the activities of the European Commission in the field of eSafety.
- Before the European Statement of Principles is updated again against the background of continuing developments in the field of science and technology, it is desirable that extensive experience be gained with the present update of this EU recommendation.
- If the European Statement of Principles is updated again, the issue of its scope should be raised again and addressed in depth, in order to take systems into account that have so far been excluded, if this appears appropriate on the basis of the state of the art.

In September 2008 a meeting of European Commission with Member States representatives made a number of recommendations and requests including the re-activation of the Working Group "Human-Machine-Interaction" (WG HMI) under the eSafety Forum Initiative. The WG HMI will take into account questions raised in the meeting with MS in September 2008 and check whether clarifications in the ESoP and extensions of scope, can be achieved.

Real Time Traffic Information (RTTI)

Against the background of the European objective of halving the number of road fatalities by 2010, the application of ITS technologies is becoming increasingly important. As a result of the measures identifies by the eSafety initiative as having priority and being feasible in the near future, traffic information is to be singled out. Even though many European countries have already done preliminary work here – in some cases quite substantial – and information systems are already in operation, albeit in different shapes and sizes, it is important to identify ways and recommendations for action for future improvement.

The Conference on eSafety (see INTRODUCTION, Results of the German Presidency of the EU Council), which was held within the framework of the German Council Presidency on 5/6 June 2007, addressed the issue of real time traffic information (RTTI) services and analysed it from the angles of availability of services,, user requirements, technological development, universal coverage and accessibility. The following conclusions were reached:

- Traffic information is highly relevant to road safety. Both the users and the players involved in the information chain were calling for further improvements in terms of quality and coverage in order to meet the objectives of improving road safety and to assist the driver in performing his driving task. Realistic and feasible quality standards should be developed jointly, with the involvement of all stakeholders. Provisions of sources, whatever public, private or public / private should be made available in all member states.
- Traffic information services should cover not only the primary networks (e.g. motorways) but also sizeable sections of the secondary networks. To this end, "strate-

gic networks" are to be defined. Here, it is quite conceivable that different quality levels could be applied to the individual network sections.

- The increasing number of traffic messages makes it necessary to transmit traffic information digitally so that it can be automatically processed in an appropriate manner, both during the generation and management of the messages and by the users' receivers. For this purpose, the "Radio Data System - Traffic Message Channel (RDS-TMC)" has been developed, which is already in operation in numerous European countries, albeit with varying degrees of intensity. If the secondary networks are to be included, it might be necessary to change over from analogue radio channels to digital broadcast channels (e.g. DAB, DRM). To ensure universal coverage in conurbations, provision will have to be made for appropriate transmission capacity. Joint implementation strategies should be developed on a Europe-wide basis to facilitate access to this information, which is not based on a specific language. The aim is to create reasonably consistent information services within the European Union.

- In Europe, there are both freely accessible "public" traffic information services and commercial information services, which users can access by paying a fee. From a transport policy perspective, access to safety-related traffic information should be possible world-wide without users having to pay additional costs. Some countries have already categorised safety-related information by way of example. The minimum scope of safety-related traffic information should also be defined on a Europe-wide basis. This will not rule out the possibility of individual countries going beyond this scope when providing freely accessible information.

- Commercial information services have their place alongside freely available traffic information services. The services they offer may go significantly beyond those offered by public information services and cater to the individual needs of customers.

- Member States should, in accordance with the principle of subsidiarity, also make the necessary rules and arrangements for the free provision of safety-related traffic information within the framework of Public-Private Partnerships (PPPs).

- The newly developed systems using Car2Car communication and Car2Infrastructure communication were believed to offer great scope for improving road safety. Accidents are to be prevented by interlinking information from vehicles in the vicinity, and possibly also with roadside infrastructure, and by providing timely information on risks. For this information, which is highly relevant to safety, it is necessary to provide reliable and globally acceptable frequency bands that are not subject to interference from other services. Member States and the European Union should call for and support the efforts for the allocation of reliable Car2Car and Car2Infrastructure frequencies.

- To ensure that traffic information provides greater coverage, it is necessary to open up new information channels. The inclusion of vehicle-generated data (floating car data, floating phone data, etc.), data provided by congestion reporters, emergency call systems, etc. makes it necessary to form public private partnerships, within which it must ensured that this improved data basis can be used by both public and commercial service providers for collective traffic management and individual services respectively. Services have to be created and implemented on a long term basis benefiting from existing and coming telecommunication facilities.

Legal issues of Advanced Driver Assistance Systems (ADAS)

Advanced Driver Assistance Systems (ADAS) are growing more and more important for today's road traffic and they comprise a great potential for improving road safety. The investment already made within ADAS-development and the need to ensure effective cross-border transport and uniform conditions for market access throughout the member states of the European Union, has lead the eSafety Conference (held in Berlin on 5th/6th June 2007) in essence to the following common conclusions valid for the EU on the whole:

- The introduction of ADAS that intervene into driving manoeuvres or influence vehicle operation via driver behaviour raise legal issues with regard to the responsibility of the stakeholders (manufacturers, road users, infrastructure managers). National traffic law systems in Europe take their starting point based mostly on the principles of the Vienna Convention on Road Traffic (especially Articles 8 and 13) and see – starting from the technology available in the past – the entire responsibility with the driver. This responsibility

for driving is thereby accompanied by liability of the vehicle keeper. Legal clarity regarding regulatory framework has therefore been considered a main requirement for successful ADAS-commercialisation.

- The legal systems of the EU-Member States cover those ADAS that do not put the full control of the driver over his vehicle into question. Such systems tend to optimise functions initiated by the driver (e.g. ABS) just as well as systems that only provide information or recommendations (e.g. speed alert) or ADAS that can be overridden or adjusted (e.g. adaptive cruise control).
- The legal systems also cover non-overrideable ADAS without any difficulty that perform within customary vehicle limits (e.g. HGV speed limiters) or intervene in situations which cannot be handled in a timely manner by the driver and at the same time guarantee that the intervention remains in accordance with the will of the driver (e.g. ESP, automatic emergency braking).
- It has therefore been recommended to ensure that within ADAS development full driver's control over his vehicle will not be impaired. This will generally avoid specific liability risks. Here the principles and mechanisms developed within the RESPONSE 3 project can be taken as a basis in order to ensure compliance with this requirement. This can help to minimise technological development risks and thereby reduce the liability risk. The observation of functional performance of intervening ADAS in the field – for instance within regular vehicle inspections or product observation – can further contribute to the minimisation of liability risks. The clarification of the understanding of vehicle "controllability" from the Vienna Convention on Road Traffic can lead to further legal certainty and will help to ensure comprehensive cross-border road traffic.
- The eSafety Conference is opposed to ADAS that intervene into driving against the will of a driver still able to perform the driving task. Such ADAS would have legal implications that cannot be predicted at present. Should such ADAS yet be considered, the regulatory framework will have to be fashioned in a way that legal certainty is guaranteed. This will also apply to systems that trigger specific driving functions beyond mere driver information on the basis of telematics (by means of communication with the vehicle).

eSecurity

In the world of transport and traffic, electronic systems are of greater importance than in earlier times. The systems lead to an upgrade in comfort, environmental protection and – above all – road safety. On the one hand electronics and software in vehicles increase the safety of the road users but on the other hand new chances for misuse, manipulation and attacks are born. Consequently it is necessary to protect electronic systems against new risks and design them in a legally permissible way. This mechanism is called "eSecurity" – taken from the terms "electronic" and "secure". The issue of eSecurity is thereby twofold: Risks for eSecurity exist to certain extent in today's cars which becomes evident in prospect of possibilities for manipulation and misuse (e.g. activation of TV-, DVD- or Internet-functionalities for speeds beyond walking speed, unauthorised power enhancement, unauthorised mileage adjustment, etc.). However substantial risks potentially arise within the future field of Cooperative Systems, such as Car-to-Car and Car-to-Infrastructure communication technologies. The risks in this field can only roughly be estimated due to so far foreseeable system-design. This estimation will then necessarily lead to the conclusion that such future systems will require a so far unprecedented security concept. In future this will be the main field of work on this important issue.

At the eSafety conference in Berlin held on the 5th/6th June 2007 (see INTRODUCTION, Results of the German Presidency of the EU Council) the participants agreed that eSecurity is an important issue which must be taken care of. In particular in the development phase, security mechanisms must be installed before new electronic systems are launched. This issue was also identified in the eSafety Initiative and therefore a corresponding eSecurity Working Group has been installed. The working group will present the first results in the course of 2009.

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ESV CONFERENCE 2009 - ITALIAN GOVERNMENT STATUS REPORT

Dr. Antonio Erario
Head of Division, International Regulatory Affairs
Ministry of Infrastructure and Transport
Department for Land Transport
Italy

ABSTRACT

This paper provides an overview of the main results achieved by Italy in the field of road safety during the last two years. It focuses on the follow-up of the "National Plan on Road Safety", adopted eight years ago and subsequent introduction of new provisions in the "Highway Code".

After a general descriptions of main road safety results, this paper describes the principal measures adopted during the last period, focusing on regulatory policies and enforcement.

Weak factors and the main unresolved problems are described: regional and local gaps, safety of urban areas, high risk road network, urban crossing roads, two-wheeler safety, vulnerable users.

A brief descriptions of the research activities in the field of vehicle safety is given as well as a summary of the main recommended actions to be taken to improve road safety.

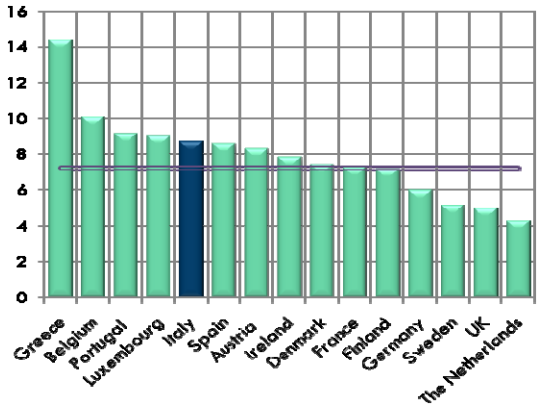
GENERAL

Road Safety in Italy

In the year 2007 Italy recorded a 9.5 % reduction of fatalities which is the best score in the European Union (EU15).

According to a recent report presented to the Parliament by the Ministry of Infrastructure and Transport, Italy is progressively bridging the gap with the other Member States which originated in the period 1990 - 2002 by passing from the 13th to the 11th position in the EU15 chart.

FATALITY RATE IN THE EUROPEAN UNION
(DEATHS/100,000 INHABITANTS) - YEAR 2007



In spite of the progress made, Italy remains the European country with the highest number of fatalities (5,131); Therefore, further and continuos improvements are necessary to become again one of the best five countries in Europe.

The present report describes the principle measures adopted at national level to improve road safety in Italy, makes an analysis of the principle problems and suggest some actions to be taken.

THE MAIN ADOPTED MEASURES

The recent improvements in road safety are manly due to the following factors:

Regulatory policies

The national highway code has been amended several times. In particular two major changes relating to

- the introduction of a penalty point system based driving license (law 150/2003) and

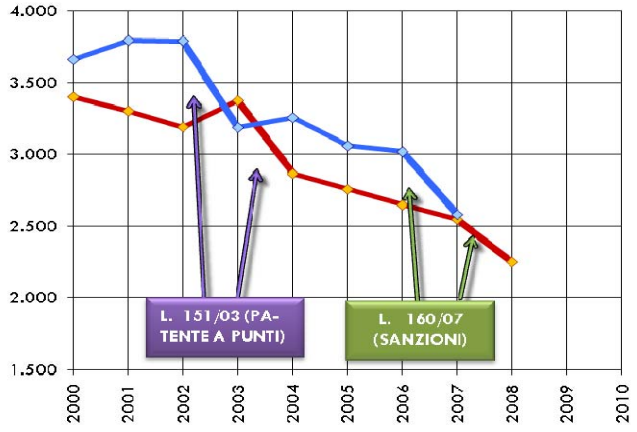
- revision of penalties (Law 160/07),

need to be mentioned.

During the first two semesters of application of laws.151/03 and 160/07 a reduction of 1846 deaths has been recorded. This represents about the 86 % of the reduction of fatalities recorded between 1st January 2003 and 30 June 2008.

In the six preceding years (1997-2002) no reduction had been recorded.

THE EFFECT OF NATIONAL REGULATORY POLICIES
ON THE FATALITY RATE



_____ 1st semester _____ 2nd semester

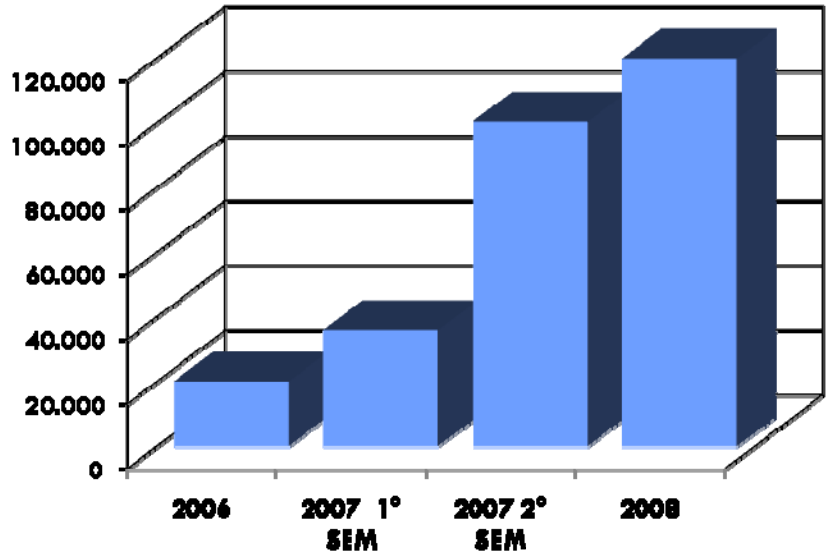
Better Enforcement

Compared to the year 2006, the number of controls carried out on the roads has increased .

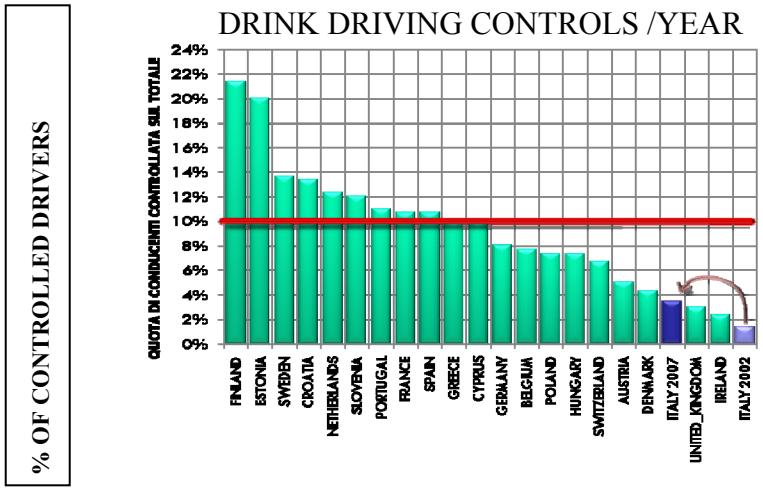
In particular, starting from 2006, the number of checks on drink and driving, compared to the number of driving licence has increased by six times (from 20,000 to 120,000 controls per month).

As for other European countries, automatic controls, made by cameras and radars have been increased and the results are quite encouraging.

CONTROLS/MONTH



The increasing number of controls has allowed to reach the target to make drivers aware of the certitude to be punished in case of high risk behaviour(e.g. drink and driving, speeding, aggressive driving, no use of safety belts and helmets).



