Towards safer transport of goods and passengers in Europe

In the European Union **4,254** people lost their lives in collisions involving heavy goods vehicles (HGVs) in 2011, **3,999** in collisions involving light goods vehicles (LGVs) – goods vehicles with a maximum permitted weight below 3.5 tonnes – and **722** in collisions involving a bus, coach or trolleybus, totalling 29% of the overall number of road deaths recorded in 2011. Since 2001, for the EU as a whole, deaths in collisions involving an HGV and in collisions involving a bus or coach were reduced at a somewhat faster pace than the overall number of road deaths, with average annual reductions of 6.0% and 6.4% respectively compared with 5.7% for the overall number of road deaths. In contrast, the number of deaths in collisions involving an LGV were reduced at 4.7% per year a somewhat slower rate than the total number of road deaths.

The number of road deaths in collisions with HGVs has dropped in all the PIN countries, Latvia leading the EU countries with an average annual reduction of 14.7% per year, a steeper reduction than the one in the total number of road deaths (fig. 1). The number of road deaths in collisions involving LGVs has been reduced in all PIN countries except for France and Romania, with the best average annual reduction being observed in Lithuania with 19.9% (fig. 11). Road deaths in collisions involving buses or coaches have been reduced in all countries but Israel and Romania, Austria having the best annual average reduction of 16.5% (fig. 14).

The largest share of those killed in collisions with goods vehicles, buses or coaches are not the occupants of those vehicles (figs. 2, 12 and 15). This is an important factor to note in the context of the free movement of goods and persons, which are among the fundamental freedoms in the European Union. These freedoms carry important externalities which should be minimised in the context of high levels of road traffic.

Member States should maintain focus on vehicles with a large weight – those looked at in this PIN Flash – when planning and introducing policies to improve road safety. Indeed HGVs and buses or coaches are involved in more fatal collisions per billion km travelled than the average vehicle (figs. 4 and 16) and most of those killed are other road users rather than the occupants of the heavier vehicles. General, as well as targeted road safety measures, should be combined in order to reduce road deaths in collisions involving these types of vehicles sustainably. These include the enforcement of current legislation, particularly when aimed at HGVs and buses, the promotion and large-scale rollout of life-saving technologies and the training of road users, with a renewed focus on those who drive as part of their work or profession.

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ETSC European Transport Safety Council 1993 - 2013

3.1 Collisions involving HGVs

3.1.1 Country comparison

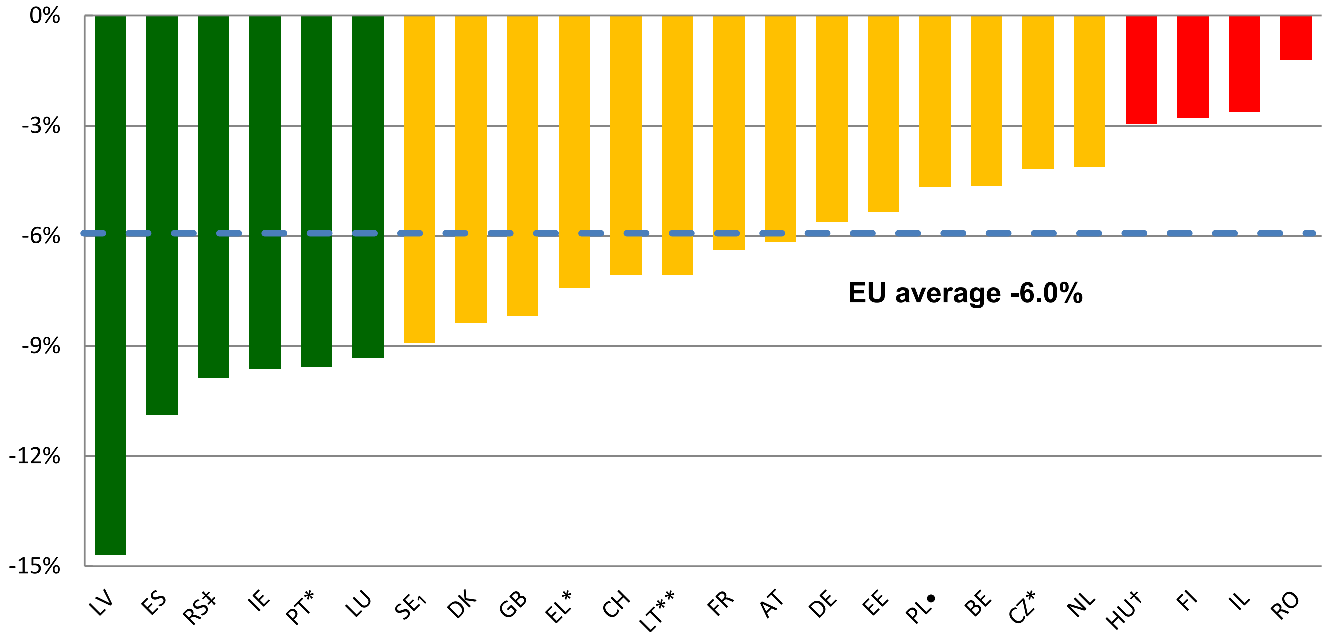


Fig. 1 Average annual percentage change between 2001 and 2011 in the number of road deaths in collisions involving a goods vehicle with a maximum permitted weight larger than 3.5 tonnes.*CZ, EL, PT data for 2011 not available, average annual percentage change calculated for the period 2001-2010. **LT data for 2001 not available, average annual percentage change calculated for the period 2002-2011. †HU data for 2001 and 2011 not available, average annual percentage change calculated for the period 2002-2010. ‡RS data for 2001-2005 not available, average annual percentage change calculated for the period 2006-2011. •PL data refers to all goods vehicles.

Latvia achieved the fastest pace of reduction in the number of road deaths in collisions involving HGVs with an average year-to-year reduction of 14.7% per year between 2001 and 2011. It is followed by **Spain** with a corresponding reduction of 10.9% and **Serbia** with 9.9%, while **Ireland** and **Portugal** come close behind with reductions of 9.6%. **Luxembourg**, **Sweden**,[1] **Denmark**, **Great Britain**, **Greece**, **Switzerland**, **Lithuania**, **France** and **Austria** all had average annual reductions above the EU average[2] of 6.0%. A decrease in the number of road deaths in collisions involving HGVs was observed in all countries surveyed but in **Romania**, **Israel**, **Finland** and **Hungary** these road deaths decreased at an average annual rate of less than 3%.

Improvements in the safety of HGVs are associated with overall road safety in Latvia: since 2001 road deaths have gone down by 68%. During the last eleven years we have implemented many actions to reduce road deaths. The only measure targeted directly at HGVs is a lower speed limit for vehicles with a gross weight of 8 tonnes or more: 80 km/h compared with 90 km/h for all other vehicles. Our traffic safety work is showing good results as every year we see a reduction in the number of road deaths.
Aldis Lama, Ministry of Transport, Latvia.

1 Suicides are excluded in the official statistics for 2010 and 2011. Vehicles with unknown weight are excluded. The STRADA official statistics in Sweden differentiate between vehicles with a maximum weight of over 3.5 tonnes, under 3.5 tonnes and unknown. National analysis has shown that a considerable proportion of the vehicles with unknown weight are HGVs.

2 Source: CARE database when available, completed and updated by the PIN Panellists. No reply was received from the Panellists from Bulgaria, Malta, Norway or Slovakia. EU average calculated for the 27 EU Member States excluding Italy for which data was available only for 2008-2010;

In addition to general measures – such as the introduction of the penalty point system in July 2006 or the reform of the Criminal Code in December 2007 making drink driving, speeding and driving without licence criminal offences – a regulation mandating that HGVs and trailers use special conspicuity markings came into force in July 2011.
This is a reflective sticky tape which marks the boundary of the rear and side of the goods transport vehicles. Thus, in conditions of poor visibility, at night or in adverse weather, this device improves visibility from all angles.
These markings are mandatory for vehicles with a maximum weight exceeding 7.5 tonnes, length over 6m and width over 2.1m, as well as trailers and semitrailers weighing more than 3.5 tonnes which have been registered after the 10th July 2011.
Pilar Zori, Dirección General de Tráfico, Spain.

As in the EU, buses – categories M2 and M3 – and HGVs – categories N2 and N3 – with a maximum authorised weight exceeding 7.5 tonnes registered after the 1st of July 2011 must be equipped with a speed limiter as well as a digital tachograph, except for trolley buses for urban transport. Speed limiters for HGVs, including those used for the transport of dangerous goods are set at 90 km/h.
Jovica Vasiljevic, Traffic Safety Agency, Republic of Serbia.

2011 was an exceptional year in which there was an increase in the number of deaths in collisions involving HGVs. We hope that in the coming years we will see a return to the positive trend seen between 2001 and 2010.
Shalom Hakkert, Ran Naor Foundation for Road Safety Research, Israel.

3.1.2 By type of road user killed

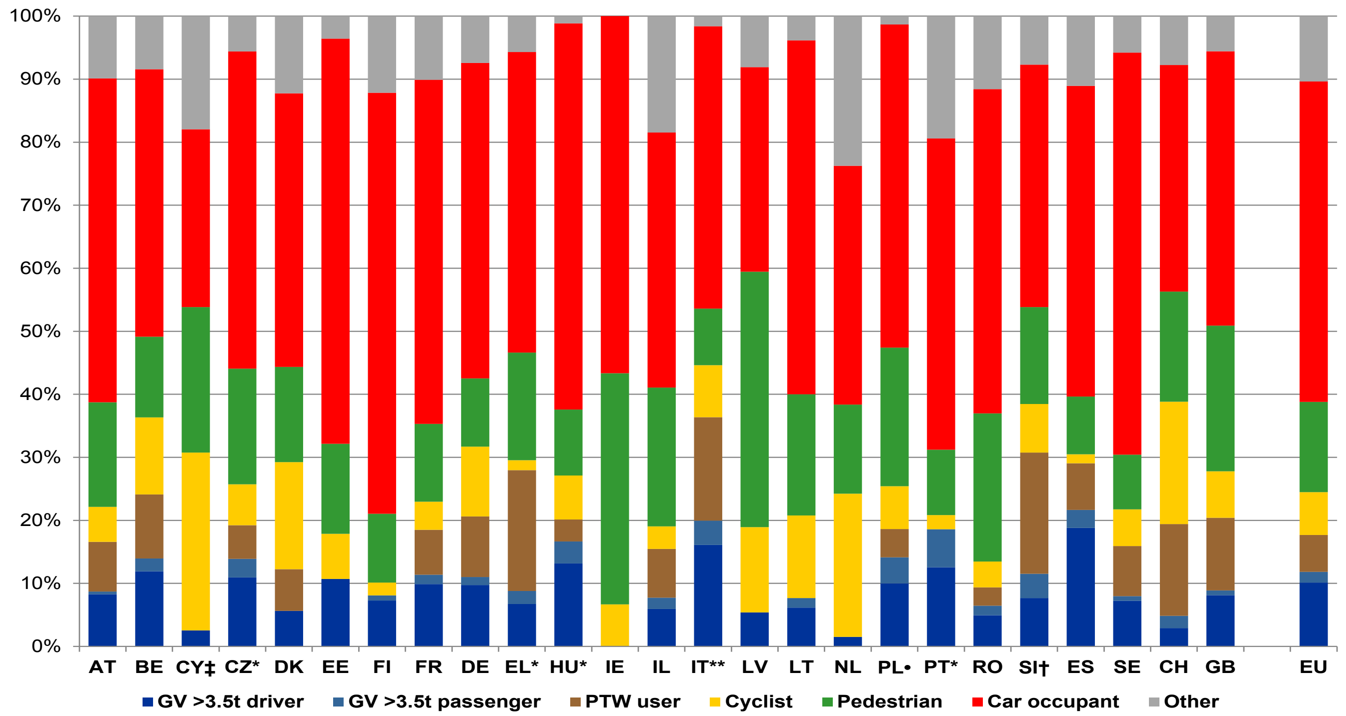


Fig. 2 Percentages by type of road user of deaths in collisions involving a goods vehicle over 3.5 tonnes in the last two or three years for which numbers are available (2009-2011 unless otherwise indicated).*CZ, EL, HU, PT values for 2009-2010. **IT 2008-2010, †SI 2010-2011, ‡CY values for 2009 and 2011. •PL data refers to all goods vehicles.*

Across the EU the occupants of the HGVs involved in the collision make up only 12% of the deaths. The highest number of road deaths following collisions with HGVs is observed among the occupants of passenger cars, either drivers or passengers. They amount to 50% of such road deaths during the last three years observed. Unprotected road users amount to 28% of the road deaths recorded following collisions involving HGVs: 6% were riders of powered two-wheeled vehicles (PTW), 7% were cyclists and 15% were pedestrians. Other types of road user accounted for 10% of the road deaths.

The percentage breakdown by type of road user of those killed in HGV collisions has changed only slightly between the beginning and the end of the period 2001-2011.

In **Romania** and **Israel,** the percentage of deaths among car occupants in collisions with HGVs has increased during this period. Increases in the levels of car ownership can to some extent explain this development, but attention should be paid to reversing a possible trend. In these two countries, despite a downward trend in the total number of road deaths, the number of deaths among car occupants in collisions with HGVs has increased.

The exact reasons for this trend are not fully known, but we believe that a period of economic expansion between 2001 and 2005, high traffic density on the Israeli road network and limited speed enforcement might have contributed to the increase in the share of car occupants among those killed in collisions involving HGVs.
Shalom Hakkert, Ran Naor Foundation for Road Safety Research, Israel.

In **Spain**, **Italy**, **Portugal** and **Hungary** the percentage of deaths that are HGV occupants is above the EU average, with rates of 22%, 20%, 19% and 17% respectively. The lowest proportions of HGV occupants among deaths in HGV collisions were recorded in **Ireland**, where no HGV driver or passenger died between 2009 and 2011, and **the Netherlands**, where 2 HGV drivers died in 2010 and one died in 2009.

The Italian goods vehicle fleet is quite old, with an average age close to 20 years, so most of the vehicles currently on the roads lack safety systems such as ABS or ESP. The renewal of the vehicle fleet could generate important safety benefits through on-board safety and efficiency technologies, such as brakes, tyres, lighting, ITS in the form of cruise control and lane departure warning.
Lucia Pennisi, Automobile Club Italia.

In Spain, 54% of the road deaths among HGV occupants occur in single-vehicle collisions. In these cases, the main contributing factors were distraction in 55% of the cases, infractions in 25%, speeding in 17% and fatigue in 16%.
Pilar Zori, Dirección General de Tráfico, Spain.

It is typical that most (more than 60%) fatal crashes occur outside built-up areas, a consequence of the higher speeds. Rural roads are especially dangerous where the most serious head-on and single-vehicle crashes occur. Hungary is a typical transit country and some road sections (single carriageway) are very dangerous from the point of view of serious head-on collisions. The real causes of these crashes have to do with speeding, dangerous overtaking and fatigued drivers.
Péter Holló, KTI Hungary.

