European Transport Safety Council

A Proposal for a strategy to reduce the number of people seriously injured on EU roads

Position Paper

February 2016

Executive Summary

Since 2010 the number of people seriously injured in the EU has been reduced by just 1.6%[1], compared to an 18% decrease in the number of road deaths in the same group of countries[2]. The majority of countries have reduced road deaths at a faster pace than seriously injured since 2001[3].

In 2014, more than 203,500 people were recorded by the police as seriously injured on the roads in the EU[4], representing an increase of almost 3% compared to 2013[5].

There is strong political support to take action on serious injury. In 2010 the Council of the European Union underlined the 'urgent need to address serious injuries, supporting the development of a common definition and agreeing to the principle of a specific quantitative target'[6].

In July 2013, the European Parliament adopted a Resolution urging the European Commission to set an ambitious target for the reduction of road traffic serious injuries over the 2014-2020 period.[7]

The European Commission presented its 'First Milestone towards a Serious Injury Strategy' in 2013[8]. The Commission committed to setting a common EU target for the reduction in the number of people seriously injured on the roads by 2020. However, after having promised a target 'shortly' in a press release of 24 March 2015[9], the European Commission backtracked and it is now unclear when the target will be set.

ETSC recommends to the EU to adopt a target of a 35% reduction between 2014 and 2020 in the number of people seriously injured. A 35% reduction over the period 2014-2020 would be similarly challenging for Member States to the target to halve road deaths between 2010 and 2020. In addition, the EU should adopt a joint strategy including measures against which delivery can be made accountable.

Key recommendations to the EU

- Create a road safety system that recognises the vulnerability of the human body.
- Adopt a target of a 35% reduction between 2014 and 2020 in the number of people seriously injured. A 35% reduction over the period 2014-2020 would be

[1] Using current national definitions of people seriously injured. See data and national definitions of people seriously injured in ETSC (2015) 9th PIN Annual Report, Tables 7 and 8.
[2] In the 23 countries distinguishing between seriously and slightly injured in their data.
[3] ETSC (2015), 9th Road Safety PIN Report.
[4] Ibid.
[5] The actual number of people injured in road collisions is not known, but sample studies have shown it to be considerably higher than the official recorded number based on police reports.
[6] Council conclusions on road safety, 3052th Transport, Telecommunications and Energy Council meeting, Brussels, 2–3 December 2010.
[7] http://www.europarl.europa.eu/sides/getDoc.do?type=MOTION&reference=B7-2013-0318&language=EN
[8] European Commission (2013) Staff Working Document: On the Implementation of Objective 6 of the European Commission's Policy Orientations on Road Safety 2011-2020 – First Milestone Towards an Injury Strategy.
[9] European Commission Press release of 24th of March 2015, How safe are your roads? http://europa.eu/rapid/press-release_IP-15-4656_en.htm

similarly challenging and numerically comparable for the Member States to the target to halve road deaths between 2010 and 2020.

- Involve all relevant directorates general, in particular DG Health and Food Safety (SANTE), in identifying preventive measures, adopting the joint strategy to tackle serious injuries and implementing it. The joint strategy should include measures against which delivery can be made accountable.
- Include numbers of seriously injured in the impact assessment of countermeasures, where this does not take place already.
- Suppport Members States' efforts to improve the quality of the data on seriously injured people and prioritise short-term measures that can be implemented with existing knowledge, e.g. measures to improve speed limit compliance will reduce injury severity and have immediate effect.

Vehicle safety

Within the context of the revision of Regulation 2009/661 concerning Type-Approval Requirements for the General Safety of Motor Vehicles and the revision of Regulation 2009/78 on the protection of pedestrians and other vulnerable road users:

- Upgrade type approval crash tests to be more closely aligned with the requirements of Euro NCAP crash tests.
- Update the existing pedestrian protection tests for new motor vehicles and extend them to protect cyclists.
- Extend the mandatory fitment of advanced seat belt reminders as standard equipment to all seats.
- Adopt legislation for fitting all new vehicles with an overridable Intelligent Speed Assistance system. Curbing illegal and inappropriate speed will reduce injury severity in all kinds of collisions.
- Extend fitment of Autonomous Emergency Braking systems (which operate at all speeds and can detect pedestrians and cyclists) to passenger cars and light trucks and vans.
- Legislate to ensure that retrofitting of vehicles with alcohol interlocks continues to be possible in the future (building on the CENELEC draft standard for the electrical connection between the alcohol interlock and the vehicle). Legislate for a consistently high level of reliability of alcohol interlock devices. As a first step towards wider use of alcohol interlocks, legislate their use by professional drivers.
- Mandate Event Data Recorders in all new vehicles and require the data to be made available for accident investigation.
- Encourage Member States to provide tax incentives for the purchase and use of safe cars (5 star Euro NCAP cars).
- Develop mandatory requirements for safer goods vehicles stipulating improved cabin design and underrun protection, and remove exemptions that exist so as to require the use of side guards to protect other road users in collisions with trucks.

Infrastructure safety

- Encourage Member States to adopt zones with speed limits of maximum 30km/h (or 20mph) in residential areas and areas with large numbers of pedestrians and cyclists and maximum 80km/h on undivided rural roads.
- Within the context of the review of the Infrastructure Safety Management Directive 2008/96 encourage Member States to extend the application of the instruments of the directive to cover all roads and extend the rules to tunnels covered by the Tunnel Directive 2004/54 while upholding the effects of the Tunnel Directive.
- Within the context of the Urban Mobility Action Plan, draft guidelines for promoting best practice in traffic calming measures, based upon physical measures such as roundabouts, road narrowing, chicanes, road humps and techniques of space-sharing, to support area-wide urban safety management, in particular when 30km/h zones are introduced.

Post collision care

- Encourage Member States to develop effective emergency notification and collaboration between dispatch centres, fast transport of qualified medical and fire/rescue staff, liaison between services on scene, treatment and stabilisation of the casualty, and prompt rescue and removal to an appropriate health care facility.
- Promote the widely accepted standard of a 'casualty centred' methodology which ensures a multi-service, unified approach that promotes optimum casualty care coupled with specific steps to achieve a rapid but safe rescue.
- Encourage, in the development of new vehicle technology, greater collaboration between vehicle designers, manufacturers and the emergency services to maximise the effectiveness of intervention and the safety of all involved including casualty and rescuer.
- Encourage Member States to measure the quality of trauma care and outcome via audits and follow-up of a sample of road victims over time.

Research and in-depth accident investigation

- In view of the large numbers of road deaths and serious injuries across the EU, set up a Pan-European Accident Investigation Network, as is already the case in aviation, maritime and railway sectors, applying independent and high-quality accident investigation techniques to representative stratified samples of road collisions.
- Set up a European Road Safety Agency to, among other tasks, collect and analyse data on collisions, exposure and from in-depth accident investigations to inform new safety policy as well as to evaluate the effectiveness of road safety countermeasures.

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Part I Introduction: The Need to Act

1.1 Scale of the problem

Since 2010 the number of people seriously injured in the EU has been reduced by just 1.6%[10], compared to an 18% decrease in the number of road deaths in the same group of countries[11]. The majority of countries have reduced road deaths at a faster pace than seriously injured since 2001[12].

In 2014, more than 203,500 people were recorded by the police as seriously injured on the roads in the EU[13], representing an increase of almost 3% compared to 2013[14]. Research is needed to understand why numbers of seriously injured are not going down as fast as road deaths in order to be able to devise policies for reducing seriously injured at the same pace as deaths.

The difference in progress might be attributed to several factors which have a more important impact on deaths than on serious injuries. In some countries, like France, this could be explained by a greater impact of achieved speed reduction on deaths than on injuries. In others, like the Netherlands, this is partly the result of national traffic patterns: 45% of all seriously injured Dutch road users are cyclists.

Involvement in road collisions is one of the leading causes of death and hospital admission for EU citizens under 45 years of age[15]. Vulnerable road users, for example pedestrians, cyclists, motorcyclists or users in certain age groups – notably the elderly – are especially affected by serious road injuries. Serious road traffic injuries occur on all kinds of road, but in comparison with deaths a larger proportion of them occur in urban areas and involve vulnerable road users[16]. On rural roads these injuries are more severe and thus more likely to be fatal.