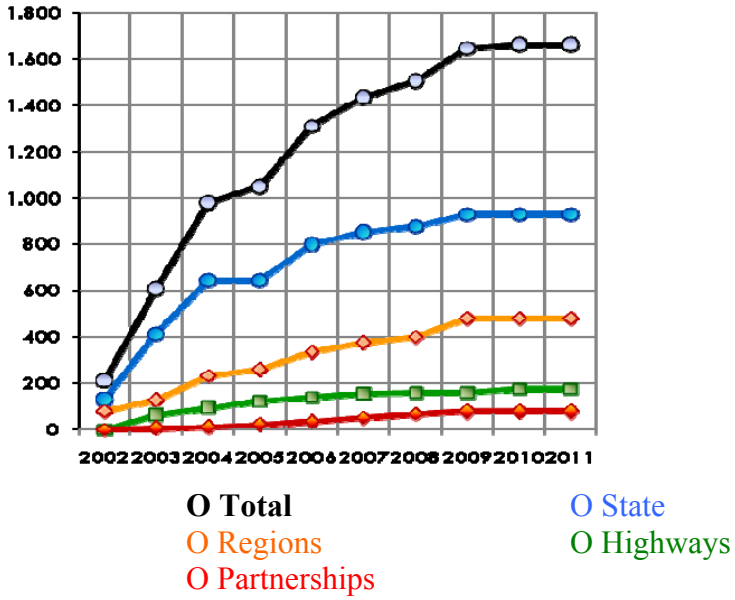
On some of the motorways network, the introduction of the “Tutor” system that records the average speed of every vehicles passing through a specific road section, has delivered a 19% accident reduction as well as 51% fatalities reduction.

At present the Tutor system is installed on about 20 % of the highway network.

<u>The adoption and implementation of Road Safety National Plan</u>;

The plan, adopted in the year 2002 has been progressively implemented and financed at national and local level..

ROAD SAFETY PLAN FUNDING (MILLION €)



Better road safety risk awareness.

The adoption at national and local level of information campaigns has increased driver's awareness with regard to drink driving, speeding, use of helmets and safety belts.

WEAK FACTORS

Road Infrastructure Inadequacy

The road network in not adequate to the present traffic flows and characteristics.

During the last 30 years we have passed from an average of 50 vehicles/km to 110 vehicles/km.

Italy has the highest vehicle/inhabitants ratio in the EU (846/1000).

Although the number of motor vehicles has increased from 22,1 millions to 51,9 millions the road network has not changed substantially.

Moreover, the quality and the maintenance degree of the existing network (with exception of motorways) needs to be improved as well as the road signs which are not always well maintained and well positioned along the roads.

Traffic regulations

Sign management plans are not adopted in a coordinated way , in urban area as well in rural areas. They should be adopted taking in due consideration road safety analysis (e.g traffic flows, black spots) rather than public opinion requests.

Education

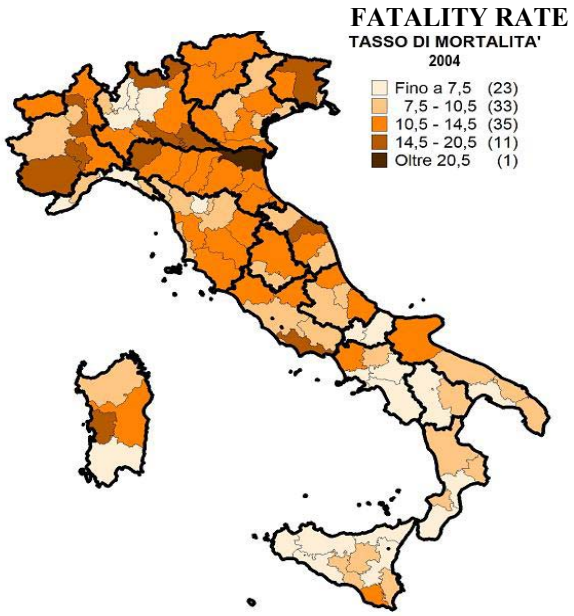
Better education is needed starting at school level and including certain categories of citizens and those people responsible for road safety.

MAIN UNSOLVED PROBLEMS

As already said, in spite of the improvements made between 2003 and to 2007, Italy presents some safety problems which still need a solution.

Regional and local gaps

Road safety risk index varies among Italian cities so that one citizen may have seven times more probability to be involved in an accident according to the region he/she is living in.



The fatality rate varies from 3 to 21 dead per 100,000 inhabitants.

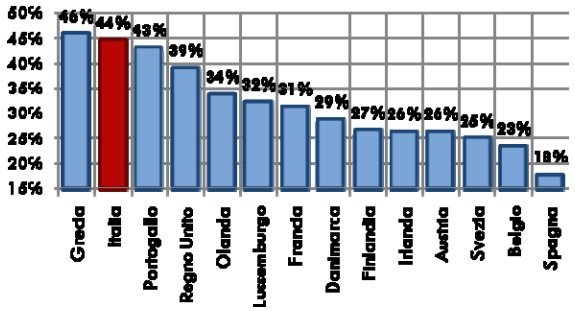
Between 2002 and 2003, 12 provinces recorded an increase of fatalities between + 10% and + 50% while 10 provinces recorded abatements between -30% and -50%. In other terms, one part of Italy has difficulties on maintaining the step of Europe while the other can achieve both, the European and national goals before the year 2010.

Urban areas

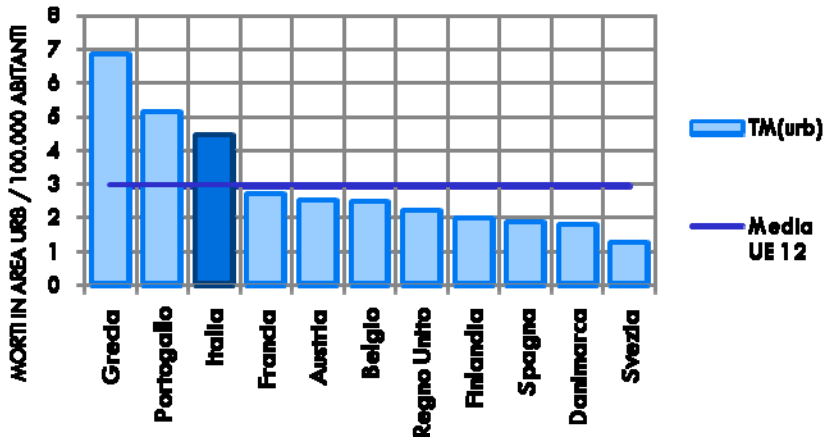
Urban areas represent a major problem since the 44 per cent of fatalities recorded in 2006 happened there. In summary:

2,269 fatalities (44% of total) while the EU average is 34 %
238,718 injured, (73% of total)
20,733 million Euros of social cost (67% of total).

DEATHS IN URBAN AREAS



FATALITY RATE IN URBAN AREAS
(deaths/100,000 inhabitants)

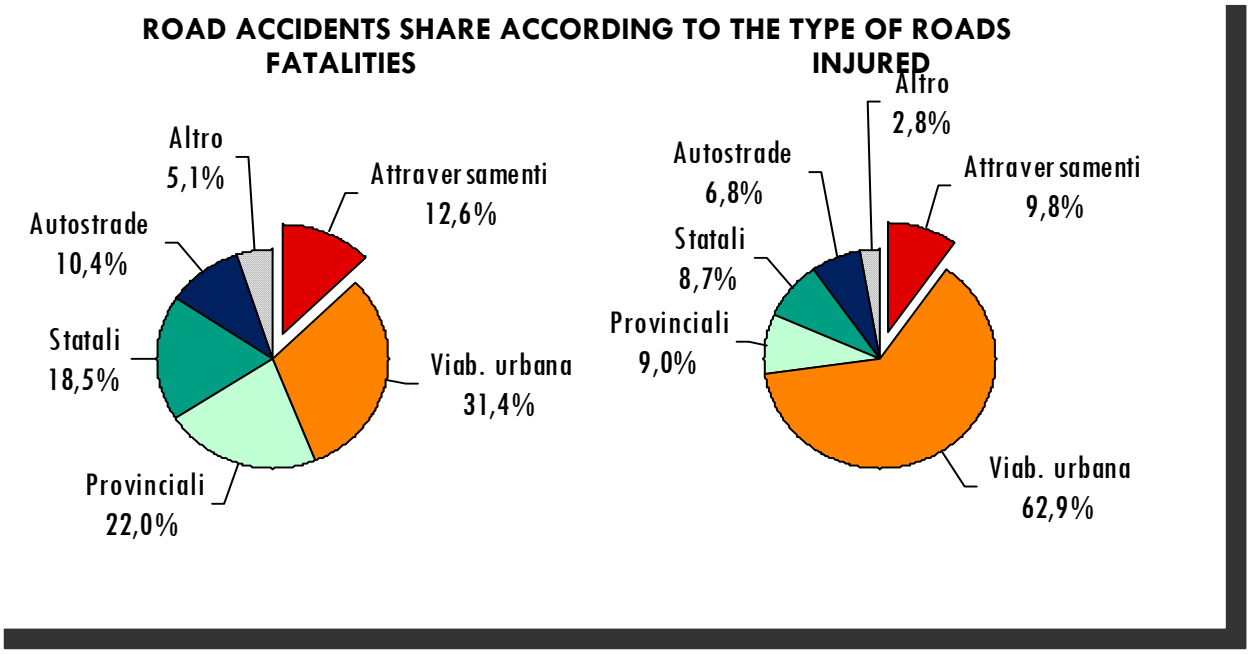


High risk road network

Following a study made by the Italian Ministry of Infrastructure and Transport, a network of about 6.000 km roads presenting the highest level of road accidents has been identified; Economic resources will be invested on these selected roads, on the basis of road safety priorities.

Urban crossing roads

A high victims concentration is due to accidents happening on roads crossing urban areas. This is particularly evident on roads crossing villages where road traffic conditions change completely passing from rural to agglomerate areas.
712 fatalities have been recorded in 2006, namely 12,6% of total amount, 32,700 injured (9,8%) with a social cost of 3.399 million Euros (10,5%).



urban roads urban area crossing roads national roads

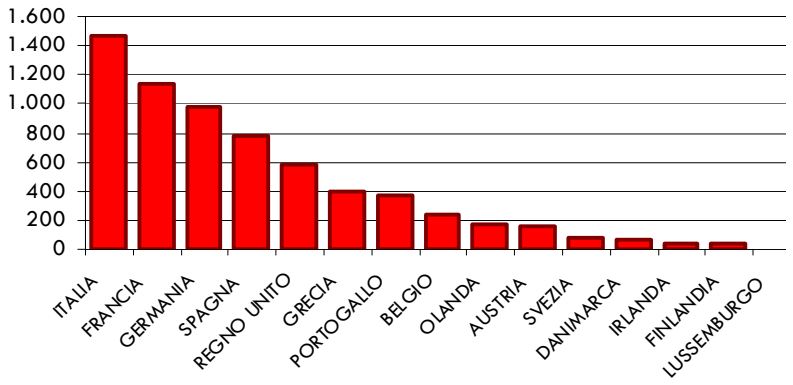
highways provincial roads other roads

Two wheeler mobility

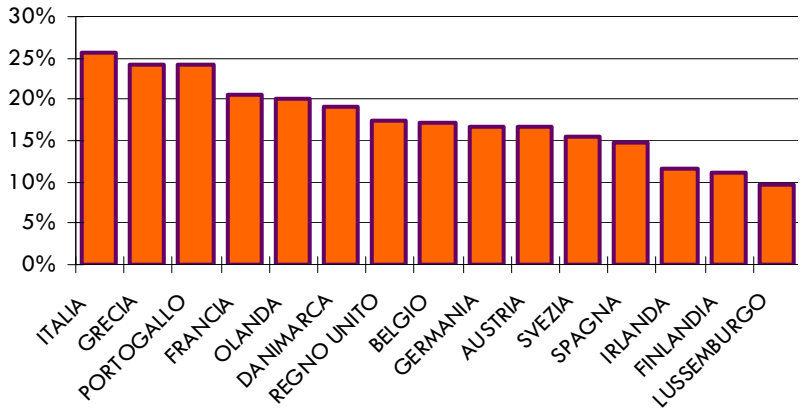
Italy has the highest number of victims in the EU15. In fact, road accident involving two wheeler users caused in the year 2007 1.540 fatalities (about 30,0% of total) and 90,551 injured (27,8%) with a social cost of 8,812 million Euros (28,3%).

About 60% of fatalities and 80 % of injured people are recorded in urban areas; Therefore, a clear link between urban area road safety and two wheeler road safety exists.

Number of fatalities – motorcycles and mopeds



Percentage of fatalities – motorcycles and mopeds



The typical victim of a two wheeler accident is represented by an adult citizen using the vehicle to commute to and from the working place, running on an urban road at low speed.

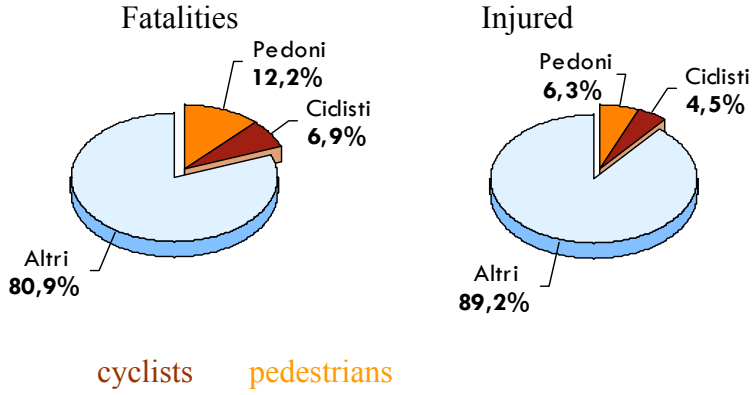
<u>Pedestrians, cyclists and elderly people</u>

Italy has recorded the highest number of fatalities among pedestrians.
As for two wheelers, these accidents mainly happen in urban areas determining a clear safety link between urban areas and road vulnerable users

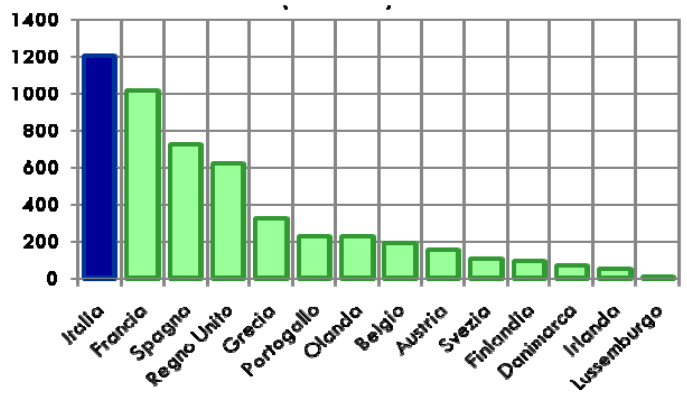
The constant increasing of number of elderly people has made the safety of this category of strategic importance.

In the year 2007 road accidents involving elderly people have led to:
1,105 fatalities (21,5% of total) which is the highest rate in the EU
27,000 injured (8,4%) with a social cost of 3.553 million Euros (11,4%).