In the Netherlands, since 1980 the average number of truck drivers killed is approximately 10 annually. This is a low number (ca 1% of the total), which is explained by the fact that truck speeds in The Netherlands are limited and roads are sustainably safe, in combination with the fact that it needs a very severe single vehicle or truck-truck crash to kill a truck driver. In 2009 and 2010 we must have had accidentally low numbers, as there were no specific safety measures taken in these years.
Henk Stipdonk, SWOV, The Netherlands.

Unprotected road users make up 51% of the road users killed in collisions involving HGVs in **Switzerland** with 15% PTW riders, 19% cyclists and 17% pedestrians, while in **Latvia** pedestrians account for 41% of the road deaths in HGV collisions.

Given Switzerland's high population density, urban areas account for a relatively larger proportion of the total distance travelled. Higher traffic exposure in urban areas leads to a higher casualty rate and in fact approximately 60% of serious injuries recorded on Swiss roads occur on this type of road.
Stefan Siegrist, Swiss Council for Accident Prevention, Switzerland.

On average, pedestrians account for 33% of the total number of road deaths in Latvia. The main reason is a lack of physical separation from other road users, especially on rural roads. Approximately 70% of all pedestrian deaths occurred during the dark.
Aldis Lama, Ministry of Transport, Latvia.

The large differences between the percentage of people losing their life as an occupant of an HGV and as other types of road user in these collisions provide an interesting insight into the externalities associated with the transport of goods by road, and further developments, both in policies and vehicle technologies, should take these into account.

The relatively large masses of the HGVs translate into higher momentum when the vehicle enters a traffic collision with another road vehicle or user, which in turn increases the severity for the occupants of the other vehicle involved in the collision. The redistribution of momentum during a traffic collision partly explains the relatively small proportion of road deaths for HGV occupants. As such, while HGVs are relatively safe for their occupants, they make for formidable collisions for other types of road users. Moreover, the generally raised cabs of HGVs afford their occupants a relatively higher level of protection than for other vehicle occupants.

Improvements in the requirements of the Regulation 2009/661/EC for underrun protection systems in HGVs would be beneficial in reducing the severity of the collisions between HGVs and other vehicles. Rigid front underrun protection is mandated for all HGVs in the EU. However, as frontal car-to-truck collisions normally occur at high relative speeds, an energy-absorbing front underrun protection system would improve the survivability of frontal collisions, even up to relative speeds of 75km/h.[3] Other pieces of EU legislation could also be used to make HGV fronts safer, (see box below). Side underrun protection systems fill the empty space between the wheels of the HGVs thus preventing unprotected road users from being caught under the HGV, especially in cases when the latter is making a turning manoeuvre (see also fig. 5 and 6 below). However, the legislation currently in force permits the use of an 'open' frame, i.e. two side planks with a maximum distance between them of 30cm. In some circumstances road users can be caught between these two planks and research has shown that deaths in such situations among pedestrians and cyclists could be reduced by

3 ETSC (2012) ETSC Contribution to the CARS 21 WP1 on Road Safety http://www.etsc.eu/documents/CARS%2021_WP%201_ETSC%20Contribution%2015%20Feb%202012.pdf

approximately 45%.[4] Rear underrun protection systems for HGVs and trailers are designed primarily to protect in the case of collisions with passenger cars. Council Directive 70/221/EEC requires a ground clearance of 550mm and test forces of 100kN. Conservative estimates by studies that reviewed these requirements showed that lowering the ground clearance to 400mm and doubling the test forces for the rear underrun protection systems would yield a one third reduction in the number of car occupants killed or seriously injured in such collisions.[5]

Directive 96/53/EC on maximum permitted weights and dimensions in road transport

In 2013 the EU Institutions are due to debate a revision of Directive 96/53/EC which prescribes the maximum permitted weights and dimensions for vehicles using the road networks in the European Union. A proposal published by the European Commission offers an opportunity to improve road safety by improving the streamlining of the cab, allowing a reduction of the driver's blind spots. A new cab profile could also incorporate energy absorption structures in the event of a collision and could potentially save lives of vulnerable road users who the driver does not necessarily see when making manoeuvres.

The proposal also adds provisions to Directive 96/53/EC to enable national inspection authorities to better detect infringements and harmonise administrative penalties that apply to them. The European Commission will also publish guidelines on inspection procedures to ensure harmonisation of inspection methods between all Member States.

However, any increase of either vehicle weight or length should be weighed carefully so that potential benefits are not outweighed by negative consequences in terms of road safety, or the costs that may arise from the need to modify road infrastructure, including rest and loading/ unloading areas, to accommodate changes in the HGV size or weight.
For further information:
http://www.etsc.eu/documents/ETSC_Position_on_Longer_and_Heavier_Vehicles.pdf

4 ETSC (2001) Priorities for EU Motor Vehicle Design http://etsc.eu/documents/mvdesign.pdf
5 ETSC (2012) ETSC Contribution to the CARS 21 WP1 on Road Safety http://www.etsc.eu/documents/CARS%2021_WP%201_ETSC%20Contribution%2015%20Feb%202012.pdf

3.1.3 By type of road

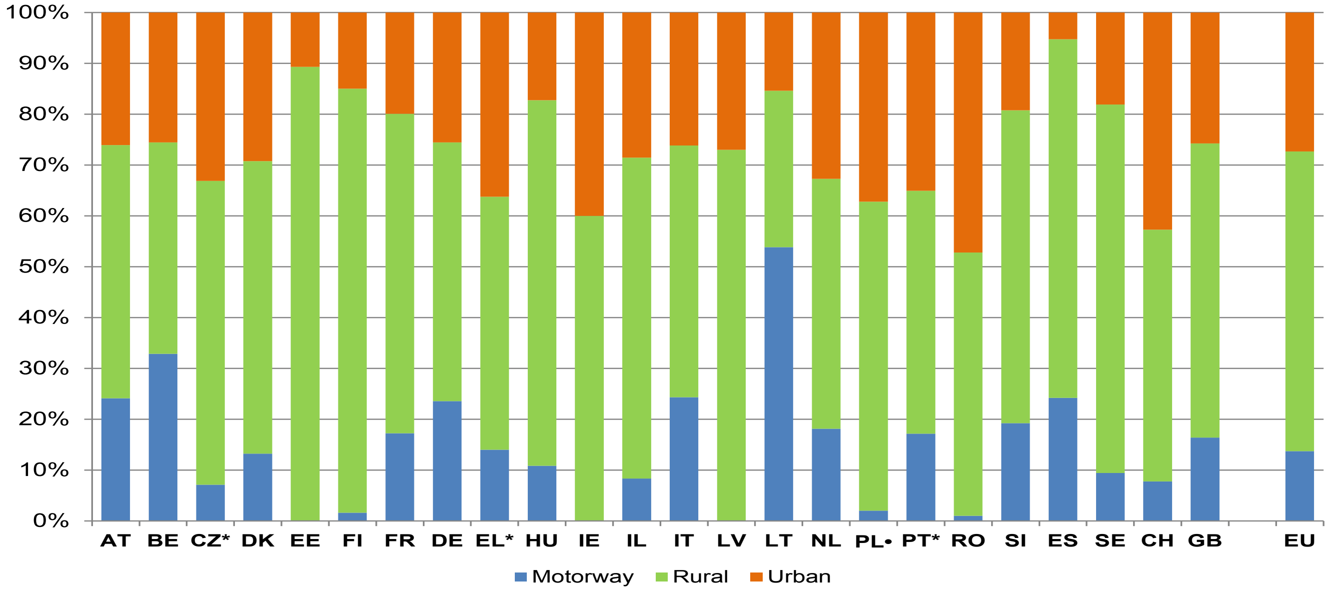


Fig. 3 Percentages by type of road of deaths in collisions involving a heavy goods vehicle in the last two or three years for which numbers are available (2009-2011 unless otherwise indicated).
**CZ, EL, PT values for 2009, 2010. •PL data refers to all goods vehicles.*

For the EU as a whole, 28% of the road deaths in collisions involving HGVs occur within urban areas, 59% on rural roads other than motorways and 13% on motorways. The lowest percentages of these road deaths occurring on urban roads are observed in **Spain** with 5%, **Estonia** with 11%, **Luxembourg** with 14% and **Lithuania** and **Finland** with 15%. In contrast, in **Romania**, 47% of the deaths in collisions involving HGVs occur on urban roads, while the figures for **Switzerland** and **Ireland** stand at 43% and 40% respectively.

In Ireland, a total of 12 people lost their lives on urban roads in collisions involving HGVs during the period 2009-2011. In 2007, the Dublin City Council approved a city-wide ban on HGVs in the inner city, which is reported to have improved the safety of pedestrians, PTW users and cyclists in the city.[6]

If deaths in collisions involving HGVs are to be further reduced on urban roads, a series of challenges have to be met and the function of providing goods to urban businesses and residents, which is performed in part by HGVs, has to be integrated with initiatives aimed at improving general road safety in urban areas. Measures to reduce the risks of death and injury for road users in urban areas generally include:

- Matching the use of each road to the functions that the road serves in terms of living space, access and through movement;
- Separating faster vehicles from slower ones and lighter vehicles from heavier ones, and separating vehicles that are making conflicting movements;
- Making the road system self-explaining to its users;
- Achieving high levels of use of protective devices and understanding of how to drive to reduce risk.

6 ETSC (2009) 3rd Road Safety PIN Report chapter 4 *En route to safer mobility in EU capitals*. http://www.etsc.eu/documents/ETSC%20PIN%20Annual%20Report%202009.pdf

While 55% of the overall number of road deaths in the EU occur on rural roads[7], a slightly higher percentage, 59%, of the deaths in collisions involving HGVs take place on this type of road. In **Estonia**, 89% of the road deaths in collisions with HGVs occur on rural roads, followed by **Finland** with 83%. The corresponding rates are 73% in **Latvia**, 72% in both **Hungary** and **Sweden** and 71% in **Spain**.

Measures aimed at the general reduction of deaths on rural roads will also have an effect on the number of road deaths in collisions involving HGVs. However, there is no single measure to improve safety on rural roads and experience from fast progressing and best performing countries shows the need for a combination of well-known and cost-effective measures. These include safe road design, safe infrastructure management and increased enforcement of applicable traffic laws, particularly with regard to speeding (more details below) and drink driving.

One of the main infrastructural measures introduced in Sweden was the upgrade of rural roads to a 2+1 design with the traffic in the two directions separated by a middle barrier. An evaluation of these roads, published in 2009, analyses the safety benefits of the investments made in the upgrade of the infrastructure.[8] In the framework of the EU-funded SUPREME project, rumble strips – milled into the asphalt surface of either the shoulder of the road or the line separating opposite directions of traffic when there is no middle barrier – have been identified as one of the best practice infrastructural measures to reduce road deaths on rural roads. Research has shown that reductions of over 30% in the number of injury collisions could be achieved through the use of shoulder-mounted rumble strips.[9] As fatigue is a contributing factor in a considerable share of collisions involving HGVs, an infrastructural element required, but which is sometimes overlooked on the road network, is the provision of adequate and secure parking spaces for these vehicles.[10] Studies from 2002 identified a considerable shortfall of parking spaces in Europe.[11]

7 ETSC (2011) 5th Road Safety PIN Report chapter 3 *Reducing deaths on rural roads – A priority for the UN Decade of Action*, http://www.etsc.eu/documents/ETSC_2011_PIN_Report.PDF
8 VTI (2009) Evaluation of 2+1 roads with cable barriers. http://www.vti.se/en/publications/pdf/evaluation-of-21-roads-with-cable-barrier.pdf
9 Further information available at http://ec.europa.eu/transport/road_safety/pdf/projects/supreme.pdf
10 ETSC (2011) Tackling Fatigue: EU Social Rules and Heavy Goods Vehicle Drivers. Preventing Road Accidents and Injuries for the Safety of Employees (PRAISE) http://www.etsc.eu/documents/Report7_final.pdf
11 "SETPOS Workshop, Brussels 29.04.2009 Alexia Journé" http://www.setpos.eu/docs/ppt-journe.pdf. For further information http://setpos.eu/handbook/SETPOS-project-handbook.pdf

3.1.4 By distance travelled

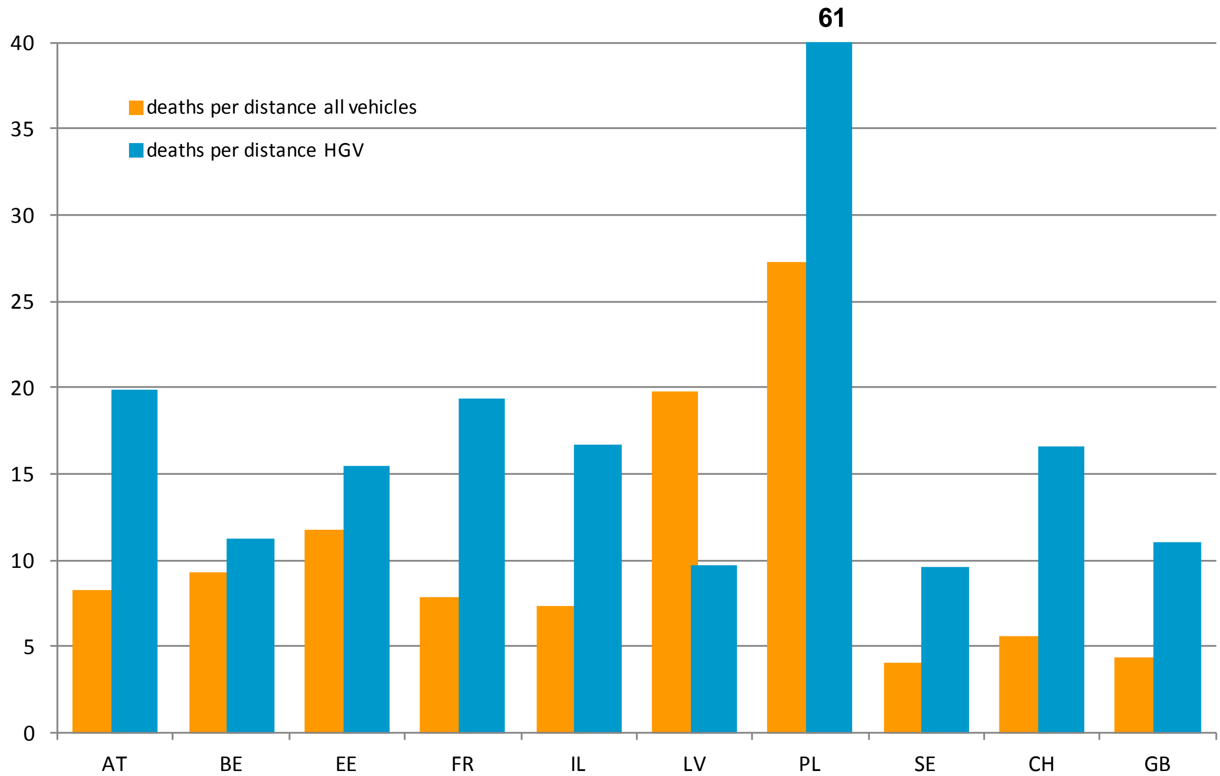


Fig. 4 Road deaths in collisions involving a goods vehicle over 3.5 tonnes per billion vehicle kilometres travelled by those vehicles (blue bars) with corresponding rates for all vehicles (orange bars). *Average for the period 2008-2010 except for LV and SE 2009-2011 and PL 2008-2009.*

In terms of the number of deaths per distance travelled by HGVs, the data from the countries that collect it shows that HGVs are generally less safe than the country average for the entire vehicle fleet, with **Latvia** being the only exception. In **Austria, France, Israel**, **Sweden**, **Switzerland** and **Great Britain** HGVs are involved in more than twice as many fatal collisions per billion km travelled as the average vehicle. While the demand for transport of goods is likely to either remain constant or increase in the future, the data in fig. 4 should serve as a reminder that road safety policies should not lose focus on HGVs.