The European Commission has launched a study to identify the most common road accident scenarios causing serious injury and to assess influences on injury severity. The analysis of the information collected should make it easier to identify effective injury prevention measures[17]. Serious injuries are also studied within SafetyCube (Safety CaUsation, Benefits and Efficiency), a research project funded by the European Commission under Horizon 2020, the EU Framework Programme for Research and Innovation, in the domain of Road Safety[18].

[10] Using current national definitions of people seriously injured. See data and national definitions of people seriously injured in ETSC (2015) 9th PIN Annual Report, Tables 7 and 8.
[11] In the 23 countries distinguishing between seriously and slightly injured in their data.
[12] ETSC (2015), 9th Road Safety PIN Report.
[13] Ibid.
[14] The actual number of people injured in road collisions is not known, but sample studies have shown it to be considerably higher than the official recorded number based on police reports.
[15] EC Public consultation on the European Road Safety Action Programme 2011-2020.
[16] European Commission (2013) Staff Working Document.
[17] http://ec.europa.eu/transport/road_safety/events-archive/2015_11_27_ser_inj_en.htm The final report is expected in October 2016.
[18] http://www.safetycube-project.eu/ The project started in May 2015 and will run for a period of three years.

1.2 Commitment to act

There is strong political support to take action on serious injury. In 2010 the Council underlined the 'urgent need to address serious injuries, supporting the development of a common definition and agreeing to the principle of a specific quantitative target'[19].

In July 2013, in response to the EU's adoption of a definition[20], the European Parliament adopted a Resolution urging the European Commission to set an ambitious target for the reduction of road traffic serious injuries over the 2014-2020 period.[21] In its Resolution, the European Parliament "welcome[d] the priorities set by the Commission for developing its global strategy, i.e. to address collision impact, accident management strategy, first aid and emergency services and long-term rehabilitation processes, and call[ed] for the swift implementation of these priorities". Finally, the European Parliament's report on the Mid Term Review of the Transport White Paper supports "the adoption of a 2020 target of a 35% reduction in the number of people seriously injured, accompanied by a fully-fledged EU strategy".[22]

Since 2010, the European Commission has been committed to introducing an EU-wide strategic target to reduce serious road traffic injuries.[23] In its White Paper on the future of Transport, the European Commission committed to following a 'zero-vision' in road safety and to help in this it intends to "develop a comprehensive strategy of action on road injuries and emergency services, including common definitions and standard classifications of injuries and fatalities, in view of adopting an injury reduction target"[24].

In 2013, the common definition of serious injuries to be recorded and tracked, which was regarded as a prerequisite for target setting, was approved[25]. ETSC welcomed the adoption of a common EU definition of seriously injured casualties as in-patients with an injury level of MAIS 3 or more. A target was finally expected to be set in the first half of 2015, having been promised 'shortly' in a press release in March 2015[26] and by

[19] Council conclusions on road safety, 3052th Transport, Telecommunications and Energy Council meeting, Brussels, 2–3 December 2010.
[20] European Commission (2013) Staff Working Document: On the Implementation of Objective 6 of the European Commission's Policy Orientations on Road Safety 2011-2020 – First Milestone Towards an Injury Strategy.
[21] http://www.europarl.europa.eu/sides/getDoc.do?type=MOTION&reference=B7-2013-0318&language=EN
[22] http://www.europarl.europa.eu/sides/getDoc.do?type=TA&reference=P8-TA-2015-0310&language=EN
[23] See 2010 Road Safety Policy Orientations: http://ec.europa.eu/transport/road_safety/pdf/com_20072010_en.pdf and 2011 European Commission Transport White Paper: http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52011DC0144&from=EN
[24] European Commission (2011) Roadmap to a Single European Transport Area.
[25] The Abbreviated Injury Scale (AIS) is a globally accepted trauma classification of injuries, which ranges from 1 (minor injuries) to 6 (non-treatable injuries) and is used by medical professionals to describe the severity of injury for each of the nine regions of the body (Head, Face, Neck, Thorax, Abdomen, Spine, Upper Extremity, Lower Extremity, External and other). As one person can have more than one injury, the Maximum Abbreviated Injury Score (MAIS) is the maximum AIS of all injury diagnoses for a person.
[26] http://europa.eu/rapid/press-release_IP-15-4656_en.htm

Commissioner Bulc at the Transport Committee of the European Parliament on 6 May 2015.

In June 2015 the European Commission published a mid-term review of its road safety policy. Expectations were for an announcement on an adoption of a serious injury reduction target. The accompanying staff working document says the Commission will "work on serious injuries including monitoring of progress…and by further activities aimed at supporting Member States and local communities" – but makes no mention of the strategic target[27]. The full interim evaluation report on EU road safety policy 2011-2020, published alongside the Staff Working Paper, says the "definition and methodology on serious road injuries is in place: prerequisites for setting a strategic target are fulfilled."[28]

The interim evaluation recognises, under the category "what remains to be done", that a target on reducing the number of people seriously injured remains to be set, that "possible actions" still have to be identified and that a study is being prepared to identify those targeted measures.[29]

Concerns over the apparent dropping of the target were expressed in a letter to Commission President Jean-Claude Juncker from more than 70 road safety experts and organisations and 12 MEPs published in June 2015.[30]

The United Nations adopted its first formal target to "halve the number of global deaths and injuries from road traffic accidents [between 2010 and 2020]" in September 2015, as part of a far-reaching package of sustainable development goals (SDGs). The UN target, in line with that agreed by the EU in 2010, goes further as it also includes serious injuries. The ambitious global target applies to all member states of the UN, including the EU28 Member States.

1.3 Value of prevention estimated at billions of Euros

There is a strong economic case to include the prevention of road traffic deaths and serious injury on the EU's health agenda as well as its transport one. In the last decade the annual socio-economic cost of road traffic injuries is estimated to be equivalent to around 2% of GDP, 250 billion Euro in 2012[31], of which serious injuries account for around one-quarter, i.e. around 65 billion Euro. The road safety community has been advocating that investing in road safety offers a great potential for saving human suffering and reallocating resources for a more productive use. Estimates undertaken by ETSC show that, if all the road deaths recorded in 2010 could have been prevented, the value of benefits to society would have been some 53 billion Euro, and a corresponding prevention of all serious injuries would have yielded social benefits of the same order[32].The EU Transport White Paper recognises that the social costs of road collisions

[27] http://data.consilium.europa.eu/doc/document/ST-9791-2015-INIT/en/pdf
[28] http://ec.europa.eu/transport/road_safety/pdf/interim_eval_2011_2020/interim_eval.pdf
[29] ibid
[30] http://etsc.eu/wp-content/uploads/2015-06-12-letter-juncker-final_for_website.pdf
[31] WHO (2004) World Report on Road Traffic Injury Prevention.
[32] ETSC (2011) 5th PIN Report.

will rise in the future. The increase in traffic would lead to cost of collisions of 60 billion Euro higher by 2050[33].

Recommendations to the EU and Member States

- Include numbers seriously injured in the impact assessment of countermeasures, where this does not take place already.
- Suppport Members States' efforts to improve the quality of the data on seriously injured people and prioritise short-term measures that can be implemented with existing knowledge, e.g. measures to improve speed limit compliance will reduce injury severity and have immediate effect.

1.4 A target to reduce the number of people seriously injured

The role of road safety targets in the current progress in reducing road deaths is known to be effective, as is confirmed both by the OECD[34] and scientists[35]. The EU targets for road deaths were an important driver for the dramatic reductions achieved in countries such as Spain, Portugal, Lithuania, Latvia, Slovenia and Estonia, all of which have cut deaths by more than 60% since 2001.

At the EU level, a quantitative serious road injury target would provide a stimulus for EU actions in areas where the EU has exclusive responsibility for road safety such as vehicle safety standards. An EU target would also inspire competition and knowledge sharing between member states, as it has done for the prevention of deaths. At least 14 EU Member States have adopted national targets to reduce the number of people seriously injured.[36]

ETSC recommends the EU to adopt a target of 35% reduction between 2014 and 2020 in the number of people seriously injured on the roads. A 35% reduction in the number of seriously injured between 2014 and 2020 would be similarly challenging to the target to halve road deaths between 2010 and 2020. Between 2001 and 2014 at least 10 countries across Europe have reduced seriously injured at similar rates to deaths. So it is reasonable for Europe's ambition for reducing serious injuries to be as challenging as its ambition

[33] European Commission (2011) Roadmap to a Single European Transport Area.
[34] OECD (2008), Towards zero: achieving ambitious road safety targets and the safe system approach.
[35] Elvik (1993), "Quantified road safety targets: a useful tool for policy making", Accident analysis and prevention.
[36] Source: PIN Panellists. In Finland, the target is to reduce by 25% the number of people injured on the roads between 2010 and 2020. Norway, Scotland and Northern Ireland have also adopted targets to reduce the number of people seriously injured. Wales has a target to reduce the number of people killed and seriously injured by 50% by 2020.

for reducing deaths.