VICTIMS AMONG PEDESTRIANS AND CYCLISTS



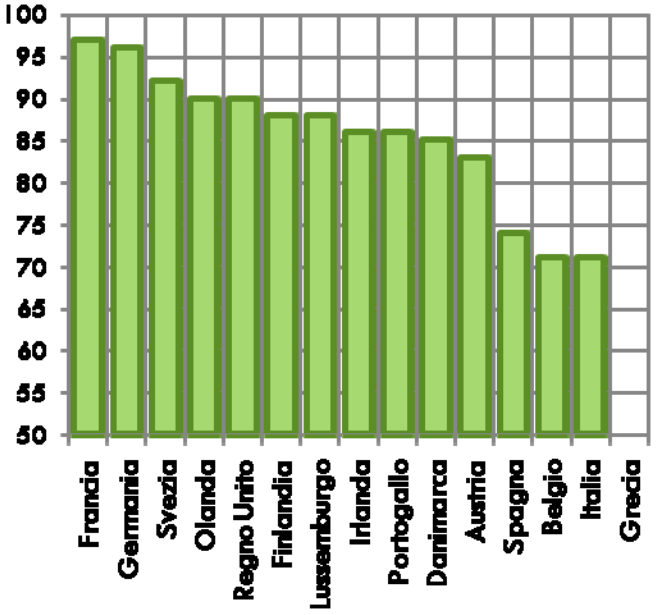
FATALITIES OF ELDERLY PEOPLE



Use of safety belts.and helmets

Italy has the lowest rate in EU regarding the use of safety belts (71.6 %)
According to the European Transport Safety Council (ETSC) the use of seat belts by all drivers and passengers would save about 800 lives every year.

USE OF SAFETY BELTS (% RATE)



Regarding the use of helmets the gap among regions is quite evident. In the northern and central regions the percentage of use of helmets is quite close to 100 per cent while in the southern regions

the available data show lower percentages which can reach 50 per cent at local level.

VEHICLE SAFETY RESEARCH

Research in the field of vehicle safety is mainly carried out in the framework of the activities of the European Enhanced Vehicle-safety Committee – EEVC of which Italy is member.

Researches conducted by EEVC are taken into account by the European Commission when preparing new legislation on road vehicle safety and by the UNECE which adopts technical regulations under the framework of the 1958 and 1998 Agreements.

The EEVC technical work is made by nine working groups, six of them dealing with passive safety, two with active safety and one with accidentology.

In the future, further progress in vehicle safety is expected more, in the area of active safety than passive safety.

In the field of motorcycles it is worth mentioning the PISa project (**P**owered two wheelers **I**ntegrated **Sa**fety) aiming at developing and implementing "reliable and fail-safe" integrated safety systems for a range of Powered Two Wheelers (PTWs), which improve the performance and primary safety (handling and stability) and can also lead to safety devices.

This project is managed by a consortium of 11 partners from 5 countries bringing together top-level academic (University of Florence) and industrial expertise in the areas of automotive and human factors research, accidentology, biomechanics research, sensor systems, suspension technology and design, engineering & manufacturing technology for PTWs.

Within the project PTWs, will be fitted with integrated safety systems to demonstrate the potential of such systems to reduce the incidence and severity of up to 50% of PTW accidents. The cost savings in terms of reduction in accidents and injuries will be related to the costs of fitting the integrated safety systems to PTWs.

ACTIONS TO BE TAKEN

Italy has been experiencing the greatest and most relevant amelioration process in the field of road safety during the last 30 years, which will make it possible to re-align with the other EU countries.

However, with exception of some regions, the European target of halving the road safety victims of 50 per cent by 2010 will be hardly reached.

A series of actions have been recommended by the transport administration and are being considered at political level.

First of all, in order to improve the effectiveness on road safety it is necessary to reinforce the action and ensuring a better coordination at central, regional and local level

In this respect a new Directorate General for Road Safety has been created within the Ministry of Infrastructure and Transport. This new organisation is linked to the corresponding regional offices which should make it possible to deal with road safety in a more systematic way.

Secondly, it s clear that the enforcement action is producing positive effects; therefore we expect to continue to increase the number of controls on the roads with a better and dissuasive enforcement of traffic rules.

Another priority will be the creation of a road safety culture, starting from school level with the aim of making the young population more aware of the need of careful and responsible drive. This priority should also concern administrations dealing with road safety in order to train better the exiting human resources and prepare the new professionals to better deal with the subject.

The Road Safety National Plan has strongly recommended the adoption of a monitoring network based on local administrations and coordinated at national level. The aim of the monitoring would be to know better the state and the evolution of road safety, to know the road safety measure adopted during the years and the results which have been achieved, to assess the effectiveness of the adopted measures.

GOVERNMENT STATUS REPORT, SWEDEN

Anders Lie
Claes Tingvall
Swedish Road Administration
Government Status Report from Sweden
ESV 2009

ROAD SAFETY ORGANISATION

The Ministry of Enterprise, Energy and Communications is responsible for the road traffic safety in Sweden. The ministry is limited in size and the Swedish Road Administration (SRA) handles much of the practical and operational work. From 2009 the new Swedish Transport Agency (STA) has overall responsibility for regulations within air, sea, rail road and road traffic. The Road Traffic Department formulates regulations, examines and grants permits, as well as exercising supervision within the field of road transport over e.g. road traffic, vehicles, driving licences and commercial transport. The agency also conduct analyses of road traffic and supply information about injuries and accidents within the road transport system. STA is also holding vehicle and driver licence registers.

The SRA has been commissioned by the Swedish Government with the overall sectoral responsibility for the road transport system. This involves issues relating to environmental impact, road safety, accessibility, transport quality, regional development and gender equality. Its responsibility also includes intelligent transport systems, public transport, adaptations for disabled persons, commercial traffic, applied research and development and demonstration activities in the road transport system. The main other bodies active in road traffic safety efforts are the Swedish Transport Agency, the police and the local authorities. Other important parties are the National Society for Road Safety (NTF), with its member organisations, and transport industry organisations. The Group for National Road Safety Co-operation (GNS) is a central body that co-ordinates co-operation between the SRA, STA, the local authorities the authority for occupational health an safety and the police. The NTF is an additional member of this group, as well as the private sector.

FATALITIES

The Swedish overall long-term safety objective within the road transport system was settled in 1997, when the Swedish parliament voted for the "Vision Zero". This vision states that ultimately no one should be killed or seriously injured by the road transport system. The design and function of the system should be adapted to the conditions required to meet this goal.

Sweden has a long tradition in setting quantitative road traffic safety targets. In the mid 1990-ies a 10-year target was set at a 50% reduction for 2007. This target was not met. In 2007 471 were killed on the Swedish roads. Sweden as member of the European Union is part of the union's target of a 50% reduction of fatalities between 2001 and 2010. For Sweden that target means maximum 250 fatalities year 2010.

Table 1.

Number of fatalities on Swedish roads

Accident Year	Fatalities
1997	541
1998	531
1999	580
2000	591
2001	583
2002	532
2003	529
2004	480
2005	440
2006	445
2007	471
2008	<420

With around 420 fatalities per year Sweden is still one of the safest countries when it comes to road traffic, with a level of 4,5 fatalities per 100.000 inhabitants. This is around half of the European Union risk average (7,6 fatalities per 100000inhabitants year 2006, EU15).

THE PROCESS TOWARDS A NEW TARGET

On demand from the Ministry of Enterprise, Energy and Communications, SRA have looked at how to manage a new road traffic safety target set for year 2020. This work was reported in 2008 and the government has proposed to the parliament to support a target of 50% reduction of fatalities and 25 % reduction of severe injuries to 2020.

The Swedish Road Administration (SRA) was commissioned by the government (Ministry of Enterprise, Energy and Communications, in June 2006) to propose new interim targets for road safety developments as well as to draw up basic data for continuing road safety work in accordance with Vision Zero. The previous interim target for 2007 was set without consultation with or commitments from parties.

The principal proposal is a system of management of objectives in road safety work that is based on *cooperation when drawing up interim targets*, more *measure-related interim targets in the form of Safety Performance Indexes (SPI:s) , and annual result conferences* where road safety developments and target achievements are evaluated. The aim is to create long-term and systematic road safety efforts.

More measure-related Interim Targets

One lesson learnt from evaluations was also that the interim target for the number of fatalities did not provide sufficient guidance to stakeholders for activity planning. More action-related interim targets are needed. This is understood to mean indicators that help stakeholders to identify measures that can contribute towards changes in condition states on the road transport system that are necessary to achieve targets for the number of fatalities and seriously injured. The following represents a summary of the most measure-related condition states (SPI:s) that we propose to prioritise in future road safety efforts:

- Speed compliance, state roads
- Speed compliance, municipal streets
- Sober drivers
- Fatigue drivers
- Seat belt use
- Bicycle helmet use
- Safe passenger cars
- Safe heavy vehicles
- Safe state roads
- Safe municipal streets
- Rescue, care and rehabilitation
- Valuation of road safety

Annual Result Conferences

Our proposal for a system for developing indicators in road safety work includes a focus on the annual result follow-ups. The proposed interim targets and stakeholder performance indicators are formulated at a national level. Arranging regional result conferences for following up national interim targets requires that the result is reported at a piecemeal level with local/regional data.

Choice of New Target Year

The assessments we have carried out of possible target levels have been based on the EU road safety targets of a 50 per cent reduction in the number of fatalities within ten years. In order to synchronise with new anticipated target years within the EU, we propose 2020 as target year. We propose that the following targets and target levels are to be achieved by no later than 2020:

- 80 per cent of vehicle kilometrage on state roads is to take place within current speed limits.
- Speed limit compliance on municipal streets is to have increased by 86 per cent.
- 99.90 per cent of vehicle kilometrage is to be driven by sober vehicle drivers (BAC below 0,02 per cent).
- A maximum 5 per cent of drivers are to state that they have fallen asleep or nearly fallen asleep while driving during the previous 12 months.
- 99 per cent of drivers and passengers in passenger cars are to use seat belts.
- 70 per cent of cyclists are to wear helmets.
- 100 per cent of new cars are to have the highest safety class according to Euro NCAP (including new technology where active and passive safety is integrated).
- 100 per cent of new heavy vehicles are to have emergency braking systems.
- 75 per cent of vehicle kilometrage on roads with speed limits above 80 km/h is to take place on traffic-flow separated roads.
- Percentage of safe pedestrian, bicycle and moped passages on the primary network.
- Percentage of safe junctions on the primary network.
- Time from injury to adequate medical care.
- Increase on the index for answers to attitude questions about road safety.

The Swedish government is now considering how progress in setting the new target and how to get political involvement

THE TYLÖSAND DECLARATION

In 2007 in Tylösand a declaration covering the rights for road users were drafted and accepted. This was done at an international road safety summit arranged by road traffic safety stake holders in Sweden. The Tylösand Declaration lays down principal rights of citizen's road traffic safety. These rights serve to protect them from the loss of life and health caused by road traffic. They rest on the general assumption that no road user wishes to harm either himself or herself or any other fellow human being, whatever the circumstances under which they are using the roads. The declaration contains 5 articles:

1. Everyone has the right to use roads and streets without threats to life or health.

2. Everyone has the right to safe and sustainable mobility: safety and sustainability in road transport should complement each other.

3. Everyone has the right to use the road transport system without unintentionally imposing any threats to life or health on others.

4. Everyone has the right to information about safety problems and the level of safety of any component, product, action or service within the road transport system.

5. Everyone has the right to expect systematic and continuous improvement in safety: any stakeholder within the road transport system has the obligation to undertake corrective actions following the detection of any safety hazard that can be reduced or removed.

ISO-MANAGEMENT SYSTEM FOR ROAD TRAFFIC SAFETY

In the spirit of the Tylösand Declaration, Sweden has been an initiator to get a new work within International Standards Organisation (ISO). The work is aiming at developing a Road-Traffic Safety Management System standard. (ISO/TC 241 - Project Committee: Road-Traffic Safety Management System). Sweden is through the Swedish Standards Institute (SIS) holding the secretariat.

The aim is that the International Management Systems Standard will provide:

• Principles of Road-Traffic Safety. The principles will include (but are not limited to) Safe Road Transport, System, Leadership, Process approach, Factual approach and Continual Improvement (PDCA)

• Requirements for a road traffic safety management system where an organization

a) wishes to seek understanding of its role in the road transport system and thereby enable effective efforts to be made in the area of road traffic safety, and;

b) wishes to create conditions, in its role in the road transport system, for individuals to survive and avoid serious injuries in the road traffic, and;

c) aims to enhance satisfaction among relevant stakeholders in the area of road traffic safety through the effective application of the system and the assurance of conformity to stakeholder and society and applicable regulatory requirements, and;

d) wishes to demonstrate its ability to consistently perform processes where the output meets traffic safety requirements on road transports from users, other stakeholders, society and applicable regulatory requirements,

and;

e) wishes to reduce costs for transports in the road traffic system

All requirements of the International Standard are generic and are intended to be applicable to all organizations regardless of type, size, products and services provided.

The project has a timeframe up to 2011 to deliver and agree upon the proposed standard.

THE ROLE OF SAFER VEHICLES

In the years since Vision Zero was first introduced in 1995, Sweden has seen major changes both as regards views on road safety as well as in the working approach adopted. An important milestone was the parliamentary resolution adopted in 1997 when Vision Zero became the foundation for road safety operations in Sweden. The goal is a transport system without health losses. This can only be achieved through a systems approach to the road transport system.

The vehicles are of major importance when it comes to support the change of the road transport system. This is becoming more and more evident also within vehicle industry. Volvo Cars Vision 2020, stating that no one should die or get a serious injury in or by a Volvo Car in 2020, is the most clear vision in this field. SRA and Volvo Cars have together initiated a work to better understand the demands on the interface between the Zero Vision vehicle and the Zero Vision road system.

Even if the hope is high to produce cars that will not get involved in crashes, the crash protection has a very important role to play for many years to come.

ESC PENETRATION IN SWEDEN

Electronic Stability Control (ESC) has been proven to be very effective in reducing crashes related to loss of control (Erke, 2008, Ferguson, 2007).

The first studies of the effectiveness of ESC were published in the ESV conference 2003. Several studies followed in 2004 and 2005 establishing a scientific ground for declaring that ESC was effective.

The first mass market car with ESC was introduced late 1998. ESC was from then on gradually implemented on executive mid size and large cars and reached a 15 % new car sales penetration in mid 2003. Sweden has been world leading in getting a high degree of ESC penetration in new car sales. In December 2008, 98% of all new passenger cars were equipped with ESC. A special paper on this process is presented in the ESV-conference.

EURO NCAP PENETRATION / SEAT BELT REMINDERS (SBR)

Sweden has been part of Euro NCAP since the start of the organisation. Over the years since Euro NCAP started, the average scores have improved both for occupant protection as well as for pedestrian protection. In Sweden 2008 the average star rating for occupant protection in new cars sales was 4,75 stars. Almost 85% of the new car sales had a seat belt reminder according to Euro NCAP

specification for the driver. 75% had a reminder for the passenger and 30% a system to monitor seat belt use in the rear seat.

THE CONTRIBUTION OF NEW VEHICLES

With a rapid development of vehicles safety there has been of interest to calculate the yearly benefit of the exchange of the vehicle fleet. With about 270 fatalities in cars every year, the exchange of slightly under 7% of the vehicle fleet results in around 10 "saved" lives per year. Out of these about two thirds comes from the better crash protection and one third from the ESC systems.

REFERENCES

More information is available at the Swedish Road Administration home page

http://www.vv.se

http://www.transportstyrelsen.se

http://www.vv.se/filer/47330/The%20Tylösand%20Declaration.pdf

THE NETHERLANDS GOVERNMENT STATUS REPORT

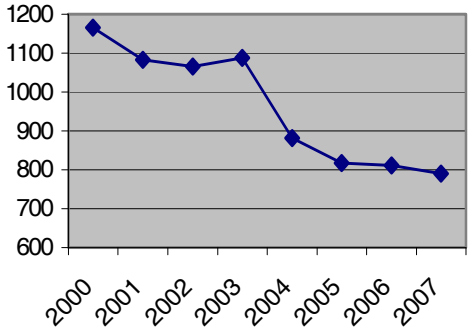
Robbert Verweij
Martin van Gelderen
Policy advisor/ Ministery of Transport

ABSTRACT

Last year The Netherlands have adopted a new Road Safety Strategy. Where we continue the successful current policy, we add a focus on specific groups of road users that are still at risk or risky in traffic. In this way we expect to decrease the number of annual road casualties to not more than 500 in 2020.