3.1.5 Nearside turn collisions

The larger size of the HGVs results in a comparatively smaller area of direct vision for their drivers than for drivers of passenger cars or LGVs, so this deficiency has to be corrected through the use of indirect vision devices, particularly mirror elements. A re-design of the cabs may also help as foreseen as the current proposal for a revision of the Directive 96/53/EC. EU-level legislation has been adopted to provide minimum requirements for reducing blind spot areas around large vehicles.[12] A study on the implementation of Directives 2007/38/EC shows the areas around the HGV which are covered by the indirect vision devices mandated by the Directive, but it also notes that even, if the requirements are fully implemented, the potential for blind spots around HGVs still remains.[13]

12 EC Directive 2003/97/EC on the fitting of blind-spot mirrors on new vehicles and Directive 2007/38/EC on retro-fitting mirrors to heavy goods vehicles.
13 TRL (2011) A study of the implementation of Directive 2007/38/EC on the retrofitting of blind spot mirrors to HGVs http://ec.europa.eu/transport/road_safety/pdf/retrofitting_mirrors.pdf

This conclusion is consistent with the data related to deaths in collisions with near-side turning HGVs provided by the PIN panellists, as shown in Fig. 5.

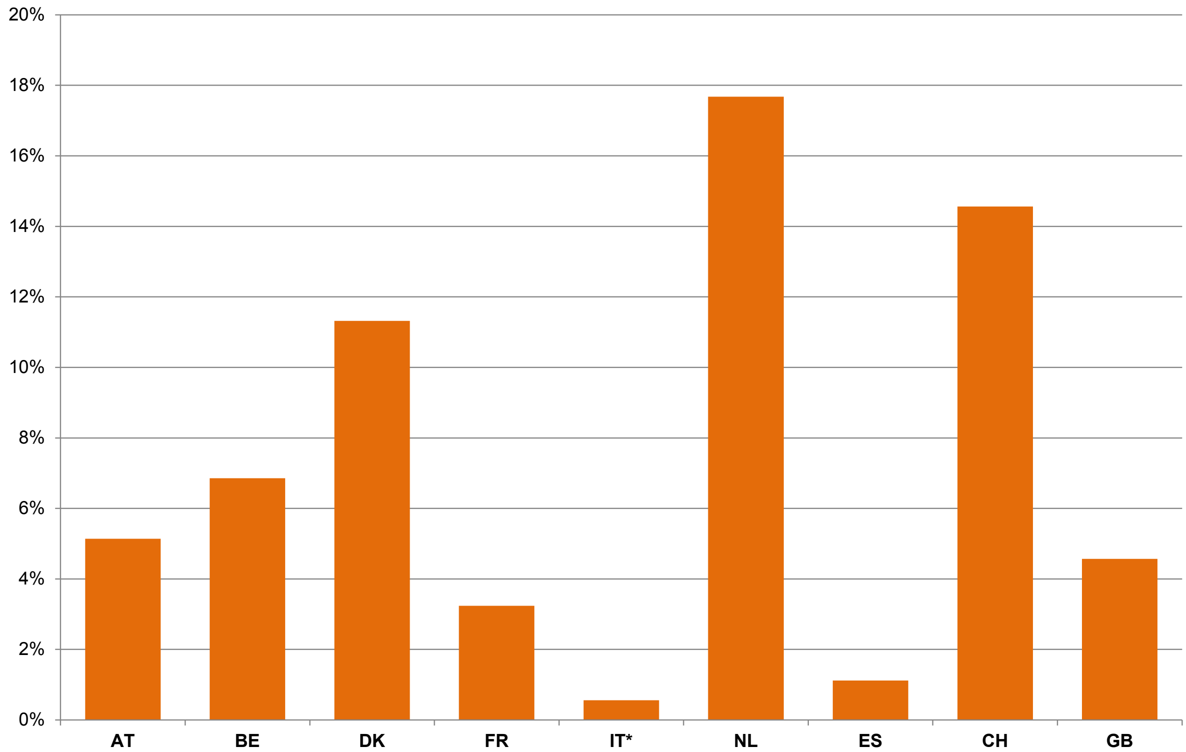


Fig. 5 Percentage of road deaths in collisions involving a goods vehicle over 3.5 tonnes for which the HGV was performing a near-side turn (left turn in the UK, Malta and Ireland, right turn in the rest of Europe). Average for the last three years available.
**IT average for 2009 and 2010.*

In **the Netherlands**, close to 18% of the total number of deaths following collisions with HGVs occur while the vehicle is performing a nearside (right) turn. The corresponding percentages are 14.6% in **Switzerland**, 11.3% in **Denmark**, 6.9% in **Belgium** and 5% in **Austria**.

Further research would be needed to provide a full explanation of the higher share of deadly nearside collisions in The Netherlands. A possible explanation might be found in the large proportion of Dutch roads that have separate bicycle infrastructure and the fact that cyclists, as well as moped riders, must stay on the right of motorised traffic. These rules increase the safety on road sections but might increase the risk of collisions at intersections when HGVs are performing a right turn.
Henk Stipdonk, SWOV, The Netherlands.

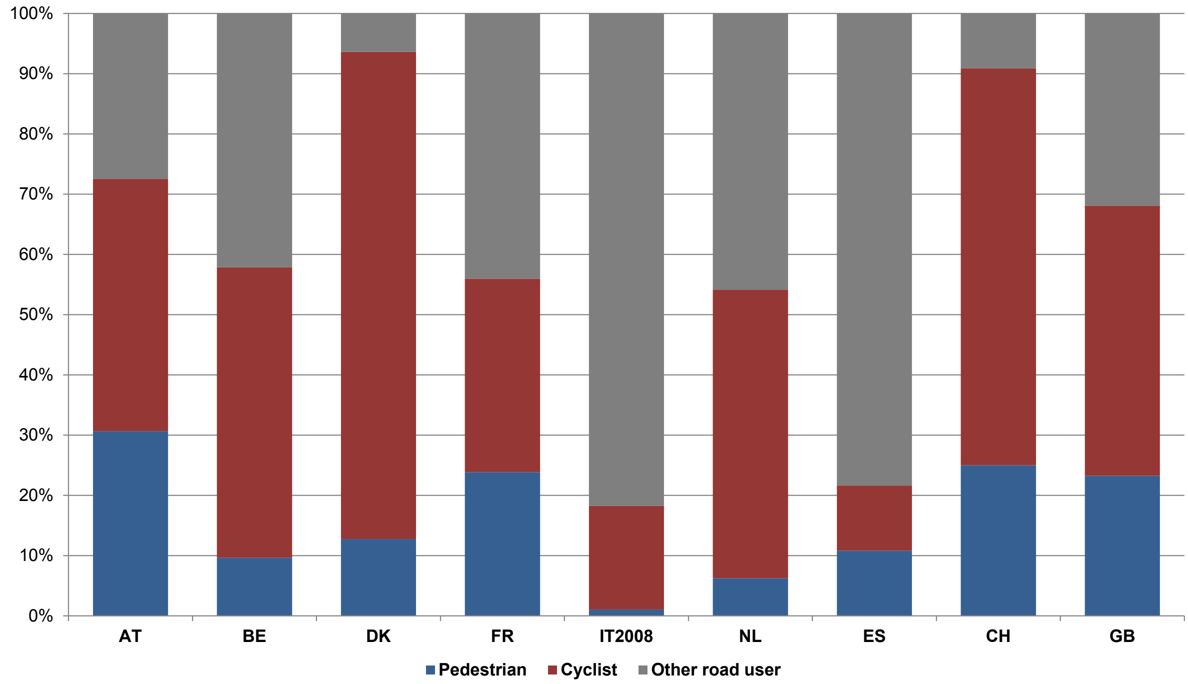
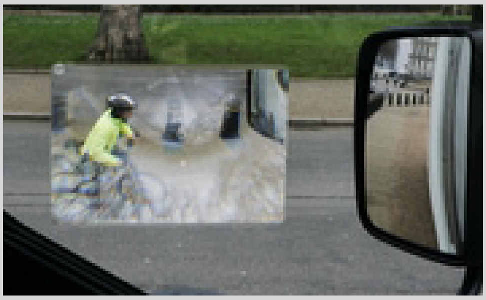


Fig. 6 Percentage by type of road user of those killed or seriously injured in a collision with a goods vehicle over 3.5 tonnes performing a near-side turn (left turn in the UK, Malta and Ireland, right turn in the rest of Europe). *Average for the last three years available.*

The problem of blind spots around nearside turning HGVs is particularly acute for vulnerable road users, not just because of their small weight in relation with the HGVs, but also because of the limited amount of space they occupy on the road, which reduces the chance of the drivers detecting them through the rear-view mirrors. Fig. 6 shows the percentages of pedestrians and cyclists among those who are killed or seriously injured in collisions with nearside turning HGVs.

As a measure to improve the safety of cyclists, Transport for London started promoting the use of Fresnel lenses, distributing 20,000 of them in 2008, of which 5,000 were given to vehicles working on the Olympic site in London.[14] Moreover, the use of Fresnel lenses is required for all HGVs operating on or delivering materials and goods to work sites contracted by Transport for London. Transport for London also asks that all drivers working on or delivering goods to its sites across the city have undertaken specialised training on interacting with cyclists and other vulnerable road users within an urban environment. Public procurement rules are also used to ensure that these requirements are met.



View from driver's seat (right-hand side) of cyclist on the nearside of the lorry. Fresnel lens and side mirror. *Source: TfL*

14 Transport for London http://www.tfl.gov.uk/microsites/freight/hgvs_and_road_safety.aspx

3.1.6 Speed Measurements in countries where they are available

a) Rural roads

Unfortunately, only 6 of the PIN countries were able to provide measurements related to the speed of heavy goods vehicles, measured in free-flowing traffic. With few exceptions, data from these countries paints an encouraging picture, as the mean speed of heavy goods vehicles has decreased slightly over the observed period (fig. 7).

A marked drop in the mean speed of HGVs was observed in France, up to 2008; this mean speed subsequently increased in 2009 and 2010, but reverted to the 2008 level in 2011. In **Great Britain** the reported mean speed of HGVs on rural single carriageways remains consistently above the speed limit of 64 km/h that is specific to HGVs on these roads, but this speed limit, much lower than the limit of 97km/h that applies to smaller vehicles on those roads, is under review, partly because of the risk that it encourages dangerous overtaking by cars and other lighter vehicles. The same applies to the limit of 81km/h on rural dual carriageways.

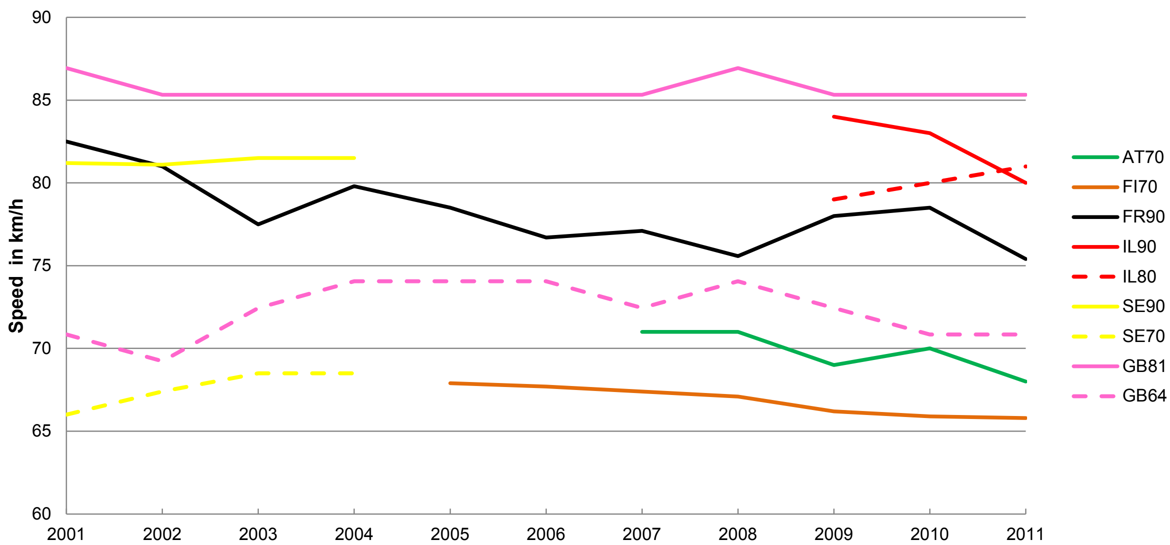


Fig. 7 Mean speed (in km/h) of goods vehicles over 3.5 tonnes, measured in free flowing traffic, on rural roads other than motorways in some European countries.
In GB the speed limits of 64 and 81 km/h refer to HGVs exceeding 7.5t only. HGVs with a maximum weight between 3.5t and 7.5t are limited to 81 km/h (50 mph) on single carriageways and 97 km/h (60 mph) on dual carriageways. Cars are limited to 97km/h and 113km/h respectively.

The evolution in the percentage of HGVs that exceed the speed limit on rural roads rather closely mirrors the evolution of mean speeds (fig.8). The best record of compliance with the posted speed limits was observed in **Finland**, where 26% of drivers exceeded the 70 km/h limit. **France** and **Israel** (on roads with 90 km/h speed limit) follow with non-compliance levels of 38% and 39% respectively.

In Sweden, speed monitoring on a yearly basis is done through the use of a 'speed index' which regularly monitors speed developments at 83 points across the rural road network. During 2012, an extensive speed survey – over 1,500 measurement points – was conducted in a manner similar to surveys done up to 2004. The results show small decreases in mean speed for HGVs (- 2.2%) and larger decreases for passenger cars (-4.5%) compared with the data from 2004.
Anna Vadeby, VTI Sweden.