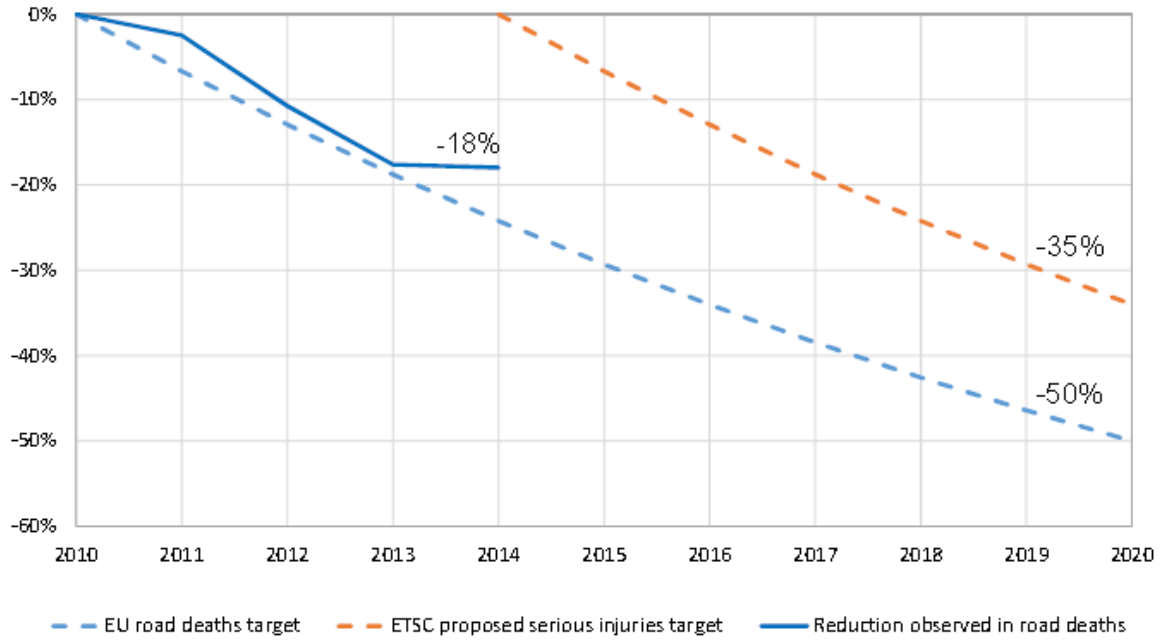

Fig. 1: Reduction in the number of road deaths since 2010 (dark blue line) plotted against the EU target for 2020 (light blue dotted line), with ETSC's recommended target for reduction in the number seriously injured (orange dotted line) - in each case an annual reduction of 6.7%.

Recommendations to the EU

- Adopt a target of a 35% reduction between 2014 and 2020 in the number of people seriously injured. A 35% reduction over the period 2014-2020 would be similarly challenging to the target to halve road deaths between 2010 and 2020.
- Encourage Member States that have not done so to adopt national reduction targets for seriously injured alongside the reduction of deaths and address explicitly the challenge of reducing the number of people seriously injured in their national road safety plans.
- Support Member States with an exchange of best practice in recording procedures and in training of data-handling professionals.
- Continue to review the procedures used by Member States to estimate the number of people seriously injured with a view to achieving comparability even though a variety of methods will be used in practice to implement the common definition.

1.5 Adopt a joint strategy and allocate the necessary resources

Road safety policy needs to be supported by effective institutional management in order to achieve long term effects on road safety levels. No government department working alone can reduce the number of road casualties effectively. It is therefore important to organise clear institutional roles and responsibilities and coordination between all stakeholders at EU, national, regional and local levels.

In its Road Safety Policy Orientations 2011-2020, the European Commission recognised that an "integrated approach to road safety" is needed: "The future road safety policy should be taken into account in other policy fields of the EU, and it should take the

objectives of these other policies into account. Road safety has close links with policies on energy, environment, employment, education, youth, public health, research, innovation and technology, justice, insurance, trade and foreign affairs, among others."

Ministers at the Transport Council in 2010 adopted Conclusions which prioritised measures they wanted to see for the brand new "common European area for road safety" in response to the "Policy Orientations". The Ministers included a strong commitment to integration, stating that: "in order to reach maximum efficiency, road safety should be integrated into other policies, together with their enforcement and implementation, such as education, health, social policy and employment, police and judicial cooperation, environment, research, insurance and taxation and therefore a holistic approach is needed."

Earmarking a budget is essential in achieving a successful road safety policy. At the EU level, Transport Ministers, in their Conclusions on road safety in 2010, asked the European Commission to "take the necessary actions and allocate the necessary resources […] to implement the road safety policy orientations 2011-2020".[37] The European Parliament reaffirmed its own strong support for EU action on road safety, including a matching budget to realise its objectives.[38]

Recommendations to the EU

- Involve all relevant directorates general, in particular DG Health and Food Safety (SANTE), in identifying preventive measures, adopting the joint strategy to tackle serious injuries and implementing it. The joint strategy should include measures against which delivery can be made accountable.
- Allocate the resources necessary to the implementation of the strategy and encourage Member States to do the same.

1.6 Engaging the medical and public health sector

In a number of countries, medical and public health professionals have been instrumental in convincing decision makers and in educating the public about the merits of seat belts, child restraints and helmets for motorcyclists, as well as lowering the drink driving legal limit or driving speeds[39]. The medical community also plays a crucial role in advising when their patients are medically fit to drive. For example, ETSC encourages Member States to stress the role of doctors in influencing how long and under what circumstances an older person continues driving. Mandatory reporting to the licensing agency of patients with serious medical impairment can also be required. Cross-sectorial collaboration is essential for the introduction of science-based countermeasures, and this is something the public health sector is in a good position to promote.

The WHO has proposed that the health sector embrace a more proactive role in preventing road traffic injuries. Internationally the public health dimension of the road

[37] Council conclusions on Road Safety (December 2010).
[38] EP resolution on European Road Safety 2011-2020.
[39] ETSC (2008) A Blueprint for the EU's 4th Road Safety Action Programme.

safety problem was discussed as early as 1962, in a WHO report[40]. In 1974, the World Health Assembly adopted a Resolution, declaring road traffic collisions a major public health issue and calling for Member States to address the problem.

EU health policy makers should take a similar approach. There is a need for the EU to communicate in the next EU Health Strategy[41] the benefits of countermeasures in reducing road risk of death and serious injury on the roads in terms of public health and cost savings to the European citizens. Equally, all public health implications of road safety measures must be considered.

According to the EU Treaty, the EC is required to ensure a high level of health protection in 'the definition and implementation of all Union policies and activities' (Article 168). The latest EU strategy, 'Together for Health- A Strategic Approach for the EU 2008-2013', needs to be updated and to include road traffic deaths or serious injuries. Traffic accidents are only briefly mentioned within the context of healthy ageing. The EU Strategic Framework on Health and Safety at Work 2014-2020 also fails to recognise that in Europe six out of ten work accidents resulting in death are road crashes, including both crashes while driving for work and commuting crashes.[42]

Only drink driving has been addressed by DG SANTE through its EU strategy on reducing alcohol related harm[43]. The strategy recommended Member States to introduce maximum BAC limits of 0.5g/l for all drivers and 0.2g/l for professional and novice drivers and enforce the limits through frequent and systematic targeted breath testing, supported by education and awareness campaigns. Yet the effects of the EU strategy have been limited.

Recommendations to the EU and Member States

- Involve health professionals
    - in developing good practices and guidelines on essential trauma care and emergency services;
    - in estimating the real social costs of road traffic injuries;
    - to serve as opinion leaders to encourage decision makers to promote road safety legislation and to help educate the public.
- Treat road injuries and deaths as a public health problem as well as a mobility issue.
- Adopt a new EU Health strategy including road traffic injury prevention measures.

