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Agriculture and Rural Development

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**THE ROAD SAFETY
PERFORMANCE OF
COMMERCIAL LIGHT
GOODS VEHICLES**

STUDY



DIRECTORATE-GENERAL FOR INTERNAL POLICIES
POLICY DEPARTMENT B: STRUCTURAL AND COHESION
POLICIES

TRANSPORT AND TOURISM

THE ROAD SAFETY PERFORMANCE OF COMMERCIAL LIGHT GOODS VEHICLES

STUDY

This document was requested by the European Parliament's Committee on Transport and Tourism.

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Abstract

This report describes the collation and analysis of a wide range of disparate European data on the safety of light goods vehicles (LGVs – goods vehicles with a maximum mass not exceeding 3.5 tonnes). It includes data on regulations, new registrations, stock, traffic, freight performance, business sectors, accidents and casualties. It identifies the trends in both the LGV market and safety performance and identifies areas that could be a priority for safety interventions.

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GLOSSARY

LGV	Light Goods Vehicle – a vehicle designed primarily for the carriage of goods with a maximum permitted laden weight not exceeding 3,500kg. Note in some Member States LGV is taken to mean large goods vehicle and is applied to goods vehicles with a maximum laden weight greater than 3.5 tonnes. However, this is not the meaning within this report.
LCV	Light Commercial Vehicle – commonly used alternative term for LGV
HGV	Heavy Goods Vehicle – a vehicle designed primarily for the carriage of goods with a maximum permitted laden weight exceeding 3,500kg.
Vehicles of category:	Categories of vehicle defined within the European Type Approval legislation
M	Motor vehicles with at least four wheels designed and constructed for the carriage of passengers
M1	Vehicles designed and constructed for the carriage of passengers and comprising no more than 8 seats in addition to the driver's seat
M2	Vehicles designed and constructed for the carriage of passengers and comprising more than 8 seats in addition to the driver's seat, and having a maximum mass not exceeding 5 tonnes.
M3	Vehicles designed and constructed for the carriage of passengers and comprising more than 8 seats in addition to the driver's seat, and having a maximum mass exceeding 5 tonnes.
N	Motor vehicles with at least four wheels and designed and constructed for the carriage of goods
N1	Vehicles designed and constructed for the carriage of goods and having a maximum mass not exceeding 3.5 tonnes, consistent with the above definition of LGV.
N2	Vehicles designed and constructed for the carriage of goods and having a maximum mass exceeding 3.5 tonnes but not exceeding 12 tonnes
N3	Vehicles designed and constructed for the carriage of goods and having a maximum mass exceeding 12 tonnes
Car-derived LGV	A variant of a passenger car design that has been adapted to carry goods (e.g. Ford Fiesta van)
CDV	Car-Derived Van – See car-derived LGV above
ABS	Anti-lock braking system

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EXECUTIVE SUMMARY

Some stakeholders have expressed concerns that commercial light goods vehicles (LGVs, defined as goods vehicles with a maximum authorised weight of no more than 3.5 tonnes) are becoming ever more popular and are, or will become, responsible for a growing proportion of the accidents that occur on European roads. However, in recent policy debates regarding the regulation of LGVs, the European Parliament found that there was little objective data available about the safety performance of such vehicles in Europe. TRL were therefore contracted to review the available data and collect it together into one document in order to help inform future policy debate.

The research has involved:

- Analysis of various sources of data on vehicle numbers, vehicle use and accidents;
- Comprehensive review of regulations and existing scientific literature; and
- Consultation with stakeholders (including Member States representatives, the vehicle industry, the freight industry and other research institutes and Academia).

The main body of this report briefly describes the research methods used and any important limitations of the available data but focuses on clearly describing the main findings of the work. Further detail is available in the appendices.

Sources and limitations of data

In order to assess the safety performance of LGVs it is necessary to be able to identify these vehicles data relating to accident involvement, vehicle registration and vehicle usage. During the study, it was found that the data available in relation to LGVs was severely limited. Many Member States did not collect information on goods vehicles of this size and many used different definitions of smaller goods vehicles that could not be made to fit the European definitions. This variation is at least partly because the term LGV is not defined in the regulations governing the statistical returns of Member States to Eurostat and these regulations provide no fixed requirements for such vehicles. As a result, Eurostat data on LGV performance is at best confused and cannot be relied upon for accurate information, a view endorsed by the Eurostat support service. A range of alternative data sources were studied but inevitably there were still significant shortcomings for some performance measures which are described in the main report and appendices. As a result of these findings, a number of recommendations were made in relation to improving the data available for LGVs, which would improve any future evaluations of LGV safety performance or help to monitor the effects of any policy decisions. These recommendations were to:

- Introduce a rigorous definition of LGV to ensure a consistent approach across different data sources;
- Amend EC Regulation 1172/98 to require LGVs to be included in the collection of vehicle use/freight data for reporting by Eurostat;
- Extend the CARE database to include all Member States and ensure that full access to data from all states is available to all participating organisations; and
- Encourage the development of in-depth accident studies that include LGVs.

Regulation of LGV safety

The review of legislation identified three main types of regulation that can influence the safety performance of LGVs:

- Regulations to control the design, construction and performance of new vehicles, usually through the European Type Approval system, covering aspects such as braking, protective steering and pedestrian protection;
- Regulations concerning the safe use of vehicles, some of which are European legislation, for example drivers' hours and working time, and others which are national legislation such as speed limits and periodic technical inspections; and
- Health and safety at work regulations, which are constrained at a European level but much of the detail is provided at Member State level.

It was found that the legislation relating to the design, construction and performance of new LGVs is harmonised across Europe. However the safety standards applied to LGVs are less stringent than for passenger cars, for example there is no requirement for a frontal impact test and the maximum permitted stopping distances are longer for LGVs. Whereas the safety standards applied to LGVs are comparable to those applied to HGVs, there are a number of specific differences arising from the differences in vehicle characteristics. Examples of these differences are that LGVs require a protective steering test and some require pedestrian protection measures, whereas HGVs require front underrun protection, ABS and speed limiters.

The operation of LGVs is generally more regulated than for passenger cars but less stringently regulated than for HGVs, for example there are no requirements for LGVs to be subject to operator licensing, fitted with a tachograph or a speed limiter. However, much of the legislation relating to use of LGVs is controlled at a national level and there is significant variation between Member States. In European legislation, there is no limitation on the driving hours for LGVs. However, typically Member States have implemented their own rules for LGVs. Although these national drivers' hours restrictions for LGVs are generally based on the EU legislation for heavier goods vehicles (Directives 2002/15/EC, 561/2006 and 2003/88/EC), there appear to be no requirements to use tachographs, making enforcement of the rules much more difficult, and a significant variation between the detailed requirements in different Member States remains. For example, the UK domestic driving hours rules apply less stringent and less complicated daily limits (max. 11 hours per day instead of 9, extendible in certain conditions), whereas states such as Austria apply more stringent requirements (max. 8 hours per day instead of 9). In Germany the requirements for LGVs between 2.8 tonnes and 3.5 tonnes maximum authorised weight are the same as for heavy goods vehicles but the requirements for lighter LGVs of up to 2.8 tonnes are more stringent than for HGVs (similar to Austrian LGV requirements). The fact that most Member States have requirements that are related to the EU regulations means that there is clear scope for harmonisation. However, the benefits of this are unknown and are likely to be influenced by the extent of cross border traffic in LGVs (likely to be lower than for HGVs) and the extent to which any requirements are, or can be, enforced.

The maximum speed limits vary quite notably across Europe. In addition to this, at least 11 Member States apply differential speed limits for LGVs, that is, the speed limits for LGVs (often excluding car-derived vans, CDVs) is lower on some classes of road than it is for passenger cars. However, many other Member States only start to differentiate speed limits for passenger cars and goods vehicles at a maximum weight in excess of 3.5t, for example Austria and Germany.

Health and safety at work legislation applies equally to any vehicle being used by an employee on company business. There is some evidence to suggest that companies operating LGVs as part of a larger vehicle fleet are exceeding minimum standards in order to satisfy health and safety obligations.

LGV trends

There has been strong growth in the number of LGVs registered each year and the distance that they travel, such that they represent an increasing proportion of the vehicles on the roads of Europe. This growth is often attributed to the rapid expansion of Internet shopping and home delivery. However, although significant, this is just one contributor and the expansion of the service engineering sector (increasing use of sophisticated equipment requiring on-site service, outsourcing of maintenance contracts, increased number of households etc.), increasing use in the delivery of high-value time-critical goods, reduced stockholding levels and shifts from HGVs, as a result of reduced regulatory burden and driver shortages, all play an important role.

Overall it is estimated that LGVs represent approximately 10% of all vehicles on Europe's roads but in many Member States the number of accidents is falling and the accident rate (per vehicle registered or per vehicle km) is decreasing faster than for other vehicle types. The net result is that in Europe as a whole LGVs are involved in approximately 8% of all accidents and 9% of all fatal accidents. This is a lower proportion than would be implied by the share of all registered vehicles that are LGVs.

There is no data that can conclusively explain this trend for increased use resulting in fewer accidents. However, there is some evidence to suggest that the LGV industry has to some extent been self-regulating and this may have influenced these casualty reductions. For example, some LGVs have been shown to pass safety regulations that they are not required to, for example the frontal impact test and braking deceleration for cars. Additionally, LGV operators have in some cases been voluntarily taking part in best-practice programmes or developing/adopting codes of practice, for example the 'Safe Loading of Vans' booklet produced in the UK. If these trends continue then it would suggest that LGVs would be a similar or lower priority for regulation than some other vehicle types. However, the reduction in the number of accidents involving LGVs could also be attributed in part to improvements to the safety performance of collision partners, particularly cars, which are the most frequent type of opponent vehicle. There is some evidence to suggest that at least part of the growth in LGV traffic is because LGVs are increasingly used in the final delivery leg in logistics and delivery services. It is therefore also possible that the professional haulage and distribution companies are applying operating practices for the use of LGVs similar to those required for the larger vehicles that they operate.

While the reduction in accident rates is true when Europe is considered as a whole, it is not the case in every Member State. The proportion of all accidents/fatalities that involve an LGV is increasing in Belgium, Spain, Hungary, the Czech Republic and France (although a steady decrease from 2001 to 2005 prior to a step-change increase in 2006/7 raises concerns about data accuracy for France). The trend was for a decreasing proportion in Denmark, Germany, Greece, Italy, the Netherlands, Austria, Sweden and the UK. For Estonia, Ireland, Malta, Portugal, and Finland the trend was either constant or variable (often a function of low numbers). This may lead to conflicting safety priorities (e.g. measures to improve the safety of HGVs, LGVs, buses, or cars) in different Member States. In addition to this, within the group of accidents involving an LGV, the types of accidents experienced varied quite considerably. When Europe was taken as a whole, car occupants (31%) and LGV occupants (33%) were the most frequently killed in

accidents involving LGVs. However, in Italy just 13% of fatalities were the occupants of the LGV itself while 38% were car occupants. In Spain, the reverse was true with 40% of fatalities being LGV occupants and just 28% being car occupants. Again, this may lead to conflicting safety priorities in different Member States (for example, LGV frontal impact performance may be considered important in Spain whereas it may be a lower priority in Italy).

Some detailed patterns were also clear within the data. For example, when cars and LGVs collide the car occupants are killed more frequently than the LGV occupants. The behaviour of the LGV driver was considered to have contributed to the cause of the accident more frequently than was the case for the drivers of most other vehicle types. However, the type of factor was different. For example, impairment by alcohol and loss of control were less frequent for LGV drivers compared with all drivers but errors of judgement were more frequent. Fatigue as a whole was similar for LGV drivers and HGV drivers but for LGVs it was even more common for the fatigue to have occurred without exceeding the regulated hours limits. Defective LGVs were found to be a contributory factor in about 3% of fatal accidents but this was less of a problem than for HGVs (6%), despite the increased regulatory requirements for HGVs compared with LGVs. Movement of the load carried by LGVs was rarely found to be contributory to the cause of an accident but movement during a collision was found to contribute to the severity of the injury for a significant minority of occupants. It was also clear that a much larger proportion of LGV occupants failed to wear their seat belt than was the case for passenger car occupants and that this contributed strongly to the severity of injury received by the LGV occupants.

These trends could justify a wide range of policy responses, including a “do-nothing” approach, non-regulatory interventions and mandating new safety measures. Regardless of the chosen policy options, the disproportionate growth in LGV use means that it would be beneficial to monitor the trends identified in this report, which would involve consideration of the data limitations and recommended improvements discussed above.

Future safety interventions

If any safety intervention were to be considered, then the analysis suggests that the highest priority would be measures that influenced collisions between LGVs and cars, which resulted in approximately half of all fatalities from LGV accidents. However, it was also shown in these collisions that increasing the protection that LGVs offer to car occupants would be a higher priority than increasing the levels of self protection, particularly while seat belt use amongst LGV occupants remains low. Measures to increase the use of seat belts were identified as the most obvious and well established route to improving LGV occupant safety. However, a range of other measures, including operational and behavioural measures, such as introducing tachographs or fleet management technology, as well as vehicle construction and design measures, such as the introduction of stability control systems or the improvement of impact performance could all offer potential benefits. The magnitude of this potential has not been quantified in detail in this project but was assessed by the IMPROVER project (Höhnscheid *et al*, 2006), which showed electronic stability control, seatbelt interlocks and professional driver training were all likely to offer benefits that outweighed the costs. Measures such as digital tachographs, speed limiters and accident data recorders were not considered to be economically viable. Additionally, the accident data provided in this report also provides some preliminary indication of the potential scale of resulting benefits.

1. INTRODUCTION

It is generally perceived that the number of commercial light goods vehicles (LGVs, defined as goods vehicles with a maximum laden weight not exceeding 3.5 tonnes and categorised for type approval purposes as N1 vehicles) on the roads of Europe has been growing. This had led to concern among some stakeholders that such vehicles are, or will become, responsible for a growing proportion of the accidents that occur on European roads. However, in recent policy debates regarding the regulation of LGVs, the European Parliament found that there was little objective data available on the safety performance of such vehicles in Europe. This report is a collection and review of the available data, the objective of which is to help inform future policy debate.

The research tasks were:

- Analysis of various sources of data on vehicle numbers, vehicle use and accidents;
- Comprehensive review of regulations and existing scientific literature; and
- Consultation with stakeholders (including Member States representatives, the vehicle industry, the freight industry and other research institutes and Academia).

The main body of this report clearly describes the main findings of the work, but also describes the research methods used and any important limitations of the available data. The detailed annexes provide technical support for the conclusions drawn in the main report. These annexes can also be used to provide a reference source of data for the future use of the research and policy community.

2. THE REGULATION OF LGV SAFETY

There are a number of different types of regulation that could have an influence on the safety performance of commercial LGVs. These include:

- Regulations to control the design, construction and performance of new vehicles;
- Regulations concerning the safety of vehicles in use; and
- Health and safety at work regulations.

An overview of the status of each of these and their application to LGVs is provided below. More details are provided in Annex 1.

2.1 The design, construction and performance of new vehicles

The design, construction and performance of new motor vehicles is regulated by the European type approval system, which means that manufacturers must demonstrate that each type of vehicle they manufacture will comply with a range of safety and environmental requirements and obtain an official Certificate of Conformity before it can be registered for use on the road. The revised framework Directive (2007/46/EC) currently controls the type approval systems and requires that vehicles comply with a range of separate technical directives. However, not all technical requirements are equally applicable to all types of vehicles. Those requirements, where there is a notable difference between what is required for LGVs (category N1) and what is required for either passenger cars (M1), buses and coaches (M2, M3), or HGVs (N2, N3), are shown in Table 1 below, with more details in Annex 1.1.

Table 1. Requirements that vary in different vehicle categories

Subject	Directive is applicable to...						Comments
	M1	M2	M3	N1	N2	N3	
Braking (71/320/EEC)	X	X	X	X	X	X	The minimum deceleration for N1 vehicles is 5 m/s ² – the same as required for heavy goods vehicles, buses and coaches but less than the 5.8m/s ² required for passenger cars (M1). Heavy vehicles (N2, N3, M2, M3) are required to be fitted with ABS. Cars and LGVs are not.
Interior fittings (74/60/EEC)	X						Within certain zones that the occupant could come into contact with in a collision, passenger cars are required to have interior fittings that help to minimise injury to the occupants. There must be no sharp edges that could cause injury and fittings in certain areas must dissipate collision energy. There are no equivalent requirements for buses or goods vehicles.

Subject	Directive is applicable to...						Comments
	M1	M2	M3	N1	N2	N3	
Forward vision (77/649/EEC)	X						For passenger cars a minimum area of forward view is defined together with a maximum limit for the obstruction caused by A-pillars. There are no such requirements for buses or goods vehicles.
Defrost/demist (78/317/EEC)	X						For passenger cars minimum standards are specified for defrost/demist systems. For other vehicle types there is just a requirement that they be fitted with an "adequate" system.
Wash/wipe (78/318/EEC)	X						As for demist/defrost
Wheel guards (78/549/EEC) & Spray suppression (91/226/EEC)	X				X	X	Passenger cars must be fitted with wheel guards (78/549/EEC) to protect other road users from thrown up stones, mud, water etc. HGVs (N2, N3) and their trailers must be equipped with spray suppression devices around the wheels (91/226/EEC). There are no similar requirements for LGVs
Speed limiters (92/24/EEC)			X		X	X	Heavy vehicles are required to be fitted with devices to limit their maximum speed to a certain level. There are no requirements for LGVs
Frontal Impact (96/79/EC)	X						Passenger cars are required to offer certain minimum standards of protection to occupants in a frontal collision. There are no equivalent requirements for LGVs or heavier goods vehicles and buses.
Protective steering (74/297/EEC)	X			X			Requirements on the intrusion of the steering wheel into the passenger compartment in a frontal crash. Requirements apply to LGVs and cars but not HGVs or larger passenger vehicles.
Side Impact (96/27/EC)	X			X			Requirements relating to the protection of occupants in a collision from the side. Requirements not applicable to certain LGVs with seating positions higher above the ground
Front underrun protection (2000/40/EC)					X	X	HGVs are required to fit devices that improve the structural compatibility in a head-on collision with a car, thus improving the protection of the car occupant. There is no equivalent requirement for LGVs

Subject	Directive is applicable to...						Comments
	M1	M2	M3	N1	N2	N3	
Pedestrian protection (2003/102/EC)	X			X			Requirements to offer minimum levels of protection to pedestrians struck by the front of the vehicle. Only applicable to car-derived LGVs of no more than 2.5 tonnes maximum weight.

Source: Annex IV, Part I of the revised framework directive 2007/46/EC and the individual Directives cited

It should be noted that there are many other technical requirements not listed in this table that apply equally to all motor vehicles. However, it can be seen that the minimum safety requirements for LGVs do vary, typically being of a lower standard than required for passenger cars. For occupant protection the standard applied to LGVs tends to be higher than required for heavy goods vehicles².

2.2 The safety of vehicles in use

There is a range of both European and national legislation that relates to the safe use of vehicles. Annex 1.2 describes this legislation. The topics covered include:

- Operator licensing;
- Driver licensing;
- Drivers' hours and working time;
- Speed limits; and
- Periodic technical inspection (roadworthiness).

European legislation (Directive 96/26/EC as amended) sets out the minimum requirements for operator licensing which Member States should apply. This covers the fitness and competence of a company to carry out road haulage (or passenger transport) operations. This regulation only specifies that such licensing should apply to vehicles in excess of 6 tonnes maximum permitted weight or 3.5 tonnes payload weight and, thus is only applied to (most) HGVs and not to LGVs. Although individual Member States are permitted to apply the principles of operator licensing to vehicles of lesser maximum weight, it is typically still not applied to LGVs. For example, in the UK only operators of vehicles in excess of 3.5 tonnes maximum weight are subject to the national operator licensing regulations.

A similar approach is applied to driver licensing where European Directive 91/439/EEC specifies a basic framework for the Member States to follow. Differential standards are applied to LGVs, for example, the minimum age at which an LGV licence can be gained is 18. However, individual Member States do have the option of derogating to 17 years of age and some Member States, for example the UK, Poland, Iceland, and Ireland, are known to do this. It is well documented that, typically, younger drivers present an increased risk of accidents per km driven than older drivers. Thus, where licences for LGVs are available at 17, there is a possibility that this could lead to higher accident and casualty rates. However, there is no statistical evidence available that actually confirms or disproves this theory for LGV drivers. It is possible that in practice relatively few 17- and 18-year-olds drive LGVs because, for example, they are not used as leisure vehicles,

² With respect to the steering wheel intrusion requirement. However, UNECE Regulation 29 does set out technical requirements for HGV cab strength.

many people of that age remain in education rather than work, and companies may be reluctant to employ younger drivers of LGVs because of perceived increases in insurance premiums.

EU Regulation 561/2006/EC controls the maximum hours drivers can work and the minimum periods of rest that should be taken. In addition to this, drivers can also be subject to the Road Transport (working time) Regulations (2002/15/EC). However, these only apply to drivers of vehicles in excess of 3.5 tonnes and not to LGVs. For vehicles or circumstances that are outside the scope of the European regulations, Member States can apply their own drivers' hours rules. Information was obtained on the national requirements in 17 of the 27 Member States and it was found that in most cases some form of drivers' hours restrictions were applied to LGVs and in many countries these are based on the existing European Directives (2002/15/EC, EC 561/2006, 2003/88/EC). For example, in the UK the drivers of LGVs are required to comply with domestic driving hours rules, which apply less stringent and less complicated daily limits of 10 hours' driving and 11 hours' total work duty. Some countries set more stringent LGV driving hours limits with Austria specifying that typically the maximum daily driving limit is eight hours and Estonia specifying a maximum driving hour week of 40 hours. Germany even has separate driving hours rules depending on the size of the LGV, where for LGVs below 2.8 tonnes the state regulates specific drivers' hours requirements and specifies that for LGVs exceeding 2.8 tonnes and equal to or lower than 3.5 tonnes the drivers' hours specified in EC 561/2006 should be followed. Overall, it is understood that there are many exceptions to rules on LGV drivers' hours and rest breaks across Europe. Key variations in these rules across Europe are detailed in Table 2, with further information in Annex 1.2. Within many of the national measures there is scope for collective or union agreement to reject or modify national measures. However, there is a noticeable trend within a number of Member States to adopt existing European legislation on driver and working hours and breaks as a template for national legislation.

Table 2: Summary of the key differences in LGV drivers' hours rules across Europe

	Minimum	Maximum
Daily driving	8 hours	11 hours
Weekly driving	39 hours	48 hours
Continuous driving allowed prior to a break	4 hours	6 hours
Breaks from driving	15 minutes	45 minutes
Daily rest	11 hours	12 hours
Weekly rest	24 hours	45 hours

The speed limits on different categories of road are set by the individual Member States. There is considerable variation in the magnitude of the limits, but most Member States do apply different limits to different types of vehicles, at least on some classes of roads. In at least 11 Member States the speed limit for LGVs (excluding CDVs) is, on some classes of road, lower than it is for passenger cars (e.g. the UK, Portugal). However, many other countries only start to distinguish between passenger cars and goods vehicles at maximum weights in excess of 3.5 tonnes (e.g. Germany, Austria). In

Germany, this means that LGVs are considered to be the same as passenger cars and can, therefore, travel at potentially unlimited speeds on the autobahns.

European Directive 96/96/EC specifies that Member States must undertake programmes of periodic technical inspection of its motor vehicles to help ensure that vehicles are maintained in a roadworthy condition. This Directive specifies very basic minimum standards for these inspections, which Member States can choose to exceed. In most of these testing regimes LGVs are subjected to much the same tests as passenger cars, whereas in many countries heavier goods vehicles are subjected to more extensive inspections. The frequency of inspections as well as the technical content varies widely in different countries. For example, in both the UK and Ireland the inspection regime is the same as for passenger cars, with the first inspection when the vehicle is three years old and every year thereafter. The systems assessed are as follows:

Steering wheel and column	Windscreen	Bonnet catch
Horn	Number plate and VIN	Lights
Brakes	Tyres and road wheels	Mirrors
Doors	Seats	General vehicle structure
Suspension	Fuel system	Towing hook
Exhaust	Emissions	Seatbelts

It is understood that in Germany inspections are carried out biannually.

2.3 Health and safety regulations

The EU has created a range of legislation to provide a framework and minimum standards for health and safety at work. Directive 89/361 provides a framework designed to encourage the adoption of measures intended to improve the health and safety of employees in the workplace and to allow more specific requirements to be developed in separate regulations. The requirements of this European legislation are to be implemented by each Member State.

The Health and Safety at Work Regulation is generic and applies to all workplaces and thus to all road vehicles used for work. There is, therefore, no differential effect on cars, LGVs and HGVs. However, in the UK at least there is some evidence that concern over health and safety and corporate manslaughter legislation and the significant criminal penalties that can be imposed on companies and individuals³, is encouraging companies operating LGVs to go beyond the minimum standards required by vehicle and traffic law so that the difference between them and other vehicle types is reduced. For example, the UK industry is collaborating to produce best practice guidance for the safe loading of vehicles; some companies voluntarily fit speed limiters to their vehicles and others participate in best practice programmes such as the Safe and Fuel Efficient Driver

³ Such as financial penalties, remedial and publicity orders and even significant custodial sentences for responsible individuals within the company management.

(SAFED) programme for van drivers (<http://www.freightbestpractice.org.uk/>). However, it is not known to what extent this occurs in other Member States. More details can be found in Annex 1.2.

2.4 Analysis

It is clear that the regulatory requirements applied to LGVs can vary quite considerably compared with other vehicle types and in different Member States within Europe. With respect to the design, construction and performance of new vehicles, the requirements are harmonised throughout Europe, but the requirements for LGVs are quite different to those for passenger cars. Typically, the safety standards of LGVs are less than those applied to passenger cars, for example, a longer maximum stopping distance and no requirement for frontal crash tests. Overall the safety requirements for LGVs are of a comparable level to those for HGVs although there are a number of specific differences arising from their quite different characteristics. For example LGVs require a protective steering test and some require pedestrian protection and a side impact test, which HGVs do not. On the other hand HGVs require speed limiters, ABS and front underrun protection, which LGVs do not.

In terms of the regulatory control of the use of vehicles in service, it is clear that LGVs can be subject to more stringent safety standards than passenger cars but that this is not harmonised across Europe. For example, LGVs are subject to lower speed limits in many Member States, such as the UK and Portugal and are sometimes included in national drivers' hours regulations that allow some differences from the EC requirements (e.g. Slovakia allows the minimum daily rest period to be reduced to just 6 hours three times per week but in Austria the driving time is limited to just 8 hours). However, the safety standards applied to LGVs are also considerably less stringent than those applied to HGVs (and large passenger vehicles), in particular with respect to operator licensing, driver licensing, drivers' hours and tachographs and, in some Member States, the even lower speed limits applied to heavier trucks.

Health and safety at work legislation applies equally to any vehicle being used by an employee on company business. There is some evidence that, at least with larger fleet operations, the obligations of health and safety legislation is encouraging operators of LGVs to exceed the other minimum standards by developing and adopting best practice programmes.

3. SOURCES AND LIMITATIONS OF DATA

The most comprehensive set of transport data available in Europe is the Eurostat⁴ data. This contains data on the number of vehicles, traffic, freight activity and fatalities from road accidents. However, there are very significant limitations on the ability to use this information in this analysis because the Eurostat transport glossary (Eurostat, 2003) does not separately define an LGV and data relating to LGVs is treated differently in different parts of the database:

- LGVs are included in the vehicle information but, although it is possible to separate vehicles by overall type (e.g. goods/passenger car) and the goods vehicles can be separated by load capacity (the maximum weight of goods that a vehicle can carry), they cannot be separated by maximum permitted weight and the categories of load capacity do not closely match the payload expected for an LGV.
- In the traffic data, LGVs appear (based on comparison with national data) to be included in the category for passenger cars and cannot be separated.
- In the freight data, many countries exclude LGVs completely and where LGVs are included they cannot be separately identified (see Eurostat, 2008)
- The data on fatalities from road accidents includes LGVs but cannot be divided by vehicle type to allow fatalities from accidents involving LGVs to be separately identified.

When investigating the suitability of the Eurostat data, help was sought from their support office. The following reply was received:

"Please note that data based on Regulation 1172/98 is not a good source on light commercial vehicles transport or traffic performance! Regulation allows reporting countries to exclude vehicles with loading capacity below 3.5 tonnes (or maximum permissible laden weight below 6.0 tonnes from the scope of their surveys. Not all countries, however, do this in the same way...

In general, we cannot give any "correct figures", not even estimates on the performance of light goods vehicles."

For this reason, Eurostat data has generally not been used in this analysis. The availability of national data is summarised in Table 3, below.

Table 3. Availability of data for the study

Member State	Vehicle stock	New registrations	Traffic (vehicle kms)	Freight (tonne kms)	Accidents
Austria	2001-2006	2001-2008	No source identified	Not separately identifiable	2001-2007
Belgium	2001-2006	2001-2008	No source identified	Not available	2001-2007
Bulgaria	No source identified	2006-2008	No source identified	Not available	2001-2006
Czech Republic	2001-2006	2003-2008	No source identified	Not separately identifiable	2005-2007
Cyprus	No source identified	No source identified	No source identified	Not available	No source identified

⁴http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1090,30070682,1090_33076576&_dad=portal&_schema=PORTAL.

Member State	Vehicle stock	New registrations	Traffic (vehicle kms)	Freight (tonne kms)	Accidents
Denmark	2001-2006	2001-2008	2001-2004	Not available	2001-2007 ⁵
Estonia	No source identified	2003-2008	No source identified	Not available	2005-2007
Finland	2001-2006	2001-2008	No source identified	Not available	2001-2007
France	2001-2006	2001-2008	2001-2006	Not available	2001-2007
Germany	2001-2006	2001-2008	Not available	Not available	2001-2004 ⁶
Greece	2001-2006	2001-2008	No source identified	Not available	2001-2007
Hungary	No source identified	No source identified	Divided by load capacity not GVW – cannot separately identify	Not available	2003-2007
Ireland	2001-2006	2001-2008	No source identified	Not separately identifiable	2001-2003
Italy	2001-2006	2001-2008	Divided by “light”/“heavy” vehicles only – cannot separately identify LGVs	Not available	2001-2007
Latvia	2001-2006	2003-2008	No source identified	Not separately identifiable	No source identified
Lithuania	No source identified	2003-2008	No source identified	Not available	No source identified
Luxembourg	No source identified	2001-2008	No source identified	Not available	No source identified
Malta	No source identified	No source identified	No source identified	Not known	2005-2007
Netherlands	2001-2006	2001-2008	Not available	Partially available via Eurostat (load capacity >2 tonnes)	2001-2007 ⁵
Poland	2003-2006	2003-2008	No source identified	Not available	No source identified
Portugal	2001-2006	2001-2008	HGV only	Not available	2001-2007
Romania	No source identified	2006-2008	No source identified	Not available	No source identified
Slovenia	No source identified	2003-2008	No source identified	Not separately identifiable	No source identified
Slovakia	No source identified	2003-2008	No source identified	Not separately identifiable	No source identified
Spain	2001-2005	2001-2008	Divided by “light”/“heavy” vehicles only	Not available	2001-2007
Sweden	2001-2006	2001-2008	No source identified	Not available	2001-2007
UK	2001-2006	2001-2008	2001-2007 ⁷	2002	2001-2007 ⁸

⁵ Data available from both CARE and national database – numbers not always consistent so most plausible/consistent values used.