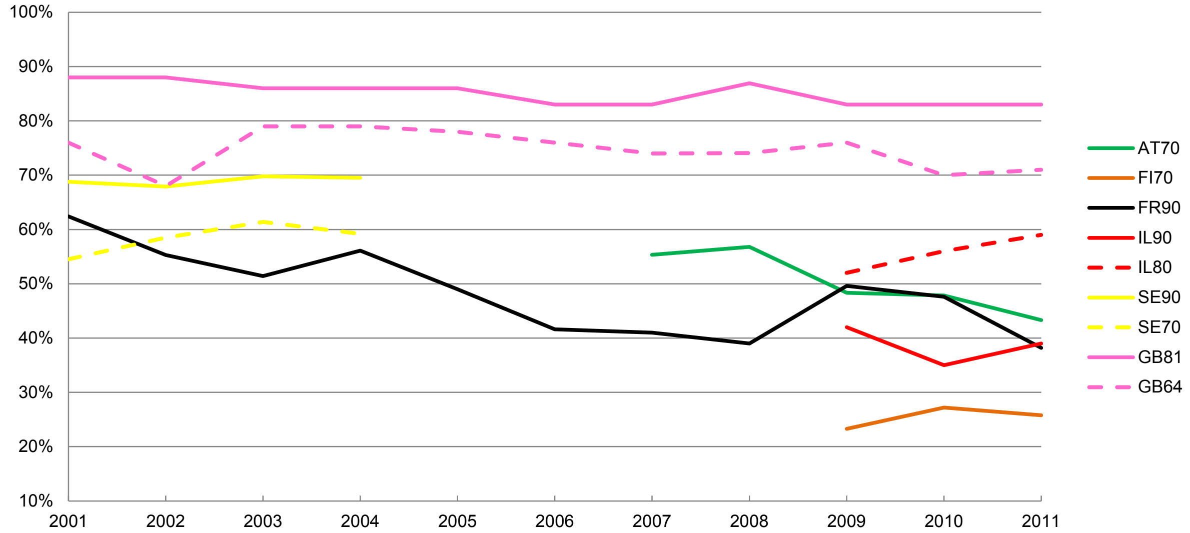


Fig. 8 Percentage of goods vehicles over 3.5 tonnes exceeding the speed limit on rural roads other than motorways.
In GB the speed limits of 64 and 81km/h and the observed percentages refer to HGVs exceeding 7.5t only, which have a lower speed limit than the rest of the vehicles. HGVs with a maximum weight between 3.5t and 7.5t are limited to 81 km/h (50 mph) on single carriageways and 97 km/h (60 mph) on dual carriageways. Speed limits for cars are 97km/h and 113km/h respectively.

b) Urban roads

With exceptions, the mean speed, measured in free flowing traffic, of HGVs on urban roads, shows a relatively static picture for the countries that provided data (fig. 10). The biggest nominal reduction in the mean speed of free flowing HGV traffic on urban roads was observed in **France,** from 56 km/h in 2001 to 49 km/h in 2011. The lowest mean speed for HGVs on French urban roads was recorded in 2006 and the mean speed has fluctuated slightly since then. Mean speed was also reduced substantially on 30 km/h limited **Austrian** urban roads, from 30 km/h in 2007 to 25km/h in 2011.

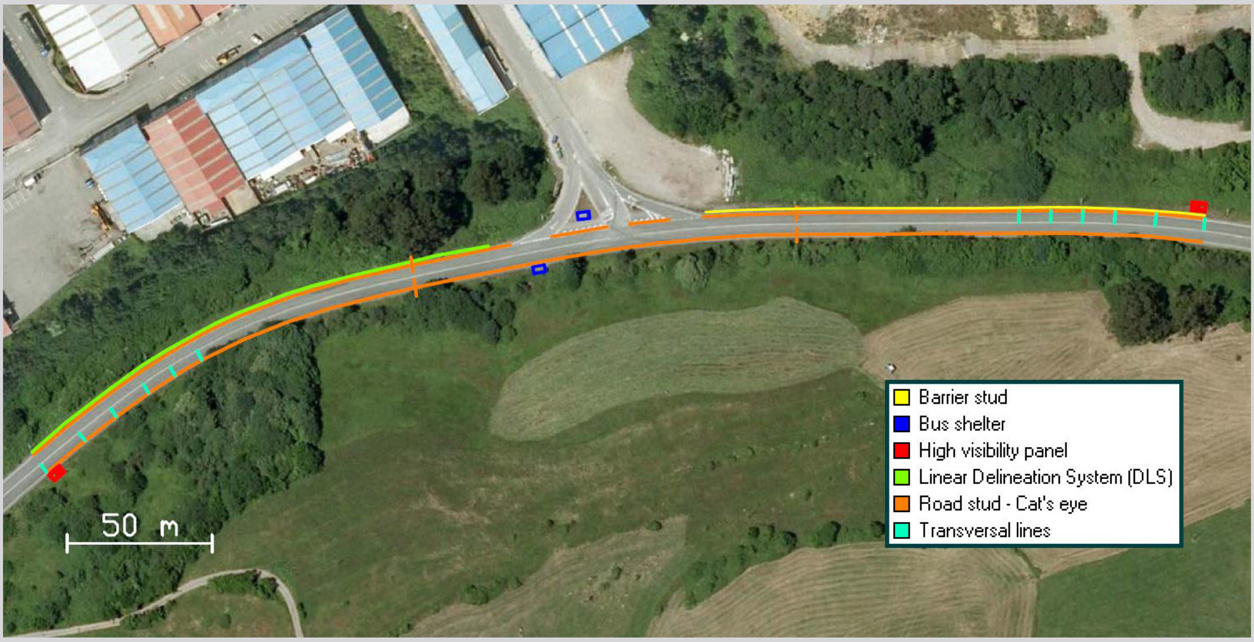
In Austria, area-wide engineering speed management measures on 30 km/h roads have been introduced as part of a new policy, thus ensuring that compliance with the posted speed limits minimises the need for additional resources dedicated to enforcement. We now appear to see the first positive results of these comprehensive investments.
Klaus Machata, Austrian Road Safety Board.

ETSC project STARS 'Students Take Action to Reduce Speed'

STARS is a project which aims at mobilising transport research into speed management to demonstrate how excessive and inappropriate speed can be reduced through measures that are available now. The main objective of STARS is to take concrete actions that can reduce speed through the work of students. Groups of two students from across the continent devise their projects to manage and reduce speed at a selected site and participate in an EU-wide competition.

The winning group in the 2010-2011 round of STARS implemented a speed management project on the AS-19 road linking Avilés and Gijón in Spain. The selected site had the highest concentration of collisions within the region and it was located in an area with high HGV traffic due to its proximity to an industrial site, as well as having two bus stops in locations with low visibility.

The students installed high visibility elements to make drivers pay more attention at the site. They placed two fluorescent reflective high visibility panels at the beginning of the treated road section, painted transversal lines to alert drivers of a reduced speed limit and installed reflective road studs on the road surface and on the crash barriers (see below). Moreover, the speed limit for the treated site was reduced from 90km/h – the general limit on rural roads – to 60km/h.



http://www.etsc.eu/stars.php

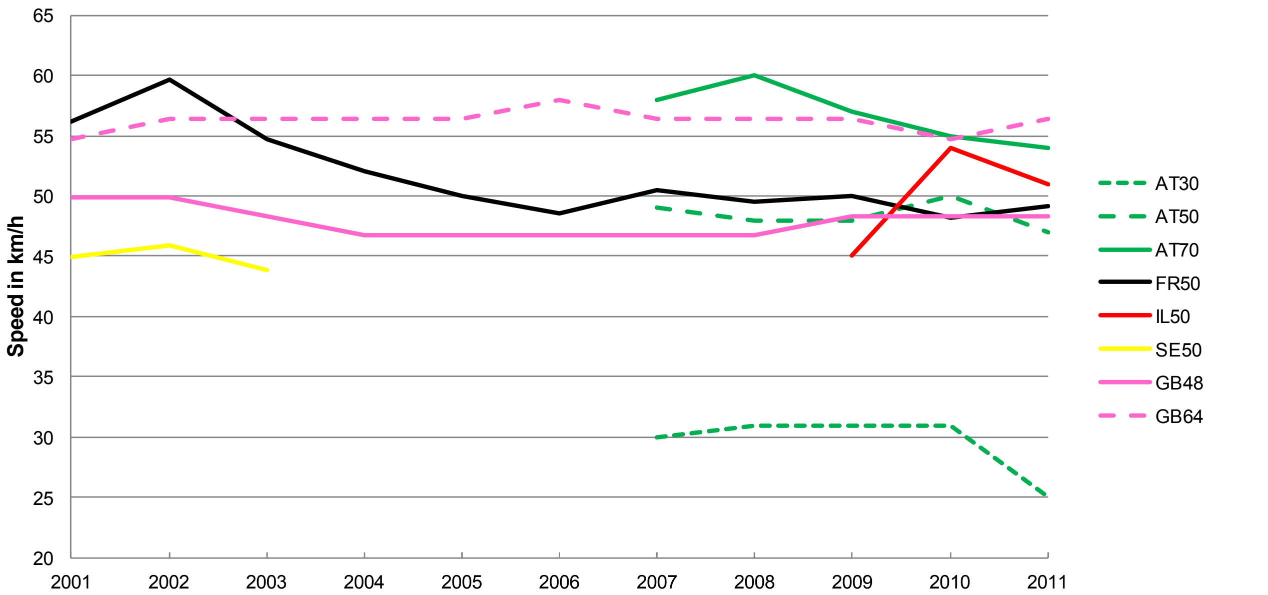


Fig. 9 Mean speed (in km/h) of goods vehicles over 3.5 tonnes, measured in free flowing traffic, on urban roads in some European countries.
The GB data refers to 2-axle rigid HGVs only.

The proportion of HGVs travelling above the speed limit in urban areas was the lowest on 70km/h roads in **Austria** at 3%. In **Great Britain**, 21% of HGV drivers went above the speed limit on 64km/h urban roads. In **Austria**, 28% exceeded the limit on 30 km/h roads and 39% on 50 km/h roads.

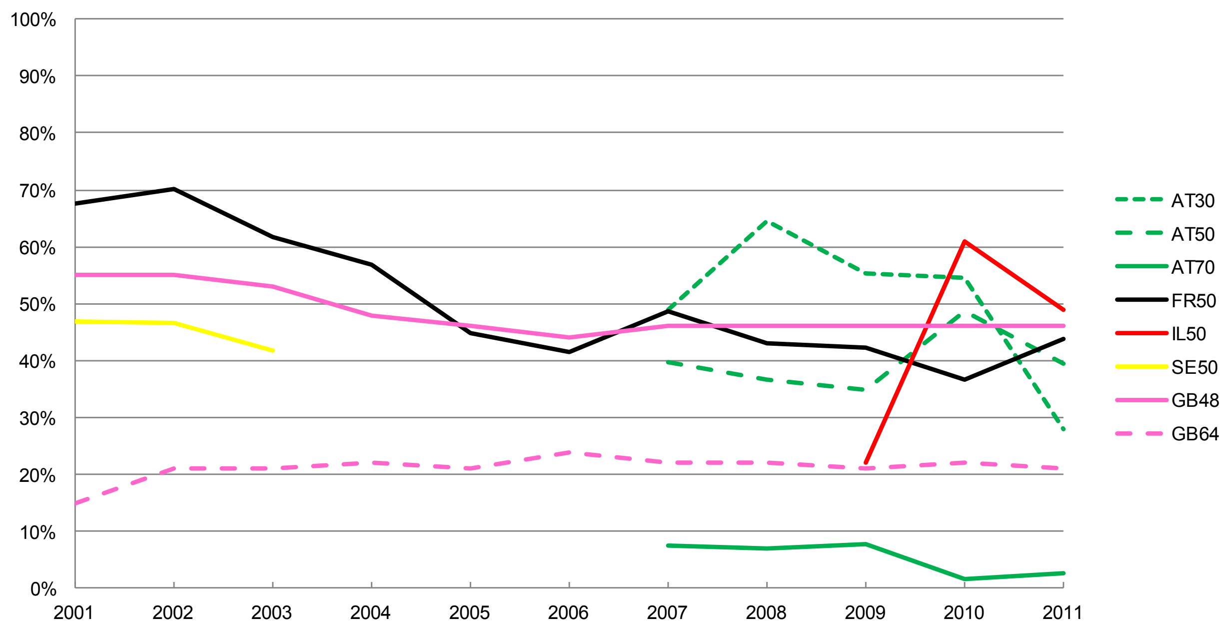
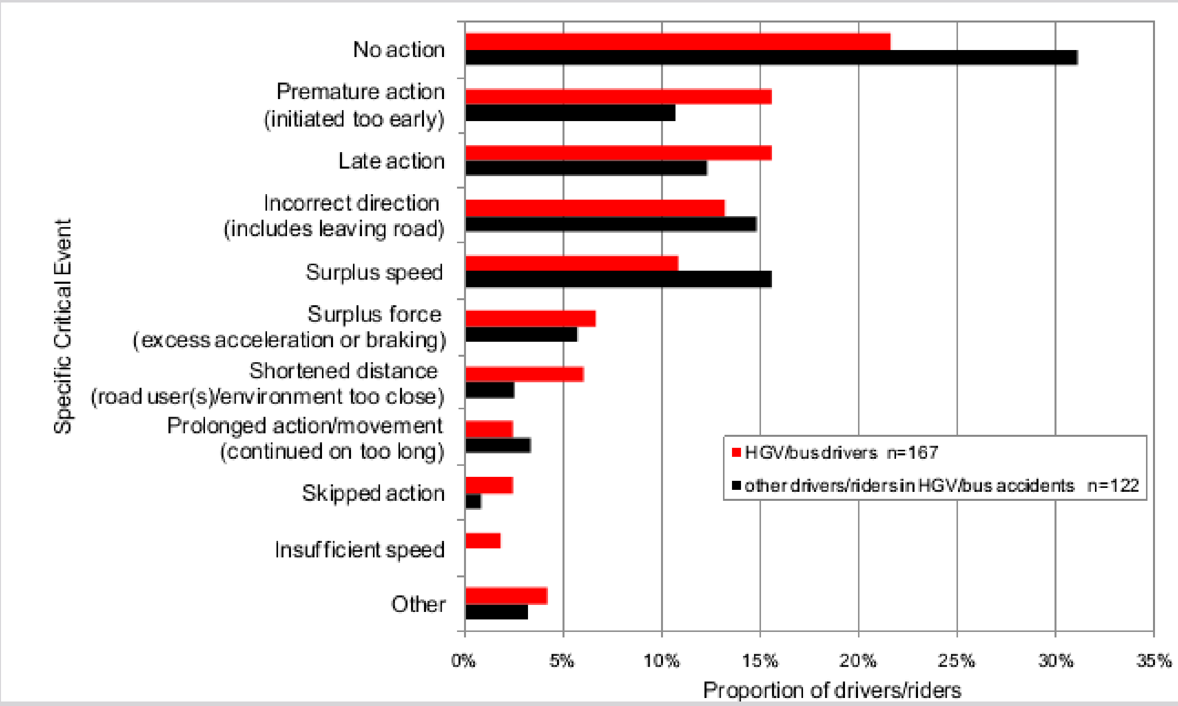


Fig. 10 Percentage of goods vehicles over 3.5 tonnes exceeding the speed limit on urban roads.
The GB data refers to 2-axle rigid HGVs only.