INTRODUCTION

Never change a winning concept. That certainly holds true for road safety policy in the Netherlands. The number of road casualties is dropping steadily and the way our country is dealing with this issue is being followed all over the world. Therefore, we will be continuing to use public awareness campaigns, enforcement, infrastructure adaptations and new vehicle technology to make the ambitions for 2020 from the Mobility Policy Document a reality: no more than 500 deaths and 12,250 injuries in traffic, a drop of over 25% compared to 2007. But, however successful we may be, we will not achieve such a significant decrease without any effort.



Figuur 1. Dutch road casualties in 2000-2007

Accordingly, the Ministry worked with many partners over the last year to draw up the Road Safety Strategy 2008-2020. These partners included not only other government bodies and enforcement authorities, but also knowledge institutes and civil society organisations. Calling on all those parties is something that we view as an important task for the Ministry of Transport, Public Works and Water Management. We want to organise a process and initiate measures in order to work together to continue decreasing the number of road casualties, because road safety is everyone's responsibility.

The most important question here is how far the measures should go and at what cost. In road safety strategy, we have chosen in favour of the principles of proportionality, maintaining freedom of mobility and the existing financial frameworks. Within these frameworks, more drastic measures such as raising the motor scooter age or imposing a ban on night-time driving are neither appropriate nor necessary.

TRENDS

Positive trends

Analysis of the accident figures revealed many positive facts and developments. A few of the relevant developments in the Netherlands include the following:

- The decrease in the number of accidents occurs in nearly all age groups and nearly all vehicles;
- The chance of a fatal accident per one thousand million vehicle kilometres was nearly halved between 1997 and 2006 (from 11 to 6.1);
- The risk of accidents among the elderly also dropped between 1994 and 2004;
- The number of fatalities among pedestrians dropped in the years leading up to 2004, especially among children;
- Despite an increase in traffic intensity, the number of road fatalities dropped on 50 km and 80 km roads in particular (primarily due to measures introduced in infrastructure);
- Road users are better equipped for their driving responsibilities, primarily through improved driving skills in combination with good enforcement;
- The number of motorcyclists who died in traffic accidents has dropped sharply.

Negative developments

These successes require some qualification though. In some areas, accident figures appear to be stabilising or even increasing, or the risk of accidents remains relatively high. Facts and developments giving reason for concern include the following:

- The number of fatal accidents among the vulnerable groups of cyclists and the elderly increased in 2006, particularly among older cyclists;

- Single-person accidents involving cyclists are increasing;
- Motor scooters and mopeds are seven times more likely to have an accident than bicycles; they represent a small percentage of total transport figures, but contribute to a considerable percentage of the number of fatalities and injuries requiring hospitalisation;
- Compared to experienced drivers, drivers aged 18 to 24 are nearly three times as likely to have a fatal accident;
- Motorcyclists remain a high-risk group: they are 24 times more likely to have a fatal accident than automobile drivers;
- Alcohol, drugs and medication continue to be an important factor in fatal accidents;
- Speeding and unsafe traffic situations go hand in hand;
- Roads that have a speed limit of 50 or 80 km continue to be the most important accident-prone roads;
- The number of road fatalities due to an accident with a lorry or delivery van is decreasing less quickly than the total number of road fatalities. As a result, their relative involvement is increasing.

FUTURE RESEARCH IN FINDING SOLUTIONS TO THE SAFETY PROBLEMS IDENTIFIED

Innovative research ideas and emphasis

Road safety policy for 2008-2020 is based on the three cornerstones that made this policy successful over the past years: **cooperation**, **an integral approach** and **'Sustainable Safety'.** We will be pursuing cooperation in the road safety sector and beyond. For example, we will be joining forces with the school systems for educational activities and with the police, the Ministry of Justice and the public prosecutor's office for enforcement, including cooperation within the local 'triangle' of municipal, judicial and police authorities. But numerous civil society organisations and market parties also play a role in policy implementation. The integral approach emerges when road safety policy helps to realise other Cabinet targets (and vice versa) in such areas as the environment, town and country planning and neighbourhood renewal. These links to other fields of policy require that the stakeholders think outside the box more often.

Two approaches can be identified in the policies for the coming years, based on the three cornerstones.
The first approach uses **generic measures** to continue building on the success of the past years, in which good results have already been achieved. 'Never change a winning team', as they say in sports; similarly, we need to maintain our successful policies in road safety.
The second approach focuses on **specific areas that require targeted attention**. These focal areas were identified by analysing accident data and researching trends that may influence road safety in the coming years. The analyses clearly show a number of groups vulnerable to accidents, but also a number of groups that cause accidents. To reduce the risk of an accident for these groups, the Ministry of Transport, Public Works and Water Management will be introducing targeted measures over the coming years, to supplement the generic measures already in effect.

Policy in the coming years will be based on these three cornerstones and follow these two approaches. The ambition is for everyone, regardless of origin, age or mode of transport, to take part in traffic with the least possible risk of having an accident – so that (nearly) everyone can make it home safely.

Areas of emphasis

Analysing accident data and researching trends has yielded several specific areas of emphasis. This concerns groups of road users who deserve extra attention, both victims and perpetrators. These road users run a relatively greater risk of having an accident, or did not reflect the general decrease in accident statistics as much or at all. Some categories of roads and vehicles also need extra attention.

Some groups of road users stand out because they fall victim to accidents relatively often; this includes such vulnerable road users as cyclists, pedestrians and the elderly. Other groups catch our attention because they cause unsafe traffic situations relatively often, consciously or subconsciously. This would be the case for e.g. speed violators and people driving under the influence of alcohol, drugs or medication. In the category of 'deliberate and accidental causal agents', new drivers – generally young people – continue to require our attention. In cases of deliberate repeat violations, we will be applying the 'causer pays' principle more frequently.
We have also designated several types of roads and vehicles as areas of emphasis. Despite every effort, the most accidents involving casualties continue to occur on roads that have 50 and 80 km speed limits. In terms of vehicles, lorries and delivery vans deserve attention, due primarily to their mass and size, which make any potential 'collision partner' particularly vulnerable.

We have identified the following areas of emphasis:

- Pedestrians;
- Cyclists;
- Single-person accidents;
- Children;
- The elderly;
- New drivers;
- Drivers of motor scooters, mopeds and microcars;
- Motorcyclists;
- People driving under the influence of alcohol, drugs, medication or fatigue;
- Drivers who violate the speed limit;
- 50 and 80 km roads;
- Lorries and delivery vans.

New approaches being tried

A great deal of new technology is being developed, more and more of which is hitting the market. Mobility technology is also increasingly advanced. These trends are relevant to the Ministry of Transport, Public Works and Water Management in view of the policy targets for accessibility, road safety and the environment. After all, new systems can contribute to more efficient, cleaner, safer roads.
Innovative solutions help us to realise road safety policy ambitions for the coming years. This makes innovative solutions an integral part of the range of measures. After 2010, innovative vehicle technology will play an increasingly major role, primarily because mobility is continuing to increase, while almost all the possibilities of conventional behavioural influence tactics have been exhausted.
In principle, any technology that contributes to road safety is welcome. Besides possible side effects and public support, we naturally also have to take the cost-benefit ratio into account. In context, we have to consider the fact that technical solutions sometimes have unwelcome side effects, like distracting the driver, or invite inappropriate behaviour. Some techniques also have the potential to be abused.

In our policy, we have allowed man to be the measure of all things; we primarily make room for technology that people understand, and that they are willing and able to use. And there is technology that we can use to compel 'causers' to drive appropriately.

Potential for collaborative research internationally

The international importance of road safety is apparent from the ongoing globalisation of the topic. The Global Road Safety Week organised jointly by the UN and the WTO in April 2007 illustrated this trend. Worldwide interest arose from the concern about the costs society pays for unsafe traffic conditions and human suffering as a result of accidents. Moreover, the expectation is that the number of road casualties will continue to grow worldwide, particularly in developing countries. Road safety in developing countries is the number-one cause of death among young people aged 15 to 21.
As 'world champion of road safety', the Netherlands should act as a role model; working in concert with other countries that do well in this area, we can and should help the countries that are not doing as well.

In the Netherlands, foreign road users represent over 10% of the traffic violations. Since the opening of the inner borders in the EU and the increase in road traffic throughout Europe, the number of foreign road users in the Netherlands has been increasing.
Driving licence requirements have been equalised in the European Union by now, but not all countries train and test their drivers as thoroughly as the Netherlands. In particular, some drivers are relatively unfamiliar with the prominent role that cyclists play in Dutch traffic, which can have unfortunate consequences. We will be focusing extra attention on this aspect with public information and campaigns. Conversely, we can pay more attention to Dutch drivers abroad. By providing accurate information, we can help to prevent accidents in foreign countries.

RESEARCH ON ADVANCED TECHNOLOGIES

The Netherlands are currently carrying out a number of research projects on advanced technologies in vehicle safety systems:

The Field Operational Test on anti-accident systems.

The FOT will involve approximately 3,000 vehicles owned by more than 60 haulers. Five different accident prevention systems and a registration system will be tested. Vehicle movements of lorries involved in the FOT will be recorded and processed for at least four months and the Ministry of Transport expects the results in July 2009. This is the most comprehensive FOT ever conducted with accident prevention systems.

- The objectives of the FOT can be divided into three aspects:

- To reduce the number of accidents involving lorries and analyse the traffic safety effects.
- To assess the impact of large-scale implementation of accident prevention systems on traffic circulation.
- To gain insight into the effectiveness of the various systems with regards to lorry traffic safety.

The FOT will address the three most common types of accidents: rear-end collisions (ACC, HWM, FCW), side collisions (LDWA) and singlevehicle accidents (DC, ROC). A separate registration system will also be tested.
The results will be widely communicated, amongst others to the European Commission, with which contact already exists on this topic. More information can be found on the internet: http://www.fileproof.nl/index.php?cat=3&id=52

Alcohol-lock demonstration trial

The Netherlands wants to reduce the number of road accidents due to alcohol use. To this end we want to build the alcohollock into cars of people sentenced for driving with more than 1.3 promille. In 2008 a trial with 80 cars was held in the Netherlands to test the alcohol-lock. It showed that the lock could be installed in all cars, was safe to use and difficult to fool. Further information can be found on the internet: http://www.verkeerenwaterstaat.nl/onderwerpen/rijbewijs/alcoholendrugsinhetverkeer/alcoholslot/

Trial speed-monitoring in vans.

The last year 100 vans where equipped with a new speed-monitoring device to get practical experience, knowledge about the cost-benefits for fleet owners and the effect of these devices on road safety. The speed-monitoring device warns the driver in case of speed violation on every road type. That makes it an driving assistant for well willing drivers. The aim was actually to prevent not-well willing drivers from speeding. Therefore the system sends the information to the fleet owner. The conclusions are not yet available. One of the most important conclusions will be that such a system has to be 100% effort free. Drivers don't switch on such a system voluntarily. It has to be a black-box version that automatically turns on by starting the engine. Otherwise the system has to be a part of work related processes.

Other fields of research planned for the near future.

- Research on accident causes, including single-person cycle accidents;
- Ex-post effects of measures;
- Options for supporting measures in the area of ITS for the elderly; (follow-up study)
- Analysing types of accidents on 50 and 80 km roads;
- Developing vehicle innovation monitor for Dutch vehicle fleet;
- Improving passive safety, collision compatibility and testing methods (Euro NCAP, EU legislation);
- Using trip recorder and accident data recorder;
- Drug testers;
- Measures to limit aggression in traffic (road rage);
- Limiting single-vehicle accidents;
- Better protection of bicyclists;
- Exploration of the possibilities for infrastructure-vehicle and vehicle-vehicle communication technology

PUTTING SAFETY TECHNOLOGIES TO WORK

A great deal of new technology is currently being developed, more and more of which is hitting the market. Mobility technology is also increasingly advanced. This trend is relevant to the Ministry of Transport, Public Works and Water Management in view of the policy targets for accessibility, road safety and the environment. After all, new systems can make the traffic system more efficient, cleaner and safer.

We see a clear trend towards a car filled with sensors. They make driving easier, warn the driver of risks and/or intervene on their own initiative if danger occurs. For example, Anti-lock Braking Systems (ABS) and Electronic Stability Control (ESC) keep the car under control under difficult conditions, such as sudden evasive manoeuvres or braking sharply on a slick surface. By now there are also applications that help drivers control the car on an ongoing basis. This includes keeping the right distance from the vehicle ahead (ACC), stay in the same lane (LDWA) and maintain a safe speed (ACC). Technology is also taking on a more important role along the roadside, such as peak-hour lanes, ramp meters and traffic management. This development in technology will continue strongly in the coming years.

In deciding whether or not to introduce new technology, due consideration should be given to potential side effects that might distract drivers from what they are doing, such as navigation systems or on-board diagnostics. Another

development is the arrival of entertainment devices in cars, such as DVD players. If this presents a danger to road safety, it will need to receive more attention.
Public support is important. Experience shows that innovative products are generally used voluntarily at first, followed by gradually growing support. In the long term, an innovative application becomes standard usage out of habit, either on its own or in response to a statutory requirement.

CONCLUSIONS

The newly adopted Road Safety Strategy 2008-2020 will help the Netherlands to achieve its goal to further reduce road casualties. Technology plays a paramount role in making traffic safer and more reliable. Different target groups were identified which either are at high risk or demonstrate a risky behaviour. A combination of behavioural and technical measures are envisioned to reduce their accident risk.

EUROPEAN ENHANCED VEHICLE-SAFETY COMMITTEE

Status Report for the 21st ESV Conference

Dr. Dominique Cesari, Chairman

INTRODUCTION

The EEVC, European Enhanced Vehicle-Safety Committee, exists since June 1974 and has been active in participating in the ESV-programme. We are pleased to present the EEVC Status report containing a summary of the most recent results of our work at the 21st ESV Conference.

WG12 – Anthropomorphic dummies

This working group is the longest active Working Group within EEVC. The scope of the Working Group includes adult as well as child crash dummies and corresponding biomechanical criteria concerning injuries. Important achievements of EEVC WG12 in the period following the 2007 ESV conference include:

Completion of an extensive evaluation of various candidate crash dummies for injury protection in rear-end impacts (whiplash dummies). From this evaluation it was concluded that the Hybrid III dummy is not suitable for evaluation of whiplash injuries mainly due to its lack of biofidelity. The two other dummies that were evaluated, i.e. the BioRID IIg and the RID^{3D} dummy, both offer sufficient biofidelity capabilities for the study of injury protection in rear end impact, with a slightly better biofidelity rating for the BioRID (see Figure 1). It was also concluded that no reliable injury criteria and corresponding injury risk functions exist yet to assess the injury risk in rear impacts. In 2009 the Working Group has started a new study to develop such injury risk functions using real world data.

Figure 1: The BioRID segmented spine

A study concerning a new generation of child dummies (Q dummies) has been completed. It was concluded that this new generation of dummies offers a major step forward compared to the current P dummies used in the ECE 44 regulations. Currently the following 5 dummies are available in the Q family: a new born, a 9 month, a 1.5 year, a 3 year and a 6 year old dummy (see Figure 2). The development of a 10 year old version of the Q dummies has recently started and WG 12 will monitor these developments. WG 12 has also developed a set of injury risk functions for these new dummies. New activities of WG12 in this field concern the application of child dummies for the evaluation of side impacts.