⁶ CARE data for Germany not available to non-German partners in Road Safety Observatory. Data taken from existing literature.

The vehicle stock information referred to in the table all comes from ANFAC reports provided by ACEA. Where possible (GB, the Netherlands, Denmark) this has been cross-referenced with official national statistics. Minor discrepancies were found between the different data sources but the ANFAC data has been used in all analyses because it provides the largest consistent coverage of different countries. The new registration data are sourced from ACEA and similar discrepancies exist with the national data from the few countries that had it available. Again, the analysis has relied on the ACEA data.

Very few countries were identified where traffic data were available for LGVs. Where it was identified, it was found in individual Member States national statistical data. It was confirmed for many of the countries where data were not available (e.g. Germany, Italy, Spain, Hungary, Portugal) that this was indeed because it was not recorded, or not recorded in a way that allowed data for LGVs to be separated from other vehicle types, rather than simply because the project team were unable to find it. The situation was similar, but slightly worse for freight data. Eurostat (2008) described the detailed surveys providing freight information in each Member State and confirmed that the majority of countries did not routinely collect data on smaller goods vehicles and those that did often still excluded the smallest (load capacity <2 tonnes) and usually classified the vehicles in a way that did not allow LGVs to be separately identified (i.e. either by load capacity or unladen weight, rather than GVW).

Most of the accident data were sourced from the CARE database, although Eurostat and Member States databases were available for comparison in a number of cases (e.g. GB, the Netherlands, Denmark). Non-German partners in the Road Safety Observatory project are not permitted access to the German accident data in CARE. German data have been made partially available from existing research literature. In addition to the national accident statistics, a variety of sources of in-depth accident data samples have been reviewed.

More detailed information about the availability/limitations of data is provided in Annex 2 and Annex 3.

⁷ Figures for GB only not UK.

⁸ UK figures reported separately as Great Britain and Northern Ireland.

4. AN OVERVIEW OF RECENT TRENDS IN THE LGV MARKET

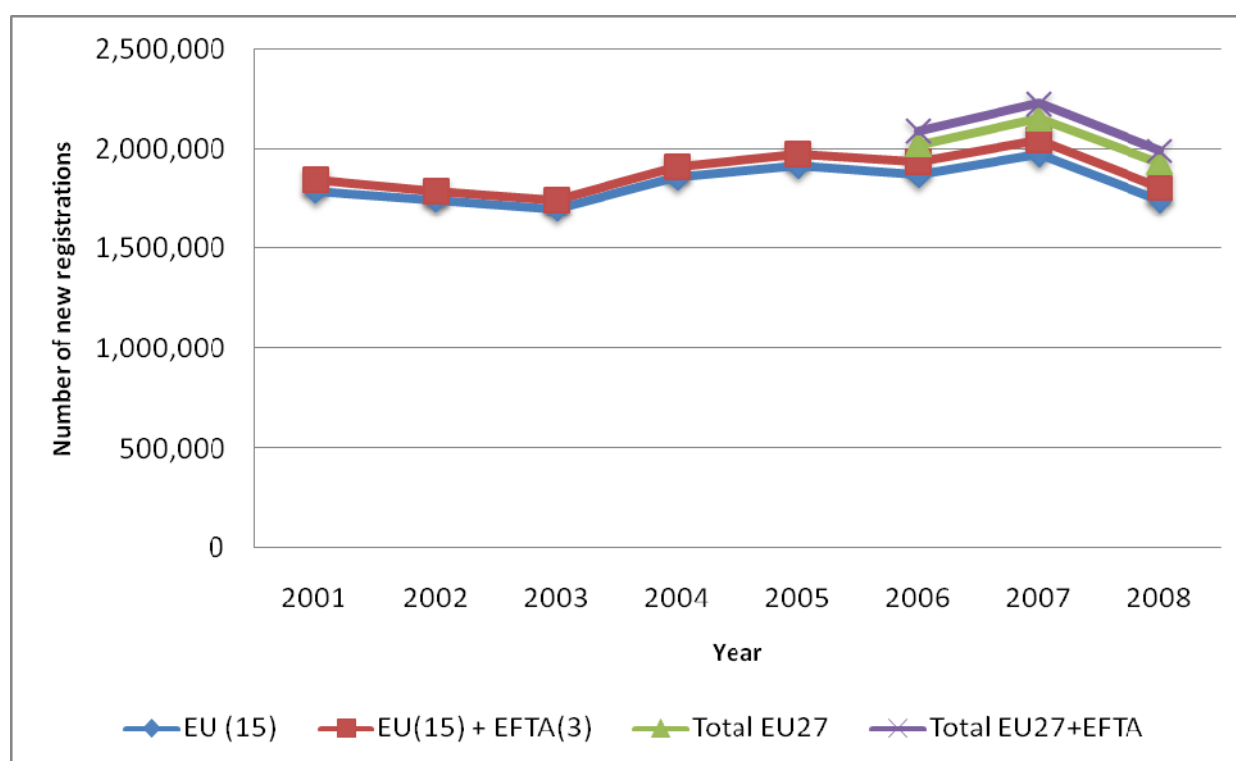
The key findings with respect to the major trends in the LGV market are reported below. The detailed technical information that supports these findings is reported in Annex 2.

4.1 The number of LGVs

4.1.1 New registrations

The data presented in Figure 1 below, shows that the number of new registrations of LGVs in Europe grew by approximately 10% between 2001 and 2007. However, in 2008 the numbers dropped to below 2001 levels and the early indications are that they will fall further in 2009. This is highly likely to be a direct consequence of the current economic difficulties and makes forecasting a longer term trend more difficult.

Figure 1. Trend in new registrations of LGVs (2001-2008)



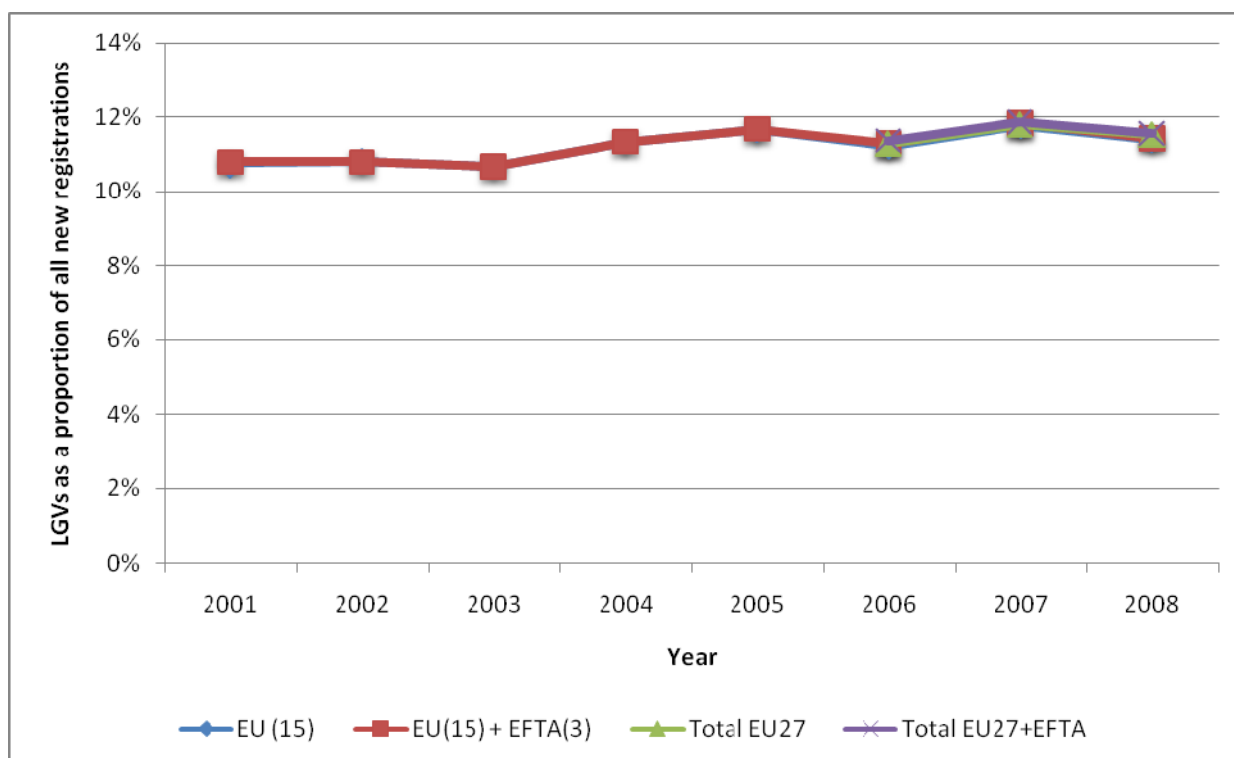
Source: ACEA statistical registration data (www.ACEA.be)

Analyses of data for individual Member States shows that the trend can vary considerably, with some Member States recording much stronger growth (e.g. Denmark with an 80% increase between 2001 and 2007) and some Member States recording a decline (e.g. Portugal with a 30% reduction between 2001 and 2007). The decline in 2008 is, however, fairly consistent for all countries, with only Austria, Germany and the Netherlands reporting greater sales in 2008 than in 2007 and even in these states the rate of growth had considerably slowed.

For Europe as a whole, the growth in new registrations of LGVs has been exceeding that of all motor vehicles. Figure 2 shows that LGVs represent a slowly but steadily increasing proportion of all new vehicle sales. Although there is again some variation in different

Member States, the trend is more consistent than that for absolute numbers and only three of the countries for which data were available showed a lower proportion of LGVs in 2007 compared with 2001.

Figure 2. New registrations of LGVs as a proportion of all new registrations



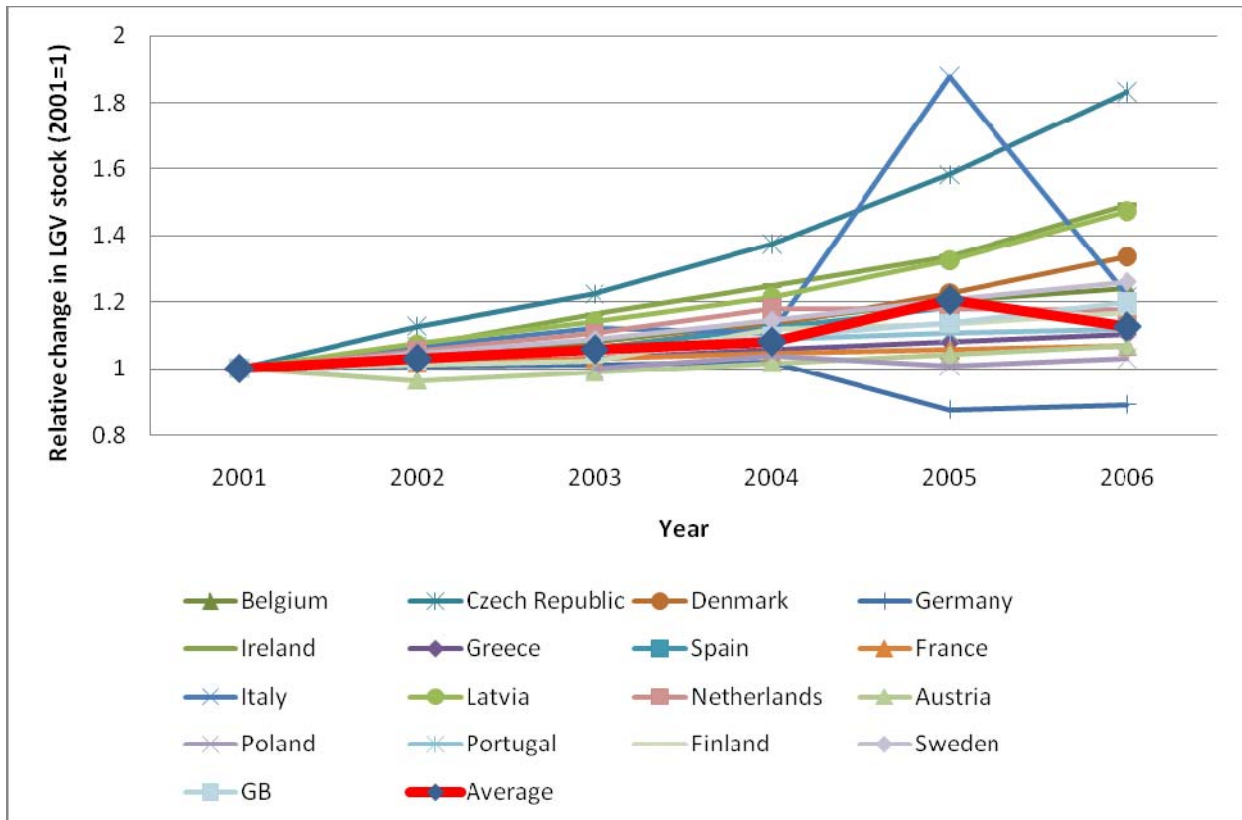
Source: ACEA statistical registration data (www.ACEA.be)

4.1.2 Vehicle stock

Vehicle stock is defined as the total number of registered vehicles in a particular country, usually measured on one specific day of the year. Limitations in the Eurostat data meant that data for LGVs was only available for the four countries where TRL could gain access to their national data⁹ and the 17 Member States where the ANFAC reports could provide data. Again, the absolute numbers of registered LGVs varied considerably in each country but there was a reasonably consistent rising trend. This can be seen in Figure 3 below.

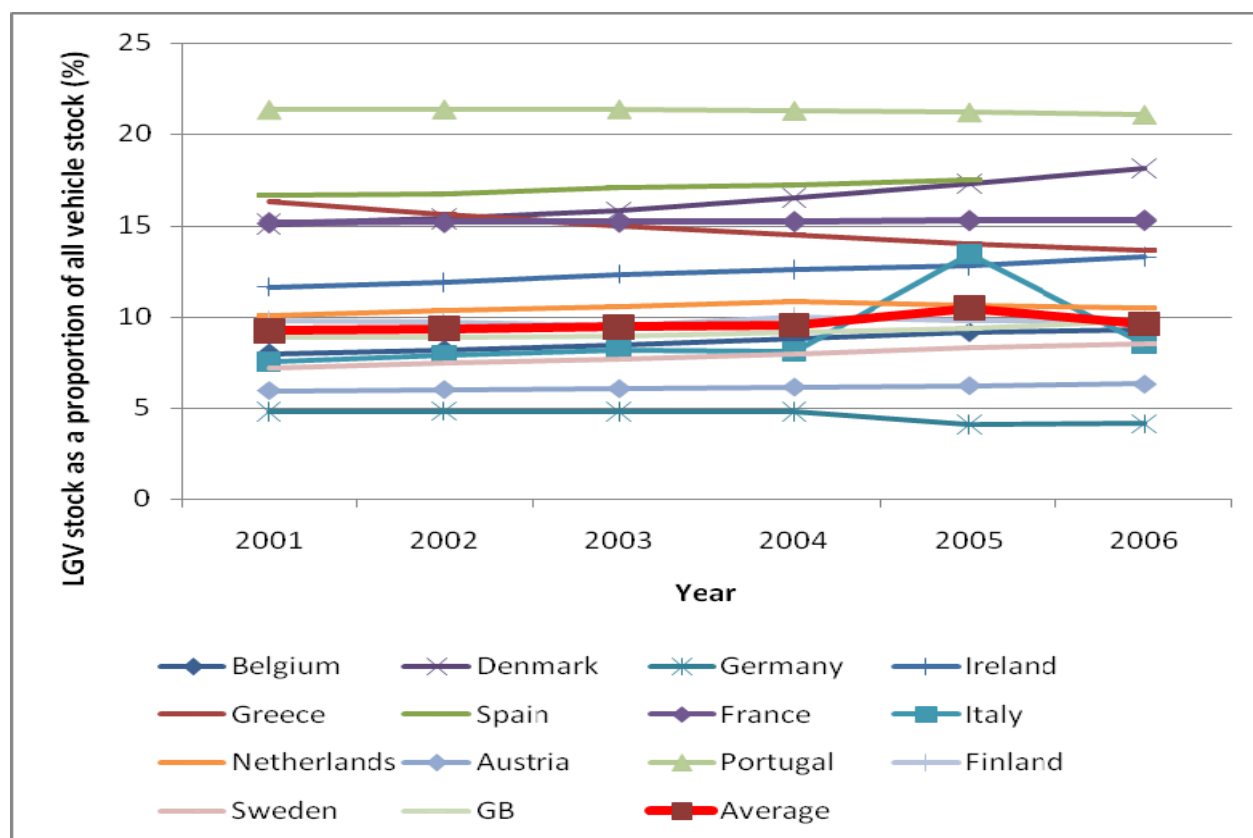
⁹ Denmark, France, GB and the Netherlands.

Figure 3. Relative change in LGV stock



It can be seen that for most Member States the numbers of registered LGVs have increased by up to 20% in the six-year period. However, in some Member States (e.g. the Czech Republic, Italy, Latvia, Belgium and Denmark) the increase has been greater than 20%, with an increase of more than 80% in the Czech Republic. It should be noted that there is a very large increase for Italy in 2005 but these data appear anomalous and is unlikely to be correct. This anomaly is sufficiently large to be duplicated to a lesser extent in the average for the EU. Although these growth rates are very large, it should be noted that the largest growth rates are typically seen in Member States with relatively low total numbers of vehicles. For this reason, when the EU is considered as a whole it can be seen that on average the growth over 6 years has been approximately 13%.

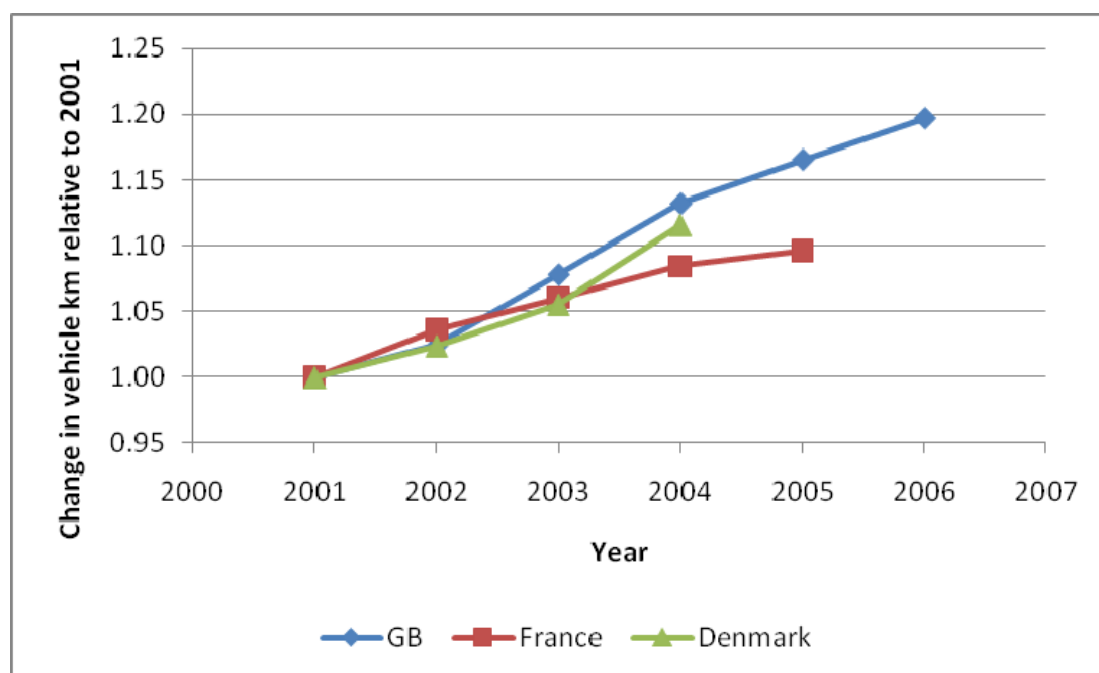
The number of all vehicles registered has also been increasing so it is important to compare the above growth to that of all vehicles. Figure 4 shows the number of LGVs registered as a percentage of the total number of vehicles of all types registered.

Figure 4. LGV stock as a proportion of all vehicle stock

It can be seen that LGVs form a variable proportion of the whole vehicle fleet, ranging from less than 5% in Germany to more than 20% in Portugal, with an average of approximately 10%. The trends also vary with LGVs forming an increasing proportion of all vehicles in several Member States (e.g. the UK, Denmark, Ireland, Spain, Italy and Sweden), a constant proportion in some (e.g. Austria, France and Portugal) and a declining proportion in a few others (e.g. Germany and Greece). Overall, on average, the trend is that LGVs have been coming to represent a very slightly increasing proportion of the whole European vehicle fleet in recent years.

4.2 Vehicle traffic performance

Vehicle traffic performance is defined as the product of the number of vehicles and the distance that they are driven (vehicle kilometres). Data regarding the traffic performance of LGVs in Europe were very scarce and only three data sets examined (France, GB and Denmark) contained the necessary information. The three countries had substantially different quantities of LGV traffic so, to clearly show the trend, Figure 5. shows the change in vehicle kms relative to the baseline year 2001.

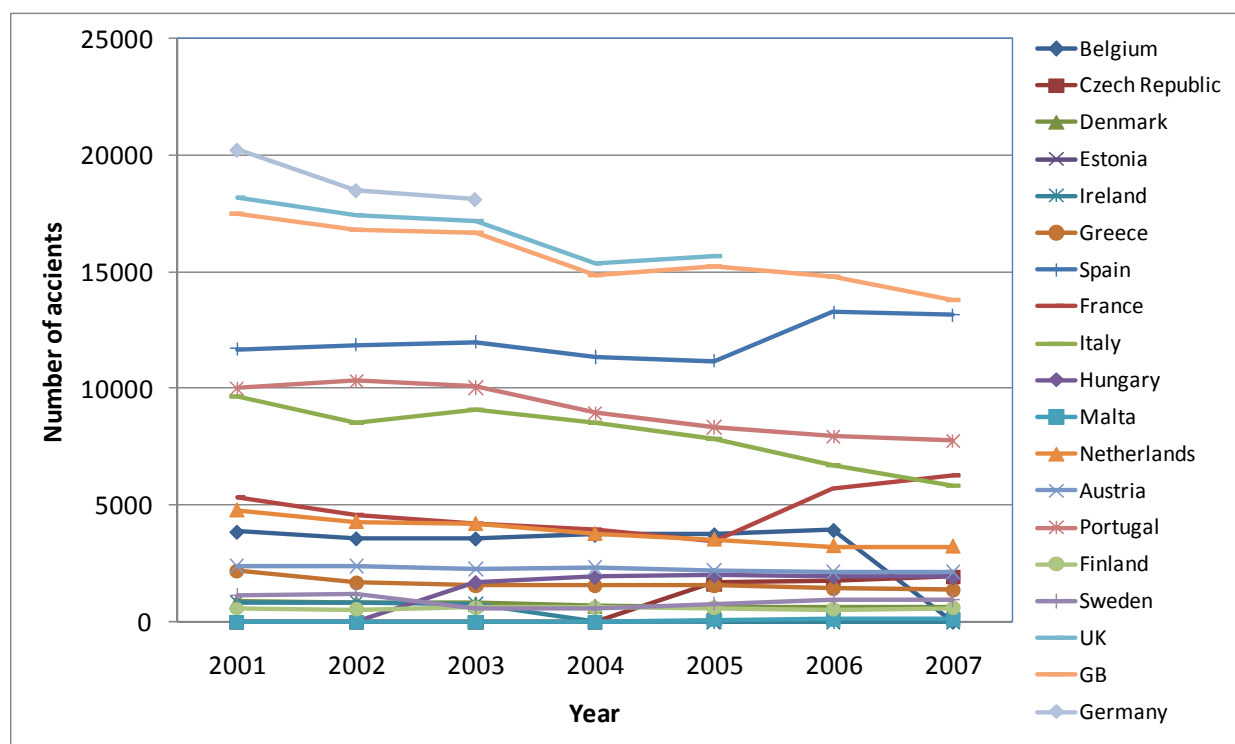
Figure 5. Relative traffic performance of LGVs (vehicle km)

Again, this change is reasonably consistent with the data on increased stock, and trends in LGV traffic as a proportion of all traffic are also similar to those for stock (see Annex 2 for details).

4.3 Accidents

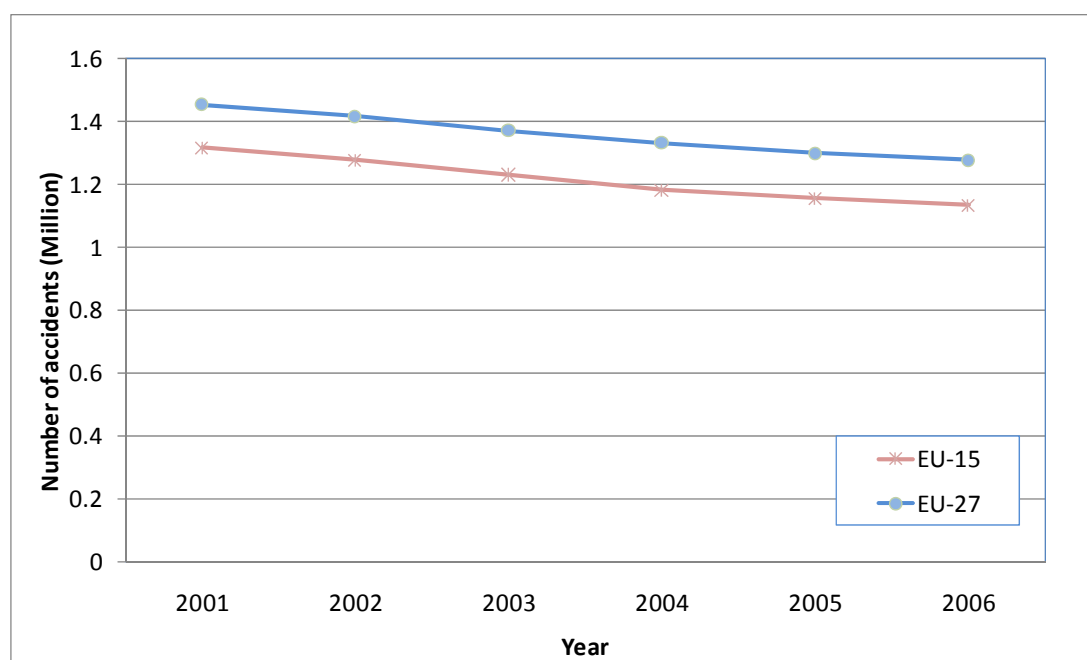
The data available for accidents involving LGVs is incomplete in that not all data are available for all years in all Member States. This means that it is not possible to produce a trend in the absolute number of LGV accidents. Figure 6, shows the data that are available.

Figure 6. Number of accidents involving LGVs in each Member State for which data were available



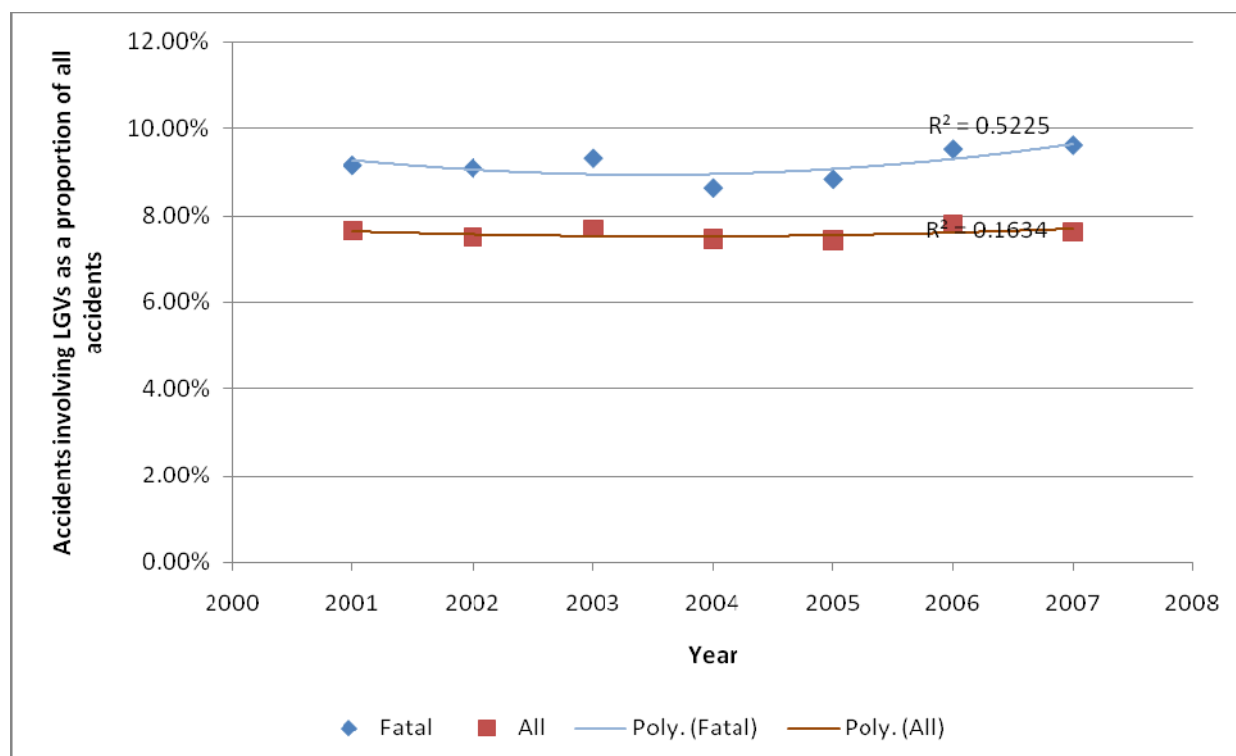
It can be seen that both the magnitude and trends of the number of LGV accidents can vary considerably between different Member States. For many of the Member States, particularly those with larger numbers of LGV accidents, the trend is for the numbers to fall over time. However, when all road vehicle types are considered, the road safety record in Europe as a whole is also improving, as shown in Figure 7, below.

Figure 7. Total number of road accidents in Europe



In order to better assess whether the trends shown in Figure 6 for accidents involving LGVs represent a positive or negative safety effect, the number of LGV accidents has been calculated as a proportion of all accidents. Figure 8 shows the average proportion of accidents that involved LGVs. The average is based on data from up to 17 Member States where both the total number of accidents and the number of LGV accidents was known for each individual Member State. Appropriate data from the remaining Member States has not been identified.

Figure 8. The proportion of accidents that involve at least one LGV (average of all Member States for which data were available¹⁰)



Assuming that the data available¹⁰ is representative of the whole of Europe, the average proportion of accidents that involved LGVs can be used to estimate the absolute number of accidents that involved LGVs for EU-27. In 2006, there were 1.28 million accidents in EU-27, and the available data suggests that almost 8% of the accidents involved LGVs. This suggests that in 2006 there were approximately 100,000 accidents involving LGVs in Europe (EU-27). The same method would suggest that approximately 4,100 of the 42,953 (DG-TREN, 2007) fatal accidents that occurred in the EU-27 would have involved an LGV. The trend lines suggest that the proportion of accidents involving LGVs has fluctuated slightly, but remained approximately constant, despite the fact that LGVs have represented an increasing proportion of the vehicles on the road. For fatal accidents, the trend is not entirely clear but there is a suggestion that for the last four years of data the proportion of fatal accidents that involved LGVs has increased. However, it should be noted that data are available from fewer Member States in the most recent years, which introduces a potential source of bias.