In-depth collision studies

Many studies used in-depth accident investigation in order to reveal the dynamics of collisions and draw conclusions to prevent similar ones in the future. A recently-published report by Volvo Trucks uses the investigations of their Accident Research Team to analyse collisions involving the Group's heavy goods vehicles in Europe. The report looks at the factors contributing to collisions and reveals that in 90% of the collisions involving an HGV one of the contributory factors was related to the driver, in 30% one was related to the road/traffic environment and in 10% one was related to the vehicle, with a combination of factors contributing to a large proportion of the collisions analysed.[15]

In the framework of the EC-funded SafetyNet project, a sample of collisions that occurred in Germany, Italy, The Netherlands, Finland, Sweden and the UK was identified and in-depth data for these collisions was collected. The SafetyNet Accident Causation Database contains 1,006 accidents, 158 involving an HGV or bus driver and, through the SafetyNet Accident Causation System, one specific critical event is attributed to each driver/rider/pedestrian involved in a collision.[16] The figure below shows the distribution of critical events for HGV or bus drivers (red bars) and other drivers/riders involved in collisions with HGVs/buses within the database.



Eleven collisions, occurring on Dutch motorways between October 2011 and January 2012, investigated by the Dutch Safety Board form the basis of a report published in November 2012.[17] On this basis, the Safety Board selected several focus areas that need to be looked at more closely to gain an insight into the underlying causes of collisions involving HGVs: the general area of

15 Volvo Trucks (2013) http://pnt.volvo.com/e/GetAttachment.ashx?id=26704

16 ERSO (2010) Heavy Goods Vehicles and Buses. Traffic Safety Basic Facts 2010 http://ec.europa.eu/transport/road_safety/pdf/statistics/dacota/bfs2011_dacota_intras_hgvs.pdf. Another factsheet related to accident causation has been published by ERSO(2012) Accident Causation Traffic Safety Basic Facts 2012 http://www.dacota-project.eu/Deliverables/BFS%20ASR%202012/BFS2012_DaCoTA_TSRC_Causation.pdf

17 Dutch Safety Board (2012) Truck Accidents on Motorways, The Hague, November 2012. http://www.onderzoeksraad.nl/docs/rapporten/Summary_Vrachtwagenongevallen_EN_web.pdf. The full report (in Dutch) is available at http://www.onderzoeksraad.nl/docs/rapporten/Vrachtwagenongevallen_NL_web.pdf.

alertness and the more specific areas of tyre blowouts and collisions at the end of traffic jams – i.e. vehicles encountering a traffic jam and unable to brake in time to avoid collision with the vehicles in front, who are either travelling at reduced speed or are stationary. The report says that new technologies, such as Advanced Emergency Braking System (AEBS) and Lane Departure Warning System (LDWS), can help in limiting serious HGV collisions if used correctly, and notes that HGV drivers' behaviour is key to road safety. The report also draws attention to the role of infrastructure in inducing correct behaviour: a shortage of 1,800 truck parking spaces, as calculated in 2011, could be a contributory factor in non-compliance with legislation on driving and rest times.

In a 2010 report analysing 130 fatal collisions involving HGVs that occurred in Norway between 2005 and 2008, the Institute of Transport Economics identified several risk factors and tested 14 hypotheses related to the influence of these risk factors on collisions.[18] In 39 of the cases studied the HGV was the vehicle triggering the collision, while in 76 cases another vehicle involved in the collision triggered it. The Norwegian data identified speed (either inappropriate or illegal) as a triggering factor in all types of collisions except for those between a HGV and a vulnerable road user. The report also showed that, while vehicle conditions (such as brakes or tyres) may contribute to road collision, they are rarely its main cause.

A 2009 study by the Swedish Road Administration looked at collisions in the period 2000-2007 and quantified the life saving potential of various road safety measures as it related to collisions involving HGVs.[19] The measures were divided into:

- Measures related to safe roads: median barriers, central and side rumble strips, safe intersections in urban areas, safe intersections on main (rural) roads and speed controlled pedestrian and bicycle crossings;
- Measures for safe use: sober drivers of passenger cars, sober drivers of heavy goods vehicles, seat-belted drivers of passenger cars, seat-belted drivers of heavy goods vehicles, well secured loads, speed limit compliance by drivers of passenger cars and speed limit compliance by drivers of heavy goods vehicles;
- Measures for safe vehicles: crashworthiness in new vehicles, safe reversing by heavy goods vehicles, heavy goods vehicles without technical faults, Electronic Stability Control systems for passenger cars, Electronic Stability Control systems for heavy goods vehicles, LDWS for passenger cars and HGVs, AEBS for passenger cars and heavy goods vehicles in rear-end collisions, detecting unprotected road users, automatic emergency brake for heavy goods vehicles and automatic emergency brake + deformation zone + safe cars

According to the report, the greatest individual effects are yielded by median barriers, rumble strips, sober passenger car drivers, LDWS and AEBS. It was also noted that a combination of AEBS and a deformation zone on heavy goods vehicles would reduce the number of deaths in frontal collisions with HGVs by slightly over 50%.

18 TOI (2010) In-depth-study of 130 fatal accidents involving heavy goods vehicles in Norway 2005-2008 https://www.toi.no/getfile.php/Publikasjoner/T%D8I%20rapporter/2010/1061-2010/1061-2010-Sum.pdf

19 Swedish Road Administration (2009) In-depth analysis of accidents with heavy goods vehicles – Effects of measures promoting safe heavy goods traffic. http://publikationswebbutik.vv.se/upload/4598/2009_2_in_depth_analysis_of_accidents_with_heavy_goods_vehicles.pdf

EU legislation for the use of tachographs in professional road transport

A tachograph is a recording device, fitted to commercial vehicles, which stores details of the movement of vehicles and of certain work periods of their drivers. The recording of the driver's individual duty periods is mandatory in commercial vehicles in European countries for enforcement of driving-time regulations.

The digital tachograph records drivers' activities, speed, distances, identification data of the vehicle, of the tachograph fitted, calibration data as well as faults and attempts to manipulate the system and when data has been accessed (for example by the enforcement authority). It stores digital records of the driver activities and vehicle activities on its internal memory and separately on a driver's smart card. A truck operator must periodically download this data from the digital tachograph and the driver cards. They also need to analyse the data, to ensure that the rules have been complied with. The system of the digital tachograph is controlled by four different Smart Cards: Driver, Company (operators), Workshop (Tachograph manufacturers, Vehicle manufacturers or Tachograph Calibration Centres) and Control Card for enforcement authorities. Each Smart Card is issued according to the specific needs. All Member States have to ensure the availability and provide all necessary infrastructure and equipment for application, personalisation and issuing of digital tachograph Smart Cards.

3.2 Light Goods Vehicles

3.2.1 Country comparison

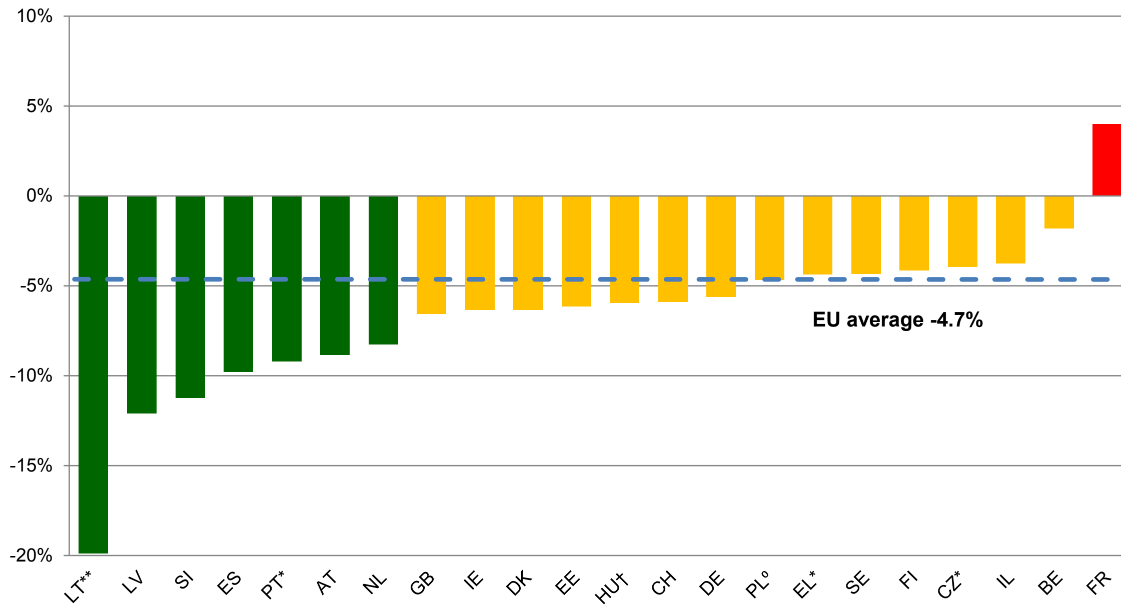


Fig. 11 Average annual percentage change between 2001 and 2011 in the number of road deaths in collisions involving a goods vehicle with a maximum permitted weight below 3.5 tonnes.
**CZ, EL, PT, 2011 data not available, annual average percentage change calculated for 2001-2010. **LT 2001 data not available, annual average percentage change calculated for 2002-2011. †HU 2001 and 2011 data not available, annual average percentage change calculated for 2002-2010. PL data refers to all goods vehicles.*

Lithuania achieved the best average annual percentage change in the number of road deaths in collisions involving light goods vehicles (vehicles with a maximum permitted weight of less than 3.5 tonnes). It is followed by **Latvia** and **Slovenia**, which achieved average annual reductions of 12.1% and 11.2% respectively. **Spain**, **Portugal**, **Austria** and the **Netherlands** also achieved reductions of more than 8.0% per year. At the other end of the table, the number of road deaths in collisions with LGVs has increased in **Romania** and **France**, at an annual average rate of 10% and 4% respectively. It should be noted that the number of road deaths reached a peak in 2008 for Romania and 2009 for France, followed by a slight decrease in the number of recorded deaths.

3.2.2 By type of road user killed

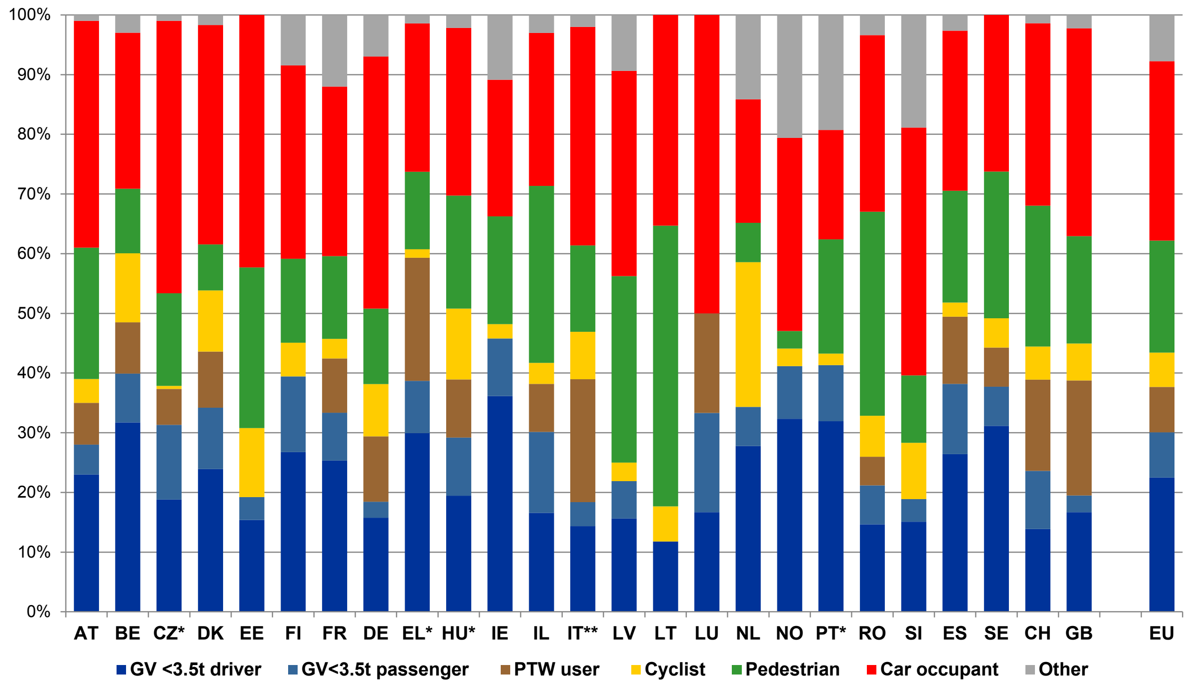


Fig. 12 Percentages by type of road user of deaths in collisions involving a goods vehicle under 3.5 tonnes in the last two or three years for which numbers are available (2009-2011 unless otherwise indicated).
**CZ, EL, HU, PT values for 2009-2010. **IT 2008-2010.*

Occupants of LGVs make up approximately 30% of the total number of road deaths recorded in collisions involving this type of vehicle, 23% being the drivers of the LGV and the other 7% LGV passengers. Car occupants form the largest other percentage of road deaths in collisions involving LGVs, also accounting for 30% of the number of such deaths between 2009 and 2011. Among unprotected road users the largest percentage is that for pedestrians, at 19%. Riders of PTW vehicles account for 8% and cyclists for 6%, while 8% are other road users.

Compared with the corresponding road user group breakdown for HGVs (fig. 2), the larger proportion of those killed who are LGV occupants – 30% for LGVs compared with 12% for HGVs – reflects in part the lower weight of the LGVs, which makes their occupants more vulnerable. It is also worth noting the larger share of unprotected road users killed in collisions involving LGVs than the corresponding share in collisions involving HGVs, particularly when looking at the share of pedestrians killed – 19% of deaths in LGV collisions compared with 14% of deaths in HGV collisions. With heavy traffic being subjected to entry restrictions in several urban centres in Europe,[20] smaller vehicles are being used more and more for 'last mile' deliveries, leading to an increase in the share of LGVs in urban traffic, reinforcing the tendency for much of the activity of LGVs being in areas where many pedestrians are using the roads and thus possibly offering a partial explanation for the observed figures. Road safety in urban areas should thus focus on the purpose, or function, of the vehicles entering urban areas, rather than exclusively on their weight.

The percentage of those killed in LGV collisions who are LGV occupants is the highest in **Ireland**, where they account for 46% of these deaths, compared with the 30% EU average. In **Norway** and **Portugal**, LGV occupants account for 41% of the road deaths, followed by **Belgium** with 40%. For LGV passengers killed in these collisions, **Israel** has the largest share with 14%, compared with the EU average of 8%, the **Czech Republic** and **Finland** each have 13% respectively and **Spain** 12%.