Figure 2: Q series child dummies

Side Impact Protection

The working group in charge of side impact protection has developed a roadmap for the coming years, which was approved by the EEVC Steering Committee. The main research topics for the side impact protection are the following:

1) Evidence Review: Review the nature of European side impact accidents and consider the likely effects of advances in vehicle technology on the current accident and casualty profile.
2) Barrier based test: On the basis of the Evidence Review, and taking account of the most recently available studies, assess the societal benefit of improving the current regulated barrier based test procedure (ECE Regulation No. 95). Review the updated AE-MDB barrier and test procedure as proposed by the APROSYS project and other

bodies that have evaluated the barrier and procedure.

3) Non-struck side protection: On the basis of the Evidence Review make recommendations regarding necessary research with regard to 'non struck side' occupant protection and the societal benefit of introducing measures to mitigate such injury risk.

4) Pole Test: On the basis of the Evidence Review examine the work that has been undertaken by IHRA members, APROSYS and any other groups into the pole test (perpendicular and oblique).

5) Review the proposed EEVC interior surface test procedure, including any validation testing that has been completed and, if necessary, refine the procedure such that it is fit for regulatory application

A subgroup including experts in accident studies (joint WG 13 and WG 21 subgroup) has been set up to determine the societal benefits of an enhanced side impact test procedure.

The work on the definition of an AE-MDB is in progress; this work includes contributions of Japan in addition to EEVC countries.

Compatibility

The work done by EEVC has progressed over the last two years in conjunction with EC funded VC Compat project. EEVC acknowledges that compatibility is a complicated matter.

The group has developed two candidate test procedures:
1. A full width frontal impact against a deformable element (FWDB) and high resolution force measurement, combined with an offset deformable barrier test.
2. A frontal offset impact against a progressive deformable barrier (PDB), combined with a full width test.

The group has analysed the results of the VC compat project and prepared new terms of reference which will consider the new EC project "FIMCAR"

Pedestrian Safety

Since the last ESV, EEVC did not develop activities in the field of pedestrian safety waiting for phase 2 of the European regulation. However as APROSYS has just made proposals for new additional test methods and as the design of the JARI flex PLI leg is completed, EEVC is considering to analyse in the near future these two items.

WG 18 – Child Safety
The group dealing with the protection of children in cars, buses and coaches is composed of national government representatives, supported by technical advisers..
This group was created in 2000 with clearly defined terms of reference:

- Review accident statistics with respect to car child occupants and injuries in all type of car accidents.
- Review research with respect to car child occupant safety.
- Describe the state-of-the-art taking into account all existing regulations .
- Identify lacks in knowledge, methods and tools

After the publication of the results of the first part of the terms of reference, a report on the comparison of existing legislations and a critical analysis of ECE R44 / 04 is approved by the Steering Committee und public available.

A study concerning a new generation of child dummies (Q dummies) together with working group 12, has been completed.
The Steering Committee of EEVC is considering the continuation of this group with new terms of reference which are under discussion.

Active/Passive Safety Interaction.

This group has started a new activity in which the group will look at 5 to 8 functions of advanced systems aimed at improving safety, and report on evaluation of function assessment methods within two years.

Rear Impact Protection and Whiplash Injuries

Since ESV 2007, EEVC WG20 has worked closely with WG12 on the evaluation of crash test dummies for low-speed rear impact test procedures. WG20 has evaluated static test methods for assessing head restraint geometry, including methods similar to that used by RCAR and methods based on measurements using a co-ordinate measuring machine. Currently, the WG is evaluating methods to assess the *effective* height of head restraints; i.e. the head of the structure of the head restraint that is able to provide adequate support for the centre of gravity of the head of the occupant in a rear impact. A cost-benefit study for head restraint height and backset requirements was also published, which

found that the cost of long-term whiplash injuries was £3 billion pounds per year in the UK alone.

Many seats that have come on to the market in the last few years incorporate an active or, most commonly, reactive head restraint. Both types of head restraint move forward (and sometimes upwards) in a rear impact to support the head and neck, but are typically quite far behind the head in normal use modes. The geometry of reactive head restraints in particular is difficult to assess with static test procedures, as the amount the head restraint moves is dependent on the interaction between the occupant and the seat back. WG20 therefore developed a dynamic test of head restraint geometry – known as dynamic backset – that has been proposed by Japan and the EC as an update to UNECE Regulation 17.

The dynamic backset test procedure uses the BioRID II dummy because it was considered that humanlike interaction between the dummy and the seat back, and humanlike neck kinematics in a low-speed rear impact, were very important.

WG20 continues to collaborate with WG12 on the validation of criteria for dynamic seat assessment test procedures. This work aims to correlate the risk of long-term whiplash injury claims with dummy measurements made with groups of seats and with individual seats. Most recently, EEVC WG20 has met with parties from around the world who are interested in developing a seat assessment test procedure using the BioRID II dummy as part of the proposed Global Technical Regulation 7 Phase 2 work programme.

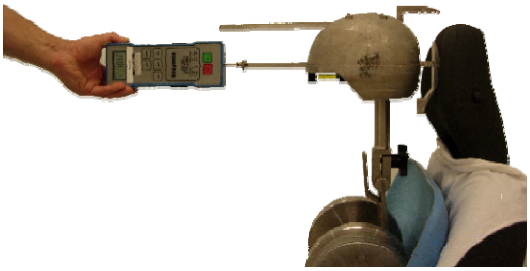


Figure 3: Static backset measurement according to the draft WG20 test procedure.

Accident studies

1. The Working Group dealing with accident studies is aimed at supporting the research activities of other working groups by the provision of accident data and analysis. It has developed links with other working groups and has supplied many sets of data analysis.
2. Side impact analysis – a major analysis of side impacts is being conducted on behalf of WG 13 using data from UK, Germany, Sweden, and France. Some of the results of this analysis will be reported during this conference.

Virtual Testing

The aim of this working group was to examine why and how the numerical simulation technology could be introduced in automotive safety regulations.
A first one year mandate allowed to show that numerical simulation is widely used in industry for product development. However, limitations exist in the modelling of some physical phenomena involved in a crash (e.g. material rupture). Many questions still lack appropriate answers such as model validation, dependence of results on code/platform/user, organization and liability.
This working group explored the area of current regulations which may benefit from the introduction of virtual testing and has proposed a plan for 3 years work dealing with four case studies, from the most simple (geometrical analysis) to the most complex (dynamic test).
The objective of the next three year mandate is to initiate the process to address these questions, focusing on the most important aspects, relying on the outcome of recent completed projects, in particular APROSYS, and taking benefit from work performed by other groups such as ISO or within the next IMVITER EC funded project when the objectives of this work are in line with those of EEVC.

Bus and Coach Safety

An ad-hoc has been established to investigate the need of analysing bus safety issues at a European level.

Future of EEVC

EEVC, which has contributed to IHRA activities from the beginning; is considering that there is a need for international cooperation in the field of vehicle safety research. to comply with those thoughts. After having considered to set up the Vehicle Safety Research Forum as an answer to that question, considering that this will take some time, EEVC has decided to open the participations to some of its working groups to other ESV countries.
The following working groups are concerned:
WG 13 – Side impact protection
WG 15 – Compatibility
WG 18 – Child safety

WG 20 – Rear impact
WG 22 – Virtual testing.
An invitation letter has been sent to the GFP of the relevant countries, and we then expect at least for an intermediate period before setting up a more permanent structure, non EEVC countries will be able to contribute to some key scientific issues which are important for future safety regulations.

UNITED STATES GOVERNMENT STATUS REPORT

John Maddox
National Highway Traffic Safety Administration
United States

State of Motor Vehicle Crashes

In 2007, 41,059 fatalities occurred in the U.S. as a result of motor vehicle crashes. This is contrasted with the 54,589 people who were killed in traffic crashes in 1972 and 39,250 in 1992, the highest and lowest in the past 35 years.

The fatality rate per 100 million VMT in 2007 was 1.36, the lowest recorded in the U.S. This is contrasted to 5.5 fatalities per 100 million VMT in 1966, the highest in the past 41 years. Similarly, the fatality rate on a person basis was 13.6 fatalities per 100,000 population in 2007 the lowest in the past 35 years. This is compared to 26.4 in 1969. Based on a statistical projection, in 2008 fatalities in motor vehicle traffic crashes are estimated to have dropped to 37,313 – a 9.1-percent decline from the 41,059 fatalities reported in 2007.

The total number of police-reported crashes in the U.S. in 2007 was estimated by the National Automotive Sampling System (NASS) General Estimates System (GES) to be 6.0 million. These police reported crashes resulted in 2.5 million persons being injured. In recent years, the estimated number of injuries has decreased, as has the injury rate, based on VMT. In 2007, the injury rate reached 82 injuries per 100 million VMT. In 2007, safety belt use reached a usage rate of about 82 percent for outboard seated occupants during daytime hours.

State of Motor Vehicle Safety

Over the past several decades, the fatality rate per VMT has been steadily decreasing. The safety improvements made are due in part to the collective efforts of the operating agencies of the Department of Transportation,[1] the States, automobile manufacturers, and other organizations. NHTSA's engineering efforts combined with its educational and enforcement programs that ensure proper compliance with the U.S. regulations have been major contributors to this significant achievement in safety. Figure 1 shows the number of fatalities and the fatality rate for the period 1966 to 2005.

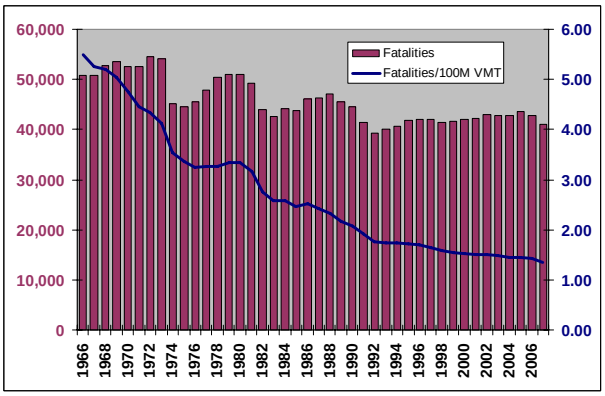


Figure 1. 2007 U.S. Fatalities and Fatality Rate by Year

As can be seen from Figure 1, the number of fatalities in the U.S., after being rather constant for the last decade, has decreased in 2007. The fatality rate has slowly decreased over this period.

Another factor affecting the fatality rate is the increase in motorcycle fatalities. Motorcycle rider fatalities, after a major decrease in the 1980s and early 1990s, have increased steadily since a historic low in 1997. In 2007, motorcycle rider fatalities numbered 5,154, an increase of over 2,700 fatalities from the 1997 level.

Table 1 provides a breakdown of all motor vehicle fatalities by person type.

Table 1. 2007 U.S. Fatalities by Person Type

	Fatalities
Total Fatalities	**41,059**
Passenger Vehicle Occupants	28,933
Motorcycle	5,154
Large Truck, Bus, Other Vehicle Occupants**	1,468
Nonoccupants*	5,504
Pedestrian	*4,654*
Pedalcyclists	*698*

**Includes Other and Unknown nonoccupants*
***Includes occupants of unknown body types.*
Many of the unknown body types in 2007 will be resolved in the final file.

Rollover crashes continue to be a major component in the US fatalities. The distribution of fatalities by vehicle type is shown in Table 2.

[1] The National Highway Traffic Safety Administration (NHTSA), the Federal Motor Carrier Safety Administration (FMCSA), the Federal Highway Administration (FHWA), Federal Transit Administration (FTA) and the Federal Railroad Administration (FRA)

Table 2. Passenger Vehicle Occupants Killed in Rollover Crashes, by Type of Vehicle

Type of Vehicle	2007
All rollover fatalities*	**10,194**
Passenger Cars	4,041
Vans	571
SUVs	2,842
Pickup Trucks	2,736
* Includes occupants of "Other Light Trucks"	

Status of Current NHTSA Research Programs

Crashworthiness Research

Frontal Crash Safety

Frontal crashes are the most significant cause of motor vehicle fatalities. This research program addresses these fatalities through development of crash test procedures using impact conditions not currently addressed by Federal Motor Vehicle Safety Standard (FMVSS) No. 208. Recent crash investigations have evaluated the safety considerations for belted, air bag equipped occupants in small overlap and oblique frontal crashes. NHTSA is also evaluating the safety potential for advanced restraint systems for front and rear seat occupants.

Crashworthiness Rollover

The crashworthiness rollover research program can be separated into two main topics, ejection mitigation and protection for non-ejected occupants. Ejection is a major cause of death and injury in light-vehicle rollover crashes. Almost two-thirds of all ejection related fatalities occur during rollover crashes. NHTSA is pursuing a phased approach to reducing occupant ejection in rollover crashes. First, a side impact pole test requirement was recently added to FMVSS No. 214 which will provide improved head protection for occupants, will likely result in greater use of side curtain air bags, and will reduce the number of partial ejections, primarily in side impacts. The other phase is to establish occupant retention performance requirements for side windows, and Congress has mandated NHTSA to issue a final rule on this by October 1, 2009. This program is aimed at providing occupant containment, primarily in rollovers, through the use of countermeasures such as side curtain air bags and/or advanced glazings. The research includes developing test procedures and performance requirements for evaluating these countermeasures. Side curtain air bags designed for occupant containment differ from those designed only for side impact head protection in that they will deploy in a rollover, they maintain pressure in the curtain for an extended time, and they cover a larger portion of the side window area.

The protection of non-ejected occupants in rollover includes increased roof crush strength and improved restraints for rollovers. The agency has conducted considerable research on roof crush strength and expects to issue a final rule upgrading FMVSS No. 216 in 2009. The agency also has a research program to evaluate the effectiveness of standard and advanced restraints systems in reducing occupant excursion from the seat in rollover crashes.

Side Impact Research

NHTSA's recent upgrade of FMVSS No. 214 requires auto manufacturers to provide head protection in side crashes and to enhance thorax and pelvis protection for a wider range of vehicle occupants. The new rule augments the previous side-impact standard by requiring an additional performance test involving a 20-mph (32 kph) vehicle side crash into a rigid pole at an approach angle of 75 degrees. The agency has incorporated the more precise biomechanical knowledge provided by second generation side impact dummies. The upgrade establishes the use of two dummies, representing a 5th percentile adult female (SID-IIs) and a 50th percentile male (ES-2re), for both the proposed oblique pole test and the barrier-to-vehicle test. NHTSA's current research in this area includes evaluating a new side impact dummy, WorldSID, which was designed by a global consortium. The new dummy has been evaluated for its biofidelity, durability, and performance in crash testing in the current U.S. vehicle fleet and crash environment and found to show promise as an acceptable test device. NHTSA is also interested in conducting a similar program for the small female WorldSID.

Integrated Safety

Integrated safety systems are intended to utilize data from pre crash warning systems to reduce occupant injuries through automatic braking and pre-deployment of advanced restraint systems. NHTSA has implemented cooperative agreements with automotive manufacturers and suppliers to develop performance criteria, objective tests, and benefits estimates for both crash imminent braking and advanced front seat restraints.

Hydrogen, Fuel Cell and Alternative Fuel Vehicle Safety Research

NHTSA's program for hydrogen, fuel cell, and alternative fuel vehicles is focused on establishing safe performance requirements for hydrogen fuel storage and delivery and electrical system safety in fuel cell and internal combustion engine (ICE)

vehicles. NHTSA's safety initiative will complement the efforts by the U.S. Department of Energy and the U.S. Council for Automotive Research (U.S.CAR). NHTSA's approach is to develop foundational research information that will be necessary to determine future requirements, such as research on performance of high pressure cylinders in fires, localized flame impingement on cylinders, electrical integrity of high voltage fuel cell propulsion systems, and developing criteria for post-crash hydrogen leakage. NHTSA will also investigate the potential safety risks posed by lithium ion battery storage devices.