Data for Germany have not been included in this analysis because data were only identified up to 2003. Inclusion of the data for three years only distorts the apparent trend, which could be misleading, as discussed in Annex 3. Germany has one of the

¹⁰ Includes data from Belgium, Czech Republic, Denmark, Estonia, Ireland, Greece, Spain, France, Italy, Hungary, Malta, the Netherlands, Austria, Portugal, Finland, Sweden and the UK although data were not available for all years in all of these countries.

highest numbers of LGV accidents in Europe (circa 18,000 in 2003) but LGV accidents still represent one of the smallest proportions (circa 5%) of the total number of all German road accidents. This means that the estimated proportion of all accidents that involve an LGV is likely to be a slight over-estimate as a result of excluding the German data.

4.4 Analysis

It is clear that the size of the LGV fleet and the distances that it travels have increased in recent years. There is evidence to suggest that this increase is the result of a number of different factors. The most commonly cited factor is the increase in e-commerce and the home delivery services that this entails (e.g. Lang & Rehm, 2006; Weijers *et al.*, 2001). There has been a rapid rise in the levels of e-commerce in recent years and it is likely that this will continue. For example, Kuneva (2009) reports that the share of online shoppers has increased from 27% in 2006 to 33% in 2008 and that action is being taken to remove the remaining barriers to the success of e-commerce. However, this is not the only source of increased LGV activity. Several publications (e.g. Allen and Browne, 2008; Browne, 2008) cite a number of potential factors influencing the levels of activity:

- LGVs are increasingly used in the delivery of high-value time-critical goods;
- LGVs are used in the service sector to transport personnel and equipment to the location where the service is required (e.g. engineers, maintenance etc.). This type of activity has increased, partly because many companies have chosen to outsource these services and also because the use of sophisticated equipment requiring expert installation and maintenance has increased;
- Reduced stockholding levels;
- Increase in same-day time-critical packages;
- Growth in:
 - Home delivery sales;
 - Number of households;
 - Home improvements;
- Shortage of HGV drivers; and
- LGVs can be attractive to some operators because they are subject to less regulation than HGVs; for example there is no requirement for an operator's licence or tachograph and fewer restrictions on driving licences, driving hours/rest periods or maximum speed.

When considering how these trends may affect the safety performance of commercial LGVs it is, therefore, important to consider where the growth comes from. For example, increasing activity in the service sector is likely to involve genuinely new freight transport. However, HGV driver shortages, less regulatory burden and the increase in e-commerce will represent a shifting of existing trips from one form of transport to another. Weijers *et al.* (2001) suggested that, if increasing home delivery were to replace trips to the shops previously made either on foot, bicycle or public transport, then the result could have an adverse effect on sustainability. However, Edwards *et al.* (2009) found that neither home delivery nor conventional shopping had an absolute advantage in environmental terms but that, on average, home delivery had the potential to generate lower CO₂ emissions than the typical shopping trip. If it was assumed that each choice faced the same traffic conditions, the home delivery was successful first time and the conventional shopping trip was a single purpose trip (i.e. not combined with other activities), then a typical van-based delivery would generate 181g CO₂ compared with 4,724g for a typical trip to the shops by car and 1,265g for a trip as a bus passenger. However, the report emphasised that these could be strongly affected by practical

difficulties such as the fact that home deliveries were frequently unsuccessful (e.g. intended recipient not at home), thus requiring multiple delivery trips.

Factors similar to those described by Edwards *et al* (2009) will apply to the affects of LGV market changes on safety. The safety performance of the vehicle fleet (e.g. the number of accidents) can be expressed as a function of the risk of an individual vehicle becoming involved in an accident and the exposure to risk. Typically when comparing the safety performance of different vehicle types, the collective distance driven (i.e. vehicle kms) by the relevant vehicle types is taken to represent the exposure to risk. Thus, if there were an increase in home deliveries this would tend to increase the exposure to risk and the number of accidents associated with LGVs but tend to reduce the exposure to risk and the number of accidents associated with the form of trips that the home delivery was replacing.

To calculate the accident rate, both the accident data and the exposure data are required for each Member State. Traffic performance data (vehicle kms) were rarely reported for LGVs by the statistical organisations responsible for the data, often because there was no European Commission requirement for the data to be collected. Time-series data for LGV traffic performance data were only identified for three Member States (Great Britain, Denmark and France). The fatal accident rate per billion vehicle kms is shown in Figure 9, below, both for accidents involving LGVs and accidents involving all vehicle types for the three Member States where sufficient data were available.

Figure 9. Fatal accident rate per billion vehicle kms

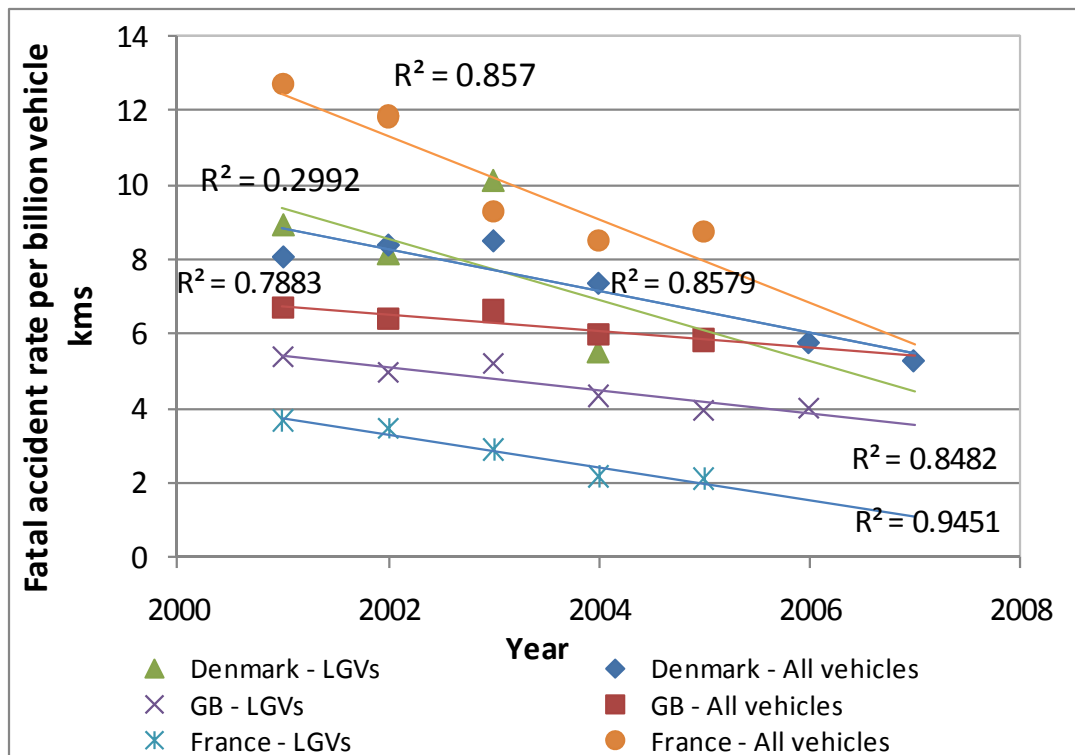
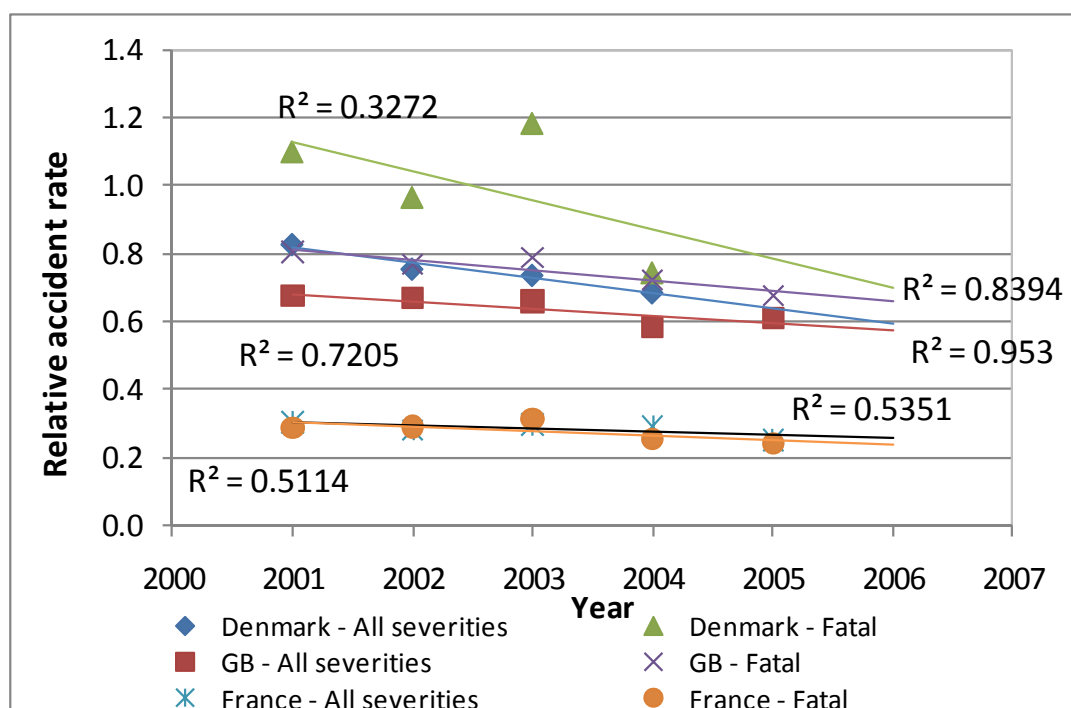


Figure 10. Relative accident rates for LGVs

If the relative accident rate has a value of one, it means that the vehicle type considered presents an equal risk per km travelled to all vehicles considered as a whole. A value in excess of one indicates a higher risk and less than one indicates a lower risk. Where the relative accident rate decreases over time, this indicates that the risk associated with the vehicle type considered is decreasing faster than that for all vehicle types.

It can be seen that, with the exception of earlier fatal accidents in Denmark, the risk per km travelled associated with LGVs is less than that for the whole vehicle fleet (values less than one) and that the risk is decreasing faster than that of the whole vehicle fleet (downward trend). Figure 2 and Figure 4 showed that LGVs represent an increasing proportion of the vehicle fleet and Figure 5 showed that the distance they travelled was increasing by even more. However, the reductions in absolute and relative accident rates for LGVs show that the risk they represent per km has been decreasing strongly. The net result is that they have continued to represent an approximately constant proportion of the total EU accident population, as was shown in Figure 8.

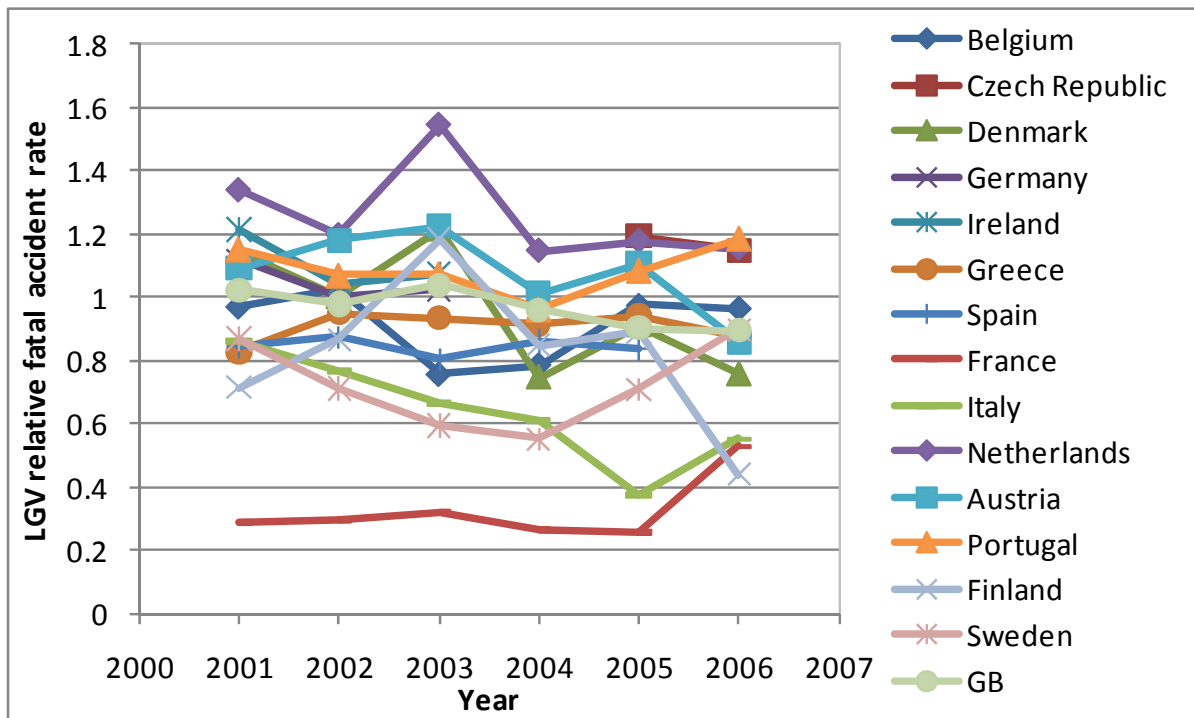
Although the more detailed data for this study were only available from three Member States, the data presented earlier on the number of new registrations and the number of accidents in all countries suggest that the overall conclusions should be representative of Europe as a whole but may not fully reflect the situation in some individual Member States.

Given that there is little data available on LGV traffic (vehicle kms), it is worthwhile comparing accident rates per vehicle registered as a substitute. Although this is a more crude measure of exposure, the data are more widely available, and a comparison for the three countries where traffic data were also available suggests that broadly consistent conclusions are reached for two of the three countries where direct comparison was possible, although there was greater divergence in the third (see Annex 3.2).

Comparing the fatal accident rate per vehicle registered for GB with the equivalent rate per vehicle km shows that the relative rate per registered vehicle is noticeably higher than the relative rate per km. This is not the case for France or Denmark where the rates are comparable. This is likely to be because on average LGVs travel longer distances than the average for all vehicles considered as a whole in most countries. This suggests that the use of accident rate per vehicle registered will slightly over-emphasise the relative importance of LGVs compared with other vehicle types in most Member States.

The above notwithstanding, the general conclusion is that the risk associated with LGVs is for Europe as a whole lower than it is for all vehicle types considered together. This is not true in all Member States, in particular Portugal, the Netherlands, the Czech Republic and Austria, where LGVs present a greater risk than the average for all vehicle types (Figure 11). In general it can be seen that, although the trends are subject to some fluctuation, the risk associated with LGVs is generally decreasing faster than for all vehicles.

Figure 11. Comparison of relative fatal accident rate by Member State



5. IN-DEPTH ANALYSIS OF THE SAFETY PERFORMANCE OF LGVS

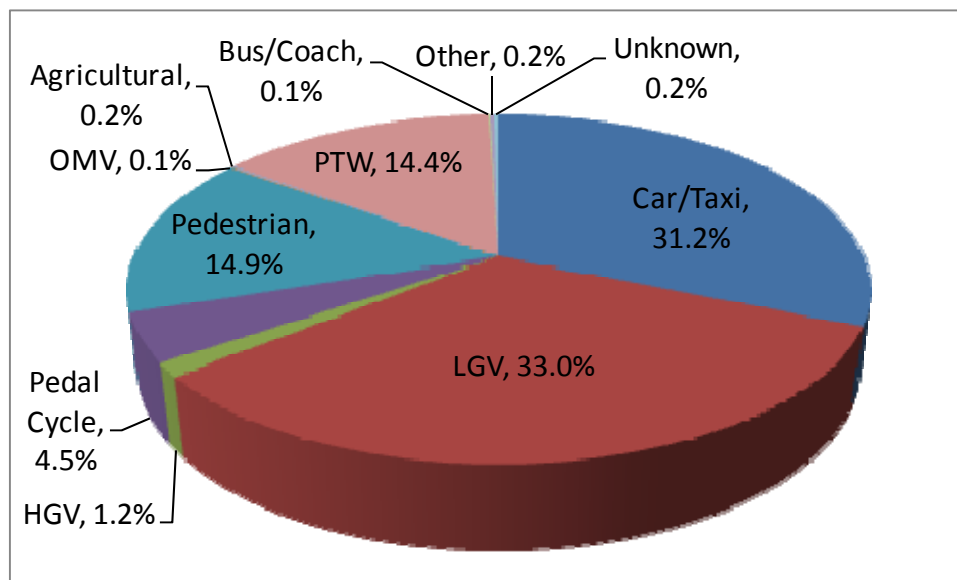
5.1 Sources and limitations of data

Most of the data sources used for the previous overview of trends in LGV accidents are not sufficiently detailed to allow in-depth analyses of the types, outcomes and causes of accidents involving LGVs. Although in-depth data sources such as the GIDAS database in Germany are available, they are not publicly accessible and sub-contracting analyses to organisations with access to these databases was not considered to represent the best possible value for money for a project of this modest size. The analysis has therefore been undertaken on the basis of existing scientific literature and a recent analysis of in-depth heavy vehicle accident data held in the UK¹¹. One of the main limitations is, therefore, that appropriate in-depth studies are only available in a few Member States, predominantly the UK and Germany. In addition to this, the data are not structured in a consistent way, often making it difficult to directly compare identically defined data. Further detailed analysis can be found in Annex 3.4.

5.2 Accident types and patterns

The distribution of fatalities from accidents involving LGVs is shown in Figure 12. This is based on the total of the Member States included in the CARE database and represents the most recent year available for each country¹²

Figure 12. Distribution of fatalities from European accidents involving LGVs



Source: Analysis of the CARE database¹³

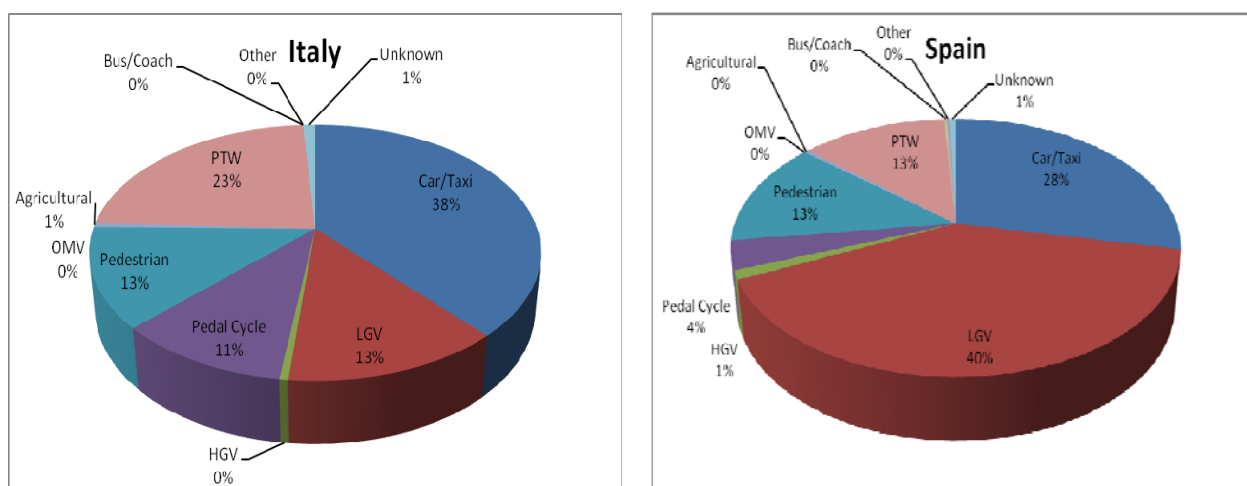
¹¹ The Heavy Vehicle Crash Injury Study fatal database, funded by the UK Department for Transport.

¹² Year 2007 for 16 Member States, one was 2006, two were 2005, one was 2004, and one was 2003.

¹³ PTW is defined as Powered Two-Wheeler, OMV is defined as "Other Motor Vehicle" which is any powered vehicle not covered by the other categories and typically includes vehicles such as refuse collectors, recovery vehicles, fire engines and military vehicles.

It can thus be seen that in Europe as a whole LGV occupants and car occupants are the people most frequently killed in accidents involving LGVs, representing 31% and 33% respectively of all those killed. Pedestrians and riders of Powered Two Wheelers (PTW, motorcycles, mopeds etc.) are the next largest groups, with 15% and 14% of the total. When data for individual Member States are studied it can be seen that, while this order of priority would hold true for about half of the Member States; in some others, the rank order is substantially different. The distributions for Italy and Spain are shown as examples of the extremes of the differences found across the EU (excluding Member States with abnormal percentages resulting from low total numbers of fatalities from LGV accidents).

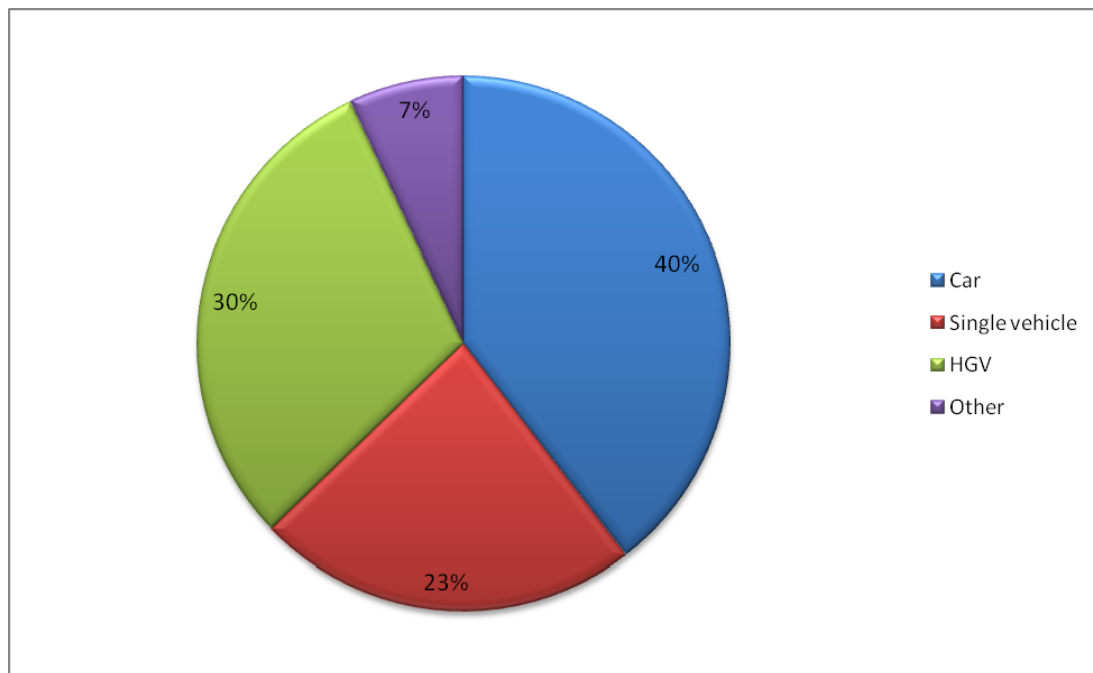
Figure 13. Differing distributions of road users killed in Italy and Spain



This variation in different Member States may lead to differing safety priorities in those countries, for example measures to protect PTW riders (23%) would be a considerably bigger priority in Italy than the protection of LGV occupants (13%) but in Spain protecting LGV occupants (40%) would be the highest priority by some margin, with PTW-rider protection a distant joint third with pedestrians (13% each).

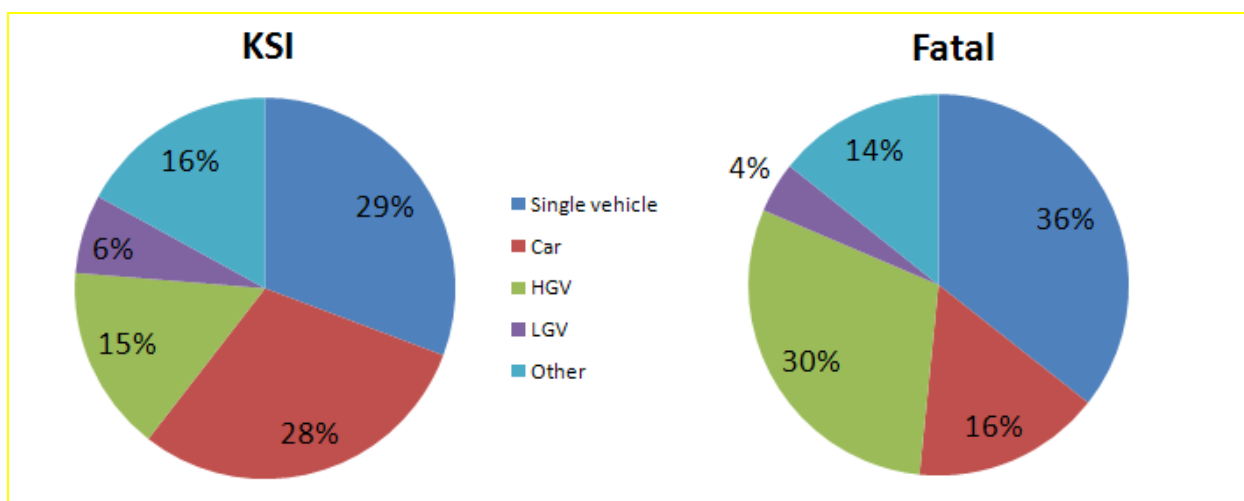
The definition of the accident data sample (accidents involving LGVs) means that nearly all of the fatally injured car occupants shown in Figure 12 would have been killed in direct collision with an LGV (the only exceptions being those where they sustained a minor collision with an LGV either before or after a major collision with another vehicle or obstacle). However, the LGV occupants could have been killed in collisions with cars or in any of the other types of accident. When assessing the relative priority of measures to protect LGV occupants, it is important to understand the types of impacts they are seriously injured in. Figure 14, shows the distribution of accident types when an LGV occupant was killed or seriously injured, based on a sample of data from Germany. Figure 15 shows the equivalent data for GB, with additional data where the sample is restricted to fatally injured LGV occupants only.

Figure 14. Accident opponent when an LGV occupant is killed or seriously injured



Source: Neiwöhner *et al.*, 2001

Figure 15. Accident opponent when an LGV occupant is killed or seriously injured or killed (GB STATS19)



Source: Smith *et al.*, 2007

It can be seen that 40% of the LGV occupants killed or seriously injured in Germany will have sustained their injuries in a collision between a car and an LGV. In GB the proportions are slightly different:

- only 28% of LGV occupants killed or seriously injured in collisions with a car (compared with 40% in Germany);
- a much lower proportion in collision with an HGV (15% GB compared with 30% DE);
- a higher proportion in single vehicle accidents (29% GB compared with 23% DE); and
- a higher proportion in collision with "other" vehicles (22% GB compared with 4% DE), which includes the 6% of LGV occupants killed or seriously injured in collision with another LGV.

These findings cannot be directly combined with the overall data for Europe from CARE (Figure 12) because the CARE data relates only to fatalities. Data on accident types where LGV occupants were killed was not available for Germany but was for GB. This shows that when only fatalities are considered, single vehicle accidents and collisions with HGV are responsible for the majority of LGV occupant deaths (66%). However, overall collisions with cars will remain the biggest cause of all deaths because it will cause all the car occupant fatalities (31% of all fatalities from accidents involving LGVs in Europe, see Figure 12) and 16% of LGV occupant fatalities. Figure 12 showed that 33% of all fatalities from accidents involving LGVs in Europe were LGV occupants, so approximately 5% of all fatalities from accidents involving LGVs were LGV occupants killed in collision with a car (16% of 33%). In total therefore, collisions between cars and LGVs are responsible for approximately 36% of all fatalities from accidents involving LGVs in the EU, making this the single most important group of LGV accidents.

Although based on proportions in GB, which may vary from the European average, this analysis suggests that in the region of 85% of the people killed in collisions between cars and LGVs will have been car occupants, almost six times the number of LGV occupants killed in the same collisions. Although the exact magnitude of this bias may well vary in different Member States it is still likely to be substantial. The typically greater mass of the LGV is likely to be one factor in the bias toward car occupant fatalities but this will not always be the case because in some accidents a small car-derived van may collide with a large SUV (e.g. Ford Fiesta van versus BMW X5). The analysis, therefore, suggests that there may also be other significant issues contributing to the bias and it is possible that there are significant issues with the structural compatibility between the two vehicle types.

One measure claimed to offer significant casualty reduction potential for LGV occupants that has been proposed in both regulatory and consumer testing forums is to extend the scope of the Frontal Impact Directive (96/79/EC) to include LGVs. However, the European Enhanced Vehicle-safety Committee (EEVC, 2000) reviewed accidents involving LGVs and, although they also found that they were involved in similar accidents to passenger cars and could thus benefit from the frontal impact directive, they were concerned that this could lead to an increase in the frontal stiffness of LGVs that would have adverse consequences for the occupants of the cars involved in collisions with them. The EEVC (2000), therefore, recommended that LGVs should not be included in the scope of the Frontal Impact Directive until further understanding of the potential compatibility issue was gained. At this time, no further research on the crash compatibility of European cars and LGVs has been identified, so the EEVC concern remains valid today.

The data presented in this report highlight the need to fully understand this issue. The test prescribed by the Frontal Impact Directive is intended to represent a head-on collision with an identical vehicle travelling at the same speed in the opposite direction. Thus if simply transferred to LGVs it would represent a head-on collision between two LGVs. The data presented in Figure 14 and Figure 15 suggest that all collisions between two LGVs are responsible for no more than about 4% to 7% of LGV occupant fatalities and serious injuries (in the region of 1% of all fatalities from LGV accidents). The measure would only be effective for a proportion of these accidents (e.g. those where the collision was head on and the vehicles were not travelling excessively fast, the passengers were wearing seatbelts and were typical healthy adults). Good performance in this test might require the structure to become quite stiff but this could have adverse effects in collisions between cars and LGVs for the occupants of both vehicle types. This collision type is responsible for 36% of all fatalities involving an LGV so a measure to gain benefits for an accident type resulting in 1% of the fatalities could result in disbenefits for an accident type resulting in 36% of the fatalities, giving the clear

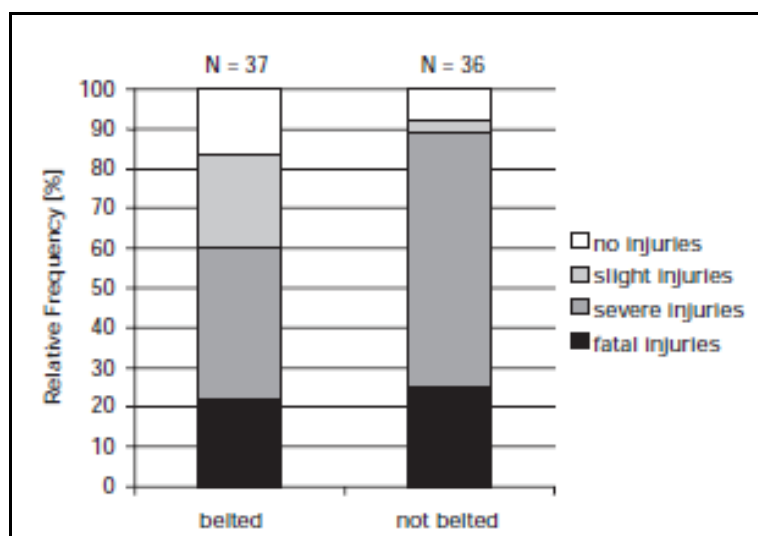
potential for an overall negative effect. It seems likely that improving the structural impact performance of LGVs would involve developing test procedures that improve LGV self-protection where it could offer most benefit (single vehicle accidents, collisions with HGVs, collisions with cars, collisions with other LGVs in that order of priority) at the same time as improving partner protection for collisions with cars. This is likely to involve considerable research and development.