3.2.3 By distance travelled

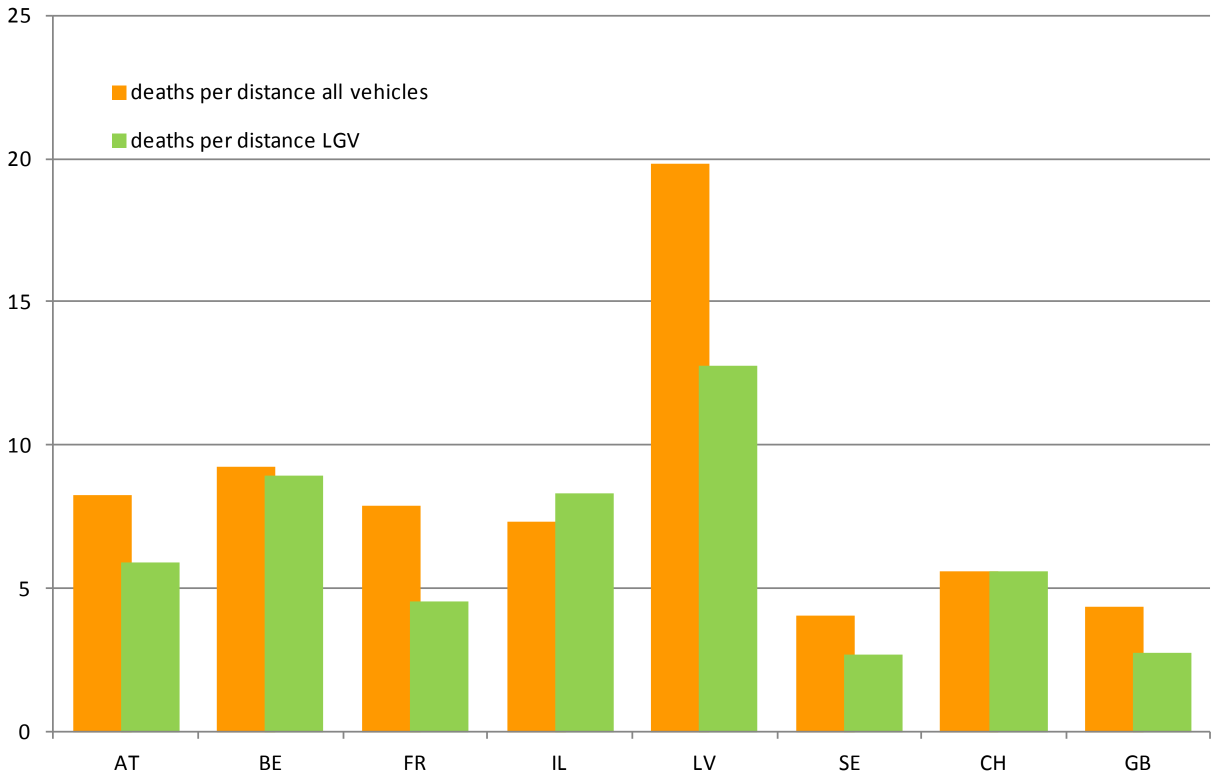


Fig. 13 Road deaths in collisions with a goods vehicle under 3.5 tonnes per billion vehicle kilometres travelled by those vehicles (green bars) with corresponding rate for all vehicles (orange bars). Average for the last three years for which the data is available.

The data from the countries that record the distance travelled by goods vehicles under 3.5 tonnes shows that, per kilometre travelled, the safety of LGVs is generally better than that of the entire vehicle fleet. Moreover, with the exception of Latvia, all the countries that record the data used for figures 4 and 13 reported more traffic for LGVs than for HGVs. However, the two figures should not be used as an argument for general replacement of HGVs by LGVs. Even where smaller vehicles could carry goods now carried by HGVs, each HGV-km would be replaced typically by several LGV-km. And

20 For further information, please consult ETSC (2009) 3rd Road Safety PIN Report, Chapter 4 En route to safer mobility in EU capitals.

HGVs are covered by several pieces of EU legislation, particularly related to the drivers' driving and rest times. When LGVs are used for long trips – whether a single long-distance trip or combined multiple short-distance trips – it should be ensured that LGV drivers benefit from the same social provisions as their HGV counterparts.

An ETSC report published in 2010 noted an increase in the use of LGVs in Europe, particularly following a rise of the home delivery sector.[21] For example, the number of LGVs in the UK has increased by approximately one third during the 2001-2010 period, while LGV traffic increased by 40%.[22] The SafetyNet project noted however a lower rate of seatbelt wearing in LGV drivers and passengers compared with occupants of passenger cars. Moreover, an examination of the severity of collisions in Great Britain shows that LGVs are more likely to be involved in fatal and serious collisions than other vehicle groups. In approximately one quarter of the road deaths where the driver of an LGV caused the collision, they were travelling above the speed limit – either the applicable speed limit for the vehicle class or the posted speed limit.[23] The ETSC report also presents examples of good practices related to the training of LGV drivers.[24]

3.3 Buses and Coaches

Road deaths in collisions involving buses, coaches or trolley buses make up a relatively small percentage of the total number of road deaths recorded yearly in the EU, 2.4% in 2011. However, this type of collisions is likely to receive a relatively high level of attention from the public. This could be in part because of the relatively large number of passengers on buses or coaches. Particularly in the case of coaches, it can happen that a relatively large number of casualties occur in a single collision, thus drawing a higher level of attention from the media, policy-makers and the general public.

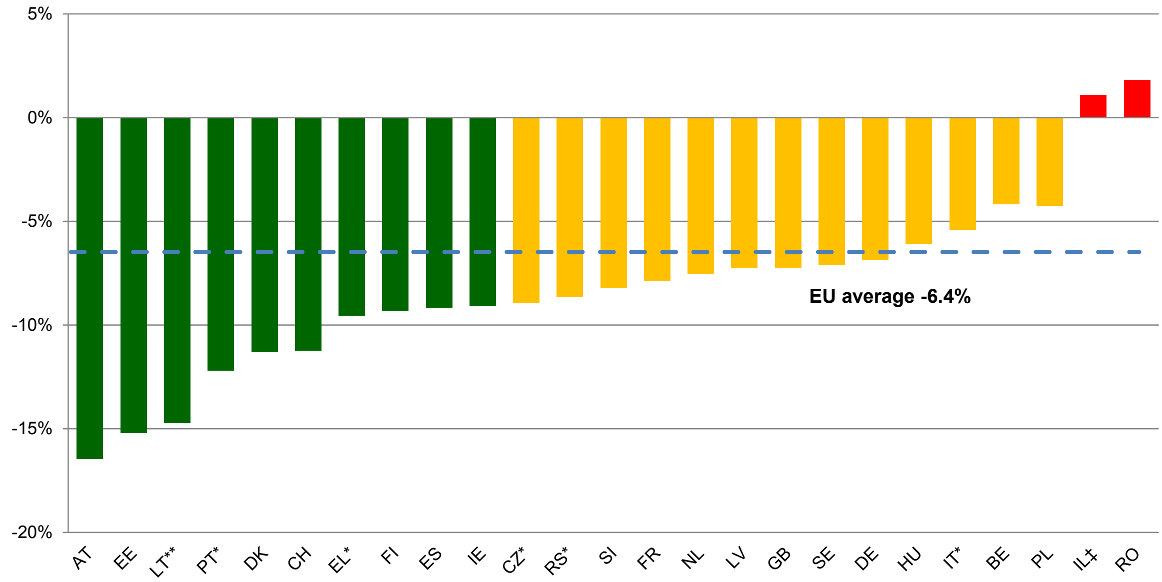


Fig. 14 Average annual percentage change between 2001 and 2011 in the number of road deaths in collisions involving a bus, coach or trolley bus.**CZ, EL, IT, PT, RS 2011 data not available, annual average percentage change calculated for 2001-2010. **LT 2001 data not available, annual average percentage change calculated for 2002*-2011. ‡IL 2001-2002 data not available, annual average percentage change calculated for 2003-2011.

21 ETSC (2010) Fit for Road Safety: From Risk Assessment to Training. Preventing Road Accidents and Injuries for the Safety of Employees (PRAISE) http://www.etsc.eu/documents/PRAISE%20Report%202.pdf
22 DfT, THINK! http://www.thinkroadsafety.gov.uk/campaigns/drivingforwork/index.htm
23 PACTS (2003), Speed Cameras: 10 criticisms and why they are flawed, PACTS & SSI, London, p4.
24 ETSC (2010) Fit for Road Safety: From Risk Assessment to Training. Preventing Road Accidents and Injuries for the Safety of Employees (PRAISE) http://www.etsc.eu/documents/PRAISE%20Report%202.pdf

Between 2001 and 2011 **Austria** achieved the largest reduction in the number of road deaths in collisions involving buses, coaches or trolley buses, with an average reduction of 16.5% per annum. **Estonia** and **Lithuania** follow with corresponding annual average reductions of 15.2% and 14.7% respectively, while Portugal, Denmark and Switzerland have also achieved average percentage reductions of more than 10% per annum. In **Romania** and **Israel** there was an average annual increase between 2001 and 2011 in the number of road deaths in collisions involving a bus or a coach.

3.3.2 By type of road user killed

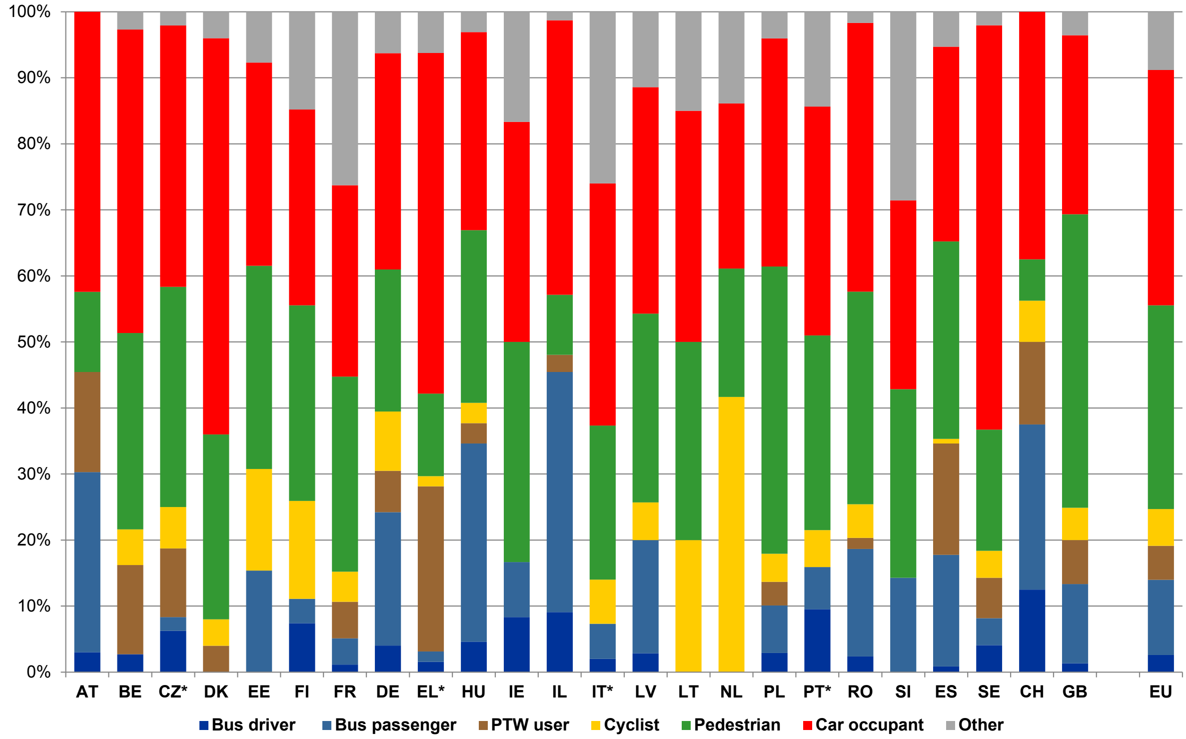


Fig. 15 Percentages by type of road users of deaths in collisions involving a bus or coach in the last two or three years for which numbers are available (2009-2011 unless otherwise indicated).
**CZ, EL, IT, PT values for 2009-2010.*

Occupants of buses or coaches account for 14% of the total number of road deaths in collisions involving such vehicles. As expected – because of a high passenger to driver ratio – most of these are the passengers of the vehicle: 11% of the total compared to 3% drivers. This data appears consistent with an ETSC assessment of the relative safety of transport modes in the EU, which presented buses and coaches as the safest road transport option.[25] However, figure 16 shows that, when buses and coaches are involved in collisions, it is mostly road users outside the said vehicle who lose their lives. The collision mechanics discussed in the case of HGVs in chapter 3.1 are also applicable in this case due to the large weight of buses and coaches: 36% of those losing their lives in collisions involving buses or coaches are car occupants, while the heterogeneous group of unprotected road users account for 41% of the deaths. The latter group is composed of pedestrians accounting for 31% of these deaths, cyclists accounting for 6% and PTW users accounting for 5%. The large percentage of pedestrians may well be accounted for partly by the large amounts of pedestrian activity in many urban streets used by buses, especially around bus stops.

25 ETSC (2003) Transport safety performance in the EU. A statistical overview http://www.etsc.eu/oldsite/statoverv.pdf

As explained at the beginning of this section, a large number of casualties may occur in the context of a single collision involving a bus or coach, thus drawing the attention of the media and the public on a particular incident. The coach transporting Belgian school children that hit the wall of a tunnel in Switzerland in March 2012 is such an example.[26] Several of the PIN Panellists provided examples of single crashes involving a large number of passengers. A 2008 collision in Israel where the bus was the only vehicle involved led to the death of 25 passengers, while in 2010 a bus-truck collision led to 5 deaths and a railway level crossing collision involving a coach killed 7 people. In Portugal a bus rolled over in 2007 killing 17 and seriously injuring 23 people. A 2005 collision in Romania resulted in 16 deaths, 6 serious injuries and 5 slight injuries. In Sweden single collisions recorded in 2007 and 2006 resulted in 6 deaths and 6 serious injuries and 9 deaths and 24 serious injuries respectively. Such relatively high-profile events can be seen as an opportunity, albeit a highly unfortunate one, to introduce policies that improve the safety of buses and coaches on the road network. When such policies are designed and debated, figure 16 should serve as a reminder that most often it is road users outside the bus or coach who die following such collisions.

In **Great Britain** pedestrian deaths form the largest share of the road deaths in collisions involving a bus or coach at 44%. The share of pedestrian deaths in such collisions is also higher than the EU average in **Poland,** the **Czech Republic**, **Romania** and **Spain**, with 34%, 33%, 32% and 30% respectively.[27] The percentage of cyclists among those killed in collisions involving buses or coaches is highest in **The Netherlands,** probably as a consequence of the considerable bicycle traffic in that country. **Greece** has the highest percentage of those killed in collisions involving buses or coaches who are PTW users, at 25%.