[40] Norman LG. (1962) Road traffic accidents: epidemiology, control, and prevention. Geneva, World Health Organisation.
[41] Townsend, E. (2013) Integration of Road Safety into other Policy Areas.
[42] Eurogip.
[43] European Commission (2006) EU Strategy to Reduce Alcohol Related Harm.

Part II Measures to Tackle Serious Injuries

The starting point for tackling both death and serious injury should be to create a road safety system that recognises the vulnerability of the human body. The European Commission recognised in its First Milestone towards a Serious Injury Strategy that the overall aim of EU road safety work is, in line with the Safe System Approach, to reduce the total number of accidents resulting in deaths and injuries. ETSC also welcomed that the European Commission recognised speed as "a primary factor determining the severity of an injury" in the same document.

To a certain extent, tackling serious injury requires the same set of measures that are needed to reduce deaths on the roads with some important additions that are specifically targeted at reducing injury severity. ETSC supports the view of the European Commission that "a focus on serious injuries does not compete with a focus on fatalities – the objectives complement each other'[44]. The European Commission also rightly acknowledged that 'there might well be other tools and instruments which, though less obviously life-saving, can still be of great assistance in reducing certain types of serious injury".

2.1 Curbing speed – the number one priority

Speeding is a primary factor in about one third of fatal accidents and an aggravating factor in all accidents where it occurs[45]. Cases of drivers exceeding speed limits are widespread[46]. While the risk linked to speed varies across road types, analysis of a wide range of observations using the well-established Power Model[47] indicates that, on average, a 1% reduction in the mean speed of traffic leads to the following percentage reductions in casualties:

- On motorways and rural roads a 2.2% reduction in casualties of all severities, a 3.5% reduction in seriously injured casualties and a 4.6% reduction in deaths.
- On urban roads a 1.4% reduction in casualties of all severities, a 2% reduction in seriously injured casualties and a 3% reduction in deaths.

Experience shows that there is not one single measure to reduce speed. It takes a combination of measures including credible speed limits, enforcement and education, combined with 'self-explaining'[48] roads and self-complying vehicles.

[44] European Commission (2013) Commission Staff Working Document, First Milestone Towards an Injury Strategy.
[45] OECD/ECMT (2006), Speed Management.
[46] ETSC (2010) PIN 4th Annual Report, Road Safety Target in Sight - Making up for lost time.
[47] Elvik R. (2009) The Power Model of the relationship between speed and road safety – update and new analysis, TØI Report 1034.
[48] Road users should know which driving behaviour is expected from them and what they can expect from others. People need to recognise the road type and drive accordingly, in particular at the appropriate speed. This must apply to the whole road network which should also be predictable, as should others' driving behaviour. ETSC (2010) PIN 4th Annual Report, Road Safety Target in Sight - Making up for lost time.

2.1.1 Intelligent Speed Assistance: the most effective driver support system

A short film and infographic on ISA can be viewed on the ETSC website at http://etsc.eu/isa.

Intelligent Speed Assistance (ISA) technologies bring speed limit information into the vehicle. ISA can advise drivers of speed limits using a GPS database combined with cameras that read road signs. Assisting ISA can take the form of increased resistance of the accelerator pedal. With assisting ISA, drivers are given a capability to override the system.

The introduction of Intelligent Speed Assistance will help to achieve a high level of compliance with speed limits and thereby reduce road deaths substantially[49]. Estimates by Carsten show that mandating ISA would save 30% of fatal collisions and 25% of serious collisions over a 60-year appraisal period[50]. A cost-benefit analysis of ISA was performed by Carsten and Tate[51] and produced ratios of 7.9 to 15.4 depending on the type of ISA system considered. As the cost of technology reduces and more cars are equipped with navigation systems as standard, the costs of ISA implementation are considered by TRL to have reduced over time. Therefore the estimates made by Carsten (2005) and Carsten and Tate (2005) may underestimate the benefit to cost ratio[52]. A comprehensive assessment, by the Norwegian Institute for Transport Economics (TØI), of eight different driver support technologies, including Adaptive Cruise Control, alcohol interlocks, seatbelt reminders, Electronic Stability Control and fatigue warning, shows that Intelligent Speed Assistance (ISA) would save the most lives. Selective use for high-risk groups such as young drivers could be even more cost-effective, according to the study.

In November 2013, the European Commission published a study focusing on the safety benefits of speed limiters and ISA[53]. It also included the results of a survey aimed at assessing opinions at the European level.

Since 2013 Intelligent Speed Assistance (ISA) has been included in the Euro NCAP safety rating with both advisory and voluntary active systems being awarded points.

Recommendations to the EU

- Adopt legislation for fitting all new commercial vehicles with assisting Intelligent Speed Assistance systems in line with the recommendations of the evaluation study conducted on behalf of the European Commission. The system should be overridable up to 100km/h for buses and 90km/h for lorries, in line with existing EU legislation on speed limiters.

[49] Carsten, O. and Tate, F. (2005) Intelligent Speed Adaptation: Accident savings and cost benefit analysis.
[50] Lai, F, Carsten, O., Tate, F. (2012) How much benefit does Intelligent Speed Adaptation deliver: An analysis of its potential contribution to safety and the Environment.
[51] Carsten, O. and Tate, F. (2005) Intelligent Speed Adaptation: Accident savings and cost benefit analysis.
[52] Hynd D. et al. (2015), Benefit and Feasibility of a Range of New Technologies and Unregulated Measures in the fields of Vehicle Occupant Safety and Protection of Vulnerable Road Users, Transport Research Laboratory.
[53] http://ec.europa.eu/transport/road_safety/pdf/vehicles/speed_limitation_evaluation_en.pdf

- Adopt legislation for fitting all new passenger cars with an overridable assisting Intelligent Speed Assistance system.

2.1.2 Member States must set and enforce safe and credible speed limits

According to Vision Zero and the Sustainable Safety approach, speed limits should be determined by road characteristics so that the forces in collisions do not exceed the level that the human body can tolerate (taking into account the more vulnerable such as infants or the elderly). The maximum travel speeds - given best practice in vehicle design and 100% restraint use - should not exceed, for instance, 30km/h on roads with possible conflicts between cars and unprotected road users, and 70km/h on roads without a median barrier.[54]

Road types and mix of road users	Safe speed
Roads with possible conflicts between cars and unprotected road users	30km/h
Intersections with possible transverse conflicts between cars	50km/h
Roads with possible frontal conflicts between cars	70km/h
Roads with no possible frontal or transverse conflicts between road users	≥ 100km/h

Table 1: Safe travelling speeds according to possible conflicts between road users.

The risk of a pedestrian being killed in a collision with a vehicle going at 50km/h is eight times higher than with the same vehicle going at 30km/h. As well as reducing impact severity in the case of collision, a maximum speed of 30km/h creates opportunities for positive interaction among road users through visual communication, and gives drivers more time both to make use of their visual field to see potential hazards and to react to these. Low speed also reduces feelings of danger for pedestrians and cyclists and might encourage more people to walk and cycle[55].

Recommendations to the EU

- Encourage Member States to adopt zones with speed limits of maximum 30km/h (or 20mph) in residential areas and areas with high levels of pedestrians and cyclists and maximum 80km/h on undivided rural roads.

2.1.3 Enforcement

Enforcement is a means to prevent collisions from happening by way of persuading drivers to comply with the safety rules. Deterrence is based on giving drivers the feeling that they run too high a risk of being caught when breaking the rules. Traffic law enforcement is a very cost-effective means of enhancing road safety. The benefits of

[54] Wegman, F. and Aarts L, Advancing Sustainable Safety, National Road Safety Outlook for 2005-2020. SWOV. Based on Tingvall, C., Haworth, N (1999) Vision Zero, An ethical approach to safety and mobility.

[55] ETSC (2015), PIN Flash 29, Making Walking and Cycling on Europe's Roads Safer.

applying existing best practice in enforcement to the whole of the EU exceed the costs by a factor of 4 (drink driving) to 10 (seat belt use)[56].

In March 2015 the EU adopted a new Directive[57] on the enforcement of financial penalties against drivers who commit an offence in another Member State than the one where the vehicle concerned is registered. The Directive covers the main offences causing death and serious injury in the EU: speeding, drink/drug driving, non-use of seat belts and mobile phone use. This new instrument will put in place an important missing link in the enforcement chain thus enabling the information exchange needed to follow through police's and enforcement authority efforts to achieve fuller compliance with traffic law and improve road safety.