The data suggest that collisions with pedestrians are the next most important type of accident. Data from the UK (Smith *et al.*, 2007) suggest that approximately 55% of the killed and seriously injured pedestrians were in collision with the front of the LGV. Pedestrian protection regulations have been applied to new passenger cars and car-derived LGVs (<2.5 tonnes) and the EU APROSYS project has studied the application of these principles to heavier trucks (>3.5 tonnes). There may, therefore, be scope for such principles to be applied to all LGVs. However, more detailed investigation of the feasibility, costs and benefits would be required if a proposal were to be made with scientific confidence.

Figure 14 also shows that collisions with heavy vehicles are a substantial contributor to LGV occupant fatalities and serious injuries. In this case, the mass of the LGV will be much less than its opponent so although the collisions are much less frequent than LGV-to-car collisions, they will be much more severe for the LGV occupant. Again, there may also be issues with structural compatibility and it is known, for example, that front and rear underrun protection for heavy trucks is designed for the structural geometry, mass and energy absorption characteristics of a passenger car not an LCV. The last significant accident type for LGV occupant injuries is single vehicle accidents. This category will include loss of control/rollover accidents and leaving-the-carriageway accidents where no other vehicles are involved. Existing proposals for a new regulation on electronic stability control would be expected to be of benefit for this type of collision and to some extent the multi-vehicle collisions. Measures to control fatigue, lack of attention and lane departure warnings would also be expected to be of benefit.

5.3 The use of seat belts

The fitting and use of seat belts is mandatory for LGV drivers. However, there is considerable evidence to suggest that the compliance with these requirements is much lower for LGV drivers than for passenger car drivers and that this has a strong effect on the severity of injuries suffered. For example, German data suggests that approximately half of the LGV drivers in their accident sample were not wearing their seat belt. The effect on the injury severity is shown in Figure 16, below.

Figure 16. The effect of seat-belt use on LGV occupant injury severity

Source: Berg, 2003

These findings are supported by UK studies which showed that 63% of fatally injured LGV drivers and 77% of fatally injured LGV passengers were not wearing their seat belt at the time of the collision that killed them. It should be noted that more sophisticated measures such as applying the Frontal Impact Directive to LGVs would only be expected to offer substantial benefits to belted occupants.

5.4 Contributory factors

5.4.1 Driver behaviour

A number of different studies of the contribution of driver behaviour to accidents involving LGVs were available and, to some extent, provided conflicting results:

- Berg *et al.* (2003) found on the basis of German national statistics that drivers of LGVs were more frequently considered to be at least partly to blame for causing an accident than the drivers of other vehicle types.
- GB national statistics (DfT, 2008) suggest that drivers of LGVs were contributory to the cause of accidents as frequently as HGV drivers, slightly less often than motorcyclists but more often than car, bus and pedal cycle drivers/riders.
- Smith and Knight (2005) studied a sample of fatal accidents and found that the behaviour of 44% of the LGV drivers were contributory to the crash compared with 51% of the other vehicle drivers involved in the same fatal crashes.

GB national statistics (DfT, 2008) allow a comparison of the most frequent contributory factors for LGV drivers and all vehicles. This is shown in Table 4, below.

Table 4. Comparison of contributory factors in GB (DfT, 2008)

Contributory factor	LGVs		All Vehicles	
	Number	Percent	Number	Percent
No contributory factor assigned	4,777	41	110,813	43
Failed to look properly	2,674	23	51,858	20
Failed to judge other person's path or speed	1,556	13	28,237	11
Careless, reckless, in a hurry	1,250	11	23,921	9
Loss of control	565	5	20,637	8
Poor turn or manoeuvre	1,008	9	20,097	8
Slippery road (due to weather)	570	5	14,198	5
Travelling too fast for conditions	593	5	14,185	5
Sudden braking	452	4	10,610	4
Following too close	640	6	9,622	4
Exceeding speed limit	238	2	7832	3
Learner or inexperienced driver/rider	81	1	7686	3
Impaired by alcohol	262	2	7220	3
Vision affected by stationary or parked vehicle	160	1	4830	2
Failed to signal or misleading signal	192	2	2685	1
Passing too close to cyclist, horse rider, pedestrian	164	1	1829	1
Vehicle blind spot	148	1	1725	1
Total number of vehicles	11,540	100	259,435	100

It can be seen that generally the behaviour of LGV drivers contributed to accidents in a similar way to that of all vehicle drivers. However, there were some notable differences. Contributory factors relating to poor judgement by the driver (i.e. failed to look properly, failed to judge other person's speed or path, careless, reckless, in a hurry, poor turn or manoeuvre, following too close) applied to a bigger proportion of the LGV drivers than all drivers, suggesting that measures to improve the judgement of LGV drivers could be effective. It could be argued that this is related to pressure applied by tight work schedules, finding multiple delivery addresses, use of mobile phones or other logistics telematics etc. However, it is worth noting that some factors that might be expected to relate directly to this, for example exceeding the speed limit and travelling too fast for the conditions apply to a similar or lower proportion of LGV drivers compared with all drivers (although still higher than for HGV drivers where speed limiters are routinely fitted).

Inexperience is more rarely a contributory factor for LGV drivers than it is for all drivers, suggesting that the exception permitted in the UK allowing LGV licences to be held at 17 is not a major problem. Impairment by alcohol is also less of a problem for LGV drivers (2%) than for all drivers (3%) but considerably more than for HGV drivers (0.3%). This

is likely to reflect the fact that many LGV drivers are professional drivers relying on their licence to make a living and that for a significant number driving a van is incidental to their main work (e.g. service engineers, plumbers, builders etc.). Few car drivers but almost all HGV drivers would describe their main job as professional driver.

These findings are broadly supported by Clarke *et al.* (2008), who studied a sample of more than 2,000 police accident reports (all injury severity levels) to assess work-related traffic collisions. Overall they found that work-related drivers were more likely to contribute to the accident in which they were involved and, of these, the drivers of LGVs were the second most likely to contribute, with heavier goods vehicles being the most likely. An analysis of the contributory factors for all vehicle types showed that the only statistically significant difference in the category of contributory factors for LGVs was that they were more likely to have contributed through poor observation than the drivers of other vehicle types.

Fatigue and drivers' hours are not included in Table 4 because they were not recorded as being in the top ten factors for any of the vehicle types considered. On its own this suggests that fatigue is not that important a factor. However, it is important to consider how the factors are derived. In the data reported for GB (DfT, 2008), the contributory factors are reported by the police officer in charge at the scene, usually only a short time after the accident. The assessment does not, therefore, take into account in-depth investigations or interviews with witnesses. Thus, some factors that are difficult to identify, such as fatigue, may be under-represented.

When accidents result in a fatality a much more detailed investigation is undertaken by the police. Although it remains difficult to identify factors such as fatigue there is often evidence from office paperwork to identify how long the driver has been driving and how far, while other witness evidence from family and friends can testify to the amount of sleep obtained in the periods running up to the accident. An analysis of the latest release (2009) of the HVCIS fatal accident database (based on such detailed investigations) in the UK compared contributory factors for accidents involving a range of commercial vehicle types, with a specific emphasis on the role of fatigue. The results are shown in Table 5, below.

Table 5. Contributory factors in commercial vehicle accidents

Drivers	Commercial Vehicle Type			
	HGV	LGV	Bus / coach	All ¹⁴
All	1851 (100%)	745 (100%)	473 (100%)	5355 (100%)
Without behavioural factors	1160 (62.7%)	360 (48.3%)	332 (70.2%)	2603 (48.6%)
With behavioural factors	691 (37.3%)	385 (51.7%)	141 (29.8%)	2752 (51.4%)
<i>Fatigue</i>	76 (4.1%)	41 (5.5%)	5 (1.1%)	213 (4.0%)
<i>Excess hours</i>	36 (1.9%)	3 (0.4%)	0 (0.0%)	43 (1.6%)
<i>Fatigue & Excess hours</i>	18 (1.0%)	1 (0.1%)	0 (0.0%)	21 (0.4%)

¹⁴including cars, motorcyclists etc.

This analysis supports the findings of the other studies that overall LGV drivers are more likely to have contributed to the accident than other commercial vehicle drivers. It shows that overall fatigue or excess hours are comparable in size as a problem (circa 6%) for HGVs and LGVs, despite the fact that EU drivers' hours rules apply to HGVs and are enforced by tachographs whereas only UK domestic hours rules apply to LGVs with no objective enforcement. The data suggest that a large proportion of those suffering fatigue are tired without exceeding the prescribed hours limits.

The severity of each fatal accident can be judged by the number of fatalities that occur in it. Table 6 compares the number of fatalities per accident for all accidents involving the vehicle of interest (HGV, LGV or bus/coach) with those where the driver of the vehicle of interest (VOI) was fatigued.

Table 6. Fatality rate per accident, comparison of all accidents with fatigue related accidents

	HGV	LGV	Bus/coach
A) All accidents involving vehicle of interest	1691	731	469
B) All fatalities involving vehicle of interest	1875	819	522
Fatalities per accident (A/B)	1.11	1.10	1.11
C) Accidents involving fatigued driver of vehicle of interest	76	41	5
D) Fatalities involving fatigued driver of vehicle of interest	96	45	10
Fatalities per accident involving fatigued driver of vehicle of interest (C/D)	1.26	1.10	2.00

For HGV and bus/coach accidents, the data suggest that the severity of the accidents is greater when the driver of the heavy vehicle is fatigued, with 1.26 fatalities per accident compared to 1.11 fatalities per accident for all accidents involving HGVs. This is not the case for LGVs, where the severity of the collision appears uninfluenced by fatigue of the driver.

The types of road users fatally injured can be influenced by the characteristics of the accidents. Table 7 shows the number and proportion of the fatalities that were the occupants of the vehicle of interest and those that were outside the vehicle of interest (e.g. car occupants, pedestrians, motorcyclists, etc.). The data are shown for all accidents involving each vehicle of interest and also for accidents where the driver of the vehicle of interest was considered to have suffered from fatigue.

Table 7. Comparison of road user fatalities for all accidents and fatigue related accidents

Accident group	Fatality group	HGV	LCV	PSV
All Accidents	VOI occupant	192 (10%)	215 (26%)	97 (19%)
	VOI opponent	1,683 (90%)	604 (74%)	425 (81%)
Accidents where VOI driver was fatigued	VOI occupant	49 (51%)	33 (73%)	9 (90%)
	VOI opponent	47 (49%)	12 (27%)	1 (10%)

Thus for all vehicle types accidents where the driver is fatigued are far more likely to result in the death of the driver rather than the death of an opponent. It is likely that this is related to the incidence of single vehicle run-off-road accidents when the driver is fatigued and it may also be one of a number of factors linked to the different distribution of fatality types from accidents involving LGVs in different Member States (Figure 12 and Figure 13); that is to say that fatigue may be more of an issue in some countries compared with others.

5.4.2 Vehicle loading

The load carried by LGVs has the potential to contribute to the cause of an accident or to contribute to the severity of an accident once it has occurred. Analysis of UK national statistics shows that poorly loaded or overloaded LGVs represented 1.2% of LGVs that were assigned a contributory factor (i.e. 0.7% of all LGVs in accidents). The HVCIS fatal database (release P2J) contained information on 860 LGVs involved in fatal accidents. It showed that, where the loading condition was known, the vehicle was empty at the time of 31% of the fatal accidents. It was found that 1.9% of the LGVs where the vehicle was known to be loaded suffered load movement before the collision and, where known, this was a contributory factor in 1.6% of the fatal accidents. In contrast 18% of the loaded LGVs experienced some form of load movement after the collision. For approximately 11% of the loaded HGVs this was considered to have contributed to the severity of the injuries received.

A separate study found that load movement could have contributed to the severity of injury for up to approximately 10% of car-derived LGV occupants.

Existing codes of practice on commercial vehicle load security (e.g. European Best Practice Guidelines for cargo security¹⁵) typically focus on restraining the load under normal driving practices. The accident data suggests that for LGVs few fatal accidents are caused by insecure cargoes so there would be limited fatality benefit from ensuring that the load cannot move during normal driving conditions. However, if loads could be restrained under crash conditions, which is considerably more challenging, then a significant minority of fatalities (up to 10% or 11% of LGV occupants) could be positively influenced.

¹⁵ http://ec.europa.eu/transport/road_safety/vehicles/guidelines_cargo_securing_en.htm

5.4.3 Vehicle roadworthiness

The HVCIS fatal database (release P2J) shows that approximately 16% of LGVs involved in fatal accidents in GB had some kind of defect and that for 20% of these defective vehicles (3% of all LGVs), the fault could have contributed to the cause or severity of the accident. Just over 7% of all LGVs were found to have a tyre defect (e.g. low tread depth, incorrect inflation pressure etc.) at the time of the accident but only for around 23% of these (1.7% of all LGVs) was the tyre defect considered to have contributed to the cause of the accident. The next most common defect was to the braking system where 5% of LGVs were defective, with 20% (1% of all LGVs) where the brake defect was contributory to the accident.

Knight (2000) found that the comparable figures for HGVs were that 15% of HGVs had defects of which 40% (6% of all HGVs) could have been contributory to the accident. This suggests that roadworthiness is an issue for LGVs but less so than for HGVs, particularly given the fact that HGVs are typically subject to more “in-service” regulation, such as operator licensing, and typically more stringent periodic technical inspections and roadside enforcement.

5.4.4 Accident risk in different business sectors

LGVs are used in a variety of different roles. They can be used for the collection and delivery of goods in a freight capacity, they are used by tradesmen and professional engineers to carry tools and equipment with them when travelling to service jobs and they can be used in a private capacity for commuting and/or travel outside work hours. In order to target safety solutions effectively, it would be beneficial to be able to identify whether any of these sectors present a greater accident risk.

Successful identification requires both accident data and exposure data (e.g. vehicle kms driven) that divide the accidents by the type of journey undertaken and both data sets would need consistent definitions. Unfortunately, little if any such data exist in Europe. A limited analysis was undertaken for the UK using the HVCIS fatal accident database and the results of the UK Department for Transport van activity survey. The results are shown in Table 8, below, but must be treated with caution because the definitions were not the same in both data sets and the accident data included more years than the exposure data, so a range of assumptions were required. The differences in LGV activity and accidents across different Member States, highlighted elsewhere in this report, also mean that this limited analysis cannot reliably be assumed to represent the whole of Europe.

Table 8. LGV activity and fatal accidents by type of journey

Type of journey	Proportion of vehicle kms	Proportion of fatal accidents
Commercial non-freight	25%	56%
Commercial freight	30%	20%
Personal and commuting	44%	24%

It can be seen that journeys defined as commercial non-freight, for example engineers and tradesman carrying tools between jobs, appear to be responsible for 25% of LGV traffic but be involved in 56% of LGV fatal accidents. In this case it would appear that this business sector would be a higher priority for safety initiatives than the freight or personal sectors, but it must be emphasised that as a cross-Europe finding this result is only very weakly based in scientific terms.

Unfortunately, it is not possible to further investigate or explain this finding because of severe limitations in the ability to accurately and consistently identify business sectors in the UK data. It has not been possible to reproduce this analysis for any other Member State because no data were identified where the business sector was identified in both accident and exposure data.

6. DISCUSSION

The analysis undertaken has found that the number of LGVs on the roads of Europe is growing and they represent an increasing proportion of the vehicle fleet (approximately 10% of all vehicles in 2006). The limited data available also suggest that the distance travelled by LGVs has increased by an even greater margin. It was estimated that there were approximately 100,000 accidents involving LGVs (8% of all accidents) in Europe in 2006, of which approximately 4,100 were fatal accidents (approximately 9% of all fatal accidents). Accidents involving LGVs, therefore, represent a significant minority of the European road safety problem. The proportion of all accidents that have involved LGVs has stayed approximately constant over the time period assessed and the absolute number of LGV accidents, casualties and fatalities has decreased. This, combined with the strongly increasing trends for LGV traffic, results in an accident rate per km travelled that is decreasing more quickly than for other vehicle types. This decreasing accident rate was confirmed for a larger sample of Member States using a rate per vehicle registered to increase the data available.

This declining accident rate has largely been achieved without the significant regulatory interventions seen for other vehicle types in recent years, although it will obviously have benefited from the resulting improvements to other vehicle types, for example improved car occupant protection or reduced drink driving in cars both help to reduce the fatality rate in LGV accidents as well as in car accidents. In terms of construction, the mandatory safety requirements for new LGVs are substantially less stringent than for passenger cars and the mandatory operational requirements are substantially less stringent than for HGVs, buses and coaches.

It has not been possible to provide a definitive explanation of these trends. There is evidence to suggest that at least part of the growth in LGV traffic is because they are increasingly used for the final delivery leg in logistics and distribution services. It is, therefore, possible that the professional haulage and distribution companies involved in these operations are voluntarily applying similar operational practices to those that are a mandatory requirement for their main HGV operations, perhaps because of concerns regarding health and safety regulations. This would be consistent with GB analysis suggesting this sector is under-represented in fatal accidents but could only be partly responsible for the trends because there is more LGV traffic in other sectors.

There is also some evidence to suggest that the vehicle manufacturing industry is voluntarily bringing the design of new LGVs closer to the safety standards set by regulation for passenger cars. For example, Berg *et al.* (2003) described the results of a crash test programme that showed a modern Ford Transit (at 2.5 tonnes) would be capable of passing a regulatory frontal impact test. Similarly, it was shown that the straight line braking performance of three different LGVs substantially exceeded the minimum requirement for passenger cars and produced comparable results to one passenger car tested. Whatever the actual explanation is, the overall trends suggest that safety improvements for LGVs are of no higher priority, and possibly lower priority, than those for other vehicle types, for as long as the current trends continue.

The findings above apply to Europe as a whole but do not hold true in every Member State when considered individually. The proportion of all accidents/fatalities that involve an LGV is increasing in Belgium, Spain, Hungary, the Czech Republic and France (although decrease prior to step change in 2006/7 raises data accuracy concerns for France). The trend was for a decreasing proportion in Denmark, Germany, Greece, Italy, the Netherlands, Austria, Sweden and the UK. For Estonia, Ireland, Malta, Portugal, and Finland the trend was either constant or variable (often a function of low numbers)

Again, there are insufficient data available to conclusively explain this variation in different Member States. It is possible that the different approach to regulating LGV operations in different countries is of some influence. Table 9 compares some of the national legislation and the accident data for some Member States. The table is created using a simple category comparison to identify for each Member State:

- whether the accident rate was high, medium or low in comparison to other Member States;
- whether the change in accident rate or the change in the proportion of accidents that involve LGVs is increasing, constant or decreasing;
- whether drivers' hours restrictions for LGVs are tighter, similar or more relaxed than EU requirements for HGVs;
- whether speed limits for LGVs are lower or the same as those for passenger cars; and
- Whether the derogation to 17 for the driver licensing age was implemented.

The table shows little or no correlation between these parameters. However, there does appear to be some regional variations with Germany and Austria showing similar trends, as do GB and Ireland.

Based on these results it is possible to consider the effects of a wide range of potential policy options. Examples of potential options include:

- **Do nothing** – The evidence suggests that the LGV industry has to some extent, been self-regulating in that the safety performance has improved despite a growth in vehicle numbers and traffic. If these trends were to continue then it is likely that at a European level the number of LGV accidents would continue to decrease as fast as those of other vehicle types, without imposing any additional regulatory burden or cost. However, in some Member States this could mean that casualties from accidents involving LGVs continue to be a growing proportion of the casualty total and there is some risk that fatal accidents involving LGVs could begin to represent a larger proportion of all fatal accidents.
- **Voluntary harmonisation** – The analysis has revealed different LGV safety trends in different Member States. Measures such as information campaigns (e.g. www.safed.org.uk), best practice programmes (e.g. www.freightbestpractice.org.uk) or codes of practice (e.g. www.shop.fta.co.uk/pc-457-39-safe-loading-of-vans-booklet.aspx), could be taken to encourage the industry in Member States with an increasing LGV accident problem to adopt the best practice in those Member States where it is decreasing. This could potentially encourage a greater reduction in the European accident total without additional regulatory burden while confining any costs of improvement to those Member States with an increasing problem. However, the effectiveness of this type of programme has not been statistically proven and the effectiveness of any measures would be strongly dependent on the willingness of the relevant Member States and industries to adopt best practices voluntarily.
- **Mandatory harmonisation** – The performance of new vehicles is harmonised across Europe but many of the operational requirements (e.g. reduced speed limits, driver licensing etc.) are not. Mandatory measures could be taken to harmonise such requirements at the level of the most stringent. This is likely to reduce accidents but the effectiveness cannot be statistically proven without considerable additional data. Compulsory measures may be more effective than voluntary encouragement but may impose regulatory and cost burdens on some Member States where the number of LGV accidents is already declining more

quickly than other accident types. The benefit to cost ratio across Europe would be uncertain.

- **Mandatory introduction of new safety requirements for LGVs** – There are a range of areas where LGVs are subject to lower safety requirements than other vehicle types and a range of new technology is being introduced that could improve LGV safety. Action could be taken to mandate such safety performance for all LGVs.

Table 9. Summary of legislation and accident trends for selected Member States

Member State	Driving hours relative to EU HGV	Speed Limits on dual carriageway*	Licensing age	LGV accident rate 2006	Change in accident rate 2001-2006	Change in LGV accidents as % of all accidents 2001-2007
Austria	Shorter daily and weekly drives and shorter before break	100km/h highways, 130km/h motorways	18	7.4	-15.9%	-5.3%
France	Longer daily drive but shorter weekly drive	Unknown	18	1.0	+1.0%	+25.6%
Germany	Shorter weekly and daily driving for <2.8t,	No speed limit	18	7.8 ¹⁶	-11.4% ¹⁷	-5.6% ¹⁷
	as EU HGV for 2.8-3.5t					
Great Britain	As EU HGV for weekly drive and time before break, but longer daily drive permitted	112km/h if car-derived and <2.0t, 96km/h if >2.0t	17	4.4	-29.5%	0.0%
Ireland	Longer daily drive but shorter weekly drive. Longer drive before break and shorter weekly rest	97km/h	17	3.5 ¹⁶	-20.9% ¹⁷	+6.6% ¹⁷
Portugal	unknown	90km/h or 90km/h if towing trailer	18	6.7	-29.2%	-6.4%
Spain	Longer drive before break but longer daily rest	100km/h	18	2.5 ¹⁸	-19.4% ¹⁹	+12.0%

Notes:

- 1) Colour coding – regulatory aspects
 - a. **Green** – less stringent than EU HGV drivers' hours, speed limit comparable to cars, Driver age less than EU Directive
 - b. **Purple** – Comparable to EU HGV drivers' hours, speed limit between passenger cars and HGV speed limit, Driver age as EU Directive
 - c. **Blue** – more stringent than EU HGV drivers' hours, lower/same speed limit as HGVs, Driver age higher than EU Directive
- 2) Colour coding – accident data
 - a. **Green** – accident rate in upper third of Member States, increase in accident rate or proportion of accidents that involve LGVs
 - b. **Purple** – accident rate in mid third of Member States, minimal change in accident rate or proportion of accidents that involve LGVs
 - c. **Blue** – accident rate in lower third of Member States, decrease in accident rate or proportion of accidents that involve LGVs

¹⁶ Data from 2003.¹⁷ Change from 2001-2003.¹⁸ Data from 2005.¹⁹ Change from 2001-2005

The above list is intentionally presented at a high level because in-depth research into the effectiveness of different policy options was beyond the scope of this study. It is also highly unlikely to be an exhaustive list.

Whatever policy approach is chosen, it would be desirable to monitor its effectiveness. The scientific confidence in any future evaluations of safety in the European LGV fleet could be substantially increased if the accident and exposure data available were to be improved. In particular:

- Introducing a rigorous definition of LGV (designed for the carriage of goods with a maximum permitted weight less than or equal to 3,500kg) into Eurostat and presenting existing data on new registrations, stock and traffic separately and consistently for LGVs. This would involve enabling goods vehicles to be divided by maximum permitted weight and ensuring that one of the categories is all vehicles less than or equal to 3.5 tonnes maximum permitted weight rather than the load capacity categories currently used. It would substantially improve the ability to compare the accident rates for different Member States.
- Adding a requirement for data on LGVs to the freight section of Eurostat (i.e. amending EC regulation 1172/98) would allow considerably more investigation of the efficiency of operations in terms of safety, environment and the economy: figures related to tonnes lifted, tonne kms, average load etc. Specific fields relevant to the LGV market may be required, such as the type of business or personal activity they were involved in. This would form part of the information required to answer the questions of the risk associated with different LGV market sectors, but accident databases would also need the same definitions added to be effective.
- The CARE database proved a very valuable tool when assessing the accidents that LGVs were involved in and continuing the efforts to expand the database to cover all Member States with harmonised data would further increase confidence in the results of this type of study. Germany is often seen as an important Member State in relation to road safety and permitting full access to the German data would be beneficial.
- Encouraging the development of in-depth accident studies including LGVs in more Member States and with a sufficient level of detail would improve the ability to evaluate the potential of more detailed policy proposals, for example to better identify the role of fatigue in LGV accidents. The use of Event Data Recorders (sometimes known as black boxes) could greatly enhance the accident data available to quantify safety problems as well as having some direct effect in improving the behaviour of drivers.

If a “do-something” policy option were to be selected then the in-depth accident data could be used to inform estimates of the priority of different measures. For example:

- It was clear that the seat-belt-wearing rate for LGV occupants was low and that this resulted in substantially more severe injuries. Given that LGV occupants were one of the two largest fatality groups, measures to improve seat-belt wearing have substantial potential for casualty reduction. Measures could potentially include education and training, enforcement campaigns, and fitment of seat-belt reminders or interlocks to vehicles. In particular, seat-belt reminders/interlocks are relatively low cost and likely to have substantially positive benefits for cost ratios.
- Car occupants were the other large fatality group. The difference in the weight of LGVs and cars will typically, but not always, put the car occupant at a

disadvantage in collisions between the two. However, measures to improve the structural compatibility between the two vehicle types may have potential and could be worthy of further investigation. In particular, the compatibility problem between LGVs and cars in Europe may be comparable to the situation between cars and “light trucks and vans” in the USA, where research into possible regulatory test procedures is well under way.

- There was evidence to suggest that LGV drivers were more often contributory to the cause of the accidents in which they were involved than the drivers of other vehicle types, particularly compared with other commercial drivers (i.e. HGV and bus). Measures to improve LGV driver behaviour may also have potential, particularly when implemented as part of a comprehensive fleet management programme. Such management can use technology to identify and reward “good” driving behaviour, and can pay for itself directly through savings in fuel consumption.
- Exceeding the speed limit was seen to be a factor in around 2% of LGV accidents of all severities. Introducing speed limiters such as those that are mandatory for HGVs would be expected to prevent only a small proportion of that 2% because they do not adapt to the prevailing speed limit on the road and are set to the maximum speed permitted on the fastest roads. Intelligent speed adaptation would have greater potential but also greater costs.
- The evidence suggested that fatigue could be a factor in approximately 6 % of fatal LGV accidents. Introducing drivers’ hours regulations for LGVs across Europe may not have much effect, partly because research suggests that the number of hours driven is a relatively poor indicator of accident risk and partly because there are comparable national requirements already in existence in many Member States. However, mandating the use of tachographs to provide a mechanism to objectively enforce the hours restrictions may have some potential, although the number of fatigue accidents that occur without exceeding hours limits means that it is likely that this will only reduce a fraction of the 6% of fatigue related accidents
- Extending the scope of pedestrian protection legislation to include all types of LGV could potentially offer significant benefits because pedestrians were the third largest group of road users killed (15%) in accidents involving LGVs. However, further investigation of the current performance of LGVs and the feasibility of improvements would be required to confirm this potential. Initial estimates, based on the predictions for cars, would suggest that pedestrian fatalities could be reduced to the order of 10% to 20% (1/5% to 3% of all fatalities from LGV accidents). In future, active systems such as Brake Assist, Brake Assist Plus and Collision Mitigation Braking Systems could be applied to vans to reduce collision speeds with pedestrians and reduce the risk further.
- Electronic Stability Control would be expected to offer benefits to LGV occupants in single vehicle collisions as well as affecting both LGV and car occupants where a loss of control has resulted in collisions between the two. ESC has been proven to be highly effective and the EC has already proposed making it mandatory for all new vehicles, including LGVs, as part of the General Safety Regulation. The data showed that loss of control was less frequently a contributory factor for LGVs compared with all vehicle types but this remains likely to be cost effective.
- It has been proposed that systems such as the 1st generation of lane departure warning and automated emergency braking systems (for front to rear shunt collisions only) be made mandatory for heavy vehicles (>3.5 tonnes). Applying these to LGVs could have significant casualty benefits but initial analyses suggest the benefit to cost ratios would not be favourable until either the functionality is expanded to include more accidents and/or the cost is substantially reduced.

- Extending the requirements of the frontal impact directive to LGVs would require comprehensive evaluation. Simply extending the scope of the existing test is likely to offer benefits to only a small proportion of the LGV occupants killed or seriously injured while carrying the potential risk of adverse effects for a larger proportion of LGV occupants and the much larger group of car occupants injured in collisions with LGVs. The development of structural impact requirements for LGVs that were tailored to the specific accident environment they experience has the potential to be considerably more beneficial but is likely to require extensive research and development.

The above is provided as an indication of potential areas that could be explored on the basis of the accident data and is far from an exhaustive list. Many other safety improvements would be possible, particularly as advanced braking systems, collision mitigation and collision avoidance technology develop. No attempt has been made in this study to provide a detailed estimate of the costs, benefits or technical feasibility of these measures or to validate the findings of other studies such as the IMPROVER project (Höhnschied *et al*, 2006).

The objectives of the IMPROVER project in relation to LGV safety were:

- To analyse the scope of the problem in Europe (EU25);
- Identify and define road safety measures for LGVs;
- Carry out cost benefit analyses for each measure; and
- Derive recommendations on the implementation of road safety measures dedicated to LGVs.

The analysis identified that professional driver training and the use of systems such as reminders or interlocks to increase use of seatbelts appeared to be most economically justifiable. However the costs for driver training did not include loss of working time and use of a vehicle to complete the training. Electronic Stability Programmes were also identified as being economically justifiable for LGVs. Measures such as digital tachographs, speed limiters and accident data recorders were not considered economically viable.