Child Passenger Safety

NHTSA is evaluating test parameters and potential methodologies to replicate a representative side impact scenario that could potentially be developed into a future child restraint dynamic side impact test procedure under FMVSS No. 213. A side impact sled buck designed by Takata is currently being evaluated and side impact moving deformable barrier (MDB) into vehicle crash tests have been conducted in an effort to refine sled buck test parameters. The agency is also reviewing the current FMVSS No. 213 test procedure to determine the viability or advisability of increasing the simulated frontal impact speed from 30 mph to 35 mph and updating the existing test seat fixture.

Motor Coach Occupant Safety

NHTSA conducted a comprehensive review of motor coach safety issues and developed approaches directed to the areas that have the greatest potential for achieving improved motor coach safety most quickly. In August 2007, NHTSA published its Motor coach Safety Plan where it identified four strategies that the agency is currently pursuing on a priority basis: seat belts on buses to reduce occupant ejection; improve roof strength; upgrade fire safety; upgrade emergency evacuation. In December 2007, the agency conducted its first full frontal rigid barrier crash at 30 mph with a motor coach. This crash test along with additional sled tests provided valuable information on the forces transmitted through the seat and seat anchorages in a frontal motor coach crash for different crash pulses, impact angles, and restraint conditions. In the area of roof strength, the agency has conducted tests on 4 motor coaches using the U.S. school bus and European roof strength procedures to determine their relative stringency and practicability of application to motor coaches sold in the U.S. Research on emergency evacuation and fire safety is underway and is expected to be completed in FY 2010.

Biomechanics

NHTSA's Human Injury Research Division and Applied Biomechanics Divisions continue to implement and update their Biomechanics Research Plan to build upon the rich history of impact biomechanics research supported and carried out by NHTSA over the past 30 years. The plan prioritizes the research activities based on trends and results from updated statistical analysis of crash field investigations as well as in-depth analysis of crashes from databases such as CIREN (Crash Injury Research Engineering Network). These results establish safety needs on the basis of frequency, cost, and fatal outcome of crash injuries. Based on the analyses, the plan has developed a set of projects that can produce deliverables and results that can be used to support rulemaking initiatives or put into a "tool box" for further research use by the Agency or other research groups. Recent data analysis has indicated continued need to address the following areas: Child, Adult and Elderly Occupant Injury Mechanisms. This work can lead to injury assessment methods including advanced Anthropometric Test Device (ATD) research and associated injury criteria.

Injury Mechanisms Research

An expanded research effort in head and thoracic injury research is in progress. New projects to understand functional response of the brain and axonal tissue after an insult will shed new light on levels of strain that are tolerable with respect to function. Ongoing efforts include an analysis of mild traumatic brain injury and the criteria that may be used to assess it. Continued analysis of data using the SIMon (**S**imulated **I**njury **Mon**itor) model for the brain injury has allowed further insight into the effects of head rotation as well as translation on the potential for brain injury (Figure 2). This work may lead to enhanced brain injury criteria.

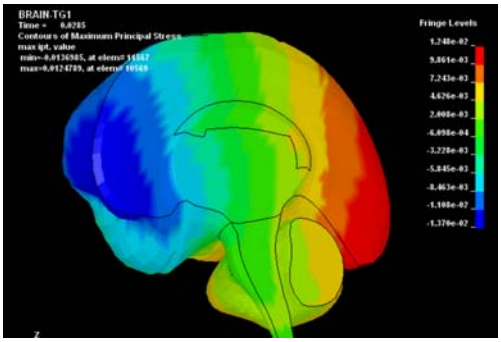


Figure 2. SIMon Finite Element brain model output indicating stress patterns in the brain.

Chest and thoracic organ injury research continues as these injuries are a major source of occupant harm in frontal, side and rollover crashes. Recent work includes assessment of a new device to measure two-dimensional deformation of individual ribs of a crash dummy rather than just one dimensional deformation

at the sternum. This device (Figure 3) has the potential to enhance prediction of thoracic injury from multiple loading modes and can be applied to crash dummies for both frontal and side impact. Work also continues on a repeatable test to evaluate human surrogate and crash dummy chest and shoulder response in three dimensions. University supported research is looking at impact response of underlying tissue that may be incorporated into future injury criteria.

Anthropomorphic Test Device Research

Activity continues to update the THOR, an advanced 50th percentile male frontal impact dummy. A set of short-term enhancements has been suggested by an international group of researchers to improve THOR response and usability. These enhancements are being applied to a few existing dummies which will be tested relative to current THOR biofidelity targets. These results may pave the way for more THOR use internationally. Already projects for an updated abdomen and new chest instrumentation are underway. A 5th percentile female version of THOR has been completed and is undergoing assessment in a variety of test conditions.

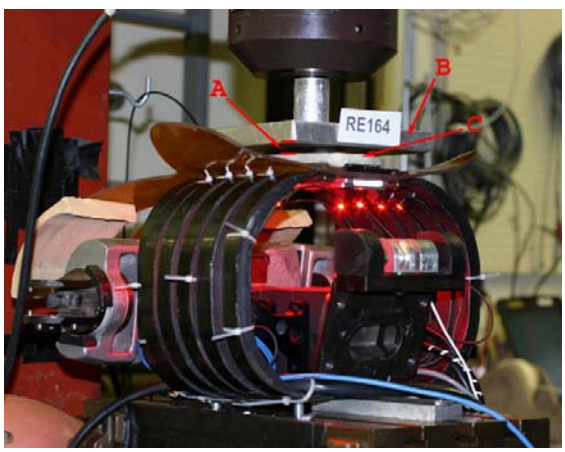


Figure 3. New crash dummy 2-D rib deformation assessment device.

NHTSA has completed an assessment of WorldSID (50th percentile male) relative to biofidelity and crash test capability. WorldSID shows better biofidelity compared to ESII-re and performs well in current side impact regulatory tests. Future work to assess repeatability and reproducibility of the male WorldSID is planned as well as efforts for the small female WorldSID. Child dummy development includes a new neck design for the Q3s, side impact child dummy. This neck design will improve the head kinematic response of the dummy as head injuries to children are most common in side impact crashes. Work continues to assess other child dummies such as the Hybrid III 6 year and 10 year old dummies to include in future regulation as well as research to enhance the response of these dummies (see below). Finally, a test series to determine biofidelity of rear impact dummies including the BioRID dummy are in progress. The Human Injury and Applied Biomechanics Divisions have developed injury criteria and calibration and certification procedures for these dummies and continue to work with industry and dummy manufacturers to complete these projects.

Vulnerable Occupant Injury Research

Vulnerable occupants include children, elderly occupants, and pregnant occupants. Dedicated field data analysis continues to help understand the issues and determine research efforts required. Recent CIREN and NASS-CDS results confirm thoracic injury as a major issue for elderly occupants. Research efforts are geared to understand the effects of changing thoracic geometry and material properties on the tolerance to thoracic loading as a person ages. Understanding the fragility (tolerance) and frailty (final outcome) for older occupants may help lead to design of tests and injury criteria that are more consistent with prediction of injury. This can lead to improved restraint design that may help to mitigate injuries in this rapidly expanding cohort of vehicle occupants

NHTSA is coordinating an ad hoc research group called the Child Passenger Protection group that consists of a multi-center research effort to better understand child injury mechanisms and associated, non-scaled injury criteria including head, neck, shoulder and thoracic injury responses and abdominal injury tolerance and criteria. This effort will result in specific child dummy response requirements that may lead to child dummy improvements and the creation of a human child computer model for further injury assessment in crash reconstructions and other tests.

Crash Injury Research Engineering Network (CIREN) Developments

CIREN continues to explore new ways to enhance NHTSA's and the public's understanding of injury causation in crashes and refining the capability to define injury criteria. The Biomechanics Tab (Bio Tab) for analyzing and deducing injury mechanisms objectively is now in routine use and has been applied to specific injury producing events such as belted rollover occupants. This application has been aided by 3-Dimensional imaging techniques for injury identification as well as initial efforts to truly integrate the CIREN network through streaming Internet video of case reviews to all centers. This allows sharing of expertise and opinions on crash, vehicle and medical results to further enhance the data quality and richness. Also, efforts to link CIREN data with NASS-CDS may provide a powerful tool for future analysis of crash and injury

data to create injury risk functions and ultimately, injury criteria. Finally, initial analysis of CIREN cases with information from Event Data Recorders (EDR) is being used to understand how crash information may be used to alert emergency response teams regarding injury severity so that better decisions can be made regarding transport of crash victims to appropriate centers of care.

Heavy Vehicle Research

NHTSA's heavy vehicle research program is directed toward improving the collision avoidance capabilities of these vehicles. A wide range of issues are currently being researched including: brake system performance improvements, enhanced heavy vehicle stability, eliminating blind spots around large combination vehicles through video/camera imaging technology, and Intelligent Transportation System (ITS) research evaluating an integrated suite of systems comprised of rear collision warning, lane departure warning, and side object detection.

The agency research has shown that major improvements in braking performance for truck tractors can be achieved by using disc brakes, larger drum brakes, or hybrid combinations of disc and drum. Stopping distance improvements of up to 30 percent or more have been demonstrated. Additional research has been initiated on autonomous braking systems (e.g. collision mitigation braking) that utilize radar sensors to sense when a safety critical rear-end crash scenario is developing and automatically apply braking to assist the driver in preventing or mitigating the scenario.

Electronic Stability Control (ESC) systems can reduce loss of control crashes involving heavy vehicles, which often result in rollover or jackknifing. Specific studies underway include testing at NHTSA's Vehicle Research and Test Center in Ohio, and safety benefit studies using hardware-in-the loop simulation and clinical analysis of large truck crash reconstruction data to determine the effectiveness of stability control systems over a wide range of conditions.

Blind spots around large combination vehicles contribute to lane change/merge crashes which are a significant portion of crashes involving tractor semi-trailer vehicles. As a result, performance specifications have been developed for camera/video imaging systems (C/VIS) and a system utilizing commercial off the shelf technology has been developed to provide 360 degree all-weather vision for the driver. A follow-on field test has been initiated to determine the potential safety benefits, driver acceptance, and overall system performance for C/VIS technology.

Intelligent Technology Research

Overview

NHTSA's crash avoidance research mission seeks to advance the scientific knowledge of how to save lives, prevent injuries, and reduce economic costs due to road traffic crashes. The results of this research are used by the Agency to improve highway safety through the regulatory process, consumer information activities and other means. This program relies heavily on problem sizes estimated from crash data that are collected, reduced, and maintained by the National Center for Statistics and Analysis (NCSA). The crash avoidance research program is implemented through a combination of contracts with research organizations, cooperative agreements with industry and university safety organizations, and internal testing and analysis. The program includes three major inter-related components, as follows:

Developing a detailed understanding of driver performance

A critical component of vehicle safety research is to understand the interaction of the driver, the vehicle and the environment in pre-crash, crash, and post-crash conditions.

In the Office of Driver-Vehicle Performance Research, human factors and advanced technology research activities are integrated to determine which aspects of vehicle design may be modified to improve driver performance and to reduce unsafe behaviors. For example, the focus of one study was to understand how drivers benefit from existing or new in-vehicle technologies. This integrated research supports Federal Motor Vehicle Safety Standards, safety defects investigations, consumer information, and the advancement of knowledge about driver behaviors and performance. The program helps stimulate the industrial development of vehicle technology that is compatible with driver abilities and limitations.

To help identify critical safety issues, efforts have been underway to understand what problems drivers are actually experiencing. This work includes an analysis of crash data, studies of early adopters of advanced technologies, and the results of naturalistic driving studies. For example, we established a pre-crash scenario typology for light vehicles to provide a common foundation for vehicle safety research. This approach provided a reference to enable public and private organizations to estimate the potential safety benefits of crash countermeasures.

Developing the requirements for system performance

NHTSA undertakes programs to help it better understand of the driver-vehicle performance features of automotive systems in order to develop meaningful regulatory and other safety improvement policies. To this end, NHTSA regularly tests the performance of available systems, and helps define the performance requirements of future systems.

Evaluating the safety impact of advanced technologies

NHTSA co-sponsors research and collaborates with other modal administrations. This practice promotes the development of advanced technologies that have greater effectiveness, overall, while addressing additional problem areas. The combined investment helps provide observations over a longer period of time in order to estimate safety benefits. There are currently three major collaborative programs:

ADVANCED COLLISION AVOIDANCE TECHNOLOGIES (ACAT)

In response to increasing public concern about automobile safety and advances in technology, many manufacturers and their suppliers are developing and incorporating advanced safety into their vehicles that help drivers avoid crashes. These systems are intended to prevent or reduce the severity for many of the most significant crash types including rear-end, lane change, driver impairment, rollover, and road departure.

This program will develop and implement a framework to understand the safety potential for vehicles that are equipped with emerging advanced safety technologies. In 2009, NHTSA will complete cooperative agreements with four teams led by Automobile manufacturers focused on technologies that address pre-collision mitigation, back-over prevention, lane departure prevention and driver monitoring. These programs will results in objective information that can help consumers identify the most effective safety technologies.

In 2009, NHTSA launched a second phase of the ACAT program, in order to refine the Safety Impacting Methodology and to expand its scope to include the additional technologies of lane keeping assistance, blind spot detection and head-on collision warning.

INTEGRATED VEHICLE BASED SAFETY SYSTEMS (IVBSS)

About 3.6 million rear-end, road departure, or lane change crashes occur each year. Of these 3.6 million, 27,500 crashes result in one or more fatalities. These fatal crashes represent about ¾ of all fatal crashes.

The widespread deployment of advanced integrated driver assistance systems has the potential to reduce rear-end, road departure, and lane change collisions by 48 percent. Integrated systems will provide better hazard information from multiple sensors and provide coordinated warnings to reduce driver distraction.

The Integrated Vehicle Based Safety Systems (IVBSS) initiative aims to demonstrate the technologies necessary to equip all new vehicles with advanced driver assistance systems that would help drivers avoid the most common types of deadly crashes. The goal of the IVBSS program is to assess the safety benefits and driver acceptance associated with a prototype integrated crash warning system designed to address rear-end, road departure and lane change/merge crashes on light vehicles and heavy commercial trucks. This initiative is the first attempt to fully integrate the individual solutions that address these three types of crashes. This research will combine existing research results, state-of-the-art commercial products and system integration efforts to develop and demonstrate an integrated solution to these problems.

The IVBSS program is a four-year initiative that began in November 2005. This two phase cooperative research program is being conducted by an industry team led by the University of Michigan Transportation Research Institute (UMTRI). The results from Phase I Vehicle Verification Tests determined that the prototype system met its performance guidelines and is safe for use by lay drivers in a field operational test planned for July 2008. The Phase II Field Operational Test started in January 2009.

VEHICLE SAFETY COMMUNICATIONS (VSC)

The U.S. Department of Transportation has conducted extensive research on the effectiveness of vehicle-based autonomous collision countermeasures for rear-end, road departure, and lane-change crashes. However, the systems have inherent limitations such as misidentification of stopped cars and out-of-path obstacles. VSC, paired with accurate vehicle positioning, may overcome these shortcomings and thus enable improved safety system effectiveness by complementing or, in some instances, providing alternative approaches to autonomous safety equipment. NHTSA is exploring how both vehicle-to-vehicle (V2V) and vehicle-to-infrastructure communications can enable improved effectiveness of active safety systems.

NHTSA is conducting a collaborative research effort with a consortium of automobile manufacturers to facilitate the development and deployment of effective V2V communication safety systems. This project is developing safety applications, addressing interoperability issues and evaluating safety benefits.