Alcohol interlocks for school buses

On the 1st of August 2011, the installation of alcohol interlock devices became mandatory on all vehicles dedicated to school and day-care transport in **Finland.** These include school buses as well as any chartered transport requested by the municipalities, cities, schools or institutes, a fleet estimated at approximately 7,000 vehicles. Failure to install the alcohol interlock devices would result in punitive fines. Finland is the second EU country introducing alcohol interlocks for school buses, after **France** mandated their use from the beginning of the 2009-2010 school year. Moreover, alcohol interlock devices are being used in several EU countries, in the context of driver rehabilitation or of commercial transport. Several EU countries have also adopted legislation mandating the use of such devices. ETSC has been regularly monitoring the gradual introduction of alcohol interlock devices in the EU and an 'Alcohol Interlock Barometer' is published three times per year in the Drink Driving Monitor newsletter.
http://www.etsc.eu/documents.php?did=2

26 Media reports are abundant across the EU and global media outlets. One report by The Guardian is available here: http://www.guardian.co.uk/world/2012/mar/14/swiss-coach-crash-belgium-mourns-22-children?INTCMP=SRCH
27 See also http://www.swov.nl/rapport/Factsheets/UK/FS_Public_transport.pdf

3.3.3 By distance travelled

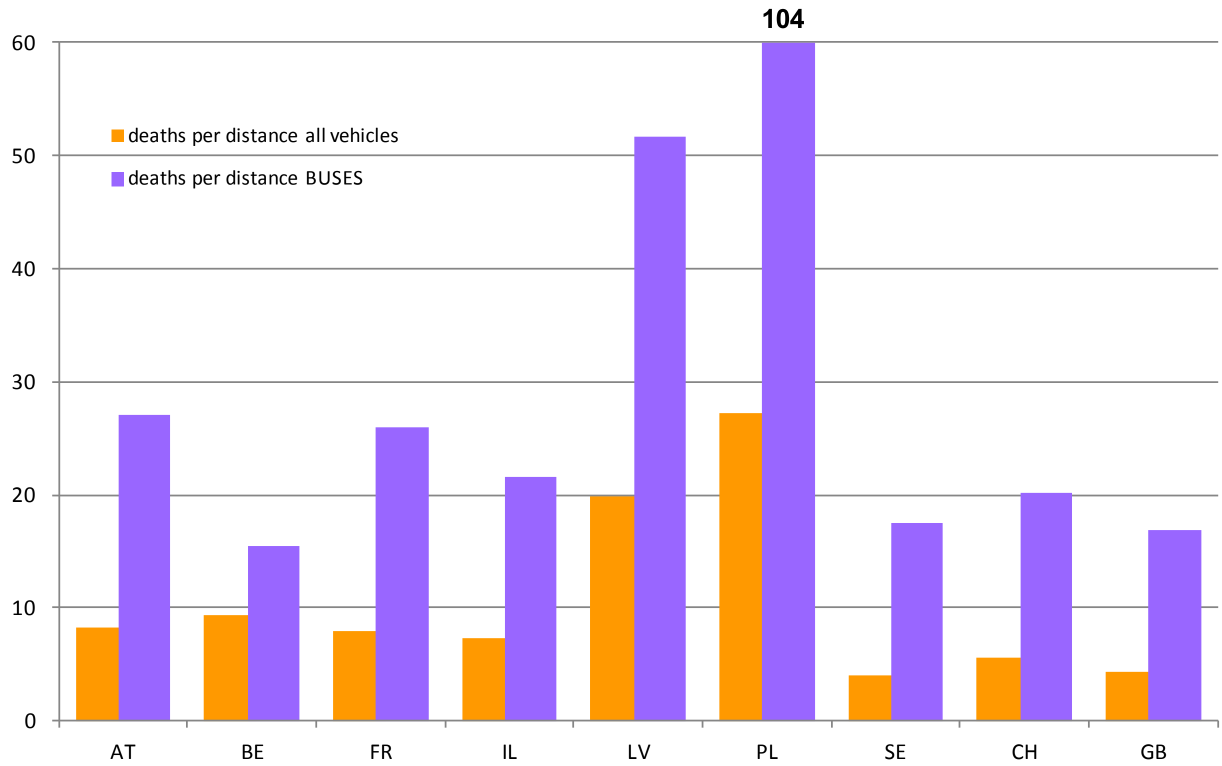


Fig. 16 Road deaths in collisions with a bus, coach, or trolley per billion vehicle kilometres travelled by those vehicles (purple bars) with corresponding rate for all vehicles (orange bars). Average for the last three years for which the data is available. PL average for 2008-2009 period.

While buses and coaches remain the safest mode of road transport for their occupants (see box above), the data in figure 17 shows that, in the countries recording the data, buses and coaches are less safe in terms of deaths per distance travelled than the average for the entire vehicle fleet.

3.4 Driving for work

As HGVs, LGVs, buses and coaches are driven largely in a work setting, employers have a role to play in reducing the number of collisions involving these vehicles. Particularly in the case of employers which operate in the field of transport, safety must be taken into account. Journey management and planning, which generally improve the efficiency of an employer's operations, are likely to have a positive road safety effect through a reduction in traffic. Moreover, companies and transport operators managing vehicle fleets should pay particular attention to the maintenance of the vehicles and schedule regular inspections to make sure they can safely travel on the roads. In the framework of the ETSC PRAISE project, a thematic report has been published which looks at the steps employers can take to implement work-related road safety management programmes.[28] While human error plays a role in many of the collisions involving HGVs – see box on in-depth collision studies – ETSC advocates that fitness to drive is tackled

28 ETSC (2012) Work Related Road Safety Management Programmes. Preventing Road Accidents and Injuries for the Safety of Employees (PRAISE) http://www.etsc.eu/documents/PRAISE_ROAD_SAFETY_MANAGEMENT.pdf

also in the framework of workplace health promotion.[29] This same report also presents a wealth of good practice examples from the national authorities as well as companies taking up this challenge. Separate reports published by ETSC look at the issues of fatigue[30] and minimising in-vehicle distraction,[31] providing the state of the art in terms of regulatory practices at EU and national levels, as well as company-level good practice examples.These matters are addressed by the recent international standard ISO 39001:2012[32]

The following sections will focus on in-vehicle technologies which can be used in goods vehicles and buses, coaches or trolleys to improve their safety.

3.4.1 Speed and speed management technologies

As seen in figures 7-10 above, speeding is still a problem for HGVs, with a considerable percentage of the drivers driving above the speed limit. According to EU legislation, both HGVs and coaches registered in the EU must be fitted with speed limiters which prevent the vehicle from travelling faster than 90 km/h in the case of HGVs and 100 km/h in the case of buses and coaches. While speed limiters provide road safety benefits, as they prevent the vehicle from going above a certain speed, these are limited to the roads where the highest speeds are permitted, normally on highways or motorways. When the speed limit is below that of the limiter they are unlikely to have an impact.

In addition to speed limiters, in-vehicle speed management technologies exist which aim to adapt the vehicle travelling speed to the prevailing conditions and speed limits. Intelligent Speed Assistance (ISA) systems range from informative to intervening ones. The life-saving potential of ISA in cars has been demonstrated[33] and ETSC has been calling for the large-scale deployment of the technology. Moreover, a trial of using ISA in a truck was performed in the UK in the framework of a project conducted by the University of Leeds. The report notes a reduction in travelling at speeds over the limit, in particular in the 'very high exceeding the limit' category.[34] While the driver of the truck involved in the trial reported his personal dissatisfaction with the ISA system, the study shows better compliance with the prevalent speed limits and an overall reduction in the average travelling speed. The ISA study also reports that in the case of the ISA trial for cars, where more vehicles and drivers were involved, a 'fleet effect' has been observed whereby the participating drivers became more acceptant of the system knowing that others were using it.[35] The ETSC PRAISE report "Driving for work: Managing Speed" provides further examples of speed management solutions implemented in vehicle fleets, as well as providing successful examples and the business case for operators and fleet managers to manage speed of the vehicles being driven for work.[36]

29 ETSC (2010) Fitness to Drive. Preventing Road Accidents and Injuries for the Safety of Employees (PRAISE) http://www.etsc.eu/documents/PRAISE%20Report%203.pdf
30 ETSC (2011) EU Social Rules and Heavy Goods Vehicle Drivers. Preventing Road Accidents and Injuries for the Safety of Employees (PRAISE) http://www.etsc.eu/documents/Report7_final.pdf
31 ETSC (2010) Minimising In Vehicle Distraction. Preventing Road Accidents and Injuries for the Safety of Employees (PRAISE) http://www.etsc.eu/documents/PRAISE_Thematic_Report_Moving%20In%20Vehicle%20Distraction_21_December%202010.pdf
32 More information about the ISO 39001:2012 standard, and the full text of its requirements, can be found here: http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=44958
33 Among others, see Carsten (2012) Is intelligent speed adaptation ready for deployment? Editorial. Accident Analysis and Prevention 48 (2012)1-3, ETSC (2009) How can In-Vehicle Safety Equipment improve road safety at work? Preventing Road Accidents and Injuries for the Safety of Employees (PRAISE) http://www.etsc.eu/documents/PRAISE%20Report%201.pdf and ETSC (2011) Driving for Work Managing Speed http://www.etsc.eu/documents/PRAISE%20Thematic%20Report%208%20Driving%20for%20Work%20Managing%20Speed.pdf
34 Carsten et. al. (2008) ISA-UK Intelligent Speed Adaptation Final Report http://www.righttoride.eu/virtuallibrary/warningcontrolsystems/isareportjune2008.pdf
35 Ibid.
36 ETSC (2011) Driving for Work Managing Speed http://www.etsc.eu/documents/PRAISE%20Thematic%20Report%208%20Driving%20for%20Work%20Managing%20Speed.pdf

3.4.2 Alcohol and alcohol interlock devices

While driving under the influence is less common in commercial transport (i.e. the types of vehicles within the scope of this publication), alcohol-related collisions in commercial transport tend to result in relatively more serious consequences.[37] The 2009 ETSC PRAISE report on in-vehicle safety technologies looks at the use of alcohol interlock devices in commercial fleets and highlights implementation examples. Moreover, a dedicated ETSC newsletter regularly monitors legislative developments related to the use of alcohol interlocks.[38]

3.4.3 Seatbelts and seatbelt reminders

In the case of collisions, seatbelts, when properly worn, ensure that occupants remain inside the vehicle. Due to the protective structure of the vehicle cab – whether a car, HGV or LGV – this is likely to reduce the seriousness of injuries sustained. As such, increased seatbelt wearing rates would result not only in improvements in road safety overall, but also in reduced mortality rates, particularly in collisions between passenger cars and HGVs, LGVs, or buses and coaches, which make up the majority of deaths in collisions involving these types of vehicle. Seatbelt reminders detect vehicle occupants – and passengers in coaches – and send a visual and audible warning if the seatbelt has not been fastened.

3.4.4 Emergency Braking and following distance warning

Such systems are based on a system being installed in the large vehicle (HGVs or coaches) in order to detect oncoming vehicles and whether a collision with the front of the vehicle is imminent. Based on the relative speed between the vehicles, the system would be able to detect rear-end collisions (HGV or coach crashing into the back of another vehicle) as well as frontal head-on collisions. The system would warn the driver both visually and audibly that it is too close to the vehicle ahead, and in the case of an imminent collision apply the brakes in order to reduce the speed of the HGV or coach.[39] A study conducted by the Swedish Road Administration in 2009 reports that just over 50% of the road deaths in head-on collisions with HGVs could be reduced through a combination of emergency brakes and a deformation zone on HGVs (see also box on maximum weights and dimensions of HGVs in European transport).[40]

The "Driver Assistance System. Safer. For you. For me" project tested the combined effectiveness of several Driver Assistance Systems in Germany.[41] 767 HGVs were equipped with Electronic Stability Control, following distance warning and Lane Departure Warning Systems, while a control group of 565 HGVs did not have such advanced driver assistance systems (ADAS) installed. Over the two years of the trial the collision involvement rate per distance travelled was approximately 34% lower for the ADAS-equipped HGVs than for the control group, with the safety gains appearing to be independent of the location – urban or rural roads – the time of day and light conditions or weather conditions.

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37 ETSC (2009) How can In-Vehicle Safety Equipment improve road safety at work? Preventing Road Accidents and Injuries for the Safety of Employees (PRAISE) http://www.etsc.eu/documents/PRAISE%20Report%201.pdf

38 ETSC Drink Driving Monitor, published 3 times per year. For more information check http://etsc.eu/documents.php?did=2

39 ETSC (2009) How can In-Vehicle Safety Equipment improve road safety at work? Preventing Road Accidents and Injuries for the Safety of Employees (PRAISE) http://www.etsc.eu/documents/PRAISE%20Report%201.pdf

40 Swedish Road Administration (2009) In-depth analysis of accidents with heavy goods vehicles – Effects of measures promoting safe heavy goods traffic. http://publikationswebbutik.vv.se/upload/4598/2009_2_in_depth_analysis_of_accidents_with_heavy_goods_vehicles.pdf

41 Hochschule Heilbronn (2011), H. Hautzinger u.a.: Schlussbericht der wissenschaftlichen Begleitung der Aktion "FAS.Sicher. Für Dich. Für Mich." von BG Verkehr, BGL und KRAVAG. More information (in German) is also available at http://www.fahrer-assistenz-systeme.de

Interview

Goods vehicles and buses are predominantly driven by professional drivers. ETSC has spoken to Dr. Will Murray, to get an insight into what companies, public authorities, regional, national and EU policy makers can do to reduce collisions involving professional drivers driving a truck, a van or a bus.

ETSC: What are the specific challenges faced by professional drivers carrying goods?

Will Murray: There are a range of specific challenges faced by professional and other drivers carrying goods, people and equipment. These include: the size, weight and shape of the vehicles; distance travelled; time on the road; time pressures and deadlines; long and often unsocial hours; responsibility for a highly expensive piece of equipment and hundreds of thousands of euros of stock, often many kilometres from home; and other road users not understanding how to share the road with large commercial vehicles. De-regulation and the moves towards contracted labour and self-employed drivers; uncertainty and varying levels of enforcement with regard to legal requirements such as tachographs and drivers hours; trends toward contracting and sub-contracting of work; and, in some cases limited enforcement allowing 'cowboy' operators to flout the rules, regulations and general good practice. Linked to all of this, there are often high divorce rates in the transport sector, and a range of health issues faced by commercial vehicle drivers – many of whom do not live long enough to enjoy their pension.

Fatigue, wellbeing and stress are also specific challenges. There is a general consensus that workloads are increasing and professional drivers face escalating pressures. Pressures from clients to deliver more quickly and cheaply, with issues such as 'just-in-time management', increased traffic, remote monitoring and working irregular and long hours. Drivers can be over-stressed by the demands placed on them to deliver goods to meet the schedules of modern transport systems and the impact of elaborate subcontracting chains. If they fail to meet such schedules the transport operator may have to compensate the client for delays incurred. This situation encourages drivers to flout the rules in relation to rest times so that they can deliver on time and remain competitive. Similar pressures also exist in the passenger transport sector as public funding is squeezed, and in other areas such as retail, home shopping and express parcel deliveries.

ETSC: The EU Directive on driving and resting time offers some protection to the drivers. What are the limits of this regulation and how can this be improved?

The EU Directive on driving and resting time is a good starting point: as a common minimum standard across the EU-27 it offers some protection to organisations, drivers, other road users and along the corridors where commercial vehicles operate. As with any minimum standard, there are limits to the regulation. As a starting point it is a minimum standard, not a target. We should think about moving beyond compliance and promoting the benefits of good practice. At a more basic level, increasing level of effective enforcement would allow the regulation to be improved and linked to EU and national road safety strategies and occupational health and safety programmes. Targets for enforcement of tachographs, including installation of and correct use and effective utilisation of the outcomes data for effective driver management, monitoring and motivation should still be promoted. Effective management, supervision and leadership, allowing appropriate and realistic times for jobs, including loading and unloading, are important. Road safety is a shared responsibility, between drivers and management. The ETSC PRAISE report 'Tackling Fatigue: EU Social Rules and Heavy Goods Vehicle Drivers' is an excellent resource for researchers, policy makers and practitioners, which is strongly recommended reading.