Recommendations to the EU

- Strengthen the Cross Border Enforcement Directive within the context of the revision in 2016 by ensuring greater convergence in enforcement of road safety related road traffic rules and developing common minimum standards. Adopt Guidelines based on the EC Recommendation 2004/345 on Enforcement in the field of Road Safety. Ensure the follow-through of the enforcement chain and strengthen sanctions.

2.2 Infrastructure safety

Infrastructure can also play a key role in reducing the severity of injury when collisions occur. Building on its 'Policy Orientations on Road Safety', the 2013 European Commission's First Milestones document proposes the extension of the instruments included in the Infrastructure Safety Directive to the secondary road network and to the urban environment. ETSC would also support the development of guidelines on traffic calming which would benefit road users, especially the unprotected ones, in urban areas.

Recommendations to the EU

- Within the context of the review of the Infrastructure Safety Management Directive 2008/96 encourage Member States to extend the application of the instruments of the directive to cover all roads and extend the rules to tunnels covered by the Tunnel Directive 2004/54 while upholding the effects of the Tunnel Directive.
- Within the context of the Urban Mobility Action Plan, draft guidelines for promoting best practice in traffic calming measures, based upon physical measures such as roundabouts, road narrowing, chicanes, road humps and techniques of space-sharing, to support area-wide urban safety management, in particular when 30 km/h (or 20 miles/h) zones are introduced.

[56] ICF Consulting (2003): Costs-benefit analysis of road safety improvements. Final Report.

[57] Directive 413/2015 facilitating cross-border exchange of information on road-safety-related traffic offences http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L0413&from=EN

2.3 Vulnerable road users

2.3.1 Pedestrians and cyclists

More than half of the people seriously injured on the roads are pedestrians or other vulnerable road users involved in a collision in an urban area. There are a whole range of measures that can be taken to improve vulnerable road user safety some of which are included in the recommendations and are covered in more detail in ETSC's Reviews on Vulnerable Road Users and of Cycling Safety Policy[58,59], as well as in ETSC's PIN Flash Report 29[60].

Non-motorised means of transport, notably cycling and walking, account for only a small share of distance travelled by road while accounting for much larger proportions of journeys made and time spent using the roads. The advantages of walking and cycling for public health (a healthy life through regular exercise) outweigh their disadvantages (the risk of death or injury)[61]. As active travel is being encouraged for reasons of health and sustainability, the safety of walking and cycling in particular must be addressed urgently.

Safety of pedestrians and cyclists is an essential component of sustainable urban mobility and should be firmly integrated into mobility planning. Real and perceived safety can have a profound effect on modal choice especially in terms of the most sustainable modes of travel - walking and cycling and ability to access public transport. The 2011 White Paper[62] includes Urban Mobility Plans within its list of initiatives and the European Commission's Serious Injury Document also includes them as a 'possible action.' ETSC recommends to integrate safety not only into the development of Urban Mobility Plans but also into proposed Urban Mobility Audits, Guidelines and common targets[63].

While neither helmets nor reflective luminous clothing are part of the bicycle, they are a part of the way in which cyclists are noticed by other traffic participants. Cycle helmets are designed to protect the cyclist's head and skull in the event of collision. Helmets sold in the EU have to conform with international standards which prescribe the protection they need to offer. Current EU helmet standards require impacts of up to around 15-20km/h to be absorbed. Head and brain injuries sustained by cyclists could be reduced by bringing cycle helmets into general use. According to German Road In-Depth Accident Study (GIDAS), use of helmets might result in 33% reductions of cyclists head injuries of severity AIS3+, isolated soft tissue injuries by 15% and skull and base of skull fractures by

[58] ETSC (2005) The Safety of Vulnerable Road Users.

[59] ETSC (2012) Raising the Bar – Review of Cycling Safety Policies in the European Union.

[60] ETSC (2015), PIN Flash Report 29, Making Walking and Cycling on Europe's Roads Safer.

[61] SQW (2007) Valuing the benefits of cycling. A report to Cycling England.

[62] European Commission (2011) Transport White Paper Towards a Single European Transport Area.

[63] ETSC (2011) Response to the Transport White Paper.

46%.[64] Some European countries are regulating obligatory use of cycle helmets but the extent of legislation varies from country to country[65].

Recommendations to the EU and Member States

- Introduce minimum requirements for cycle lighting and reflective elements.
- Revise standards for testing bicycle helmets to offer higher levels of protection.
- Integrate safety not only into the development of Urban Mobility Plans but also into proposed Urban Mobility Audits, Guidelines and common targets.
- Adopt and promote a policy of modal priority for road users, particularly in urban areas, the hierarchy being based on safety, vulnerability and sustainability. Walking should be at the top of the hierarchy, followed by cycling and use of public transport.
- Fund research to reduce the severity of cyclists-only collisions.
- Work with Member States to improve the reporting of collisions involving cyclists and pedestrians.
- Encourage Member States to recommend cyclists to wear helmets and have adequate lighting when cycling in the dark.

2.3.2 Powered two wheelers (PTWs)

"For every motorcyclist who dies there are some four motorcyclists who survive with severe brain damage, spinal cord injury or serious joint dysfunction in the upper or lower limbs. Such injuries require substantial periods of rehabilitation and often leave permanent disabilities. Such cases are very predominantly young males. The social and economic costs of such casualties are enormous". Murray Mackay, Professor Emeritus of Transport Safety, University of Birmingham, UK.

The benefits of wearing a helmet with respect to head injury risk have been widely researched. There is a strong case for more consumer information on the quality of helmets to distinguish those at the bottom end of the quality spectrum designed within the limits of existing standards and those that exceed them. Rider education is also important as a helmet can only successfully protect its wearer if the chin strap is properly adjusted and closed – if not, the helmet is likely to be ejected before the wearer's head hits an obstacle[66].

SHARP, the UK helmet safety scheme, came into being in 2007, after the UK Department for Transport found differences in the safety performance of motorcycle helmets available in the country[67]. While all helmets have to meet minimum EU safety standards, research showed that up to 50 lives could be saved each year in the UK if motorcyclists wore the safest helmets available to them. Thanks to a simple five star scoring system,

[64] O. Dietmar, W. Birgitt, (2012), Comparison of Injury Situation of Pedestrians and Cyclists in Car Frontal Impacts and Assessment of Influence Parameter on Throw Distance and Injury Severity.

[65] European Commission, Mobility and Transport, Road Safety, http://goo.gl/KXtYUq.

[66] In the framework of the MAIDS study, more than 900 collisions involving PTW were investigated. In those collisions, 90% of the PTW riders wore helmets. However, 9% of these helmets came off the wearer's head at some time, due to improper fastening or helmet damage during the crash.

[67] http://sharp.direct.gov.uk/content/helmet-safety-scheme

SHARP provides motorcyclists with independent and objective advice and raises the bar by putting motorcycle helmets through a more stringent testing process.

Recommendations to the EU

- Encourage Member States to enforce helmet wearing laws.
- Support the setting up of a European helmet consumer information scheme, similar to the UK one, providing independent consumer information on the safety performances of the most popular helmets sold in the EU.
- Investigate the opportunity for upgrading type approval requirements for PTW helmets.
- Investigate the extent to which airbags are viable PTW safety measures.
- Evaluate the opportunity for introducing eCall and Intelligent Speed Assistance as a standard for new machines.
- Develop minimum standards regarding protective clothing, including reflective elements.
- Encourage Member States to install barriers friendly to powered two-wheelers in areas susceptible to motorcycle collisions.

2.4 Vehicle safety

Although the reduction in deaths and serious injuries are the result of many factors, including better enforcement, changing behaviour and safer infrastructure, there is little doubt that improved vehicle safety standards since the late 1990s have played an important role.

Improvements in the safety of new vehicles in Europe have been driven by mandatory EU and UNECE safety requirements for new vehicles and by Euro NCAP (the European New Car Assessment Programme), a voluntary consumer testing organisation that carries out its own tests of many vehicles that sell in large numbers and awards safety ratings to them.