7. CONCLUSIONS

1. The design and safety performance of new LGVs is subject to less stringent regulation than is applied to passenger cars and their operation is less stringently regulated than HGVs.
2. Overall it is estimated that LGVs represent approximately 10% of all vehicles on Europe's roads and are involved in approximately 8% of all accidents and 9% of all fatal accidents.
3. When Europe is considered as a whole, LGVs have over recent years come to represent a larger proportion of all vehicles and all traffic. However, at the same time the number of accidents and fatalities involving LGVs has decreased such that they continue to be involved in an approximately constant proportion of Europe's road accidents and casualties.
4. There is some evidence to suggest that the LGV industry has to some extent been self-regulating and this may have influenced these casualty reductions. If these trends continue then it would suggest that LGVs would be a similar or lower priority for regulation than some other vehicle types.
5. While the above is true for Europe as a whole, it is not the case in every Member State. In some Member States, LGV accidents have shown a smaller decrease than other vehicle types, meaning they represent an increasing proportion of all accidents, and in a few the accident numbers have been increasing. This may lead to conflicting priorities in different Member States.
6. These trends could justify a wide range of policy responses, including a "do-nothing" approach, non-regulatory interventions and mandating new safety measures. Regardless of the chosen policy options, the disproportionate growth in LGV use means that it would be beneficial to monitor the trends identified in this report. The analysis highlighted several significant weaknesses in the data available for LGVs and any future monitoring could be substantially improved if these weaknesses were eliminated.
7. If any safety intervention were to be considered, the analysis suggests that the highest priority would be measures that influenced collisions between LGVs and cars, which resulted in approximately half of all fatalities from LGV accidents. The analysis showed that seat-belt use was relatively low among LGV occupants and that this resulted in a considerable increase in the frequency of severe injury. Measures to increase the use of seat belts were identified as the most obvious and well established route to improving LGV safety. However, a range of other measures could be considered and may prove as beneficial.

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ANNEX 1:

LEGISLATION GOVERNING LIGHT GOODS VEHICLES IN THE EU AND RESPECTIVE MEMBER STATES

A1.1 Safety legislation governing LGVs in the EU

A1.1.1 LGV construction

Vehicle type approval provides confirmation that production samples will meet specified performance standards. The requirements for type approval are defined in European Directive 70/156/EEC. The principal aspects of the directive concerning the safety of vehicles relate to the specific construction requirements for vehicles which are defined in additional European directives. These relate to features of the vehicle that benefit both the primary and secondary safety of the vehicle. Those requirements specific to the construction of LGVs are summarised in Table 10 and Table 11.

By default, smaller car-derived vans will meet additional requirements specified for equivalent M1 passenger vehicles. Larger LGVs (i.e. with typically 2,500kg < mass < 3,500kg) are exempt from these requirements. The additional directives met by car-derived vans are detailed in Table 12. These relate mainly to secondary safety features of the vehicle involving destructive testing of principal vehicle features.

Historically there was no European-wide approval scheme for goods vehicles. In view of this, Member States operated their own national type-approval schemes. However, a new framework Directive (2007/46/EC) has recently been introduced that provides a basis for a European-wide type-approval scheme for trucks that will be phased in over the coming years. Larger goods vehicles (i.e. Gross vehicle mass > 3,500kg) have to meet many of the directives applicable to LGVs. However, there are additional requirements for HGVs as follows:

- Lateral protection (side guards) 89/297/EEC – All N2 and N3 vehicles and O3 and O4 trailers;
- Spray suppression systems 91/226/EEC;
- Speed limiters EC 2004/11 – All M2, M3, N2 or N3 vehicles;
- Front underrun protection EC 2000/40 – All N2 and N3 vehicles;
- External projections of cabs 92/114/EEC – All N category vehicles.

Table 10. Vehicle type approval directives benefiting LGV primary safety

Category	Directive Number	Title	Description
Steering	70/311/EEC	Steering equipment for motor vehicles and their trailers	Maximum steering effort requirements with both functioning and non-functioning power steering system Test methods to determine maximum steering effort (turning circle for a period of time)
Horn	70/388/EEC	Audible warning devices for motor vehicles	Audible warning device (horn) specification Acoustic test procedures
Brakes	71/320/EEC	Braking devices of certain categories of motor vehicles and their trailers	Braking system design (construction and fitting requirements) Brake system testing (performance in terms of stopping distance and behaviour with and without power assistance) Maximum braking effort at a given speed and deceleration with and without power assistance specified
Security	74/61/EEC	Devices to prevent the unauthorised use of motor vehicles	Categories M1 and N1 must be fitted with a device designed to prevent unauthorised use Specification of the function of devices to prevent unauthorised use
Speedometer	75/443/EEC	Reverse and speedometer of motor vehicles	Requires the ability to reverse Requirement for speedometer Speedometer accuracy specification
Lights	76/756/EEC	Installation of lighting and light-signalling devices on motor vehicle and their trailers	Lighting must meet the technical requirements of UN ECE Regulation 48 (paragraphs 2, 5 and 6, Annexes 3 to 9) UN ECE R48 includes requirements for presence, number, arrangement, position, orientation, visibility and connections of lighting
Lights	76/758/EEC	End-outline marker lamps, front position (side) lamps, rear position (side) lamps, stop lamps, daytime running	End-outline marker lamps, front position (side) lamps, rear position (side) lamps and stop lamps must meet the technical requirements of UN ECE Regulation 7 (paragraphs 1 and 5 to 8 and Annexes 1, 4 and 5) Daytime running lamps must meet the technical requirements of UN ECE Regulation 87 (paragraphs 2 and 6 to 11 and Annexes 3 and 4) Side marker lamps must meet the technical requirements of UN ECE Regulation 91 (paragraphs 2

Category	Directive Number	Title	Description
		lamps and side market lamps for motor vehicles and their trailers	and 6 to 9 and Annexes 1, 4 and 5)
Symbols for controls	78/316/EEC	Interior fittings of motor vehicles (identification of controls, tell-tales and indicators)	Specifies symbols for the controls, status indicators and warning lights for various functions of a vehicle
Defrosting and demisting	78/317/EEC	Defrosting and demisting systems of glazed surfaces of motor vehicles	Specifies the requirements for defrosting and demisting systems for windscreens of category M1 vehicles However 70/156/EEC refers to this directive with the comment "vehicles of this category (N1) shall be fitted with an adequate windscreen defrosting and demisting device"
Wipers and washers	78/317/EEC	Wiper and washer systems of motor vehicles	Specifies the requirements for washing and wiping systems for windscreens of category M1 vehicles However 70/156/EEC refers to this directive with the comment "vehicles of this category (N1) shall be fitted with adequate windscreen washing and wiping devices"
Tyres	92/23/EEC	Tyres for motor vehicles and their trailers and their fitting	Requirements for tyres Tyre dimensions Load/speed test procedure Requirements for vehicles with regard to fitting of their tyres (do not mix construction types, etc.) Road noise test specification Test track specification
Mirrors	2003/97/EC	Type approval of devices for indirect vision and of vehicles equipped with these devices	Interior mirror (Class I): Compulsory unless a mirror would not provide rearward vision. Main mirror (Class III): Compulsory on both driver and passenger side. Class II mirrors may be fitted as an alternative. All other classes of mirror are optional.

Table 11. Vehicle type approval directives benefiting LGV secondary safety

Category	Directive Number	Title	Description
Fuel tanks	70/221/EEC	Liquid fuel tanks and rear protective devices for motor vehicles and their trailers	Rear underrun protection required on vehicles with rear ground clearance above 55 cm (Vehicles with less than 55 cm are deemed to meet the requirement by default) Rear underrun device design specification Fuel tank design and construction specification Flame, permeability, overturn and pressure testing for fuel tanks
Doors	70/387/EEC	Doors of motor vehicles and their trailers	Applies to the doors of category M1 and N vehicles Doors to be designed with safety in mind Latches to be designed to prevent accidental opening Steps are required if the passenger floor is more than 0.6 m from the ground
Seats	74/408/EEC	Seats, anchorages and head restraints of motor vehicles	Annex IV applies to category N1 General seat specifications (must be firmly attached, lockable in place etc.) Head restraints are required in front seats
Anchorages	76/115/EEC	Anchorages for motor vehicle safety belts	Specification of number and location of anchorages Specification of anchorage strength test (pull test)
Safety belts	77/541/EEC	Safety belts and restraint systems of motor vehicles	Applicable to seatbelts used in category M1 and N1 vehicles Strap strength tests Buckle strength, impact, durability, corrosion resistance, dust resistance, locking threshold, retracting force, microslip, abrasion, dynamic and buckle-opening tests. Conditioning environments such as light, low temperature, heat and water Installation of child restraint system (UN ECE R44 approved)
Safety glazing	92/22/EEC	Safety glazing and glazing materials on motor vehicles and their trailers	Glazing fitted to category M and N vehicles must be type approved according to UN ECE R43 UN ECE R43 specifies construction and testing requirements for windscreens and other glazing Tests include fragmentation, mechanical strength, environmental (temperature, weathering etc.), light transmittance and resistance to chemicals tests.
External projections	92/114/EEC	External projections forward of the cab's rear panel of motor vehicles of category N	Category N1 may be type approved based on compliance with 74/483/EEC (Directive concerning category M1) 74/483/EEC specifies permissible dimensions of bodywork projections
Frontal protection	2005/66/EC	Frontal protection systems on motor vehicles (e.g. bull-bars)	Applicable to M1 and N1 category vehicles. Leg form and head form impact tests at speeds and onto structures such as bull-bars that can be fitted to the front of vehicles and that could potentially increase the injury risk for pedestrians in vehicle to pedestrian

Category	Directive Number	Title	Description
			accidents.

Table 12. Requirements which may be met by car-derived vans by virtue that the equivalent M1 vehicle is tested

Category	Directive Number	Title	Description
Side impact	96/27/EC	Protection of occupants of motor vehicles in the event of a side impact	Category N1 vehicles must fulfil the same requirements as M1 vehicles (i.e. the approximating position of the seated occupant's hip joint in the lowest seat of the vehicle is not more than 700 mm from ground level) Side impact test on driver's side Head form and body block impactor tests
Pedestrian safety	2003/102/EC	Protection of pedestrians and other vulnerable road users before and in the event of a collision with a motor vehicle	Applicable to N1 category vehicles which are M1-derived and under 2.5 tonnes. Leg form and head form impact tests onto the front vehicle structures at speeds representative of vehicle with regard to pedestrian impacts.
Frontal impact	96/79/EC	Frontal impact performance of vehicles.	M1 vehicles only with a permissible mass not exceeding 2.5 tonnes. Car-derived vans effectively assessed because of their equivalent structure to the M1 class of vehicle. Leg form and head form testing. 56 km/h impact into deformable barrier with 40% overlap.
Interior fittings	74/60/EEC	Interior fittings of motor vehicles (interior parts of the passenger compartment other than the interior rear-view mirrors, layout of controls, the roof or sliding roof, the backrest and rear part of seats)	M1 vehicles only. Car-derived vans effectively assessed because of their equivalent structure to the M1 class of vehicle. Concerns assessments and tests of the sharpness, projection and energy absorption of interior fittings in vehicles.

A1.1.2 Driving hours

There are no European-wide regulations governing LGV drivers' hours across Europe. EC directives 2002/15/EC and 561/2006 do specify limits for workers hours, breaks and rest periods. A summary of the principal features of these regulations is provided in Table 13. However, drivers of goods vehicles with masses equal to or lower than 3.5 tonnes are excluded from this legislation. However, despite their omission from the formal European legislation it is known that a number of Member States use 2002/15/EC and/or 561/2006 as a template or basis for their own national measures for regulating LGV drivers' hours and breaks (Section A2.2.3). Provision is also made within (EC) No. 561/2006 and 2002/15/EC for individual Member States to set more enhanced conditions for their drivers such as longer minimum break and rest periods and reduced maximum driver hours.

Table 13. Summary of the principal requirements of Regulations 2002/15/EC and (EC) 561/2006 on working times and drivers' hours

	2002/15/EC	561/2006
Daily driving	If the work period includes night work, defined as in the period between midnight and 7.00 am, the work period should not exceed 10 hours in any 24-hour period.	Shall not exceed 9 hours, but can be extended to 10 hours up to 2 times per week.
Weekly driving	Average working week should not exceed 48 hours over a 4-month period with an absolute maximum working time in any week of 60 hours.	Shall not exceed 56 hours and the weekly average over a four month period shall not exceed 48 hours (Directive 2002/15/EC).
Fortnightly driving		Limit of 90 hours in 2 consecutive weeks.
Breaks from driving	No employee shall work more than six consecutive hours without a break. Working time shall be interrupted by a break of at least 30 minutes if working between six and nine hours and at least 45 minutes if hours total more than nine hours. Breaks may be subdivided into periods of at least 15 minutes each.	Break of 45 minutes required in or immediately following 4.5 hours of driving. The break can be split into an initial minimum period of 15 minutes, followed by a 30 minute break period.
Daily rest		11 hours in a 24-hour period (may be reduced to 9 hours up to 3 times a week). Where a driver takes daily rest away from base, rest may be taken in a vehicle given that there are sleeping facilities and the vehicle is stationary. Daily rest may also be split into two periods; the first must be at least 3 hours long and the second at least 9 hours to a total of at least 12 hours.
Weekly rest		Regular weekly rest of at least 45 hours (may be reduced to 24 hours, however any reductions must be compensated) at the end of six consecutive days from the end of the last weekly rest. In any two consecutive weeks a driver must have at least two weekly rests, one of which must be at least 45 hours long. A weekly rest period which falls across two weeks may be counted in one or the other but not both.

A1.1.2 Health and safety

Health and safety legislation provides a secondary means of improving the safety of vans by placing a duty of care on employers and drivers to take an active role in assessing and mitigating safety risks. Across Europe Council Directive 89/391/EEC introduces appropriate measures to encourage improvements in the safety and health of workers at work. This legislation could also be applied to the activities of employers with work vehicles.

A1.2 Safety legislation governing LGVs in Member States

A1.2.1 Driving hours in Member States

Drivers of LGVs are exempt from European directives covering maximum work and minimum rest periods. However, it is understood that each Member State implements its own driver hour rules and rest and break periods for LGV drivers, as summarised in Table 14. For example, goods vehicles exempt from EU regulations on drivers' hours are required in the UK to meet Domestic Hours Rules defined in the UK Transport Act (1968). The principal requirements of these rules is that the maximum daily driving should not exceed 10 hours in any period of 24 hours and the daily duty should not exceed 11 hours in any 24 hours. No specific guidance is provided concerning the periods and frequency of breaks, but it is expected that these would be covered under health and safety legislation (Section A2.2.3). Furthermore, the daily rest schedule for drivers is not specified but it is expected that this will be a minimum of 13 hours, given that the maximum allowable duty is 11 hours.

Overall it is understood that there are many exceptions to LGV drivers' hours rules and rest breaks across Europe. Within many of the national measures there is scope for collective or union agreement to reject or modify national measures. However, there is a noticeable trend within a number of the Member States to adopt existing European legislation such as on driver and working hours and breaks as a template for national legislation.

Austria, France, Portugal, Germany and Italy are reported to have driving bans for HGVs during the weekend. Research carried out by Risser *et al* (2003) indicates that this may contribute to reducing accidents involving HGVs. Similar restrictions on the use of LGVs could not be found. Such mechanisms may, therefore, be a factor in the increased use of vans because companies wishing to deliver at the weekend to areas with a weekend HGV ban may well deliver the same load using a larger number of LGVs. If it could be proved that this does occur then this would represent a potential net increase in accidents (and CO₂ emissions and other externalities) as a direct result of the bans.

Table 14. Summary of LGV drivers' hours and break rules in a number of European Member States

Country	Legislation	Drivers' hours	Breaks and rest periods
Austria	Working Time Act (AZG), Rest Periods Act (ARG)	- Driving time limited to eight hours. May be extended to hours specified in EC 561/2006. - Total driving time is 48 hours/week, but can be extended to 56 hours/week. - Accumulated driving over any two-week period must not exceed the provisions made in EC 561/2006.	- A rest period of at least 30 mins must be taken after no more than four hours of driving. - Daily rest of eleven consecutive hours, which may be reduced to eight hours up to three times/week. However reduced rest periods must be made up within 10 days by extending another daily or weekly rest period. - Weekly rest period of 45 consecutive hours. This may be reduced to 36 hours or upon agreement 24 hours. Reduced weekly rest must be compensated for by the end of the third week following the week in question. - There should be no more than six days between weekly rest periods.
Czech Republic	Decree č.281/2007 Coll	Not clear	Break requirements follow the template of EC 561/2006.
Denmark		Directive 2003/88/EC provides template for drivers' hours.	Directive 2003/88/EC provides template for breaks and rest periods.
Estonia	General Working and Rest Time Act (RT I 2001, 17, 78) which utilises Directive 2003/88/EC as template.	- Daily working hours limit of eight hours/day. - Average driving hours must not exceed 40 hours/week.	- Every four hours drivers must take a 30-minute rest break. - Drivers' must have a daily rest period of 11 hours. - Drivers' must have a weekly rest of at least 36 consecutive hours.
France	Decree No 83-40 of 26 January 1983, revised 5 January 2007 – Rules Governing Work Times in Goods Transport Businesses.	- Maximum working week for "short distance vehicle" drivers is 39 hours per week. - Overall maximum of 507 hours per 3-month period. - Certain categories of vehicle drivers, notably couriers and vehicles which carry cash and bullion, have lower limits of 35 hours per week and 455 hours per quarter. - Maximum working time is ten hours per day, but may be extended up to twelve hours per day for one day of each week. An extension is allowed only on six occasions in any	Not clear

Country	Legislation	Drivers' hours	Breaks and rest periods
		twelve-week period.	
Germany	National Working Time Regulations, Hours of Work Act (Bundesgesetzblatt), dated 6 June 1994, or EU 2003/88 if these are more favourable to workers. The German regulation Fahrpersonalverordnung (FPersV) contains provisions for the carriage of goods by motor vehicles with a gross vehicle weight exceeding 2.8 tonnes and up to 3.5 tonnes	- For goods vehicles below 2.8 tonnes - Average working time for each seven day period, including overtime, should not exceed 48 hours per week, averaged over a four-month period. - Average daily working time should not exceed eight hours per day, excluding rest periods, averaged over a six-calendar-month or 24-week period. - The daily working time shall not exceed ten hours, excluding rest periods. - Employers shall maintain records of employees that work more than eight hours per day and these shall be kept for at least two years. - For goods vehicles with a mass exceeding 2.8 tonnes and not exceeding 3.5 tonnes. - Drivers' hours in accordance with EC regulation 561/2006.	- For goods vehicles below 2.8 tonnes - Break periods follow the rules set out in 2002/15/EC. - Workers should have an uninterrupted period of rest after their daily work of at least eleven hours. This may be reduced to ten hours, provided each reduction is compensated for within a four-week or one-calendar-month period by an increase to twelve hours in the time off on another work day. - At least 15 Sundays in each year shall be free from work. If workers are employed on a Sunday they must have a rest day as compensation, to be taken within two weeks of the day they worked. - For goods vehicles with a mass exceeding 2.8 tonnes and not exceeding 3.5 tonnes. - Breaks and rest periods are in accordance with EC regulation 561/2006. - The weekly rest of 45 continuous hours may be averaged over two weeks, i.e. the rest can be taken in two continuous periods, one per week, which total at least 90 hours.
Greece	Presidential Decree 167/2006 (based upon Directive 2002/15/EU)	Working time rules based on Directive 2002/15/EC.	- Directive 2002/15/EC provides principal basis for break and rest periods. - Weekly rest of 45 continuous hours must be taken, which can be reduced to 24 hours provided that compensatory rest is taken.
Hungary		Directive 2003/88/EC acts as template for working time rules.	Directive 2003/88/EC acts as template for rules on breaks and rest periods.
Ireland	Traffic Act of 1961, Organisation of Working Time Act 1997	- In a 24 hour period, driving time must not exceed 11 hours. 5.5 hours of continuous driving is considered excessive. - Average working week must not exceed 48 hours averaged across four months. For certain	- Two periods of driving must be separated by an interval lasting at least half an hour. If a break is less than half an hour, then the two periods of driving are regarded as one continuous period. - Drivers should have a 15-minute break after 4.5 hours. A 30-minute rest period must be taken after six hours have been worked, which may include the first break.

Country	Legislation	Drivers' hours	Breaks and rest periods
		exceptions the 48 hour working week can be averaged over six or twelve months.	• Drivers should have one 24-hour period of rest per week. • Eleven hours of daily rest in every 24 hours. However, the rest period may be reduced to 9 consecutive hours in a 24-hour period if the driver is able to take 12 consecutive hours of rest in the following 24-hour period.
Latvia		• Directive 2003/88/EC provides a template for the drivers' hours rules.	• Directive 2003/88/EC provides a template for the break and rest periods.
Luxembourg	Article 214-1 of the Code du Travail, 2007	• Maximum working time for drivers of 48 hours per week averaged over one month. The averaging period may upon application be extended to four or six months. • Maximum driving time in any one week is 60 hours.	• Breaks and rest periods follow those specified in EC 561/2006.
Netherlands	ArbeidsTijdenWet (ATW), Arbeidstijdenbesluit vervoer (ATBv)	• EC 561/2006 used as a template for drivers' hours.	• After 5.5 hours of driving a break of 30 minutes must be taken. The break may be divided into two 15-minute periods. • If driving time exceeds ten hours, the driver must take a break of at least 45 minutes which may be divided into periods of no less than 15 minutes each. • Daily rest periods defined in EC 561/2006 are used as a template. • Daily rest can be reduced to a minimum of nine hours no more than three times between weekly rests. The rest must be completed within 24 hours of the end of the last daily or weekly rest period. • Weekly rest of 45 continuous hours must be taken. This can be reduced to 24 hours provided that compensatory rest is taken.
Poland	National Working Time Act of 16 April 2004	• Maximum of ten hours should be worked in any one day. • Maximum working time in any week should not exceed 60 hours. • Average weekly driving time, including overtime, should not exceed 48 hours over four months.	• The Directive 2002/15/EC acts as a template for Polish rules on break periods. • Every day a driver should have a period of eleven hours' uninterrupted rest. • Every week a driver should normally have a break of at least 35 hours of continuous rest. If a shorter period is essential, the minimum break should be 24 hours.
Slovak Republic	Slovak Republic Act No 462/2007	• Drivers' hours are in line with the those specified in 2002/15/EC. • The employer is obliged to provide the driver	• Directive 2002/15/EC is used as a template for driver breaks. • Minimum daily rest period of eleven hours in a 24-hour period. This may be reduced to six hours not more than three times per week.

Country	Legislation	Drivers' hours	Breaks and rest periods
		with a weekly working pattern schedule at least one week in advance.	Weekly rest period of at least 24 hours.
Slovenia		Regulation 561/2006/EC provides a template for drivers' hours.	Regulation 561/2006/EC provides a template for break and rest periods.
Spain		Directive 2003/88/EC provides a template for drivers' hours.	- Directive 2003/88/EC provides a template for break and rest periods. - Minimum rest time between the end of one day's work and commencement of the next should normally be at least twelve hours. - If the working day is longer than six hours it should include a break of at least 15 minutes.
Sweden	Arbetsstidslag (1982:673), Vilotidsfordningen (1994:1297)	- Normal weekly working time will not be more than 40 hours each week. If necessary for operational reasons that may be varied but the average time per week should not exceed 40 hours per week averaged over any continuous four week period. - If the nature of the work means that significant amounts of time will be on call or standby, but not working, then the on-call time should not exceed 48 hours in a four-week period or 50 hours in a calendar month. - If there is a need for overtime, and subject to local agreements, then up to 48 hours overtime may be worked over a four-week period or 50 hours in a calendar month. - Any time worked as overtime reduces the time allocation for on call/stand by the same amount. - The total working time, averaged over a four-month period, shall not be more than 48 hours per week. - No more than 200 hours overtime shall be worked in a calendar year.	- Daily rest of at least eleven hours in any 24-hour period. This may be divided into two breaks, one of which must be at least eight hours long. - Weekly rest period of 36 hours. - Maximum of five hours of consecutive work without taking a break. - Drivers shall record details of their working time in a personal Time Book (Tidboken, as defined in Transport Board Regulation 1008:1182). This must be carried in the vehicle and continually updated by the driver to contain records of the daily rest periods and time of starting work for the previous seven days. This must be made available for police or traffic officer inspection at any time. - Employers should keep records of the time worked, on call time and overtime worked by employees for a period of twelve months.

A1.2.2 Speed limits

Speed is consistently identified as a critical factor contributing to the likelihood and severity of vehicle accidents. Within Europe speed limits are regulated by the individual Member States. A summary of the main speed limits for different road types and vehicles found in many of the Member States is provided in Table 15. As shown in the table many countries mandate lower speed limits for larger goods vehicles on highways, dual carriageways and motorways where, depending on the vehicle type, speed limits typically range between 60-100 km/h on highways, 60-120 km/h on dual carriageways and 112 km/h to no speed limits on motorways.

In respect of LGVs (i.e. $GVM \leq 3,500\text{kg}$) it is not clear which of the restricted speed limits apply to this class of vehicles. For example, in Belgium, Latvia and Slovenia different speeds apply to trucks with GVMs lower than 7.5t and in France trucks with a mass up to 12t. Portugal provides a more specific limit for the truck mass of up to 3.5t. However, in all these instances it is not clear if the speed restrictions apply to all classes of LGVs with a gross vehicle mass lower than 3.5t. For instance, it is stated in the UK that there are restrictions on trucks with a GVM lower than 7.5t, but the speed limits for car-derived vans are known to be equal to those for cars. In Germany the speed limit for all LGVs (i.e. up to 3.5 tonnes) is equal to that of cars for which there is typically no speed limit on dual carriageways or motorways.

Table 15. Maximum speed limits by vehicle and road type across Europe

Country	Vehicle	Urban roads	Highways	Dual carriageways	Motorways
Belgium	Passenger car	50 (30 in the vicinity of schools)	90	120	120
	Truck up to 7.5t	50	90	90	
	Truck > 7.5t	50	60	90	
	Truck + Trailer	50	60	90	
Bulgaria	Passenger car	50	90		130
	Truck > 3.5t	50	80	80	
	Truck + Trailer	50	70	70	
Czech Republic	Passenger car	50	90		130
	Truck > 3.5t	50	80	80	
	Truck + trailer	50	80	80	
Denmark	Passenger car	50	80		130
	Truck > 3.5t	50	70	70	
	Truck + trailer	50	70	70	

Country	Vehicle	Urban roads	Highways	Dual carriageways	Motorways
Germany	Passenger car ²⁰	50	100	No speed limit	No speed limit
	Truck 3.5-7.5t	50	80	80	80
	Truck > 7.5t	50	60	60	80
	Truck + Trailer	50	60	60	80
Estonia	Passenger car	50	90 (100 on limited stretches 1 st May until 1 st Oct)	110 (with physical separator)	N/A
	Truck	50	90	90	
Greece	Passenger car	50	90		130
	Truck > 5t	50	80	90	
	Truck + trailer	50	70	70	
Spain	Passenger car	50	90	100	120
	Truck > 3.5t	50	70	80	
	Truck + trailer	50	70	80	
France	Passenger car	50	90	110	130 (110 when raining)
	Truck up to 12t	50	80	90	
	Truck > 12t	50	80	80	
	Truck + trailer up to 12t	50	80	90	
	Truck + trailer > 12t	50	60	80	
Ireland	Passenger car	48	97		97
	Truck > 3.5t	50	80	80	
	Truck + trailer	50	80	80	
Italy	Passenger car	50	90	110	130
	Truck 3.5 – 12t	50	80	80	
	Truck > 12t	50	70	70	
	Truck + trailer	50	70	70	
Cyprus	Passenger car	50	80		100
Latvia	Passenger car	50	90	110	N/A
	Truck up to 7.5t	50	90	90	
	Truck > 7.5t	50	80	80	
		50	80	80	

²⁰ LGVs with a mass equal to or lower than 3.5 tonnes have speed limits equal to those of passenger cars (http://serv.dekra.bawue.com/dekra_net/develop/content_net/psfile/pdfdown/64/15_Berg_de41da845da3867).

Country	Vehicle	Urban roads	Highways	Dual carriageways	Motorways
Lithuania	Passenger car	50	90		110 (130 from 1 st April until 31 Oct)
Luxembourg	Passenger car	50	90		130 (110 when raining)
Hungary	Passenger car	50	90		130
Malta	Passenger car	50	80		N/A
Netherlands	Passenger car	30/50/70 depending on road layout	80/100 depending on road layout		120
	Truck > 3.5t	50	80	80	
	Truck + trailer	50	80	80	
Austria	Passenger car	50	100		130
	Truck > 3.5t	20/50	70	80	
	Truck + trailer	20/50	70	80	
Poland	Passenger car	50 (60 from 11pm to 5am)	90	100/110	130
	Truck > 3.5t	20/50	70	80	
	Truck + trailer	20/50	70	80	
Portugal	Passenger car	50	90		120
	Truck up to 3.5t	50	80	90	
	3.5t with trailer	50	70	80	
	Truck > 3.5t	50	80	80	
	Articulated lorry	50	80	80	
	Truck trailer	40	70	70	
Romania	Passenger car	50	90	100	130
	Truck 3.5t – 7.5t	50	80	90	
	Truck > 7.5t	50	70	80	
	Truck + trailer	50	70	80	
Slovenia	Passenger car	30/50 (10 in pedestrian zones)	90	100	130
	Truck < 7.5t	50	80	80	
	Truck > 7.5t	50	70	70	
Slovakia	Passenger car	60	90		130 (80 in built-up areas)
	Truck > 3.5t	60	80	80	

Country	Vehicle	Urban roads	Highways	Dual carriageways	Motorways
Finland	Passenger car	40/50 (40 on more than half of the streets)	80/100 (depending on season)		100 (120 only in summer in some locations)
	Truck	50	80	80	
	Truck + trailer	50	80	80	
Sweden	Passenger car	50	70		110
	Truck > 3.5t	50	80	80	
	Truck + trailer	50	80	80	
United Kingdom	Passenger car ²¹	32/48	97	112	112
	Truck < 7.5t ²²	48	80	96	112
	Truck > 7.5t	48	64	80	
	Truck + trailer < 7.5t	48	80	96	
	Truck + trailer > 7.5t	48	64	80	
	Truck + 2 trailers	32	32	32	

Information gathered from the following sources:

www.ec.europa.eu/transport/road_safety/observatory/traffic_rules_en.htm
www.man-truckers-world.co.uk/en/CURRENT/Service/Speed_limits_in_Europe_.jsp

A1.2.3 Health and safety and road traffic acts

Within the UK there are a number of regulations and acts identifying the responsibilities of employers and employees to improve health and safety within the workplace, including vehicles. The legislation includes:

- The Health and Safety at Work Act;
- The Management of Health and Safety at Work regulations;
- The Provision and Use of Work Equipment Regulations (PUWER).

There are also additional acts identifying how vehicles and roads should be used within the UK as defined under:

- The Road Traffic Act;
- The Road Vehicle (Construction and Use) regulations.

Further to the legislation there has been the recent introduction of legal acts to facilitate prosecution under the available Health and Safety legislation. The principal acts introduced are:

- The Corporate Manslaughter and Homicide Act (2008);
- The Health and Safety (Offences) Act 2008.