In 2009, NHTSA will complete a program to develop and evaluate a system that communicates between the road way and vehicle to warn the driver of potential stop sign and traffic signal violations. The Cooperative Intersection Collision Avoidance System (CICAS) initiative employed a combination of vehicle –based technologies and systems, infrastructure-based technologies and systems and communication systems focused on detecting and avoiding potential crossing path crashes at intersections. A prototype that was validated against the system performance specifications was demonstrated. Driver acceptance and overall safety effectiveness can not be measured unless a field operational test is conducted.

Human Factors Research

NHTSA's human factors research is integrated with intelligent technologies research to examine the interaction of driver, vehicle, and environment in order to improve driver-vehicle performance. The research supports Federal Motor Vehicle Safety Standards, safety defects investigations, consumer information, and the advancement of knowledge about driver behaviors and performance. Findings are applied to the development of vehicle technologies, which are compatible with driver abilities and limitations. NHTSA focuses this research in three main safety areas: 1) Developing and applying methods to better define the safety problem; 2) Enhancing visibility from the vehicle and lighting; 3) Evaluating advanced driver assistance systems and technologies that can reduce unsafe behaviors.

Safety Problem Assessment

Many higher-end vehicles are offered with advanced technologies before they become common to all vehicles. To learn about how drivers interact with these technologies NHTSA has conducted research on these "Early Adopters." We completed an analysis of surveys of drivers who purchased integrated navigation systems, parking aids, high intensity discharge headlamps, and adaptive cruise control. The findings show that drivers appreciate the benefits of these technologies, but may not fully understand their capabilities and limitations. The full reports are available on the NHTSA website.

Back-over Crashes

The problem of passenger vehicles backing over pedestrians is a small but significant problem. Last year, NHTSA prepared a report to Congress describing our current estimates of the extent and nature of the problem as well as our test results of current parking aids. The size of this safety problem is difficult to determine because many of the back-over crashes that occur on private property are not recorded in State or Federal crash databases, which focus on crashes occurring in traffic-ways. NHTSA has developed the Not-in-Traffic Surveillance (NiTS) system (discussed below) partly to allow the agency to better estimate the size of this safety problem.

Based on data from the NiTS system, back-over crashes involving all vehicle types are estimated to cause 292 fatalities annually in the U.S. Testing showed that the performance of sensor-based (ultrasonic and radar) parking aids in detecting child pedestrians behind the vehicle was typically poor, sporadic and limited in range. Because of the potential that camera-based systems appear to offer in addressing the risk of back-over, NHTSA plans to conduct additional work to estimate the effectiveness of such systems and to develop specifications of performance for any technology that could be developed to address this risk. Further, the Agency plans to encourage vehicle manufacturers to continue to develop systems that can be effective in addressing this risk at a reasonable cost to the consumer.

Headlight Research

Driver complaints about headlamp glare affecting their vision continue to be a concern in the U.S. To address this concern and look for solutions that balance the need for increased visibility with the glare consequences that can result, NHTSA funded research to identify the factors affecting glare. Among the topics addressed are the effects on driver performance of light spectrum, glare exposure, misaim, mounting height, and beam pattern. The research results indicate that adaptive headlight systems (i.e., systems that automatically adjust light levels in response to the needs of both the driver and oncoming drivers) have the potential to increase visibility and minimize glare. The full reports are available on the NHTSA website.

Rear Signaling Research

A major difference in lighting regulations between U.S. and other countries is that the U.S. allows both amber and red rear turn signals. We completed analyses of crash data to look for any differences in the crash rates associated with turn signals and found that amber turn signals led to fewer crashes. The analyses are available on the NHTSA website.

Alcohol Detection Research: Driver Alcohol Detection System for Safety (DADSS)

Since 1997, about a third of all fatally-injured passenger vehicle drivers had blood alcohol concentrations at or above the legal limit. In order to address this problem, NHTSA entered into a five year cooperative agreement with the Automotive Coalition for Traffic Safety (ACTS) in early 2008 aimed at developing alcohol detection technologies that could have widespread deployment and are non-invasive, reliable, accurate, and precise. These technologies would be less intrusive than ignition interlocks. To achieve this goal the project aims to: (1) assess the current state of alcohol detection devices, and (2) support the development and testing of prototypes and subsequent hardware that may be installed in vehicles. The prototypes would then undergo extensive laboratory and field testing. This five year effort will result in prototypes installed in actual test vehicles. However, the ultimate end goal at this point is anticipated to be voluntary acceptance and integration of these technologies into all vehicles.

Belt Minders

NHTSA has completed its assessment of the effectiveness and acceptance of enhanced safety belt reminder systems. We observed belt use in thousands of recent model vehicles and compared belt use in vehicles with and without an enhanced reminder system. The results found that on average reminder systems increased belt use by 3 percent. We also explored the tradeoff between reminder effectiveness and acceptability to drivers. The full reports are available on the NHTSA website.

Vehicle-based technology to reduce unsafe teen behaviors

Crashes of novice teen drivers continue to be a major part of the safety problem. While education and the increased use of Graduated Licensing programs are effective, additional solutions are needed. The increasing availability and shrinking costs of vehicular technologies that can detect and provide feedback about unsafe teen driving behaviors offers a new avenue to explore. NHTSA completed a study that reviewed the concept of vehicle-based teen monitoring and analyzed data from a naturalistic study of novice teen drivers. The purpose was to identify feasible technologies, unsafe teen driving behaviors, and approaches for further research to evaluate the effectiveness and acceptability of this type of countermeasure.

Tire Safety

Tire Aging Research

NHTSA remains concerned about the endurance of older tires. The agency determined that the thermo-oxidative degradation that occurs in tires during service is accelerated with higher temperatures and is a contributing factor for tire failures, such as tread separations. Therefore the agency completed a field study to evaluate the rate of change in the tire material properties and road wheel performance after increasing durations of service, followed by development of an accelerated laboratory tire aging test protocol. The agency is currently further analyzing the safety problem, studying tire aging as a casual factor in crashes, and estimating potential benefits and costs of a combined oven-aging and road wheel durability test.

Tire Rolling Resistance and Traction Research

NHTSA has been mandated to establish a national tire fuel efficiency consumer information program for passenger vehicle replacement tires to educate consumers about the effect of tires on automobile fuel efficiency, safety, and durability. As part of this effort, the agency has conducted research to examine possible correlations between tire rolling resistance levels and vehicle fuel economy, wet and dry tire traction, and outdoor and indoor tire tread wear.

Tire Bead Unseat Research

The current tire bead unseat test equipment used in the US Federal Motor Vehicle Safety Standards for tires, which dates to the 1960s, cannot physically test tires with rim codes larger than 18. The radius of the bead unseating block is too small to accommodate larger rim codes, often contacting the rim before a valid compliance test can be completed on the tire. Therefore, NHTSA conducted research on the evaluation of larger prototype bead-unseat blocks designed by ASTM that would facilitate testing tires up to rim code 30.

Data Collection and Analysis

NHTSA conducts a motor vehicle crash data collection program through the National Center for Statistics and Analysis (NCSA). It is composed of: the data collected from the states, including Fatality Analysis Reporting System (FARS) and the State Data Program, crash investigations, which includes the National Automotive Sampling System (NASS) and the Special Crash Investigations (SCI) programs.

FARS is a census of all fatal crashes occurring on public roads in the United States. The **NASS** is comprised of the General Estimates System (GES) and the Crashworthiness Data System (CDS). The GES provides national estimates of characteristics of all motor vehicle crashes. The CDS conducts detailed investigations into a nationally representative sample of crashes involving towed passenger vehicles to investigate injury-causing mechanisms and to evaluate countermeasures.

The NASS infrastructure was utilized in two surveys to collect nationally representative data on the events and factors related to the causation of crashes. The **Large Truck Crash Causation Study** (LTCCS) was conducted by the National Highway Traffic Safety Administration (NHTSA) and the Federal Motor Carrier Safety Administration (FMCSA) from 2001 to 2003 to collect information on the causes or contributing factors for large truck crashes. From 2005-2007, NHTSA conducted the **National Motor Vehicle Crash Causation Survey** (MMVCCS) which, unlike the previous Tri-Level Study, collected nationally representative information on the events and factors related to the causation of light motor vehicle traffic crashes. The SCI program provides in-depth data on crashes where emerging issues may be of interest.

The Not-in-Traffic Surveillance (NiTS) system is a virtual data collection system designed to provide counts and details regarding fatalities and injuries that occur in non-traffic crashes and in non-crash incidents. The NiTS 2007 system produced an overall annual estimate of 1,747 fatalities and 841,000 injuries in non-traffic crashes and non-crash incidents. The NiTS 2007 system provided information about an estimated 1,159 fatalities and 98,000 injuries that occurred in non-traffic crashes such as single-vehicle crashes on private roads, collisions with pedestrians on driveways, and two-vehicle crashes in parking facilities. The NiTS 2007 system also provided information about an annual average of 588 fatalities and 743,000 injuries in non-crash incidents involving passenger vehicle occupants or otherwise involving passenger vehicles. More than half of the non-crash fatalities occurred when a vehicle fell on a person who was under it or from unintentional carbon monoxide poisoning. The most common types of non-crash injuries seen in emergency departments were injuries while entering or exiting a vehicle (estimated 164,000 per year), injuries from closing doors (estimated 148,000 per year) and injuries from overexertion such as while unloading cargo or pushing a disabled vehicle (estimated 88,000 per year).

NCSA also conducts key analyses of the collected data and publishes reports, including the Traffic Safety Facts Annual Report and Traffic Safety Fact Sheets. Copies of the most recent reports can be found at NCSA's web site using the following URL: http://www.nhtsa.dot.gov/portal/site/nhtsa/menuitem.a0bd5d5a23d09ec24ec86e10dba046a0/

Significant Rulemaking Actions

Door Locks and Door Retention Components

On February 6, 2007, the agency amended our safety standard on door locks and door retention components in order to add and update requirements and test procedures and to harmonize with the world's first global technical regulation for motor vehicles. The final rule adds test requirements and test procedures for sliding doors, adds secondary latched position requirements for doors other than hinged side doors and back doors, provides a new optional test procedure for assessing inertial forces, and extends the application of the standard to buses with a gross vehicle weight rating (GVWR) of less than 10,000 pounds, including 12-15 passenger vans. The final rule also eliminates an exclusion from the requirements of the standard for doors equipped with wheelchair platform lifts.

Electronic Stability Control Systems; Controls & Displays

On April 6, 2007, as part of a comprehensive plan for reducing the serious risk of rollover crashes and the risk of death and serious injury in those crashes, the agency established a new Federal motor vehicle safety standard (FMVSS) No. 126 to require electronic stability control (ESC) systems on passenger cars, multipurpose passenger vehicles, trucks, and buses with a gross vehicle weight rating of 4,536 Kg (10,000 pounds) or less. ESC systems use automatic computer-controlled braking of individual wheels to assist the driver in maintaining control in critical driving situations in which the vehicle is beginning to lose directional stability at the rear wheels (spin out) or directional control at the front wheels (plow out).

Side Impact Protection

On September 11, 2007 NHTSA published this final rule incorporating a dynamic pole test into Federal Motor Vehicle Safety Standard (FMVSS) No. 214, "Side impact protection." To meet the test, vehicle manufacturers will need to assure head and improved chest protection in side crashes. It will lead to the installation of new technologies, such as side curtain air bags and torso side air bags, which are capable of improving head and thorax protection to occupants of vehicles that crash into poles and trees and vehicles that are laterally struck by a higher-riding vehicle. The side air bag systems installed to meet the requirements of this final rule will also reduce fatalities and injuries caused by partial ejections through side windows.

Fuel Economy

On May 2, 2008, the Agency proposed substantial increases in the Corporate Average Fuel Economy (CAFE) standards for MY 2011-2015 passenger cars and light trucks that would enhance energy security by improving fuel economy. Since the carbon dioxide

(CO2) emitted from the tailpipes of new motor vehicles is the natural by-product of the combustion of fuel, the increased standards would also address climate change by reducing tailpipe emissions of CO2. Those emissions represent 97 percent of the total greenhouse gas emissions from motor vehicles. Implementation of the new standards would dramatically add to the billions of barrels of fuel already saved since the beginning of the CAFE program in 1975.

Convex Cross View Mirrors (Withdrawn)

On July 21, 2008 the National Highway Traffic Safety Administration (NHTSA) issued a notice terminating a rulemaking that was initiated in 2005in response to a petition. This rulemaking, to amend Federal Motor Vehicle Safety Standard No. 111, "Rearview Mirrors" to require straight trucks with a gross vehicle weight rating (GVWR) of between 4,536 kilograms (10,000 pounds) and 11,793 kilograms (26,000 pounds) to be equipped with a system capable of providing drivers with a view of objects directly behind the vehicle. More refined data generated since the 2005 NPRM shows that the sub-population of mid-sized trucks accounts for only four of the estimated 292 fatalities per year due to back-over accidents. In addition, the recently signed Cameron Gulbransen Kids Transportation Safety Act of 2007 \1\ (K.T. Safety Act of 2007) requires NHTSA to revise the Federal standard for rearward visibility, specifically to reduce backing crashes involving children and disabled people. Considering these developments, the agency believes it more appropriate to address the backing safety of straight trucks as part of the comprehensive effort to address backing safety generally, and that solutions should be formulated after the completion and review of ongoing research and data gathering on backing safety. We therefore withdrew this rulemaking.

Designated Seating Position

On October 8, 2008 NHTSA published a final rule amends the definition of the term, "designated seating position," as used in the Federal motor vehicle safety standards (FMVSS), to indicate more clearly which areas within the interior of a vehicle meet that definition. The final rule also establishes a calculation procedure for determining the number of designated seating positions at a seat location for trucks and multipurpose passenger vehicles with a gross vehicle weight rating less than 10,000 lbs, passenger cars, and buses. Further, this document eliminates the existing exclusion of auxiliary seats (i.e., temporary or folding jump seats) from the definition of "designated seating position." The final rule encourages manufacturers to use a variety of visual cues in the design of the vehicle interior to help improve occupant awareness as to which areas of a vehicle are not intended to be used as seating positions. This will help to ensure that occupants sit in locations where they are afforded the crash protection required by the FMVSS sections.

Evolving Vehicle Safety Strategy

NHTSA's Vehicle Safety Program consists of rulemaking, enforcement, research, and data collection activities. Through a productive mix of these activities we are developing a 10-year strategic vision for improving vehicle safety. The plan lays out a clear direction for short term research and the data needs to support ongoing regulatory and enforcement efforts. Moreover, the strategy provides the accountability for establishing long term Vehicle Safety Program initiatives.

The main theme of the 10 year vehicle safety strategy is to: **Identify, research, and address critical issues that affect motor vehicle safety, highway traffic safety, and fuel economy**.

To achieve this goal, five strategic outcomes have been developed:

1. Address safety and environmental challenges related to motor vehicles and equipment including those posed by global trade.
2. Identify and address emerging safety issues.
3. Foster the use of effective advanced technologies that improve safety.
4. Ensure the integrated improvement of fuel economy and safety.
5. Respond effectively to issues identified by parties outside of NHTSA.

Collaborative Approach

Safety technology continues to evolve at a fast pace. Government agencies, acting alone, cannot expect to keep up with this pace. NHTSA believes it must continue to explore collaborative models with all stakeholders, such as OEMs, suppliers, research centers, advocates, and other government agencies.

These collaborative models provides for a more transparent technology development and implementation process, which significantly reduces the time for advanced safety technologies to reach the consumer.

Short Term and Long Term Priorities

Short and long term priorities are integrated into a single evolving strategic plan. Short term priorities cover issues over a one to two year horizon and long term priorities cover issues over a three to ten year horizon. Both paths integrate mandates from Congressional, industry, and advocacy groups that emerge onto the forefront as immediate needs.