Euro NCAP's evolving 5-star safety rating has come to represent the safety gold standard in Europe. The crash tests carried out by Euro NCAP are stricter than those required by regulation – and have also become stricter over time. A car that only meets the minimum legal EU safety requirements would receive a zero-star Euro NCAP rating.[68]

The European Commission has stated that if all cars were designed to provide crash protection equivalent to that of the best cars in the same class, half of all fatal and disabling injuries could be avoided.[69] At present European citizens do not benefit equally from vehicle safety improvements. Existing consumer information tests such as Euro NCAP do not test all models of car and permit variations in safety equipment for the same model between EU Member States. Strong EU legislation is therefore needed in order to also reach the lower priced segments of the market and address aspects of protection that are less attractive to car buyers.

[68] ETSC (2016), PIN Flash Report, How safe are new cars sold in the EU? (to be published in March)

[69] European Commission (2003), 3rd Road Safety Action Programme quoted in SafetyNet (2009) Vehicle Safety, retrieved 1st April 2014.

The forthcoming revisions of the Pedestrian Protection Regulation 2009/78 and the General Safety Regulation 2009/661, which set technical requirements applied to all new motor vehicles sold in the EU market, offer a unique opportunity to ensure that road casualties continue to fall, and that vehicle safety improvements are not limited to the wealthiest consumers or member states[70].

2.4.1 Improve the protection offered by cars to vulnerable road users

Collisions with cars account for 68% of pedestrian and 52% of cyclist deaths in the EU. Different factors influence impact severity between motor vehicles and cyclists or pedestrians, the most important being speed of travel, vehicle mass and the level of protection provided by the vehicle. The Pedestrian Protection legislation 2009/78 prescribes requirements for the construction and functioning of vehicles and frontal protection systems in order to reduce the number and severity of injuries to pedestrians and other vulnerable road users who are hit by the fronts of vehicles.

In most of the collisions involving pedestrians or cyclists and a passenger car, the impact occurs between these vulnerable users and the front of the vehicle, making the frontal area of the car of particular importance. Requirements for pedestrian-friendly car fronts take into account various features including shock absorbing areas where the pedestrian's head would hit the car bonnet in the event of a collision[71].

Improvements in pedestrian protection have been provided by car manufacturers more slowly than improvements in occupant protection. To address this issue, Euro NCAP has increased the emphasis on all-round safety performance and demanded higher level of achievement for pedestrian protection. Although manufacturers have started to respond to Euro NCAP's higher demands, there is still much room for progress. ETSC urges the European Commission to include in the revision of the Pedestrian Protection Directive proposals to upgrade the existing tests for pedestrian protection and extend them to protect cyclists[72].

A Swedish study evaluating the correlation between Euro NCAP pedestrian protection test result scores and injury outcomes in car-to-pedestrian and car-to-cyclist injury collisions found that large reductions both of injury severity and the risk of permanent medical impairment can be achieved. The study also showed that pedestrian friendly car fronts can yield benefits for cyclists too, although the injury reduction is slightly lower[73]. It concluded that since pedestrian protection requires only minor additional technology and it is rather a matter of engineering in the design phase, the cost could be considered low compared to other vehicle safety systems relative to their benefits.

Recommendations to the EU

[70] ETSC (March 2015), Position on the Revision of the General Safety Regulation.

[71] ETSC (2012), Raising the bar, Review of Cycling Safety Policies in the European Union.

[72] ETSC Draft Position paper (2015) on the Commission's proposal for a review of the Regulation 2009/78 on the protection of pedestrians and other vulnerable road users.

[73] Strandroth J. et al. (2014), Correlation between Euro NCAP Pedestrian Test Results and Injury Severity in Injury Crashes with Pedestrians and Bicyclists in Sweden.

Within the context of the revision of Regulation 2009/78 on the protection of pedestrians and other vulnerable road users:

- Upgrade the existing tests for pedestrian protection and extend them to protect cyclists.
- Introduce Autonomous Emergency Braking Systems which operate at all speeds and can detect pedestrians and cyclists (see below).
- Commission an evaluation study to investigate the type of injuries resulting from vehicle to pedestrian and cyclist collisions.
- Encourage Member States to provide tax incentives for purchase and use of safe cars (5 star Euro NCAP cars).

2.4.2 Improve occupant passive safety

The General Safety Regulation will reconsider current technical requirements applied to all new motor vehicles sold in the EU market. The EU has exclusive competence on vehicle safety and vehicle type approval under Article 114 of the EU treaty, yet EU legislation on passive safety has not changed much over the last decade and as a result type approval crash tests need to be updated. Current tests should be extended to also cover rear-seat occupant safety and tests for rear-end crashes and for small overlap frontal crashes should be introduced.

Recommendations to the EU

Within the context of the revision of Regulation 2009/661 concerning Type-Approval Requirements for the General Safety of Motor Vehicles:

- Upgrade type approval crash tests to be more closely aligned with the requirements of Euro NCAP crash tests.
- Update the existing side impact regulation R95 by revising the current mobile deformable test condition and adopt the new R135 (GTR 14) standard for side pole testing.
- Introduce tests for rear-end crashes and for small overlap frontal crashes.

2.4.3 Mandate in-vehicle safety systems

Active in-vehicle technologies can reduce the severity of the impact and bring safety benefits for both car occupants and for those outside the vehicles. The most effective new technologies from a road safety perspective are:

- Intelligent Speed Assistance (ISA) (see above)
- Seat belt reminders
- Autonomous Emergency Braking (AEB)
- Alcohol interlocks
- Event Data Recorders (EDR)

Time for seat belt reminders on all seats

The seat belt remains the single most effective safety feature in vehicles. Despite the legal obligation to wear a seat belt across the EU28[74], seat belt use in cars in the EU is estimated to be only 88% for front seats and as low as 74% for rear seats in the countries that are monitoring wearing[75].

These figures are of particular concern because research has shown that non-wearers are, on average, more likely than wearers to be involved in potentially fatal collisions in which wearing the seat belt would have saved their life[76]. This explains why the safety benefits obtained from a given number of percentage points increase in seat belt usage are greatest where the percentage already wearing belts are highest.[77]

Increased usage can be achieved with seat belt reminders. Seat belt reminders detect occupants and their seat belt use in all seating positions, and then create a series of alarms to alert the car occupant if he or she is not belted.

ETSC has estimated that 900 deaths could have been prevented in 2012 if 99% of all occupants had been wearing a seat belt, a rate that could be reached with seat belt reminders[78]. The 2009 General Safety Regulation required new vehicles to be fitted with visual and audible seat belt reminders for the driver's seat by November 2012. This should now be extended swiftly to all seats, as recommended in the CARS 21 final report and the 2015 report from TRL commissioned by the European Commission[79].

Recommendations to the EU

Within the context of the revision of Regulation 2009/661 concerning Type-Approval Requirements for the General Safety of Motor Vehicles:

- Extend the mandatory fitment of advanced seat belt reminders as standard equipment to all seats as recommended in the CARS 21 final report and the 2015 report from TRL.
- Support the development of restraint systems that adapt to the needs of the user, their individual bio-mechanics and the severity of the specific collision.

Autonomous Emergency Braking (AEB)

Autonomous Emergency Braking (AEB) systems can help avoid crashes or mitigate their severity by warning the drivers and supporting their braking response and/or by applying the brakes independently of the driver. All new EU heavy commercial vehicles have been fitted with advanced emergency braking technology since 2013, thanks to a requirement set out in the 2009 review of the General Safety Regulation. Autonomous Emergency

[74] EU Directive 2003/20/EC extends the obligatory use of seat belts to occupants of all motor vehicles, including trucks and coaches when a seat belt is available for the seat.
[75] ETSC (2014) Ranking EU Progress on Car Occupant Safety, PIN Flash Report 27.
[76] Ibid.
[77] Turbell T et al. (1997) Optimising seat belt usage by interlock systems (VTI särtryck 270). Swedish National Road and Transport Research Institute, Linköping.
[78] ETSC 2014, Ranking EU Progress on Car Occupant Safety, PIN Flash Report 27.
[79] Hynd D. et al. (2015), Benefit and Feasibility of a Range of New Technologies and Unregulated Measures in the fields of Vehicle Occupant Safety and Protection of Vulnerable Road Users, Transport Research Laboratory..

Braking has an estimated death reduction of 7% on the EU25 scale with full penetration, and one of the highest benefit-cost ratios there is for driver support systems[80]. AEB is also a technology that will help reduce serious injuries. ETSC encourages further work to progress "higher speed" AEB and "Pedestrian AEB".