²¹ CDVs (derived from car chassis AND GVW < 2 tonnes) have speed limits equal to those of passenger cars.

²² Includes LGV but does not include CDV as defined above.

There is some evidence to suggest that these acts are having a positive influence within the UK, where some organisations are known to be developing and implementing appropriate risk management strategies to limit the likelihood of vehicle accidents and their injury severity outcome. For instance, primary safety initiatives adopted by organisations to mitigate accident risks include:

- Driver licensing checking and additional training of drivers where appropriate;
- Carefully planning the routes and scheduling of journeys to reduce driver fatigue;
- Regular maintenance and assessing the appropriateness of the type of goods vehicles used for the driving task;
- Enforcing legal requirements concerning the use of mobile phones and the use of alcohol and drugs.

Guidance on the type of initiative that can be undertaken by organisations to limit accident risks are provided by the UK Department for Transport (DfT)²³.

The UK transport industry (Freight Transport Association, FTA) has also taken steps to try and improve the accident safety of vehicles by commissioning TRL in the UK to develop best practice guidelines for restraining cargo on LGVs under accident conditions. These types of initiative are providing strong evidence that the legal instruments within the UK are having a positive influence on improving LGV safety for large corporate organisations. However, these instruments may be considerably less effective at mitigating accident risks for single small enterprises and LGVs used for private use.

It is not clear how health and safety and the use of roads and vehicles is legislated throughout the rest of the individual Member States within Europe and how legal acts are encouraging LGV operators to improve the accident safety of LGVs.

A1.2.4 Vehicle test standards

European Directive 96/96/EC specifies that Member States must undertake programmes of periodic technical inspection of their motor vehicles to help ensure that vehicles are maintained in a roadworthy condition. This directive specifies very basic minimum standards for these inspections, which Member States can choose to exceed. It is understood that there are variations in the frequency and extent of statutory vehicle testing standards across Europe. Lower standards and frequency of testing could lead to heightened levels of accident risk. As reported by the Association of British Insurers (ABI)²⁴

"In the UK, MOTs [periodic technical inspections] are required every year from a vehicle's third year onwards. Only three other Member States – Luxembourg, the Netherlands and Slovakia – follow the same testing pattern. Most other Member States have less regular tests."

For instance it is understood that biannual inspections are carried out on vehicles in Germany.

Within the UK the requirements for vehicle testing are defined in the following regulations:

²³ www.dft.gov.uk/drivingforwork

²⁴ www.abi.org.uk/bookshop/research/reports/european_drivers.pdf

- Road Vehicles (Construction and Use) Regulations 1986;
- Goods Vehicles (Plating and Testing) Regulations 1988.

LGVs in the UK follow the same test regime as passenger cars²⁵ and take place following the 3rd year of the vehicle's registration. The test regime involves an annual inspection and assessment of many safety critical features of the vehicle which are shown in Table 16.

Table 16. Examples of features inspected in UK

Steering wheel and column	Windscreen	Bonnet catch
Horn	Number plate and VIN	Lights
Brakes	Tyres and road wheels	Mirrors
Doors	Seats	General vehicle structure
Suspension	Fuel system	Towing hook
Exhaust	Emissions	Seatbelts

HGVs must undertake testing every year from the first year of registration. The scope of items tested is greater and the testing is undertaken by a Government test facility rather than through a network of Government-authorized private test stations.

A1.2.5 Driver licensing standards

Of the examples found across Europe it is understood that beyond the requirements of the driving test for regular passenger cars there is no need for additional training or experience to drive an LGV (UK, Germany³, Austria²⁶, Ireland).

The minimum age limit for driver licensing is 18, as specified in European Directive 91/439/EEC. However, individual Member States do have the option of derogating to 17 years of age, although Member States can refuse to recognise licences issued to drivers under the age of 18. The following lists differentiate between those countries that have a minimum driving age limit of 18 years and those that have a minimum driving age limit of 17 years²⁷.

- Countries with a minimum driving limit of 18 years:
 - Belgium, Denmark, Finland, France, Germany, Italy, Luxembourg, Malta, the Netherlands, Portugal, Spain, Sweden,
- Countries with a minimum driving age limit of 17:
 - Poland, Ireland, UK.

Young inexperienced drivers are a common factor in road traffic accidents. However, the number of very young novice drivers of larger LGVs (i.e. with a mass greater than 2.8

²⁵ The test for LGVs with a Gross Design Weights (GDW) not exceeding 3000kg is identical to that of passenger cars. For LGVs with a GDW of more than 3000kg but not more than 3,500kg the test is effectively the same as that for passenger cars.

²⁶ www.autotouring.at/napro3/appl/na_professional/parse.php3?mlay_id=1001407&xmlval_AUSGABE%5B%5D=Oktober%202007&mdoc_id=29660

²⁷ Information taken from www.ferry-to-france.co.uk/driving_abroad.html and www.2pass.co.uk/ages.htm.

tonnes and less than 3.5 tonnes such as panel vans) is likely to be relatively small compared with regular passenger cars, as high insurance premiums will make it prohibitive for younger drivers to drive this class of vehicle. For instance, it is understood that many van hire companies require a minimum age limit of 25 to hire a van because of the high insurance premiums for younger drivers²⁸.

Based on information provided by the ABI, the European Commission have taken steps to standardise HGV driving standards. As reported by ABI:

"from 2009 new HGV drivers will take a certificate of professional competence (CPC) as well as a driving test, and from 2014 all drivers will have to take 35hrs of compulsory refresher training every five years".

However, it is understood that for passenger cars and LGVs driving test standards vary throughout European Member States and could be a factor contributing to variations in accident rates for LGV drivers across Europe. Examples of specific differences in the driver licensing standards are provided by the ABI who state that:

- *"Duration – the average test lasts for 36 minutes in the UK, 19 minutes in France and 20 minutes in Spain.*
- *Errors – potentially dangerous errors and near-accident errors are both recorded. In the UK, candidates cannot pass the test if they make a near-accident error, unlike in Austria, France, the Netherlands, Spain and Sweden.*
- *Driving examiners' perceptions – in one survey, three quarters of British driving examiners felt the test allowed them to make a correct overall decision about the candidate's driving skills; only a quarter of French examiners felt similarly."*

²⁸ www.myllocalvanhire.co.uk/vanfaqs.php#two.

ANNEX 2:

RECENT TRENDS IN THE EU LIGHT GOODS VEHICLE MARKET

A.2.1 Data sources, methods and limitations

The following annex describes the recent trends in the use of commercial light goods vehicles (goods vehicles with a gross max. weight less than 3,500kg, including vans based around a car chassis). The data presented have been obtained through a review of literature and sources of data that were publicly available.

The main source of data was intended to be Eurostat (EC, 2009). However, after extensive investigation these data were later found to be extremely unreliable in relation to LGVs. Studying the Eurostat glossary suggests that there is no definition of LGV as a vehicle type in its own right and consequently they are not considered in a uniform manner in the data. For example:

- LGVs are included in the vehicle information but, although it is possible to separate vehicles by overall type (e.g. goods/passenger car) and the goods vehicles can be separated by load capacity (the maximum weight of goods that a vehicle can carry), they cannot be separated by maximum permitted weight and the categories of load capacity do not closely match the payload expected for an LGV.
- In the traffic data, LGVs appear (based on comparison with national data) to be included in the category for passenger cars and cannot be separated.
- In the freight data, many countries exclude LGVs completely and where LGVs are included they cannot be separately identified (see Eurostat, 2008).
- The data on fatalities from road accidents includes LGVs but cannot be divided by vehicle type to allow fatalities from accidents involving LGVs to be separately identified.

These conclusions were based on the Eurostat literature and comparison of the Eurostat data with known national sources. This was supported by correspondence with Eurostat who confirmed that:

"Please note that data based on Regulation 1172/98 is not a good source on light commercial vehicles transport or traffic performance! Regulation allows reporting countries to exclude vehicles with loading capacity below 3.5 tonnes (or maximum permissible laden weight below 6.0 tonnes from the scope of their surveys. Not all countries, however, do this in the same way... In general, we cannot give any "correct figures", not even estimates on the performance of light goods vehicles."

It is for these reasons that most of the necessary data were taken from the following alternative sources:

- IRAP database.²⁹
- DG-TREN Statistical Pocketbook.³⁰
- Information for GB has been verified using the DfT publication 'Transport Statistics Great Britain'³¹.

²⁹ International Road Assessment Programme 2008 – http://www.iraptranstats.net/table_edit

³⁰ European Commission Directorate General Website 2007 – http://ec.europa.eu/dgs/energy_transport/figures/pocketbook/2007_en.htm

³¹ Transport statistics Great Britain – Department for Transport – 2008 Edition

- Information on the Netherlands data has been verified from the national database.³²
- Information on Danish data has been verified from the national database.³³
- Information on Finland data has been taken from the national database.³⁴
- Data and reports provided by ACEA.

These sources had their own limitations, as outlined below:

- Although the IRAP database is a comprehensive database for many EU countries plus countries outside the EU, the retrievable data for the specific vehicle statistics required for this project returned information for the UK and France alone. As well as this, information was only returned for the period 2000 – 2005.
- In general, the DG-TREN Statistical Pocketbook³⁰ was a good source of data, however it had significant gaps in information required for this study, allowing only limited data to be retrieved. For example, the pocketbook gave data for vehicle stock for almost all EU-25 Member States for 'all motor vehicles' and 'all goods vehicles'. However it did not divide the goods vehicle information by maximum permitted mass and therefore LGVs could not be identified separately.
- Generally, the national databases for GB, Denmark and the Netherlands were useful sources of information that helped to fill in the gaps in information where the pocketbook did not provide data for those countries.
- The national database for Finland separated the 'Goods Moved' data by vehicle type into 'all goods vehicles' and 'LGVs', but this breakdown was not available for other parameters.
- Where data were available from more than one source (e.g. vehicle stock data available from ACEA reports and a national database) there were often discrepancies in the data. This inevitably led to a choice between using the national data where available, because it *should* be the most accurate, but with inconsistent data sources in different countries, or using the more wide-ranging ACEA data in all countries to ensure a consistent source for all and ignoring the possibility of small errors in individual countries. In most cases, the latter option was chosen.

The following tables summarise the data identified and used for each main performance measure in each Member State.

³² Institute for Road Safety Research – www.swov.nl

³³ www.stadbank.dk.

³⁴ Finnish Road Statistics 2007 –<http://www.tiehallinto.fi/pls/wwwedit/docs/19972.PDF>

Table 17. Sources of LGV Stock data

Eurostat data investigated extensively for all Member States but major inconsistencies identified. Investigation revealed that LGVs not consistently identified, which was confirmed by Eurostat who state "In general we cannot give any correct figures, not even estimates on the performance of light goods vehicles."					
UNECE data are same as Eurostat therefore unreliable					
Member State		Data source	Comments	Data used?	Reason
Belgium	1	ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
Bulgaria	1	DG TREN Pocketbook	Pocketbook gives data from 2001 – 2005 for all goods vehicles only	No	Cannot separate LGVs from HGVs
Bulgaria	2	ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
Czech Republic	1	ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
Denmark	1	ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Both sources used
Denmark	2	National database	Gathered from national database therefore results are reliable. Data given for total weight of 3.5t and gives a full breakdown of <3.5 to >3.5t.	Yes	
Germany	1	ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Decision required: Use ANFAC data because single source for all MS or use national database because this SHOULD be the most reliable for this MS
Germany	2	BAST Report	http://www.bast.de/nn_42642/DE/Publikationen/Downloads/kleintransporter-2006,templateId=raw,property=publicationFile.pdf/kleintransporter-2006.pdf	Yes	Information on vehicle stock
Estonia	1	DG TREN Pocketbook	Pocketbook gave data for all goods vehicles.	No	Cannot separate LGVs from HGVs
Estonia	2	ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
Ireland	1	National database	Presents data for goods vehicles	No	Cannot separate LGVs from HGVs
Ireland	2	ACEA/ANFAC	For countries with comparable national data answers not	Yes	Lack of alternative

		Eurostat data investigated extensively for all Member States but major inconsistencies identified. Investigation revealed that LGVs not consistently identified, which was confirmed by Eurostat who state "In general we cannot give any correct figures, not even estimates on the performance of light goods vehicles."			
		UNECE data are same as Eurostat therefore unreliable			
Member State		Data source	Comments	Data used?	Reason
			consistent		
Greece		ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
Spain		ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
France	1	ACEA/ANFAC	For countries with comparable national data answers not consistent	No	National Database information available
France	2	IRAP	IRAP database provides data for all goods vehicles and breaks down to LGV and HGV. Useful for depicting LGV % of all goods vehicles.	Yes	IRAP used for some analysis
France	3	National database	Van survey accessed	Yes	Market data information discussed
Italy	1	National database	Presents data for goods vehicles	Yes	Cannot separate LGVs from HGVs
Italy	2	ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
Cyprus		ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
Latvia		ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
Latvia		Latvian Statistical office	Number of vehicle under 4.9t and over 5.0t	No	
Lithuania		Pocketbook	data for all goods vehicles.	No	Cannot separate LGVs from HGVs
Lithuania		ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
Luxembourg		ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative

	Eurostat data investigated extensively for all Member States but major inconsistencies identified. Investigation revealed that LGVs not consistently identified, which was confirmed by Eurostat who state "In general we cannot give any correct figures, not even estimates on the performance of light goods vehicles."			
	UNECE data are same as Eurostat therefore unreliable			
Member State	Data source	Comments	Data used?	Reason
Hungary	National database	Presents data for goods vehicles	No	Cannot separate LGVs from HGVs. Correspondent noted that they used to separate LGVs but stopped doing so when they joined the EU because it was not a requirement
Hungary	ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
Malta	DGTREN Pocketbook	Presents data for goods vehicles	No	Cannot separate LGVs from HGVs
Malta	ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
Netherlands	ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	ANFAC data used to keep in line with other countries
<u>Netherlands</u>	National database	Gathered from national database therefore results are reliable. Data given for total weight of 3.5T and gives a full breakdown of <3.5 to >3.5T.	No	
Austria	ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
Poland	ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	More reliable than pocketbook
Poland	DGTREN Pocketbook	Data for all goods vehicles. (Some LGV data given)	No	Limited separated data available
Portugal	ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
Romania	ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
Romania	DGTREN Pocketbook	data for all goods vehicles. (Some LGV data given)	No	Limited separated data available
Slovenia				

	Eurostat data investigated extensively for all Member States but major inconsistencies identified. Investigation revealed that LGVs not consistently identified, which was confirmed by Eurostat who state "In general we cannot give any correct figures, not even estimates on the performance of light goods vehicles."			
	UNECE data are same as Eurostat therefore unreliable			
Member State	Data source	Comments	Data used?	Reason
Slovenia	DGTREN Pocketbook	data for all goods vehicles. (Some LGV data given)	No	Limited separated data available
Slovakia				
Slovakia	DGTREN Pocketbook	data for all goods vehicles. (Some LGV data given)	No	Limited separated data available
Finland	ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
Sweden	ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
UK	ACEA/ANFAC	For countries with comparable national data answers not consistent	Yes	Lack of alternative
GB	National database	Reliable data	Yes	National database figures reliable but subset of ACEA data for UK, although potentially conflicting answers

Table 18. Sources of LGV Traffic data

Eurostat data investigated extensively for all Member States but major inconsistencies identified. Investigation revealed that LGVs not consistently identified, which was confirmed by Eurostat who state "In general we cannot give any correct figures, not even estimates on the performance of light goods vehicles"				
UNECE data are same as Eurostat therefore unreliable				
Member state		Data source	Comments	Data used? Reason
Belgium		None identified		
Bulgaria		None identified		
Czech Republic		None identified		
Denmark		National database	Gathered from national database therefore results are reliable. Data given for total weight of 3.5t and gives a full breakdown of <3.5 to >3.5t for 2001-2004.	Yes National database figures reliable
Germany		National database	DEKRA report states vehicle kms are not available for N1 vehicles in Germany	
Estonia		Estonian Road Administration Annual Report	Vans combined with passenger cars	No
Estonia		Statistics Estonia	Closest match is 2-axle lorries, no data based on weight	No
Ireland		None identified		
Greece		None identified		
Spain		National Database	Vehicle km data split by light and heavy vehicles	No Light vehicles includes cars, motorcycles and some LGVs (load capacity up to 1 tonne)
France		Survey of van use 2006	LGV vehicle kms for 2006 only, but average distance per LGV has remained stable since 2001 survey. Can use the average distance travelled combined with ACEA vehicle stock data to estimate vehicle performances	Yes No alternative source identified
Italy		National Database	Vehicle km data split by light and heavy vehicles	No A definition of light vehicles has not been found but is certain to include cars
Cyprus		None identified		
Latvia		None identified		

	Eurostat data investigated extensively for all Member States but major inconsistencies identified. Investigation revealed that LGVs not consistently identified, which was confirmed by Eurostat who state "In general we cannot give any correct figures, not even estimates on the performance of light goods vehicles"				
	UNECE data are same as Eurostat therefore unreliable				
Member state		Data source	Comments	Data used?	Reason
Lithuania		None identified	LGVs not identified separately		
Luxembourg		None identified			
Hungary		Hungarian Statistical Office	Data given for load capacity (i.e. weight of goods not vehicle) of over 3.5t only	No	Includes some HGVs of up to in the region of 6 tonnes GVW
Malta		None identified			
Netherlands		National data	Source identified and used elsewhere did not contain vehicle kms	No	
Austria		None identified			
Poland		None identified			
Portugal		National data	Data appears to be for HGV only	No	
Romania		None identified			
Slovenia		None identified			
Slovakia		None identified			
Finland		None identified			
Sweden		None identified			
UK		None identified			For Eurostat UK data, LGV vehicle kms appeared to be grouped with cars, based on comparison with GB data
GB		National database	Separate LGV figures available	Yes	National database figures reliable

Table 19. Sources of LGV Freight data

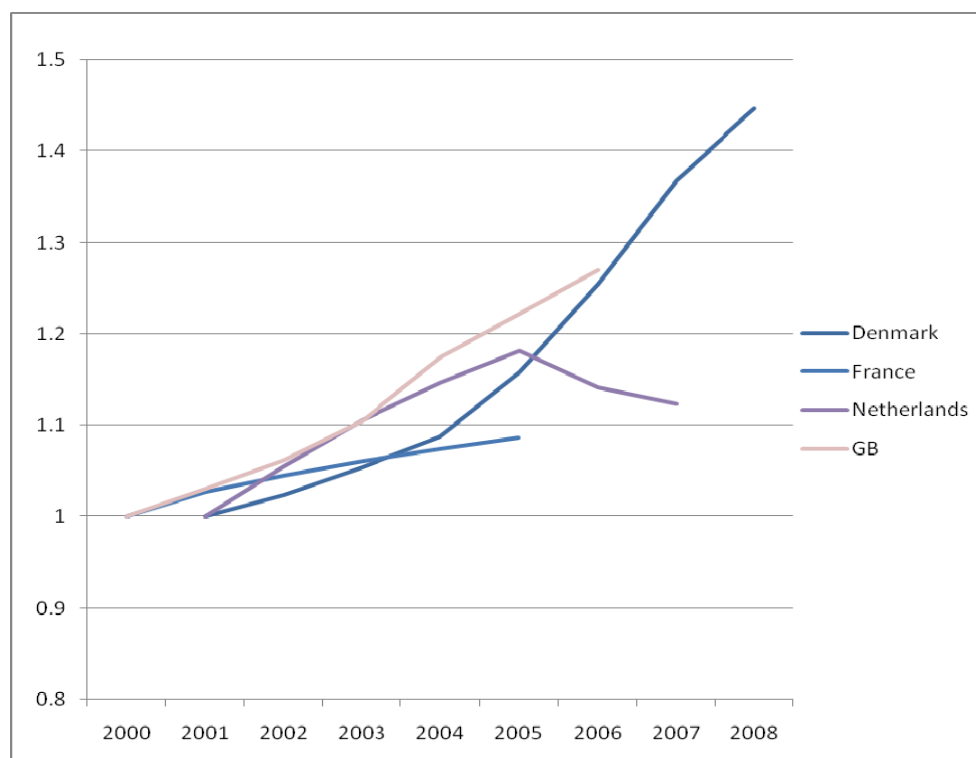
Eurostat data investigated extensively for all Member States but major inconsistencies identified. Investigation revealed that LGVs not consistently identified, which was confirmed by Eurostat who state "In general we cannot give any correct figures nor even estimates on the performance of light goods vehicles"						
UNECE data are same as Eurostat therefore unreliable						
Member state		Data source	Comments	Data used?	Reason	
Belgium		No source identified				
Bulgaria		No source identified				
Czech Republic		No source identified				
Denmark		No source identified				
Germany		No source identified				
Estonia		No source identified				
Ireland		No source identified				
Greece		No source identified				
Spain		National database	HGVs only	No		
France		No source identified				
Italy		National database	HGVs only	No		
Cyprus		No source identified				
Latvia		No source identified				
Lithuania		No source identified				
Luxembourg		No source identified				
Hungary	1	National database	All goods vehicle – stopped separating LGVs when joining the EU because it was not a mandatory requirement			
Malta		No source identified				
Netherlands		No source identified				

		Eurostat data investigated extensively for all Member States but major inconsistencies identified. Investigation revealed that LGVs not consistently identified, which was confirmed by Eurostat who state "In general we cannot give any correct figures nor even estimates on the performance of light goods vehicles"			
		UNECE data are same as Eurostat therefore unreliable			
Member state		Data source	Comments	Data used?	Reason
Austria		No source identified			
Poland		No source identified			
Portugal		National database	HGVs only	No	
Romania		No source identified			
Slovenia		No source identified			
Slovakia		No source identified			
Finland	2	National Database	Data sourced for 'all goods vehicles', LGVs and HGVs.	Yes	Used but limited data available
Sweden		No source identified			
UK		No source identified			
GB		Ad-hoc survey	Extensive sample data	Yes	This is an occasional survey only, with just two years available and sample definitions changed in this time, so caution must be used in comparing changes over time

A.2.2 LGV Stock

Vehicle stock is defined as the total number of vehicles in a given category that are registered in a particular Member State, usually measured on one specific day of the year.

Figure 17 shows the relative change in LGV stock year on year for the Member States where the information was available from their national statistics. Table 20 shows the baseline data in absolute terms, taken from the first year of available data for these Member States. Relative figures have been used because the population of each Member State and therefore the vehicle fleet size varies considerably, such that displaying on the same scale can hide the trend for the Member States with smaller vehicle fleets.

Figure 17. Relative change in LGV stock (National stats)**Table 20. Baseline (2000/2001) data for LGVs – 4 EU Member States (from national stats)**

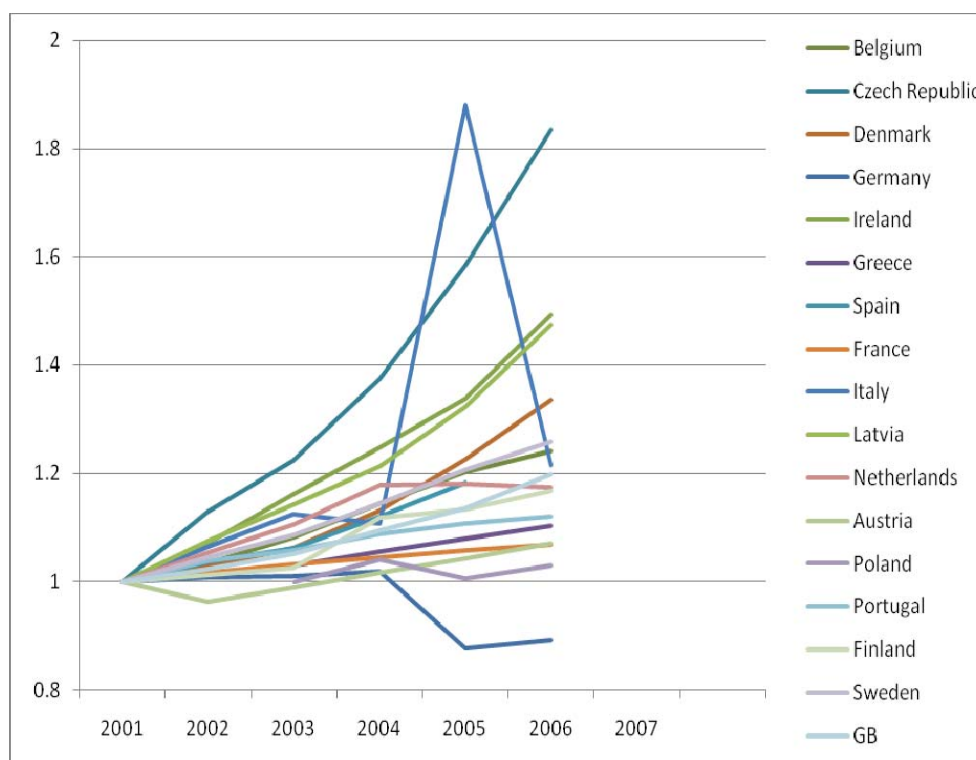
Member State	Stock (Thousands)
Denmark	335.7
France	5110.0
Netherlands	756.0
GB	2469.0

Data were taken from:

- www.stadbank.dk for Danish data;
- IRAP database for French data;
- www.swov.nl for Dutch data; and
- Transport statistics Great Britain (DfT, 2007) – these data were also available from the IRAP database.

Figure 17 shows a distinct growth trend in light goods vehicle stock for the Member States shown. Denmark shows particularly rapid growth in this measure from 2004 onwards, with an increase of 33% over four years. Conversely, the Dutch data shows a 5% reduction between 2005 and 2007 such that the number is comparable to that recorded for 2003 to 2004.

Figure 18 shows the same analysis for data retrieved from the ACEA database for 17 Member States.

Figure 18. Relative change in LGV stock (ACEA)**Table 21. Baseline (2000/2001) data for LGVs –17 EU Member States (from ACEA database)**

Member State	Stock (Thousands)	Member State	Stock (Thousands)
Belgium	421.755	Italy	2797.486
Czech Republic	196.029	Latvia	31.374
Denmark	343.466	Netherlands	756
Germany	2305.799	Austria	270.522
Ireland	186.971	Poland	1706.379
Greece	676.744	Portugal	1119
Spain	3714.87	Finland	247.139
France	5248	Sweden	346.405
GB	2918.713		

Figure 18 shows a definitive increasing trend over the sampled years for most Member States. However, the data for Germany shows only a small amount of growth up to 2004, then a sharp reduction in 2005, followed by a modest increase in 2006. There is a distinctive anomaly in the data given from Italy for the year 2005; this is likely to distort further analysis.

The number of LGVs relative to that of the whole vehicle fleet is another measure that can be used to show how the market has changed.

Figure 19 and Figure 20 show LGVs as a proportion of all motor vehicles and of all goods vehicles respectively, based on the available national statistics.

Figure 19. LGV stock as a percentage of all motor vehicle stock (National Stats)

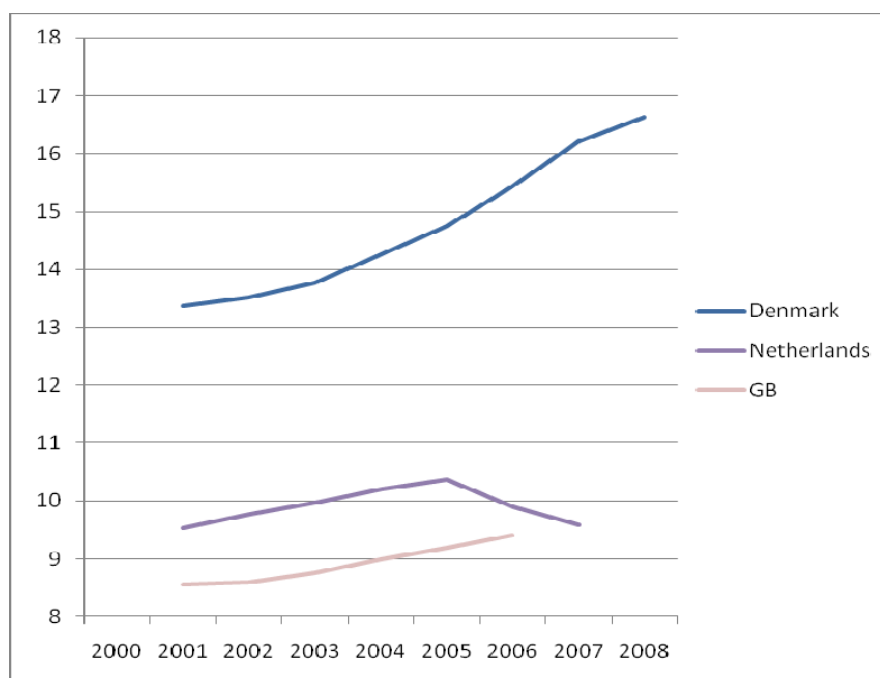
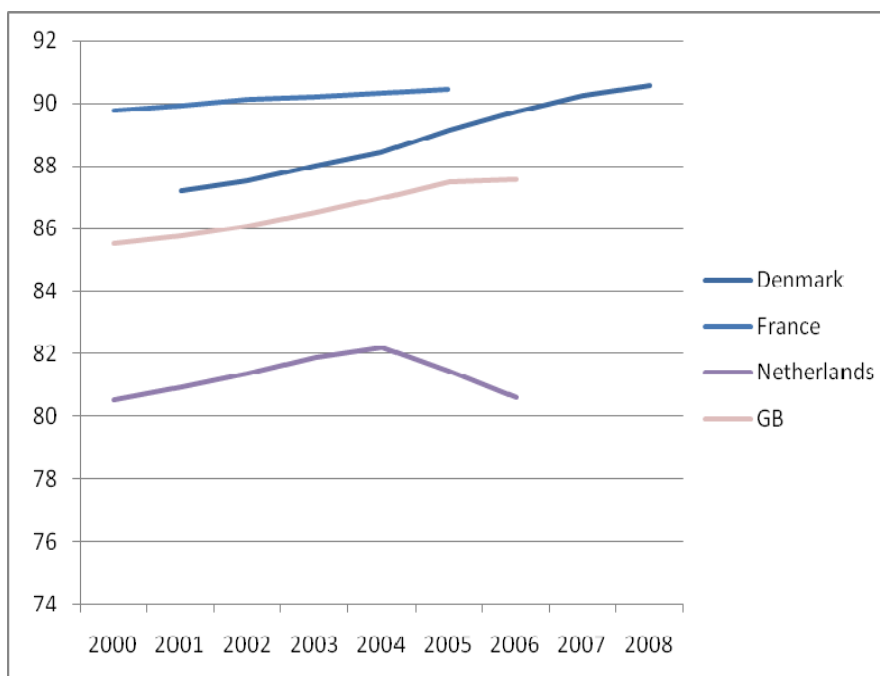


Figure 20. LGV stock as a percentage of all goods vehicle stock (National Stats)



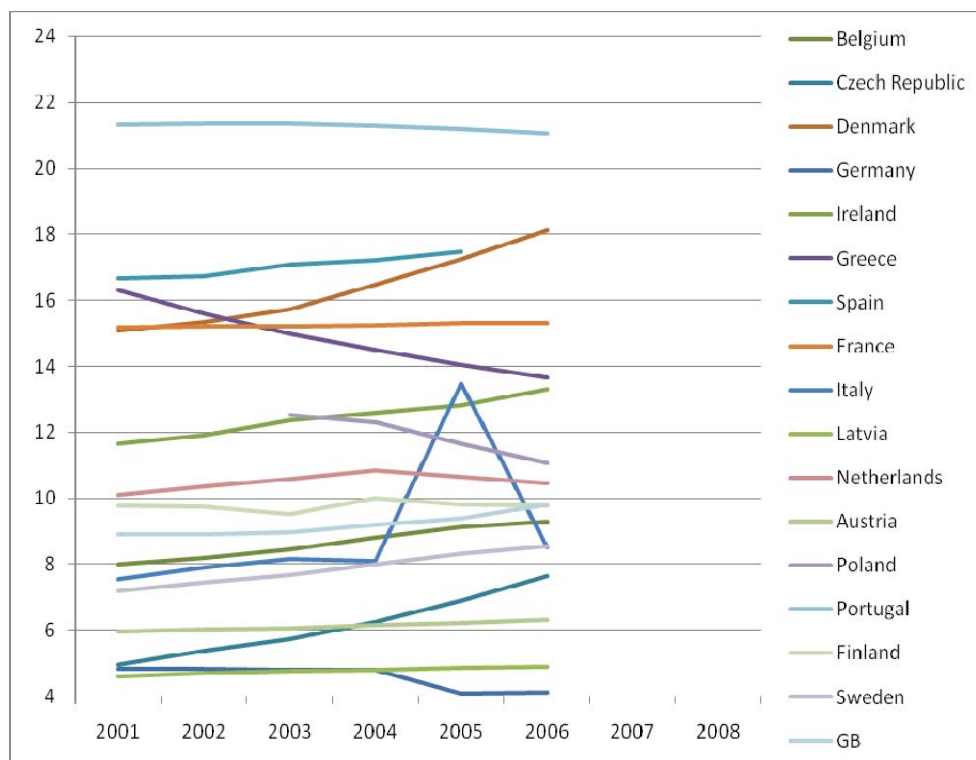
The data suggest that LGVs represent a relatively modest proportion of all vehicles but quite a large proportion of goods vehicles. In general, since 2000 they have formed an increasing proportion of the fleet.