Mechanisms for Addressing Priorities

Specific short term activities are actively updated as needed on the specific priority plans of the office directors for each activity. Longer term activities are developed by coordinating current efforts and identifying new areas that should be explored through research and data collection. The long term horizon extends beyond what NHTSA is currently doing by actively coordinating with manufacturers and suppliers, outside researchers, and other national and international entities.

It is imperative that our plan is proactive on the international stage to monitor the development of new technologies in terms of what they are, when they might enter the fleet, what impact they might have on safety, how they should be evaluated, whether they should be encouraged, and the implications of these on fuel economy.

As part of our proactive response, we especially recognize public concerns about special populations of drivers, even where the perceived risk exceeds risk quantified in crash data. One mechanism for responding to these 'calls to action' includes the development of white papers, which are regularly updated with analyses that are used to clearly articulate a plan to address immediate and future directions.

Structures for Building a Foundation for the Evolving Vehicle Safety Strategy

NHTSA is implementing management structures that support the evolving Vehicle Safety Strategy, including a Strategy Coordinating Council (SCC) composed of representatives from our Research, NCSA, Rulemaking, and Enforcement offices.

The core purpose of the SCC is to establish and maintain this 10-year strategic vision, as well as to engage and coordinate existing teams and groups working on relevant topics to carry out the short term priorities. The SCC is the focal point for raising, validating and coordinating follow-up work on potential emerging concerns as identified through crash data, staff experts, Artemis data, defects investigations, research, and external sources such as Congress, industry, and advocacy groups.

Evolving the Strategy

In sum, our Vehicle Safety Strategy is designed to proactively expand our focus on vehicle safety needs and to dynamically manage our safety programs in a culture of accountability and global leadership. It constitutes a method for managing our responses to vehicle safety needs through a flexible but disciplined approach that keeps pace with changing vehicle safety priorities over time. As new opportunities for vehicle safety emerge from our strategy, our methods will help to ensure a clear path of transition of these to main stream vehicle safety programs, such as those described through the body of this paper.

GOVERNMENT STATUS REPORT OF JAPAN

Masayuki Shima
Director,
International Affairs Office,
Engineering Planning Division,
Engineering and Safety Department,
Road Transport Bureau,
Ministry of Land, Infrastructure, Transport and Tourism of Japan

TRENDS OF THE ROAD TRAFFIC ACCIDENTS IN JAPAN

The number of fatalities (within a 24-hour period) resulting from traffic accidents in 2008 was 5,155. This represents the eighth consecutive year that the number of fatalities has been decreasing, as well as a further drop below last year's number, which was the first time in 54 years since 1953 that the number of fatalities reached the 5,000 range. This number was also below one-third the 16,765 fatalities in 1970, which was the year in which the number of fatalities reached a peak. In addition, the number of accidents resulting in bodily injury and the number of injured persons decreased for the fourth consecutive year in a row since 2004, when the numbers were at their worst, and the number of injured persons fell below 1 million for the first time in 10 years.

However, the number of fatalities and injured persons and the number of accidents resulting in bodily injury remained high in 2008, as there were approximately 950,000 fatalities and injured persons, and approximately 770,000 accidents resulting in bodily injury.

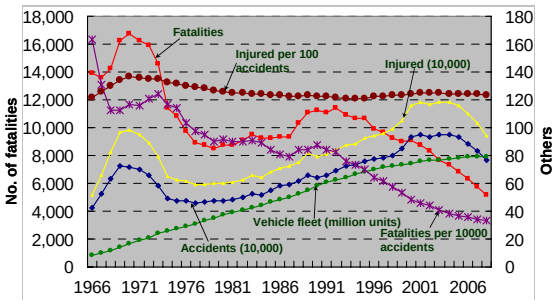


Figure 1. Trends of the road traffic accidents in Japan

With regard to reducing the number of traffic accidents, in order to achieve the national government's mid-term goal of "reducing the number of fatalities from traffic accidents to below 5,000 people by 2012" as indicated in the Prime Minister's policy speech in 2003, the targets of reducing the number of fatalities to below 5,500 and reducing the number of injured persons to below 1 million people by 2010 were established in the Eighth Fundamental Traffic Safety Program for 2006 to 2010.

Taking the state of past traffic accidents into consideration, this mid-term goal by the national government of reducing the number of fatalities to below 5,000 will be achieved in the near future, and as of the present moment, the targets in the Eighth Fundamental Traffic Safety Program will be reached two years in advance.

Based on these circumstances, in January of this year a new target by the national government to "halve the number of fatalities caused by traffic accidents to below 2,500 within approximately the next 10 years" was established in statements, etc. made by the Prime Minister.

The figure below shows the reduction in the number of fatalities based on safety measures for vehicles. In this diagram, the straight line from 1999 to 2010 represents the target for the reduction in the number of fatalities from traffic accidents that was established in 1999, and the curve extending to 2015 represents the estimated performance in the reduction of accidents based on safety measures for vehicles and subsequent reductions in the number of accidents that are anticipated.

According to analysis results based on traffic accident data, the target for the number of fatalities resulting from traffic accidents that is

based on safety measures for vehicles and that was initially established in 1999 was achieved 5 years early, and this is assessed as being largely due to the effects of measures for mitigating damage from vehicles through expanding and reinforcing safety standards and implementing vehicle assessments.

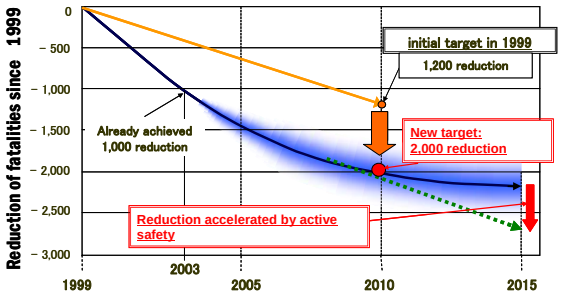


Figure 2. Targets for traffic safety by vehicle safety measures

Upon achieving this target, the following targets were newly established in 2006, in aiming towards further reductions in the number of fatalities (Transport Policy Council Report from June 2006).

(1) Reducing the annual number of fatalities in 2010 by 2000 people as compared to 1999, through safety measures for vehicles

(2) Prominently expanding active safety measures after 2010, and ensuring that the annual number of fatalities continues to decrease in 2015

As it is anticipated that the effects of damage mitigation measures will become saturated in accordance with the popularization of vehicles that conform to passive safety standards, in the future, it is important to continue promoting damage mitigation measures and to accelerate the introduction of technology related to active safety measures in order to further reduce the number of traffic accidents.

FUTURE RESEARCH IN FINDING SOLUTIONS TO THE SAFETY PROBLEMS IDENTIFIED

To achieve the abovementioned targets for reducing the number of traffic accidents, approaches will be made towards the following measures upon speculating future changes in social structures, such as future developments in IT and the progression of declining birthrates and an aging society.

- Accident analysis by using a drive recorder;
- Promotion of safety measures for pedestrians and the elderly;
- Promotion of neck injury prevention measures;
- Introduction of standards on crash compatibility;
- Research on advanced technologies, etc.

Concrete approaches regarding each of the measures are introduced below.

1. Accident analysis by using a drive recorder

In the event that useful active safety technology is to be popularized as a safety measure, further accurate information, such as the order of priority regarding introduction, cost-effectiveness, and clear information for users, etc., is necessary. Normally, these kinds of analyses are carried out based on traffic accident data, but in the case of active safety measures, there is insufficient information, such as due to the impossibility of acquiring data immediately before an accident, as conventional accident data is obtained based on surveys conducted after an accident occurs. To overcome this problem, there are expectations for drive recorders, etc., which are devices that record data immediately before an accident or when there is a near-miss incident, to provide data for the purpose of accident analysis and effects assessment. As approaches related to such in-vehicle recording equipment, technical guidelines pertaining to event data recorders were specified in March 2008, and methods for evaluating active safety equipment that make use of drive recorders are being reviewed. In the future, there are plans for reviews to be made on methods for gathering, managing, and analyzing the data recorded by drive recorders.

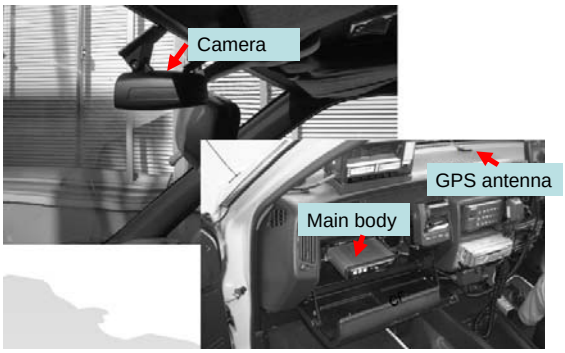


Figure 3. Example of a drive recorder system

2. Promotion of safety measures for pedestrians and the elderly

With regard to accidents involving pedestrians and the elderly, which account for a high percentage of the number of fatalities caused by traffic accidents in Japan, it is necessary to implement popularization and promotion of pedestrian protection performance standards and driving assistance systems for safety of the elderly. As a result, with regard to measures for pedestrians, pedestrian head protection standards were introduced in 2004, and reviews are being conducted on the introduction of pedestrian leg protection standards. In addition, with regard to measures for the elderly, surveys on the assessment of the effects, etc. of driving assistance systems for safety, such as brake assist systems and night vision systems, etc. are being conducted.

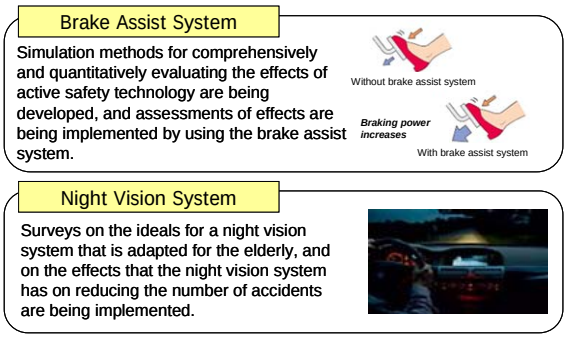


Figure 4. Examples of safety measures for the elderly

3. Promotion of neck injury prevention measures (standardization of dummies)

Accidents involving neck injury account for more than half of the total number of accidents, and as there is an increasing trend in the number of such accidents in recent years, the enhancement of standards for headrests, etc. is being promoted as measures for neck injuries.

At the same time, with regard to assessments of whiplash injuries, which 80% of occupants in rear-end collisions suffer, the mechanism behind the occurrence of whiplash is complex, and as a result, there is not enough scientific clarification and it is also unclear as to which dummies should be used and what items to assess.

In particular, with regard to dummies, there are concerns regarding the consistency of assessments due to differences in structures, etc. of the dummies, and it is necessary for dummies to be standardized by having the research institutions, etc. of each country make approaches by contributing to efforts to elucidate the mechanism behind the occurrence of whiplash injuries and decide on assessment standards and indicators.

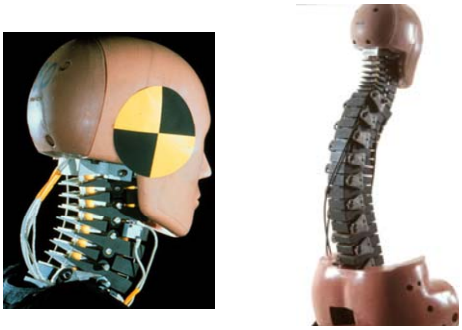


Figure 5. Standardization of dummies

4. Introduction of standards on crash compatibility, etc.

In addition to the above, crash compatibility measures for accidents involving frontal collision are also one of the passive damage mitigation measures for which approaches should be made. Japan considers measures for mini vehicles as being necessary. For the short-term, reviews are currently being conducted on the installation height of structural members so that the structural members interlock when there is a frontal collision.

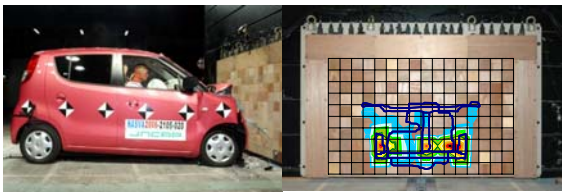


Figure 6. Crash Compatibility

Standards relating to performance for protecting occupants from electric shock after the collision of an electric vehicle or hybrid vehicle were also formulated in November 2007, and in the future, these guidelines will be reflected in reviews pertaining to electrical safety of electric vehicles, etc., on which progress is currently being made in international conferences, etc.

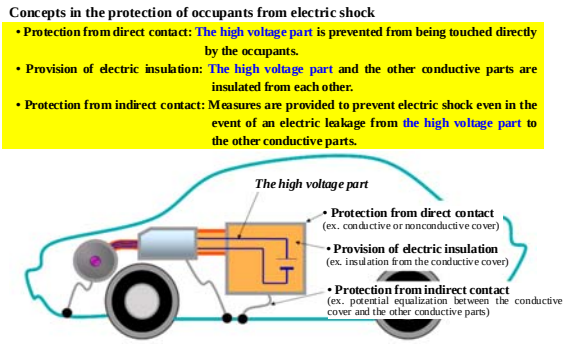


Figure 7. Concepts in the protection of occupants from electric shock

5. Research on advanced technologies

To prevent errors by drivers before they occur and decrease the number of accidents resulting in death and injuries, Japan has, with regard to ASVs, which are vehicles equipped with a system for assisting the driver to drive safely that makes use of advanced technology, established the ASV Project, which is a project to promote the development, practical application, and popularization of technology related to ASV, in 1991, and has been progressing with this project through joint efforts by industry, academia, and government.

For example, with regard to ASV technology that uses communications technology, technological developments are being promoted in the automobile industry through the implementation of experiments on public roads. In January of this year, a Large-scale Field Operation Test on public roads using approximately 30 vehicles equipped with inter-vehicle communications was conducted based on cooperation between the public and private sectors, and currently, the experiment results are in the process of being analyzed.

Figure 8. Communication-based driving assistance system for safety

PUTTING SAFETY TECHNOLOGIES TO WORK

The following table is a list of ASV technologies that are being put to practical use. Several ASV technologies, such as the lane-keeping assistance system and high-speed adaptive cruise control, have already been put to practical use, and are equipped in commercially-sold vehicles.

Table 1. Commercialized technologies from ASV Project

No.	ASV technology	Status		
		1996	2001	2004
1	High-speed adaptive cruise control (ACC)	☆	☆☆☆	☆☆☆
2	Low-speed adaptive cruise control	☆	☆☆	☆☆☆
3	Lane keep	☆	☆☆☆	☆☆☆
4	Damage mitigation brake	☆	☆	☆☆☆
5	Drowsiness warning	☆	☆☆☆	☆☆☆
6	Rear and side obstacle warning	☆	☆☆☆	☆☆☆
7	Curve warning	☆	☆	☆☆☆
8	Night vision	☆	☆	☆☆☆
9	Parking assist	☆	☆	☆☆☆

☆: In-company test, ☆☆: Road running test, ☆☆☆: Commercial use

From among the ASV technologies that are already mature, those with large effects in damage mitigation and accident reduction and

those for which there are large social needs should be disseminated in an early manner, and thus, active dissemination measures that include means for incentives are necessary.

Based on the idea that the damage mitigation braking system in heavy duty vehicles is technology that is suitably applicable to such means for incentives, in Japan, a system where aid for 50% of the costs related to installing the damage mitigation braking system in heavy duty vehicles for commercial use is provided to the purchaser has been implemented since April 1, 2007.

In addition, reviews are currently being conducted on this system regarding further measures that bring compulsory installation of the system into view.

CONCLUSION

Measures that are being taken in Japan have been described above, but in order to promote international harmonization in the aspects of further advanced safety and the environment in the future, it is perceived that approaches made in coordination with the ESV Conference, WP.29, ITS World Congress, etc. will become increasingly important.