A study, looking at the effectiveness of low-speed AEB in reducing real-life collisions, based on Swedish police-reported injury collisions in 2010-2014 found that striking rear-end collisions were reduced by 25% with AEB, and by 54% in 50km/h zones[81].

Recommendations to the EU

Within the context of the revision of Regulation 2009/661 concerning Type-Approval Requirements for the General Safety of Motor Vehicles:

- Extend fitment of Autonomous Emergency Braking systems (which operate at all speeds and can detect pedestrians and cyclists) to passenger cars and light trucks and vans.

Alcohol interlocks

The European Commission estimates that across the EU at least 20% of all road deaths are alcohol related. Alcohol interlocks are an effective countermeasure in the fight against drink driving. Alcohol Interlocks are connected to the vehicle ignition system and require the driver to take a breath test in order to drive the vehicle. If the driver is found with alcohol above a certain limit the engine will not start.

In many EU countries the technology has found its way on a voluntary basis into vehicles which are used for the transport of goods or passengers. The interlock is used as a quality assurance tool to comply with a company's alcohol and drugs policy. In some EU Member States, such as France and Finland, vehicles have to be equipped with alcohol interlocks in order to transport children to school. In addition, more and more countries in Europe are adopting legislation for the use of alcohol interlocks in rehabilitation programmes for first-time high-level offenders and for recidivists, as a substitute for driving licence withdrawal in punishment for drink driving[8283].

A study commissioned by DG MOVE and published in 2014 concluded that alcohol interlocks can offer effective and cost-beneficial improvement to road safety in Europe, particularly for offender and commercial vehicle populations[84]. The European Parliament also commissioned a study published in 2014 on the same topic[85]. It includes

[80] eIMPACT Project Results. http://www.eimpact.eu/download/eIMPACT_D6_V2.0.pdf
[81] Rizzi M., Kullgren A., Tingvall C. (2014), Injury crash reduction of low-speed Autonomous Emergency Braking (AEB) on passenger cars, IRCOBI Conference.
[82] http://etsc.eu/alcohol-interlock-barometer/
[83] Vehmas A., Löytty M., (2013) Effectiveness and impact of alcohol interlock-controlled driving rights, Finnish Transport Safety Agency (Trafi), http://www.trafi.fi/filebank/a/1364296057/07ec5f80fc5103a8c0f05b84e2ff89ab/11854-Trafi_Publications_6-2013.pdf
[84] ECORYS (2014), Study on the prevention of drinkdriving by the use of alcohol interlock devices, http://ec.europa.eu/transport/road_safety/pdf/behavior/study_alcohol_interlock.pdf
[85] TRT on behald of the European Parliament (2014), Technical development and deployment of alcohol interlocks in road safety policy, European Parliament

recommendations calling for the adoption of a legislation within five years to extend the mandatory use of alcohol interlocks as part of rehabilitation programmes targeting certain categories of users and as a preventive measure in specific categories of commercial vehicles.

Requirements for the development of alcohol interlocks are captured in the CENELEC 50436 standards. The draft standard for the electrical connection between the alcohol interlock and the vehicle has been put on hold since 2008 because it was not accepted by car manufacturers. Future deployment of alcohol interlocks may be critically dependent upon adherence to an agreed standard in this area because some new vehicles are coming to market with powertrain ignition systems that do not allow an alcohol interlock to be installed (Ecorys, 2014).

Recommendations to the EU

Within the context of the revision of Regulation 2009/661 concerning Type-Approval Requirements for the General Safety of Motor Vehicles:

- Legislate to ensure that retrofitting of vehicles with alcohol interlocks continue to be possible in the future (building on the draft CENELEC standard for a standardised installation document in the first step and on the draft CENELEC standard for the electrical interface connection between the alcohol interlock and the vehicle in the second step).
- Legislate for a consistently high level of reliability of alcohol interlock devices.
- As a first step towards wider use of alcohol interlocks, legislate for their use by professional drivers.

Event Data Recorders

Event Data Recorders (EDR) record a range of vehicle data over a short timeframe before, during and after a triggering threshold and are typically used to record information about road traffic collisions which cannot be reliably identified by the usual police investigations. A study commissioned by the European Commission has found considerable potential safety benefits and low costs for the installation of EDR in cars, vans and lorries[86]. The research, carried out by TRL in the UK, found that EDR are already fitted to almost all new cars in Europe, and have been for some years. The systems are generally linked to the control units used to deploy airbags in the event of a collision. Most meet the minimum specification set by the US federal standard (49 CFR Part 563) and many exceed it. The authors recommend recording of additional data not covered by Part 563, such as the status of all in-car safety systems (when fitted), in the moments leading up to a collision, as well as ensuring that an EDR is also able to record data surrounding a collision with a pedestrian or cyclist where an airbag may not be triggered. Retrospectively unlocking access to EDR on vehicles already in the fleet (as

http://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/513993/IPOL-TRAN_ET(2014)513993_EN.pdf

[86] Hynd, D. and McCarthy M., Study on the benefits resulting from the installation of Event Data Recorders. Transport Research Laboratory http://ec.europa.eu/transport/road_safety/pdf/vehicles/study_edr_2014.pdf

some manufacturers have already done in some markets) would increase the potential benefits.

The additional costs of standardising the technology for new cars in Europe would be negligible, as car manufacturers already fit the devices. The benefit-cost ratio for commercial vehicles is also positive and there are many examples of fleets using the technology as part of existing fleet management processes which also monitor driving behaviour at all times to enable fuel saving and safer driving. Event Data Recorders, as defined by the report, would only record data immediately before a collision. Once issues, such as who owns the data and who has access to it, are resolved, the nationally enforced provisions of Directive 95/46/EC would apply and provide an adequate data protection framework.

Event data recorders can offer first hand information about the safety systems available on the vehicle and their operation. Additional information could include speed information, measures of crash severity and vehicle manoeuvres. Liability for collision would be more accurately and objectively determined, therefore reducing time and legal costs and providing road users and society with access to justice.

Recommendations to the EU

Within the context of the revision of Regulation 2009/661 concerning Type-Approval Requirements for the General Safety of Motor Vehicles:

- Mandate Event Data Recorders in all new vehicles with high level of specifications in order to record the status of all in-car safety systems (when fitted) in the moments leading up to a collision, and also record data surrounding a collision with a pedestrian or cyclist where an airbag may not be triggered.
- Require the data to be made available for accident investigation.

2.4.4 Distraction

Driving whilst using a mobile phone and other electronic devices significantly impairs driving ability[87]. Distraction on the roads is a major source of concern. Driver distraction is thought to play a role in 20-30% of all road collisions[88].

Recommendation to the EU

- Oblige manufacturers to publish their tests to show compliance with Human Machine Interface (HMI) Guidance Statement of Principle on in-vehicle information and infotainment systems.

[87] IGES Institut, ITS Leeds, ETSC (2010): Study on the regulatory situation in the Member States regarding brought-in (i.e. nomadic) devices and their use in vehicles. Study tendered by the European Commission, Berlin 2010. http://www.etsc.eu/documents/Report_Nomadic_Devices.pdf

[88] Dews, F. A., & Stayer, D. L. (2009). Cellular Phones and Driver Distraction. In M. A. Regan, J. D. Lee, & K. L. Young, Driver Distraction Theory, Effects and Mitigation (pp. 169-190). CRC Press.

2.5 Heavy Goods Vehicles

Due to the size and mass of heavy vehicles, the problem of compatibility with other road users is a serious matter. Improving front, side and rear underrun protection of heavy vehicles would reduce casualties among pedestrians, cyclists and PTW users, as well as among car occupants in underrun impacts. This is also relevant given the revision of the Weights and Dimension Directive 96/53 and the potential for more length for safety improvements[89]. New research by TRL estimates that up to 900 lives could be saved annually as a result of the proposed measures[90].

The characteristics of the front and side structures in terms of their geometrical and structural properties will affect how they strike either passenger cars or vulnerable road users. Following the conclusion of the revision of the weights and dimensions Directive 96/53 truck manufacturers will now have the possibility to design a safer truck front with more space available, but will not be able to bring these new versions to market until 2022 at the earliest. ETSC fought hard against this delay[91]. Making these changes mandatory is now under consideration in the context of the revision of the General Safety Regulation[92]. A rounded profile will be beneficial in reducing the actual change in velocity in frontal collisions between cars and HGVs by allowing the car to be deflected and not lock into the sharp corner of existing HGV bumpers. A rounded profile for HGV fronts, which would deflect the pedestrian or cyclist sideways, will also be beneficial in reducing the risk posed to them.