Denmark shows a greater increase over the years than the other Member States but it should be noted that the Danish data are numerically relatively small, which may make them more susceptible to annual variation.

In both figures above it can be seen that the numbers and proportions of LGVs decrease notably in data from the Netherlands from 2004 onwards, where the data drops to a figure similar to that in 2001. Again, this could be simple variation around a reasonably constant long-term trend or a result of a distinct change in behaviour.

Figure 21 and Figure 22 show the same analysis but using the ACEA dataset for a wider range of Member States.

Figure 21. LGV stock as a percentage of all motor vehicle stock (ACEA)



This figure shows that there is a large variation in the proportion of the vehicle fleet that is made up of LGVs, between 4% and 22%. In most Member States, LGVs appear to account for an increasing proportion of the vehicle fleet. However, there are some exceptions, most notably Poland and Greece.

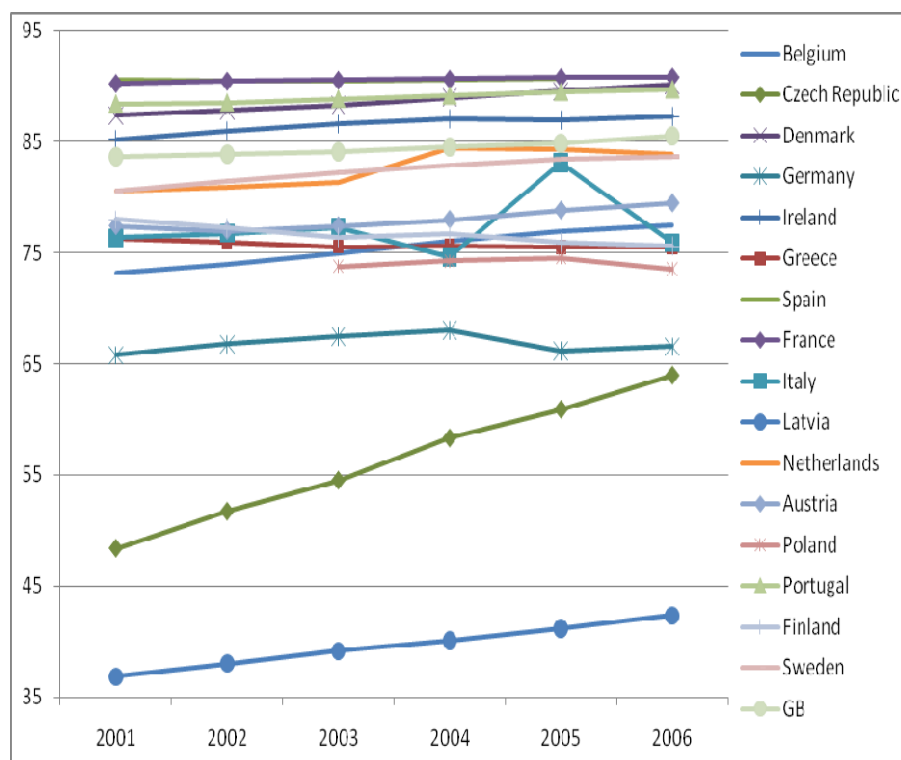
Figure 22. LGV stock as a percentage of all goods vehicles (ACEA)

Figure 22 shows that in 2006 the proportion of goods vehicles that are LGVs was between 43% and 90%. The proportion of goods vehicles that are LGVs has slightly increased or remained steady for many Member States. However there has been a much sharper increase in Germany. There has been a small reduction in the proportion of goods vehicles that are LGVs in Finland. In Latvia LGVs account for a much lower proportion of good vehicles than in any other Member State where the data are available.

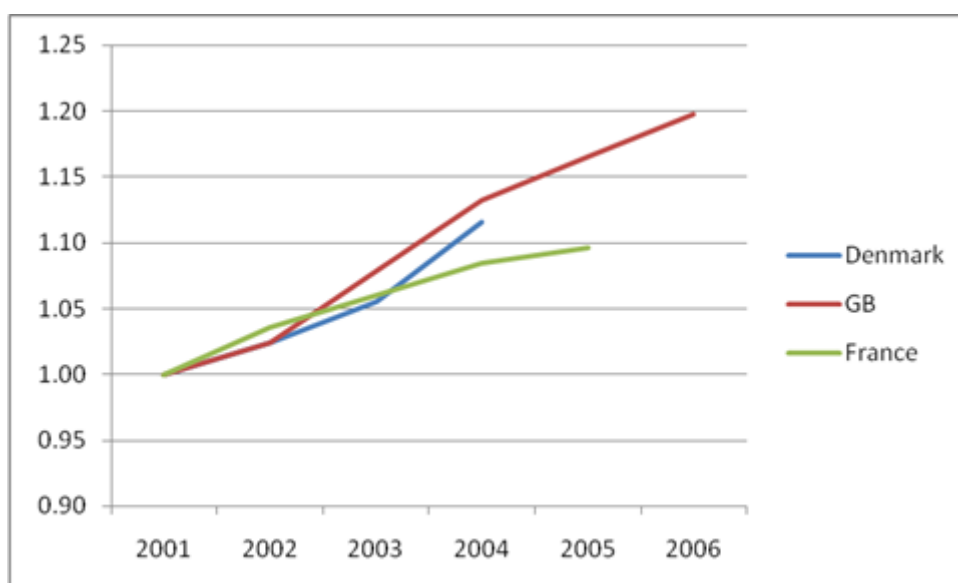
The apparent anomaly in 2005 for the Italian data can be seen to distort the trend in both figures.

A.2.3 LGV traffic (Vehicle Km)

Vehicle traffic performance is defined as the product of the number of vehicles and the distance that they are driven (vehicle kms). Annual traffic is also related to the public road network that is in place during that year and therefore traffic growth is a product of the traffic flow (vehicles) and changes in the network (kilometres) (DfT, 2006).

Figure 23 shows the relative change in vehicle kilometres driven by LGVs for the Member States of the EU where data were available (in this case the UK, Denmark and France).

Table 22 shows the baseline data taken from the first year of available data for these Member States.

Figure 23. LGV relative change in vehicle kilometres**Table 22 Baseline data for LGVs vehicle kilometres**

Member State	Traffic (Thousand Vehicle Km)
GB	53,700
Denmark	6,854
France	83,000

The above data shows a distinct increase in LGV usage for these Member States during the period shown. Great Britain shows a 20% increase in LGV vehicle kilometres over five years. Denmark shows an 11.6% increase over three years and France a lesser value of 10%.

If the Danish data are extrapolated, it suggests that there would be an increase in vehicle kilometres of approximately 28% for in the same period as for GB, as shown in Table 23 and Figure 24.

Table 23. Extrapolation of Danish data

Data	2001	2002	2003	2004	2005	2006	2007
Relative to 2001	1.0000	1.0239	1.0556	1.1158	1.1895*	1.2821*	1.3929*
Absolute	6854.00	7018.00	7235.00	7648.00	8152.83*	8787.51*	9546.94*

* Extrapolated data

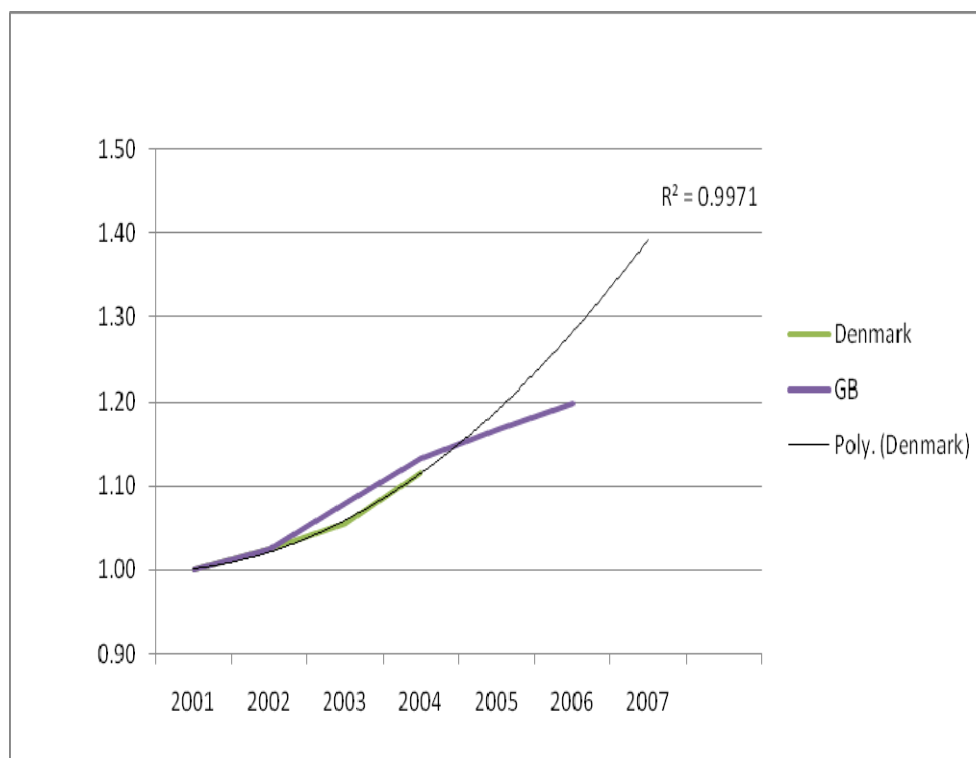
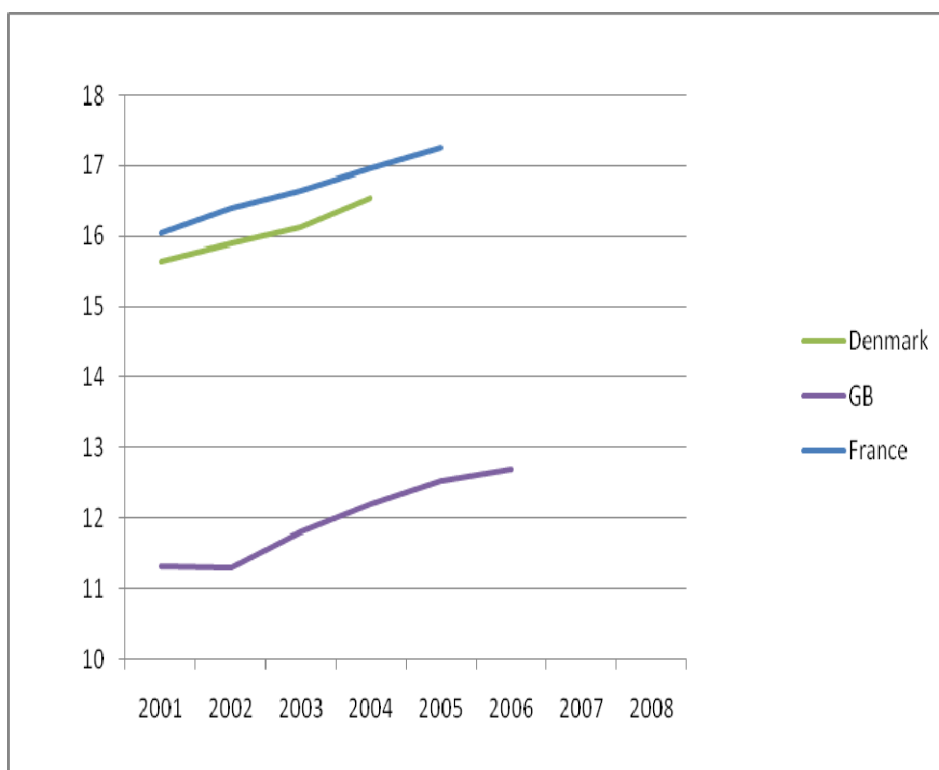
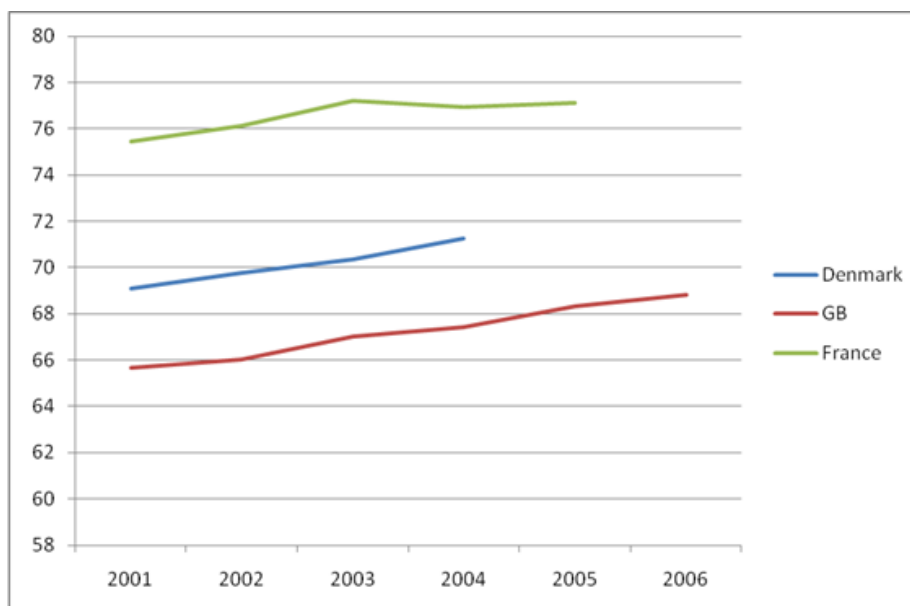
Figure 24. Danish statistics extrapolated

Figure 25 and

Figure 26 show the LGV kilometres as a percentage of all motor vehicle and all goods vehicle kilometres respectively.

Figure 25. LGV traffic as a percentage of all motor vehicle traffic**Figure 26. LGV traffic as a percentage of all goods vehicle traffic**

Analysis of the above data shows that LGV traffic is becoming a larger proportion of both goods vehicle traffic and all traffic.

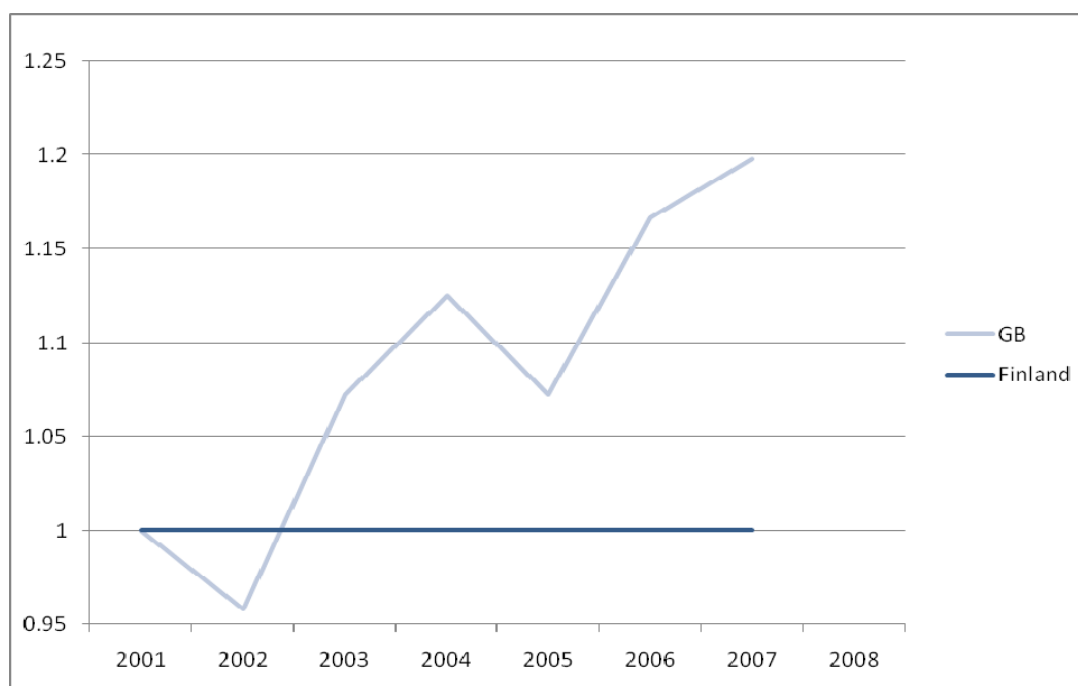
A.2.4 LGV Freight activity

Freight activity can be defined as the product of the quantity of goods moved and the distance that they are moved and is therefore, typically measured in tonne-kilometres. Goods moved can be seen as a measure of the work done by all goods vehicles. However, LGVs are not always used for transporting freight and are also often used for carrying tools or equipment required to perform a service. Such activity is not always accounted for in data describing freight activity and freight surveys often exclude LGVs. For example the Freight Survey in Ireland³⁵ (2007) only includes goods vehicles with an unladen weight of 2 tonnes or more.

Figure 27 shows the relative change in the goods moved by LGVs year on year for the Member States where information was available; in this case the only available data came from Great Britain and Finland.

Table 24 shows the baseline data taken from the first year of available data for these Member States.

Figure 27. LGV relative change in goods moved



³⁵ <http://www.cso.ie/releasespublications/documents/transport/2007/roadfreight07.pdf>

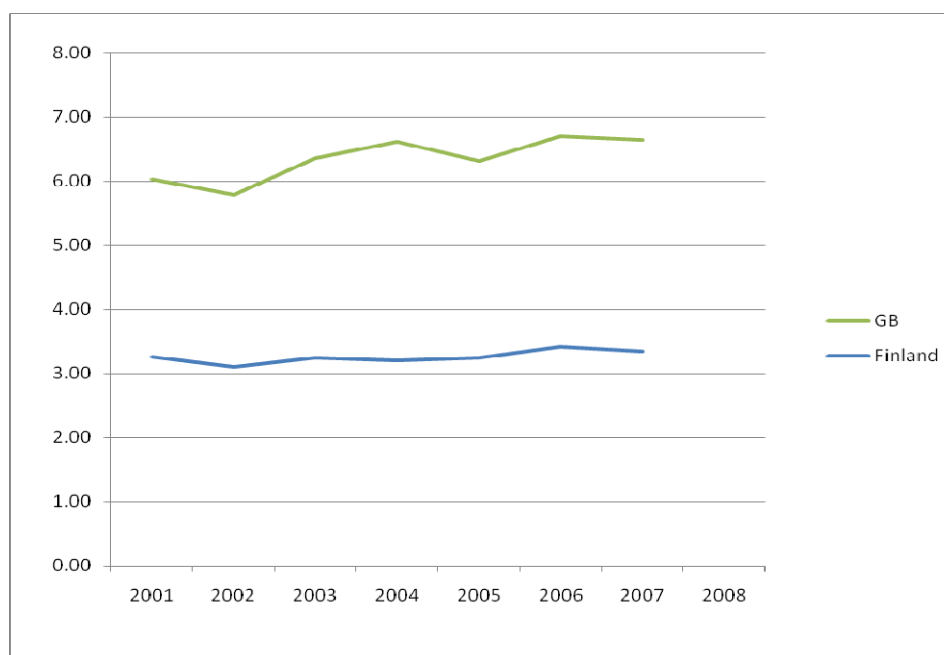
Table 24. Baseline data for LGVs goods moved

Member State	Goods moved (Mi-TKm)
UK	9600
Finland	900

The data from Finland was reported in billion tonne-kilometres to one decimal place (0.9 billion tonne-kilometres for all years shown), resulting in a relative value of 1 throughout the period. This information is considered misleading because reporting in billion tonne-kilometres to one decimal place could hide a variation of 49 million tonne-kilometres and the flat line in

Figure 27 could potentially hide an increase from 850 million tonne-kilometres to 949 million tonne kilometres, an increase of almost 12%.

The UK data show some variation but in general the trend appears to be a distinct rise in the amount of goods moved by LGV. Figure 28 shows the change in the proportion of all goods moved that were carried by LGVs between 2001 and 2007.

Figure 28. LGV percentage of all goods moved

The graph shows a faint upwards trend in the level of vehicle tonne kilometres transported via LGV in both the UK and Finland, showing there is a certain shift towards the lighter goods carrier from the heavy goods transporters.

A.2.5 The use of LGVs in different market sectors.

The 'Transport Statistics Bulletin' documents the 'Survey of Van Activity' for the UK. The bulletin provides results of the calendar year of the Department for Transport's survey of **company-owned** vans only for the years 2003 and 2004 and has recently released preliminary finding for company-owned **plus** privately owned vans for 2008.

Since the 2008 results are preliminary, added to the fact that it takes into account both private plus company-owned vans, these data cannot be judged against a preceding year. A van is described as company-owned if the registered keeper is a company or company (Messrs); a van is described as privately owned if the registered keeper is any other category i.e. Mr, Mrs, Miss, Rev., Dr, between keepers. Comparison with the DfT road traffic estimates suggests that there is still some underestimation of company van activity in the figures reported.

The 2008 survey documents that:

- "In 2007 there were 3.2 million licensed light goods vehicles (LGVs) registered in Great Britain, which is 9 percent of total licensed vehicles and account for 13 percent of total traffic in Great Britain. This traffic has increased by 40 percent between 1997 and 2007 and has accounted for 31 percent of all new traffic in that period."
- "59 percent of light goods vehicles are owned by businesses, with 28 percent owned by private individuals. The remaining 12 percent are vehicles which had been leased or hired. Although 59 percent of LGVs are owned by businesses, it is estimated that 66 percent of the average weekly mileage by LGVs is by business-owned vehicles."

Comparison between the 2003 data and the 2004 data for company-owned vans in the 'Survey of van activity' shows the rise or fall in van usage over these dates.

Figure 29. Vehicle kilometres by reason for use 2003

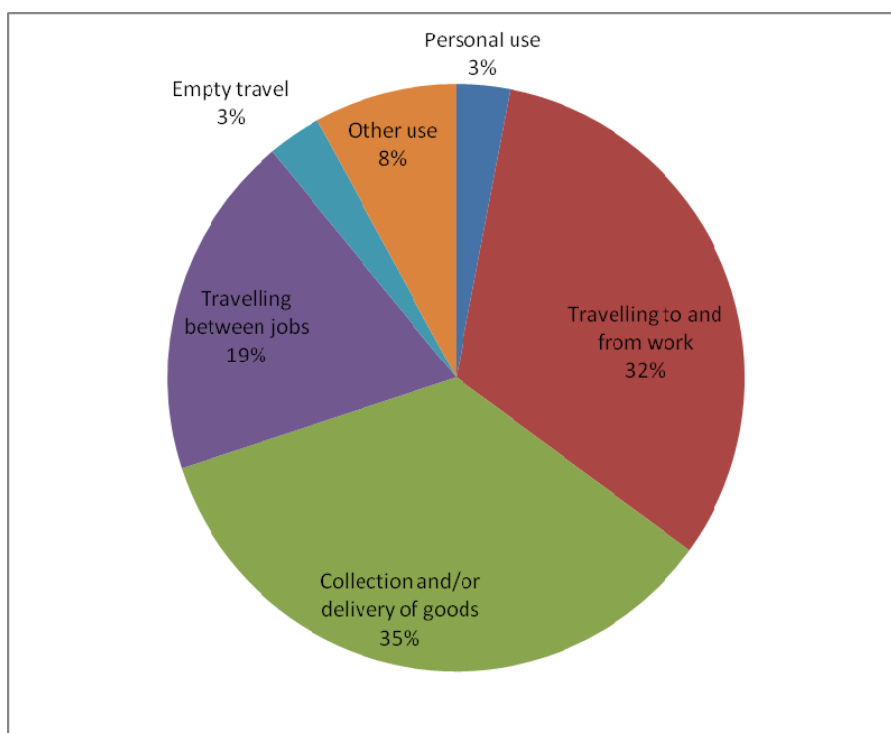
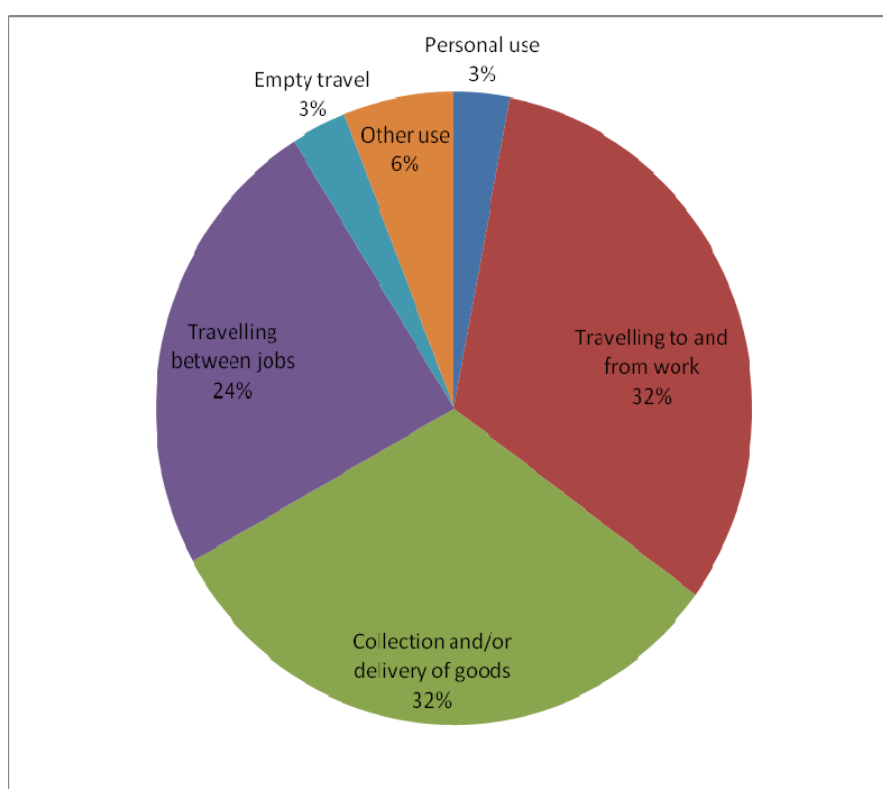


Figure 30. Vehicle kilometres by reason for use 2004

The French publication "Les véhicules utilitaires légers en 2006" (light commercial vehicles in 2006) discusses the trends of the French light goods vehicle fleet. The paper highlights the following points:

- At the beginning of 2006, 5.5 million LGVs (3.5 tonnes GVW) are in use; these vehicles (including car-derived vans) travel a total of 77 billion kilometres. That is almost four times more than the 441,000 HGVs registered in the same period.
- On average the distance travelled is stable at 15,200 kilometres per year.
- In the beginning of 2006, 5,449,000 LGVs were in service with 5,085,000 being used. This is 12.5 times more than HGV stock.

Table 25. Vehicle stock by GVW in 2001 and 2006.

Class by GVW (in Tonnes)	Vehicle stock 2001 (1000's)	Vehicle stock 2006 (1000's)	Average annual % change
<1.5	2019	1349	-7.8
1.5-2.5	1734	2564	8.1
2.6-3.4	671	917	6.5
3.5	561	669	3.6
Total	4985	5499	1.9

- The average age of LGVs is 8.4 years in early 2006, this is stable compared to 2001 when it tended to increase from earlier surveys.

- The average distance travelled by LGVs is 15,200 kilometres during the previous year, (virtually unchanged from the 15,300 kilometres averaged in 2001. This figure also seems to have stabilised since the growth between 1987 and 1992.)
- 89% of the LGV fleet are used in urban areas.
- Nearly all contributors to the survey (99%) would rather make local journeys within a radius of 150 kilometres. 22% of domestic routes are more than 150 kilometres and only 2% international travel.
- Between 2001 and 2006, the number of vehicles powered by diesel continued to grow at about the same rate of +4% per year despite a large majority (88%) of the LGV stock already running on diesel.
- The highest diesel progression in this group is LGVs between 1.5 and 2.5 tonnes which have seen an increase of 20% in the same period.
- Vehicles of 3.5 tonnes GVW are almost all diesel (99%).
- Correspondingly petrol vehicles continues to decline in 2006 (-10% per year since 2001) with super unleaded most used at (95%, 8% of the vehicle fleet).

Table 26. Vehicle stock by market sector in 2006

Market Sector	% share (2006)
Construction	28
Trade	18
Agricultural/Forestry	13
Manufacturing	11
Real estate/Rental/services	10
Transport	4

- The van body is the most common shape (73% of the stock); however, the car-derived van is on the increase and in 2006 represented 18% of the vehicle stock; tilting LGVs represented 3.5%, tray represented 3% and the 'others' category did not exceed 1%.
- The average payload increased slightly in 2006 from 0.7 tonnes to 0.8 tonnes, this is a potential increase throughout the stock of 4.4 million tonnes of payload.
- Almost 75% of LGVs do not exceed a tonne payload.
- The total number of kilometres travelled by LGVs owned by professionals increased by 6% between 2001 and 2006, or 1.2% per year.
- The construction industry is the main contributor to the vehicle stock and vehicle kilometres; however, in this sector the total distance travelled is decreasing whilst the vehicle stock is increasing.
- Only 43% of the professionals sector comprises vehicles used to transport goods; 64% of vehicles in this sector are used to transport property other than goods (i.e. tools, materials or samples of work).