ETSC: Some transport companies have understood the benefit they will get from implementing road safety policies. Can you give us recent examples of success stories of companies that managed to improve their safety performance? What was their business case?

An increasing number of organisations, both public and private have understood the potential benefits from implementing road safety policies and there are many success stories showing improved safety performance, based on sound moral, legal, commercial and financial business cases.

The ETSC PRAISE project (see Publications at http://www.etsc.eu/PRAISE.php) has a number of excellent case studies including all its annual award winners such as British Telecommunications (BT), and a range of others including DB Schenker, Suckling Transport, Fredso Vognmandsforretning, TNT and Deutsche Post.

The UK Driving for Better Business project (www.drivingforbetterbusiness.com) is another example of a project with many excellent good practice case studies, including BT which operates approximately 34,000 vans and company cars, Suckling Transport which operates approximately 50 tanker vehicles and TNT which operates a mixed fleet of 26,600+ vehicles globally (including subcontractor vehicles). All these have presented sound business cases, based on understanding the risks faced and developing appropriate data-led, systems-based, programmes - applying sound health and safety systems based principles to manage their drivers, vehicles and journeys. BT has been particularly active with regard to managing its own fleet, supporting research, engaging family members and working with governments in the UK, Europe and USA to provide good practice guidance. Their costs and claims rate are less than half of what they were 10 years ago. Details of several of the research papers can be found at www.virtualriskmanager.net/research

In our experience at Interactive Driving Systems, proactive leadership by influencing groups to achieve common goals is key to creating a crash-free culture, driving the management of behaviour change and ensuring that people travel safely. This is reflected in the sustained success of our clients and partners. As an example, the fleets in our UK 'Fleet Safety Benchmarking' programme, representing approximately 170,000 drivers and 80,000 vehicles, have saved more than £11 million in direct collision costs over the last three years through claim rate and cost-per-vehicle reductions. The business case is clear for organisations that can open their minds to the opportunities.

Our guidance would be to start with a gap analysis, framed by a systems based approach such as the Haddon Matrix. Several are available. One example is shown at www.fleetsafetybenchmarking.net which provides a very quick and freely available gap analysis tool for organisations to review and benchmark their performance against 1,000+ other participant organisations.

ETSC: What is your advice to a country as to where to start to tackle work-related road risks, in particular those involving professional drivers?

At the country level, the starting point is that the agencies responsible for transport, and occupational health and safety should *collaborate* to fully quantify, understand and begin to tackle work-related road risks. The PIN report gives a good entry point, by identifying the extent of the risks involving professional passenger and goods vehicle drivers. With regard to the extent of the work-related road safety risk, in the Police and Transport data on road collisions what does the 'Purpose of journey' data (if any exists) tell us? What proportion of collisions are directly work-related? What proportion of collisions occur during commuting? Similarly in the health and safety data, what proportion of worker injuries and deaths involve vehicles and driving, again both at work and commuting? Such data gives a beginning point for understanding the extent of the work-related road safety risk, and begin to hint at opportunities for improvement.

Also at the country level, in many jurisdictions around the EU, government is the biggest user and buyer of vehicles and transport services, both passenger and freight. This means that an important starting point is government's own procurement, road and worker health and safety policies, processes and procedures.

Several countries in the EU have addressed work-related road safety, including:

The Danish Road Safety Council, which has launched a project on work-related road safety. It will focus on what companies can do to improve road safety for their employees both at work and at home. More details are available at http://www.sikkertrafik.dk.

In Ireland in order to assist employers, the Health and Safety Authority (http://www.hsa.ie) and the Road Safety Authority (http://www.rsa.ie) have collaborated to produce 'Driving for Work: A Guide for Employers', along with a range of other good practice materials.

The Driving for work guidance from the Swedish Work Environment Authority provides a range of guidance for organisations operating vehicle fleets in Sweden. The document is available at: http://www.av.se/dokument/inenglish/broschures/adi_578eng.pdf.

In the UK the, for example, the joint Health and Safety Executive/ Department for Transport (HSE/ DfT) guidance on 'Work-related Road Safety', issued in September 2003 set out how this should be achieved by competent people in organisations taking a risk-assessment-led approach to managing drivers, vehicles and the journeys they undertake (www.hse.gov.uk/roadsafety).

At the EU level, as well as the ETSC PRAISE project, EU-OSHA also provides some excellent resources, including its recent E-facts 47 'Health Promotion in the Transport Sector', which has been translated into all official EU languages, and is available for download from the EU-OSHA website http://osha.europa.eu. Also at the EU level, DG Employment is in the early stages of developing a non-binding guide to help improve the effectiveness and efficiency of the protection of workers from Work Related Vehicle Risks. This will help to improve the understanding by both employers and workers of the risks associated with the use of a vehicle at work, by providing practical advice on how to comply with the requirements of Directive 89/391/EEC and in particular the use of risk assessments.

ETSC: What are the three most urgent actions you would like the EU to take to tackle road risks posed by professional drivers?

The three most urgent actions I would like the EU to take to tackle road risks posed by at-work and commuting drivers are understanding the extent of the risks through both transport and OHS data, managing its own travel and procurement as effectively as possible and supporting national and EU level projects. As a starting point, how many journeys does the EU generate each year that could be avoided? What are its own policies processes and procedures? Such an approach and leadership will give it more legitimacy, credibility and experience with regard to understanding and setting policy in the area of work-related road safety. It may also be worth considering the trade-offs for road safety of more coordinated investment in safer modes of transport, particularly the potential of further utilisation of rail, and similar alternatives, for longer distance bulk movements, and for passenger transport. As a part of a keen family of cyclists, I would also personally like to see even more investment in safe and effective facilities, road safety, research and coaching for users of the humble bicycle.

Will Murray has led on research, policy and practice in work-related road safety for 20+ years. He is Research Director at Interactive Driving Systems, whose Virtual Risk Manager has >1,000,000 registered drivers from all types of organisations in 30+ languages globally. Will is also a Visiting Fellow at Loughborough University and the Centre for Accident Research and Road Safety – Queensland. He works with researchers, policy makers and businesses in a range of regions around the globe including the UK, the wider EU, the USA, Canada, Australia and New Zealand. He can be contacted via www.virtualriskmanager.net

ETSC Recommendations

To the EU

The Three Main Killers on the roads

- Encourage Member States to implement best practice for speed, alcohol and seat belt enforcement as indicated in the EC Recommendation on enforcement with particular reference to goods vehicles and buses;
- Extend the mandatory use of speed limiters, which already exists for HGVs, to LGVs up to 3.5 tonnes gross vehicle weight, as a first step to introducing ISA to these vehicle types;
- Contribute to the development of harmonised standards for Intelligent Speed Assistance (ISA) systems towards eventual universal fitment, including to goods vehicles and buses;
- In the medium term adopt legislation for the mandatory fitting of all fleet vehicles with speed management technologies including Intelligent Speed Assistance systems;
- Monitor implementation of the professional driver training Directive and provide support to Member States to train drivers on road safety elements and speed management in particular;
- Adopt legislation mandating alcohol interlocks for professional drivers;
- Adopt legislation to ensure that all new goods vehicles and buses, have as standard equipment an enhanced seat belt reminder system for all occupants. This is of particular relevance to increasing seat belt wearing rates of drivers of commercial vehicles who tend to have lower average seat belt wearing rates than other drivers.

Fatigue and the implementation of driving and resting hours

- Make Lane Departure Warning Systems and Advanced Emergency Braking Systems mandatory for all new goods vehicles and buses;
- Work towards achieving a more harmonised approach to checks of the EU tachographs and driving times rules;
- Strengthen the enforcement of the liability clause (Article 10) of Regulation EC 561/2006 in order to prevent the pressures of just-in-time management contributing to fatigue and stress;
- Ensure that the Member States respect the amount of checks to be organised as referred to in Article 2 (3) of Directive 2006/22/EC on driving and resting hours in road transport;
- Support the implementation of the European Risk Rating System and deal with any existing barriers to data sharing among authorities;
- Work with Member States to lay down minimum and maximum penalties for each breach of the rules on working timeDevelop an easily understandable brochure in all official languages of

the European Union for undertakings and for lorry drivers; this brochure should give the drivers and undertakings concerned more information about the relevant social rules and the penalties applicable to infringements in the various Member States;
- Make safe and secure roadside rest facilities a long term commitment, featuring a set of annual objectives as well as providing EU funding.

Additional recommendations

- Carefully consider safety when revising Directive 96/53/EC on maximum permitted weights and dimensions in road transport;
- Tackle Heavy Goods Vehicle collisions including those caused by blind spots e.g. by improving the design and equipment of HGVs including retrofitting with front-view mirrors, improved cabin design, installation of cameras and active warning systems and front, underrun and side protection;
- Encourage Member States to include aspects specific to goods vehicle and bus safety issues in collision investigation and databases and the envisaged EU common in-depth accident investigation database.

To Member States

The Three Main Killers on the roads

- Enforce compliance with speed limits through inter-alia installing safety cameras;
- Adopt Zero Tolerance for drink driving for professional drivers and raise enforcement levels;
- Adopt legislation mandating alcohol interlocks for professional drivers;
- Increase enforcement of seat belt wearing.

Fatigue and the implementation of driving and resting hours

- Increase enforcement of specific requirements of relevant categories of road users relating to tachographs and driving times, vehicle inspection and driving licences;
- Provide safe parking and resting spaces on routes with goods vehicle and bus traffic;
- Prioritise the enforcement of ensuring that contractually agreed transport time schedules complying with the provisions on drivers' hours (rest and driving time) are respected by consignors, freight forwarders, tour operators, principal contractors, sub-contractors and driver employment agencies as per Article 10 Regulation (EC) n° 561/2006;
- Provide adequate resources to facilitate enforcement of tachograph and driving time rules;
- Ensure that comprehensive information flows exist between national enforcement authorities and also between the latter and domestic and foreign road transport operators;
- Develop targeted enforcement programmes focusing resources on the most serious / repeat offenders among the professional drivers;
- Equip enforcement officers with knowledge and equipment to be able to spot fraud and prevent it from occurring in commercial road freight;
- Establish "hotlines" so that drivers and operators can report suspected fraudulent, illegal and non-compliant behaviour;
- Establish a risk monitoring system to include not only tachographs and driver's hours non-compliance but also other areas which present a risk to other road users such as overloaded vehicles and defective vehicles;

- Implement and execute severe, dissuasive and deterrent sanctions for tachograph fraud

infringements;
- Target professional drivers through information, education and training (CPC) about the dangers of driving when tired. Efforts should be made to target transport subgroups such as small firms and self-employed workers.

Additional recommendation

- Run and organise campaigns about interaction of goods vehicles and buses with other road users.

Safe road infrastructure

- Consider road use by goods vehicles and buses in matching the use of each road to the functions that the road serves in terms of living space, access and through movement;
- Separate faster vehicles from slower ones and lighter vehicles from heavier ones where this is practicable;
- Provide adequate road markings that Lane Departure Warning Systems can read, which is crucial to managing fatigue and of particular relevance to professional drivers.

Procurement

- Include safety as a criterion for public procurement contracts involving the use of goods vehicles or buses and apply this throughout the supply chain;
- Purchase goods vehicles and buses with in-vehicle technologies which have high life saving potential;
- Promote vehicle safety information, such as EuroNCAP results (especially the safety equipment rating) more widely and effectively so that they play a more prominent role in new vehicle choices and fleet purchasing policies;
- Give incentives (such as tax breaks) to employers investing in effective and proven vehicle safety technologies.

To Employers

In the framework of the PRAISE project, ETSC has formulated and published several recommendations to employees whose staff use road vehicles in the course of their work.[42]

- Set up a register to enter any incidents;
- Assess the risk to help determine the best actions to take;
- Establish a written safety policy and instructions for drivers and self-employed drivers, considering in particular:
  - specific training for staff, especially drivers;
  - maintenance of vehicles and equipment;
  - alignment with road traffic legislation and highway codes including requirements relating to tachographs and driving times, vehicle inspection and driving licences;
- Encourage “ownership” of vehicle and driver as much as possible (1 vehicle = 1 driver) as experience has shown greater care in looking after the vehicle and included technological equipment benefits from such use;
- Consider employees’ ill-health as part of their risk assessment under Directive 89/391, and promote

42 Preventing Road Accidents for the Safety of Employees http://www.etsc.eu/PRAISE-publications.php. Several guidelines for setting a safety policy include Road Safety Authority, Ireland, http://www.rsa.ie/Documents/Driving%20for%20work/Driving%20for%20Work%20Checklist.pdf. European Agency for Safety and Health at Work, Facts, Preventing Road Accidents involving Heavy Goods Vehicles, 2001

Work Place Health Promotion as the most efficient tool to combat ill-health;
- Purchase vehicles that are equipped with the best safety features including seat belts for all passengers and airbags, safety screen behind the driver's seat, anti-lock brakes, load safety devices, blind spot elimination equipment;
- Establish schedules that allow drivers enough time to obey speed limits and avoid peak-hour driving;
- Assess employee requirements in terms of vehicle type and most appropriate speed adaption and limiting technologies;
- Adopt a clear policy against speeding-this should focus on driving at speeds that are appropriate to the prevailing conditions rather than complying (as a minimum) with the legal speed limits;
- Set speed limiters in HGV fleets at a level which is lower than the legally required compliance limit, which can benefit fuel utilization as well as safety;
- Take account of weather and adverse conditions when setting schedules;
- Specify safe routes, preferably motorways;
- Monitor and control driving hours within recommended safe limits and legal requirements;
- Report suspected fraudulent or non-compliant behaviour to the relevant agency;
- Promote education/train drivers on work, drive and rest time regulations and on the proper use of the tachographs thus minimising inadvertent breaches of the rules;
- Work with enforcement officers and member associations to identify and eliminate the causes of tachograph fraud;
- Include written guidelines on eliminating driver fatigue in the health and safety management policy and driver handbook;
- Provide advice and training in personal sleep and fatigue management and provide a mechanism, including consultation, for the continuous improvement of the roster system to fulfil and reconcile technical, operational and individual needs;
- Manage working time in order to ameliorate fatigue; this should be an essential part of mandatory qualification standards for transport operators;
- Consider the location of safe, secure and appropriate parking areas in journey planning and scheduling;
- Use trained personnel other than drivers to do the unloading. Plan rest periods for drivers who are required to load and drive, as loading can cause fatigue;
- Employ suitable drivers. Check their driving licence background. Check they are fit to drive;
- Ensure drivers are trained in safe driving practices, checking vehicle safety, proper use of vehicle safety features, safe loading of vehicles. Plan refresher training and regular briefings;
- Develop clear policies on control of alcohol and other substance abuse;
- Ensure that mobile phones are used appropriately;
- Reward compliance.

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