Recommendations to the EU

Within the context of the revision of Regulation 2009/661 concerning Type-Approval Requirements for the General Safety of Motor Vehicles:

- Develop mandatory requirements for safer goods vehicles stipulating improved cabin design and underrun protection, and remove exemptions that exist so as to require use of side guards to protect other road users in collisions with trucks.

2.6 Post accident care

The challenge to prevent road death and injury does not end with the collision. Research shows that at least 50% of deaths from road traffic collisions occur within minutes, either at the scene or while in transit to hospital[93]. Of the remainder, most die within 24 hours despite medical care.

Post accident care takes place after a collision has occurred and deals with optimising the chances of medical and psychological recovery of the victims. The care after a collision

[89] ETSC (2013) ETSC Position on Revision of the Weights and Dimensions Directive 96/53.

[90] TRL 2014, Draft Project Report, Benefit and Feasibility of a Range of New Technologies and Unregulated Measures in the fields of Vehicle Occupant Safety and Protection of Vulnerable Road Users, 90. Summary available at http://ec.europa.eu/enterprise/newsroom/cf/itemdetail.cfm?item_id=7803

[91] ETSC Press release (December 2014), http://etsc.eu/setback-for-safer-lorry-rules/

[92] ETSC (2015) ETSC Position on Revision of General Safety Regulation 2009/661.

[93] ETSC (1999) Reducing the Severity of Injury Through Post Impact Care.

usually consists of several, integrated steps: first aid, emergency call, efficient response of emergency systems, security and safeguarding of the crash site, transportation and medical treatment to enable the transport of the victims, further treatment at medical centres and psychological support of victims and their relatives[94].

Unfortunately, the quality of emergency rescue and medical care of road victims varies considerably throughout Europe. All European Member States should offer equally high standards of rescue, hospital care and long-term rehabilitation following a road collision.

2.6.1 Emergency rescue and hospital care

There is diversity in, and also still debate about, the required level of training for pre-hospital care givers and which interventions can safely be carried out without undue delay[95]. The EU should stimulate the evaluation of the different types of pre-hospital care. There is a need to set up a common 'casualty-centred' approach to aim to achieve a rapid and safe rescue. A broad outline developed by the World Rescue Organisation is set out in the ETSC Blueprint for a 4th Road Safety Action Programme[96].

In-hospital treatment for severely injured patients depends on a well organised and coordinated care delivered by a multi-specialty hospital team in a dedicated trauma centre[97]. This team should take care of the initial assessment and management of the injured. Adequate management largely depends on professional and systematic training of the team with regard to knowledge and skills. The hospital team should work with evidence-based guidelines as instructed during certified trauma courses[98]. The EU should work with Member States to ensure that people injured in a road collision can benefit from a high quality rescue and medical hospital care in all geographic areas.

Recommendations to the EU

- Encourage EU Member States to develop effective emergency notification and collaboration between dispatch centres, fast transport of qualified medical and fire/rescue staff, liaison between services on scene, treatment and stabilisation of the casualty, and prompt rescue and removal to an appropriate health care facility.
- Promote the widely accepted standard of a 'casualty centred' methodology which ensures a multi-service, unified approach that promotes optimum casualty care coupled with specific steps to achieve a rapid but safe rescue.
- Encourage in the development of new vehicle technology greater collaboration between vehicle designers, manufacturers and the emergency services to ensure effective intervention and the safety of all involved, casualty and rescuer.

[94] SUPREME (2007), http://ec.europa.eu/transport/road_safety/pdf/projects/supreme-c_en.pdf

[95] Norton R. and Kobusingye O. (2013), *Global Health: Injuries* in New England Journal of Medecine vol. 368,1723-1730.

[96] ETSC Blueprint (2008), Road Safety as a Right and Responsibility for all, Annex 2, http://urlz.fr/2slL

[97] Mackenzie E. et al. (2006), *A national evaluation of the effect of trauma-centre care on mortali*ty. New England Journal of Medecine vol. 354,366-378.

[98] Lott C. et al. (2009), *The European Trauma Course (ETC) approach: past, present and future*. Resuscitation vol. 80,1192-1196.

2.6.1 Long-term rehabilitation

As important as pre-hospital care is, good long-term hospital and post-hospital care and rehabilitation are essential to mitigate the injury sustained and improve the quality of life of severely injured survivors. The European Commission recognises this in its First Milestones document but does not yet come forward with any concrete action in this area. They list the levels of long-term rehabilitation and state that a better understanding of the long-term consequences of road collisions is needed, leaving the way open for action. Guidelines need to be formulated at a national and European level on hospital trauma care centres. There is also a need to randomise studies in this area[99].

Recommendations to the EU

- Encourage Member States to measure the quality of trauma care and outcome via audits and follow-up of a representative sample of road victims over time[100].

[99] Norton R. and Kobusingye O. (2013), *Global Health: Injuries* in New England Journal of Medecine.

[100] Evans C. (2009), Audit filters for improving processes of care and clinical outcomes in trauma systems (Review). The Cochrane library, issue 4.

2.7 Need for research and in-depth accident investigation

The annual death and serious injury on Europe's roads carries a heavy cost and burden to our society. Investing in research and development to prevent these collisions from occurring in the first place must be a priority in Horizon 2020[101].

The European Commission has also identified the importance of complementing basic data reporting with in-depth crash injury research to develop new safety measures and better understand the causation of serious injury and its impacts in the long-term. They suggest looking at applying a common taxonomy for classifying contributory factors to enable analysis, as is already used in the aviation, maritime and railway sectors[102]. The previous section on trauma management has also outlined a number of areas for research and study.

A number of countries conduct in-depth crash investigation studies which typically include more detail than is contained in police, hospital and other records[103]. These investigations conducted by independent trained experts from multiple disciplines aim to provide a fuller understanding of the factors that contribute to collisions, their severity and their impacts, including the interaction of vehicle design (primary and secondary safety features), the road and human factors.[104] This information is useful to all the stakeholders in the public and private sector including vehicle manufacturers, road and enforcement authorities, insurance and certification bodies, as well as legislators and policymakers.

The current in-depth investigation projects in member states, although extremely useful at a national level and informative at an EU level, are not sufficiently compatible or comprehensive enough in their geographical coverage, to be applicable at the European level. DaCoTA Work Package 2 was tasked with formulating a common methodology for research accident investigation and identifying and training new research teams across Europe. A basis for setting up a Pan-European Accident Investigation Network has been developed[105]. New safety possibilities offered by technology improvements can be substantial under laboratory conditions but it is essential to investigate to what extent they result in true safety improvements in real-world collisions.

A safety agency exists for every transport mode except roads. At present every one of the special EU agencies for safety fulfils a different role. The currently existing European Road Safety Observatory should be the database of a new European Road Safety Agency. Its role should cover, among others,: collecting and analysing accident and exposure data as well as setting up a Pan-European Accident Investigation Network as described in DaCoTA and analysing data when available.

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[101] ETSC response to the EC Regulation Establishing Horizon 2020 The Framework Programme for Research and Innovation (2014-2020), http://etsc.eu/wp-content/uploads/2014/03/Horizon-2020_Comments_ETSC_July-2012.pdf

[102] European Commission (2013) Commission Staff Working Document: First Milestone Towards an Injury Strategy.

[103] ETSC (2001) Transport Accident and Incident Investigation in the European Union.

[104] IRTAD (2011) Reporting on Serious Road Traffic Casualties.

[105] Hill, J. et al. (2012) Final Report, Deliverable 2.5 of the EC FP7 project DaCoTA. http://www.dacota-project.eu/Deliverables/DaCoTA_D2.5_finalreportv2.pdf

Recommendation to the EU

- In view of the large numbers of road deaths and serious injuries across the EU, set up a Pan-European Accident Investigation Network, as is already the case in aviation, maritime and railway sectors, applying independent and high-quality accident investigation techniques to representative stratified samples of road collisions.
- Set up a European Road Safety Agency to, among other tasks, collect and analyse collision and exposure data, as well as data from in-depth accident investigations to inform new safety policy as well as to evaluate the effectiveness of safety countermeasures.

For further information

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