Table 27. LGV traffic in 2006

%	To/From work	Goods Transport	Other goods	Other travel	Removals	Non Professional	Total
Professional	36	43	64	58	1	7	209
Individual	16	2	3	2	0	93	116
Total	28	28	41	37	1	40	175

- Nearly 40% of the stock is owned by individuals; the stock has increased between 2001 and 2006 by 2.3% per year. This represents 38% of the entire stock in 2006 against 34.4% in 1992.

Table 28 Vehicle stock distribution in 2006

Owned	% share (2006)
Professional	69.1
Individual	23

- The average age of these vehicles in the stock increased slightly from 11.1 years old in 2001 to 11.8 years old in 2006.
- The average distance travelled by private vehicles is 10,000km in early 2006 versus 10,500 in early 2001.
- Excluded from the survey are vehicles not registered in the 'normal' series (i.e. military vehicles), passenger cars, trailers and semitrailers.
- Car-derived vans, approved for tax purposes as commercial vehicles are within the scope of the investigation.
- The survey was conducted by sampling about 25,000 vehicles within a total population of 6,200,000 vehicles. 15,000 questionnaires were unusable.

ANNEX 3:

ROAD SAFETY PERFORMANCE OF LIGHT GOODS VEHICLES

The following annex describes the trends in accidents in each Member State. Where available, more in-depth analysis of accidents involving LGVs is also reported. The data presented has been obtained through a review of literature and sources of accident data that were publicly available.

A3.1 Number of accidents

Data relating to the number of road traffic accidents can come from a number of different sources, e.g. police reports, insurance claims, third-party data collection projects. There can be advantages and disadvantages associated with each type of data collection method. Published national statistics are usually compiled by the police, and therefore only include accidents that are reported to the police. This can lead to an under-reporting of accidents, particularly at lower injury severities. There can also be differences in the definitions of injury severities that are used, although attempts have been made to harmonise these definitions in recent years, particularly the definition of a fatality/fatal accident. Documents that accompany the publication of national road accident statistics often include the definitions used and an estimate of levels of under-reporting at different severity levels.

For the Danish statistics, a person killed in a road accident is any person killed immediately or dying within 30 days as a result of an injury accident. A person injured in a road accident is any person not killed, but who sustained an injury as a result of an injury accident, normally needing medical treatment. Injured persons are split into seriously or slightly injured persons depending on type of damage. Although the actual definition of a serious injury is not included in this document, it does deviate from the UNECE definition which requires hospitalisation for at least 24 hours (Statistics Denmark, 2005)

Accidents included in the GB published statistics must involve personal injury on the public highway (including footways). Killed road users are those that sustained injuries which caused death less than 30 days after the accident, excluding confirmed suicides. Road users are classified as being seriously injured if they are detained in hospital as an "in-patient" or if they sustained fractures, concussion, internal injuries, crushing, burns (excluding friction burns), severe cuts, severe general shock requiring medical treatment and injuries causing death 30 days or more after the accident. Slight injuries are injuries of minor character such as sprains (including whiplash), bruises or cuts that are not judged to be severe, or slight shock requiring roadside attention. The definition of slight injury includes those injuries not requiring medical treatment. The severity of the injury is recorded by the police on the basis of information available within a short time of the accident. Generally this does not reflect the results of a medical examination but may be influenced by hospitalisation of the casualty which can vary by region (DfT, 2008).

Surveys carried out by Statistics Denmark have shown that the total number of personal injuries in traffic is almost seven times the number registered by the police, under-reporting appears most among single person accidents, accidents involving cyclists, children and young people, of which only approximately 10% are recorded by the police (Statistics Denmark, 2008).

Simpson (1996) reported on a comparison of hospital and police casualty data for Great Britain. The research identified that there was mis-classification of injury severity, under-reporting to the police and also under-recording by the police. The research presents a series of correction factors for serious and slight casualties for each of the main road user groups. Overall, to account for the differences between police and hospital reported data, it was estimated that the total number of serious casualties in the national casualty data should be increased by a factor of 2.76 and slight casualties by a factor of 1.70.

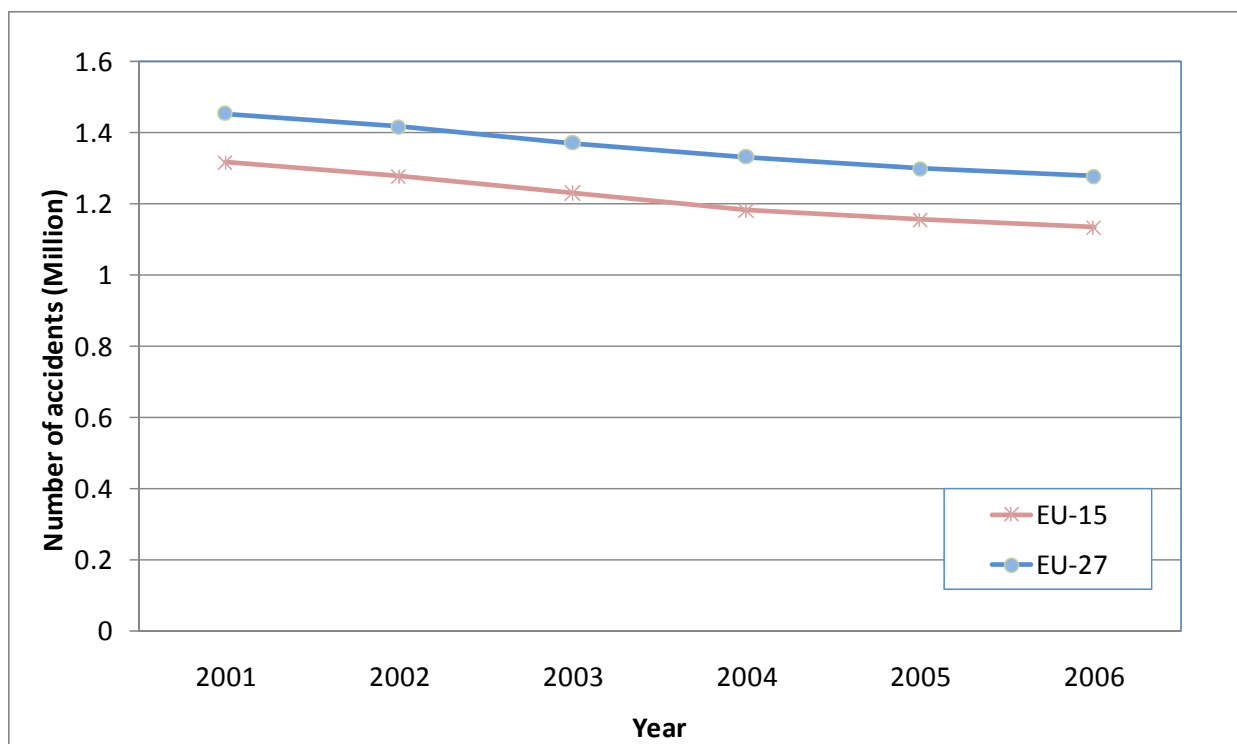
More recently, the issue of under-reporting of casualties in Great Britain was the subject of a report by Ward *et al* (2006). Analysis of data for 2004 reveals that there are as many admissions to hospitals in England, Wales and Scotland as there are serious injuries in the STATS19 database for Great Britain. The picture changed between 1999, when there were fewer admissions than STATS19 serious injuries, and 2003, when there were more. If we take the flatness of the admissions trend with the decline in serious injuries in STATS19, we may conclude that fewer serious injuries are being reported to the police and/or that the police are not recording so many injuries as serious as before. The data indicate that there are twice as many serious injuries occurring on the road as are recorded in the STATS19 database. Some of this is due to under-reporting and some due to mis-recording.

A3.1.1 All accidents

The total number of accidents for each Member State is available from a range of different sources. Some sources quote the number of accidents for EU-15, EU-25 or EU-27. However, the extent of these data is minimal, usually only one or two years. Therefore, the total number of accidents in the EU-15 and EU-27 was calculated on the basis of data available for the individual Member States.

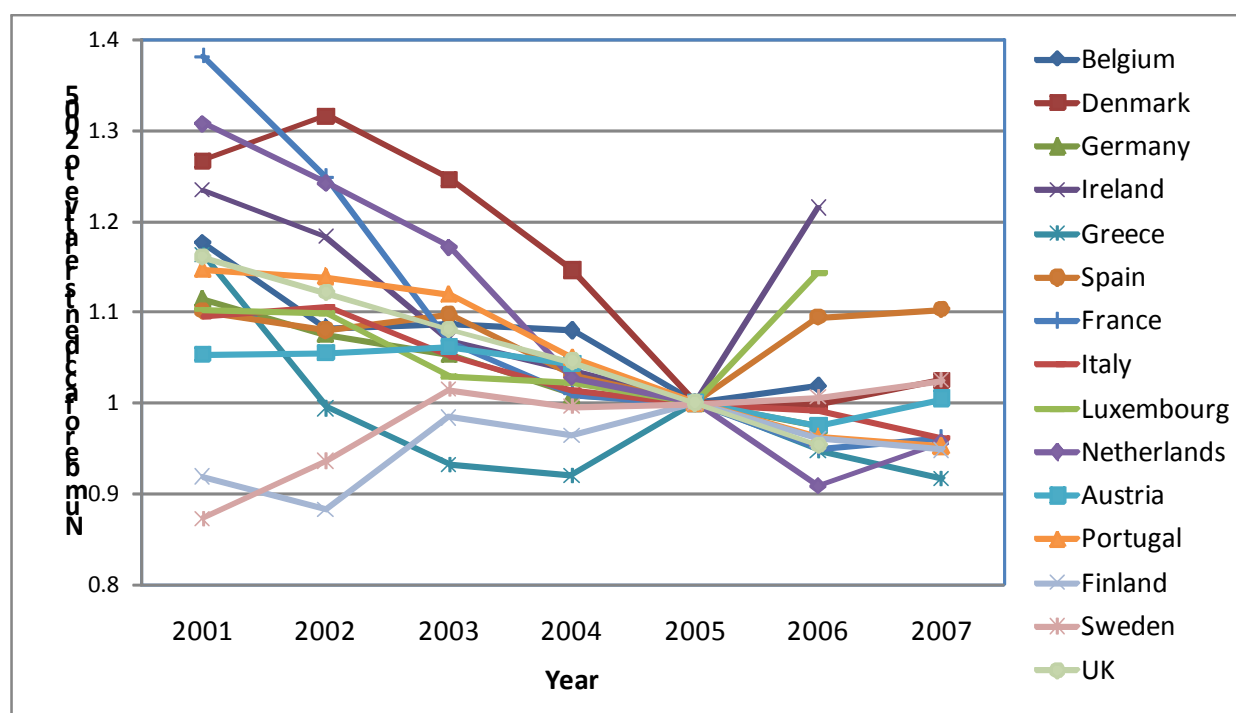
Figure 31 shows how the number of accidents for the EU-15 and EU-27³⁶ has changed between 2001 and 2006.

³⁶ Data for Lithuania, Malta and Cyprus were unavailable for 2001, 2002 and 2003, and therefore the total for EU-27 excludes accidents in these Member States.

Figure 31. Trend in total number of accidents across Europe

It can be seen that there has been a decrease in the total number of accidents for both the EU-15 and EU-27. There has been a reduction in the number of accidents of 14% for EU-15 and 12% for EU-27 based on the data that was available. The difference between the values for EU-15 and EU-27 indicates that the additional 12 Member States account for a small proportion of the overall number of accidents, approximately 11%.

Although there is a downward trend across the EU, the change in the number of accidents in each Member State is less clear. Figure 32 shows the change in the number of accidents for each of the EU-15 Member States. The data are presented as a relative change, with a baseline of 2005, the year where most data were available for each Member State.

Figure 32. Number of accidents relative to data from 2005 for EU-15 Member States**Table 29. Number of accidents in 2005, EU-15**

Member State	Number of accidents 2005	Member State	Number of accidents 2005	Member State	Number of accidents 2005
Austria	40,896	Germany	336,619	Netherlands	27,077
Belgium	40,366	Greece	16,914	Portugal	37,066
Denmark	5,412	Ireland	5,600	Spain	91,187
Finland	7,020	Italy	240,011	Sweden	18,094
France	84,525	Luxembourg	700	UK	203,682

For the majority of Member States, there was a reduction in the total number of road accidents until 2005. Since 2005, Member States such as Portugal and the UK have continued with this downward trend, whereas other states such as Spain, Denmark and Austria have seen an increase. The relatively large increase for Luxembourg is likely to be attributed to the rounding of data to the nearest hundred in the DG-TREN pocketbook and the small number of accidents (c.700). This may also be a consideration for the Irish data, however, the number of accidents is not so small (c. 6000).

However, Sweden and Finland have both seen an increase in accidents up to 2005, when the Swedish figures continued to increase and the Finnish figures started to decrease. Greece saw a reduction in accidents until 2004; the number of accidents increased in 2005, and since 2005 has started to decrease again. Table 30 shows the overall change in the number of accidents for each of the EU-15 Member States.

Table 30. Change in number of accidents for EU-15 Member States, 2001-2007

Member State	% Change 2001-2007	Member State	% Change 2001-2007	Member State	% Change 2001-2007
Austria	-4.6%	Germany*	-12.6%	Netherlands	-26.9%
Belgium*	-13.3%	Greece	-21.2%	Portugal	-17.0%
Denmark	-19.1%	Ireland*	-1.6%	Spain	0.1%
Finland	3.2%	Italy	-12.3%	Sweden	17.4%
France	-30.4%	Luxembourg*	3.6%	UK	-17.9%

* 2001-2006

In all but four Member States there has been an overall reduction in the number of accidents. The magnitude of the increases for Finland, Luxembourg and Spain are small in comparison to the 17.4% increase that has been seen in Sweden.

Figure 33 shows the change in number of accidents relative to 2005 values for the 12 remaining EU-27 Member States.

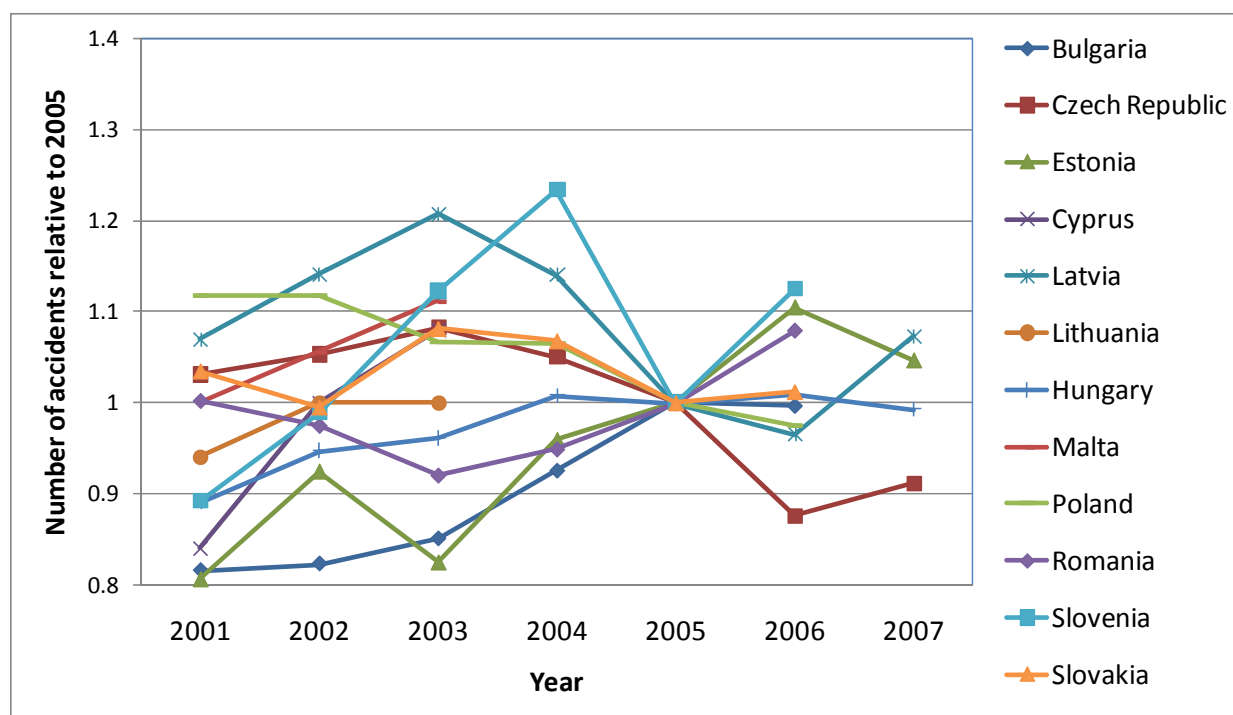
Figure 33. Number of accidents relative to data from 2005 for the 12 most recent Member States

Table 31. Number of accidents in 2005, remaining 12 Member States

Member State	Number of accidents 2005	Member State	Number of accidents 2005	Member State	Number of accidents 2005
Bulgaria*	8,224	Hungary	20,777	Poland*	48,100
Cyprus**	2,500	Latvia	4,455	Romania*	7,226
Czech Republic	25,239	Lithuania**	6,800	Slovakia*	7,903
Estonia	2,341	Malta***	847	Slovenia*	10,309

Compared with the EU-15, the data for the 12 newer Member States show trends that are less clear. The data for Poland has shown a consistent downward trend while Hungary and Bulgaria have shown consistent increasing trends. Table 32 shows the overall change in number of accidents for the period 2001-2007.

Table 32. Change in number of accidents for remaining 12 Member States, 2001-2007

Member State	% Change 2001-2007	Member State	% Change 2001-2007	Member State	% Change 2001-2007
Bulgaria*	22.2%	Hungary	13.4%	Poland*	-12.8%
Cyprus**	28.6%	Latvia	0.3%	Romania*	7.7%
Czech Republic	-11.6%	Lithuania**	6.3%	Slovakia*	-2.2%
Estonia	29.7%	Malta***	11.2%	Slovenia*	26.1%

* 2001-2006; ** 2004-2006; *** 2005-2007.

All but three of these Member States have shown an increase in the number of accidents, with the magnitude of the increases being larger than those seen for EU-15. Comparison of the two sets of data (Figure 32 and Table 29, Table 30, Figure 33 and Table 31) shows that there is a clear difference in the trends in total number of accidents between the more established and the more recent Member States.

A3.1.2 Accidents involving LGVs

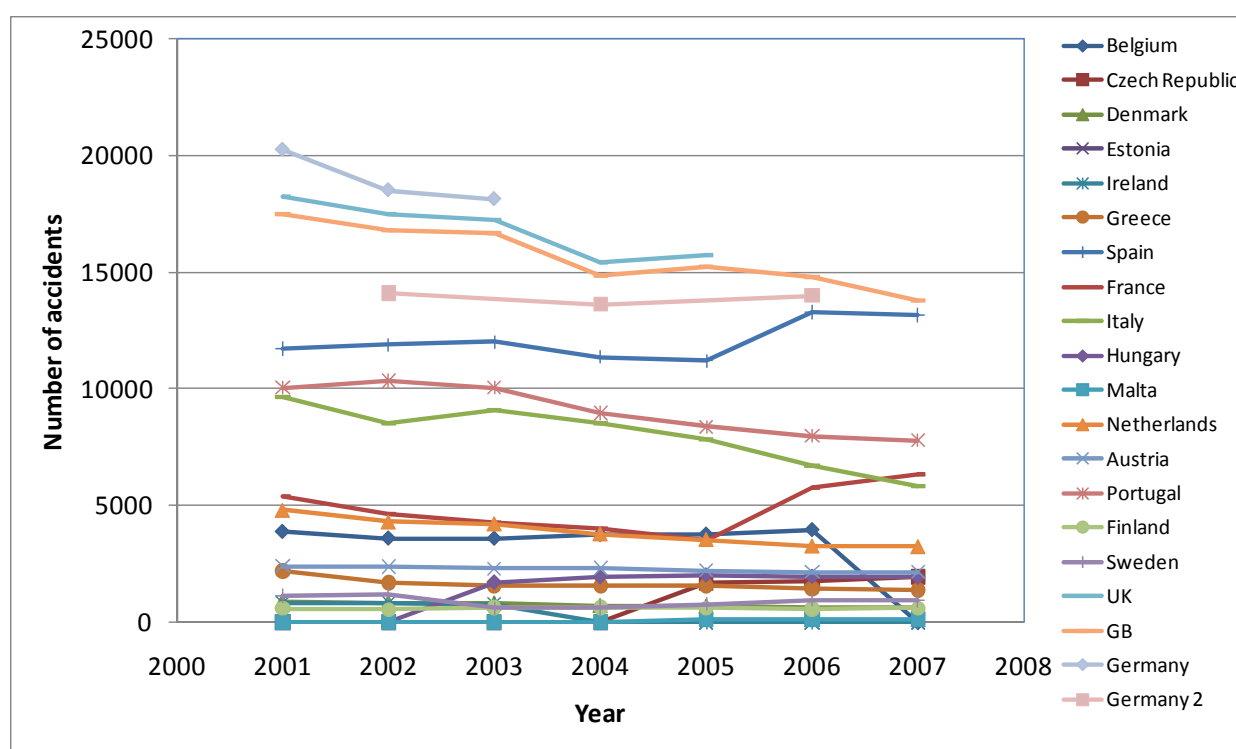
Data relating to the number of accidents that involve LGVs has been identified from the CARE database. Additionally the total number of accidents involving LGVs was available from Statistics Denmark and data relating to accidents of all severities was available for the Netherlands through SWOV. The data from Denmark shows a greater number of accidents involving LGVs than the data from CARE. The difference between the data sources ranges from the Statistics Denmark data being 0.8% to 1.8% higher than the CARE data. The data from CARE is used in the following analysis because it has been retrieved in the same manner as the data for the other Member States. The Dutch data from CARE shows a sharp reduction in the number of accidents from 4208 in 2003 to 1217 in 2004, a reduction of 29%. Comparison with data from SWOV indicates that this is likely to be erroneous data, with the SWOV data reducing from 4217 in 2003 to 3785 in 2004, a reduction of 11%. This difference between data sources is not present for the data regarding all accidents and is therefore likely to be attributed to the definition of the

vehicles involved (it is also apparent for HGVs). The following analysis for the Netherlands is based on the data from SWOV rather than CARE. Where the data are available, the most recent year is 2007 for the majority of Member States, the number of accidents involving LGVs is shown below.

Table 33. Number of accidents involving LGVs by Member State and Year³⁷

Member State	2001	2002	2003	2004	2005	2006	2007	% change 01-07 ³⁸
Austria	2398	2379	2299	2324	2224	2152	2159	-10.0%
Belgium	3884	3603	3595	3750	3771	3962		N/A
Czech Republic					1675	1760	1946	N/A
Denmark	875	839	794	692	664	647	658	-24.8%
Estonia					1	2	1	N/A
Finland	591	556	635	635	610	567	614	+3.8%
France	5398	4363	4237	4009	3493	5782	6316	+17.0%
Germany ³⁹	20248	18511	18128					N/A
Germany ²⁴⁰		14107		13613		14004		N/A
Great Britain	17482	16802	16659	14832	15211	14790	13798	-21.1%
Greece	2199	1684	1562	1569	1576	1437	1385	-37.0%
Hungary			1711	1933	2007	1948	1916	N/A
Ireland	835	820	769					N/A
Italy	9656	8535	9103	8505	7835	6685	5832	-39.6%
Malta					101	131	137	NA
Netherlands ⁴¹	4802	4299	4217	3785	3541	3258	3233	-32.7%
Portugal	10043	10334	10056	8973	8378	7979	7796	-22.4%
Spain	11714	11881	12006	11356	11198	13283	13168	+12.4%
Sweden	1131	1223	606	623	770	968	947	-16.3%
United Kingdom	18215	17477	17219	15396	15704			N/A

³⁷ Data taken from CARE database unless otherwise stated.³⁸ Where sufficient data are available.³⁹ Data taken from IMPROVER Final Project Report (Höhnscheid *et al*, 2006).⁴⁰ Data taken from BAST reports (Scmid, 2004, 2006 and 2008). Excludes vans with GVW<2.0t.⁴¹ Data from SWOV – unexplained sharp decrease in number of accidents in CARE database (4208 in 2003 to 1217 in 2004). SWOV data up to 2003 very similar to CARE data.

Figure 34. Number of accidents involving LGVs, by Member State

For most Member States where data were available there appears to be a slight downward or level trend in the absolute number of accidents involving LGVs. There has been an overall increase in the number of LGV accidents in France, Spain and Finland. Most of the increases in France and Spain have occurred since 2005.

To assess the road safety performance of LGVs it is necessary to look at the number of accidents involving LGVs in the context of all accidents within each Member State. Table 34 and Figure 35 show the number of accidents involving LGVs as a proportion of all accidents for each Member State where data were available.

Figure 35. Accidents involving LGVs as proportion of all accidents, by Member State

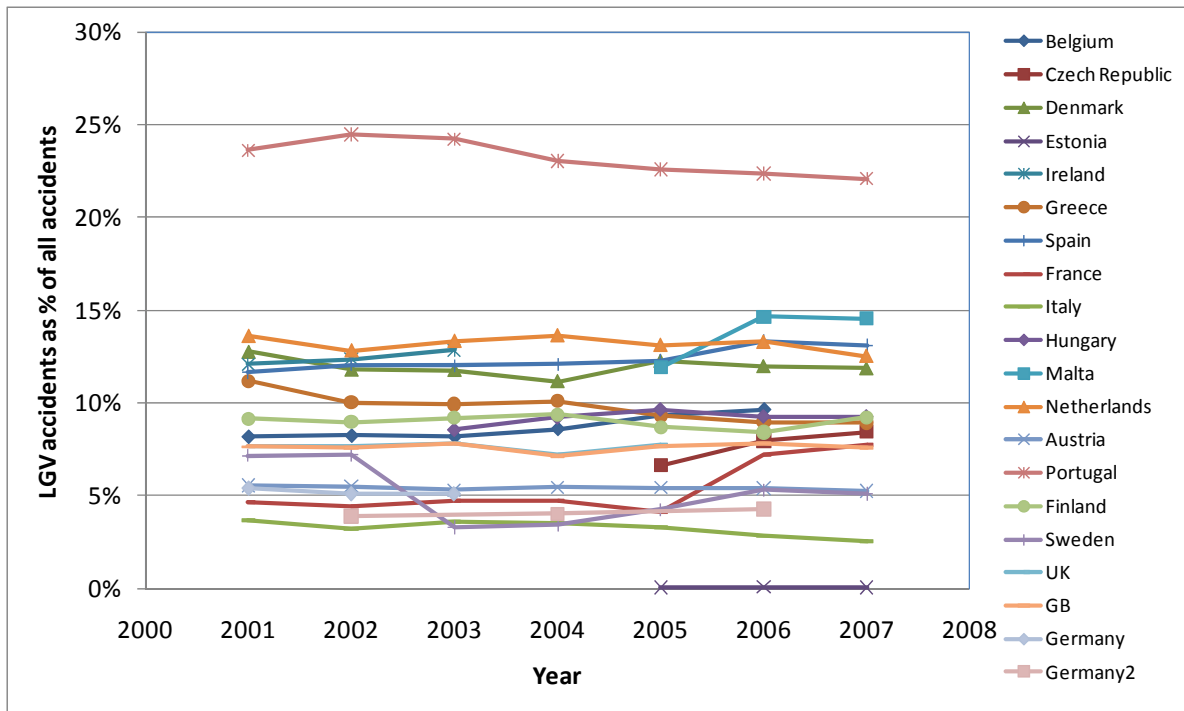


Table 34. Accidents involving LGVs as proportion of all accidents

Member State	2001	2002	2003	2004	2005	2006	2007	% change 01-07 ⁴²
Austria	5.6%	5.5%	5.3%	5.4%	5.4%	5.4%	5.3%	-5.3%
Belgium	8.2%	8.2%	8.2%	8.6%	9.3%	9.6%		N/A
Czech Republic					6.6%	8.0%	8.5%	N/A
Denmark	12.8%	11.8%	11.8%	11.1%	12.3%	12.0%	11.9%	-7.0%
Estonia					0.0%	0.1%	0.0%	N/A
Finland	9.2%	9.0%	9.2%	9.4%	8.7%	8.4%	9.2%	0.0%
France	4.6%	4.4%	4.7%	4.7%	4.1%	7.2%	7.8%	+25.6%
Germany ⁴³	5.4%	5.1%	5.1%					N/A
Germany ²⁴⁴		3.9%		4.0%		4.3%		N/A
Great Britain	7.6%	7.6%	7.8%	7.2%	7.7%	7.8%	7.6%	0.0%
Greece	11.2%	10.0%	9.9%	10.1%	9.3%	9.0%	8.9%	-20.5%
Hungary			8.6%	9.2%	9.7%	9.3%	9.3%	N/A
Ireland	12.1%	12.4%	12.9%					N/A
Italy	3.7%	3.2%	3.6%	3.5%	3.3%	2.8%	2.5%	-32.4%
Malta					11.9%	14.7%	14.5%	N/A
Netherlands ⁴⁵	13.6%	12.8%	13.3%	13.6%	13.1%	13.3%	12.5%	-8.1%
Portugal	23.6%	24.5%	24.2%	23.0%	22.6%	22.4%	22.1%	-6.4%
Spain	11.7%	12.1%	12.0%	12.1%	12.3%	13.3%	13.1%	+12.0%
Sweden	7.2%	7.2%	3.3%	3.5%	4.3%	5.3%	5.1%	-29.2%
United Kingdom	7.7%	7.6%	7.8%	7.2%	7.7%			N/A

⁴² Where sufficient data were available.⁴³ Data taken from IMPROVER Final Project Report (Höhnscheid *et al*, 2006).⁴⁴ Data taken from BAST reports (Scmid, 2004, 2006 and 2008). Excludes vans with GVW<2.0t.⁴⁵ Data from SWOV – unexplained sharp decrease in number of accidents in CARE database (4208 in 2003 to 1217 in 2004). SWOV data up to 2003 very similar to CARE data.

In 2007, LGV accidents accounted for approximately 22% of all accidents in Portugal. This is much higher than in other Member States, the second largest proportion in 2007 being 15% in Malta. There has been a slight downward trend in the proportion of accidents involving LGVs in Portugal, Greece, Italy Denmark, GB/UK, Germany and the Netherlands. The proportion has slightly increased in Hungary and Spain. In France there was a sharp increase in the proportion of accidents involving LGVs between 2005 and 2007 after a relatively steady period. The data for Sweden show a sharp reduction from 2002 to 2003, followed by a gradual increase to a level below that in 2001. Where data were available for Malta and Ireland there appears to be an increasing trend. The recorded number of accidents involving LGVs in Estonia is very small (1 or 2 per year); the reason for this is unknown.

As discussed previously, it is acknowledged that there are issues relating to the under-reporting of some types of road accidents and that the levels of under-reporting are different between Member States. The use of a consistent definition of road users killed minimises the levels of under-reporting for accidents involving fatalities. Therefore many analyses focus on fatal accidents only, for example the Traffic Safety Basic Facts based on the analysis of the CARE database (ERSO, 2009). The trends in the number of fatal accidents for Member States where data were available for multiple years are shown in Figure 36 and Table 35.

Figure 36. Number of fatal accidents involving LGVs, by Member State

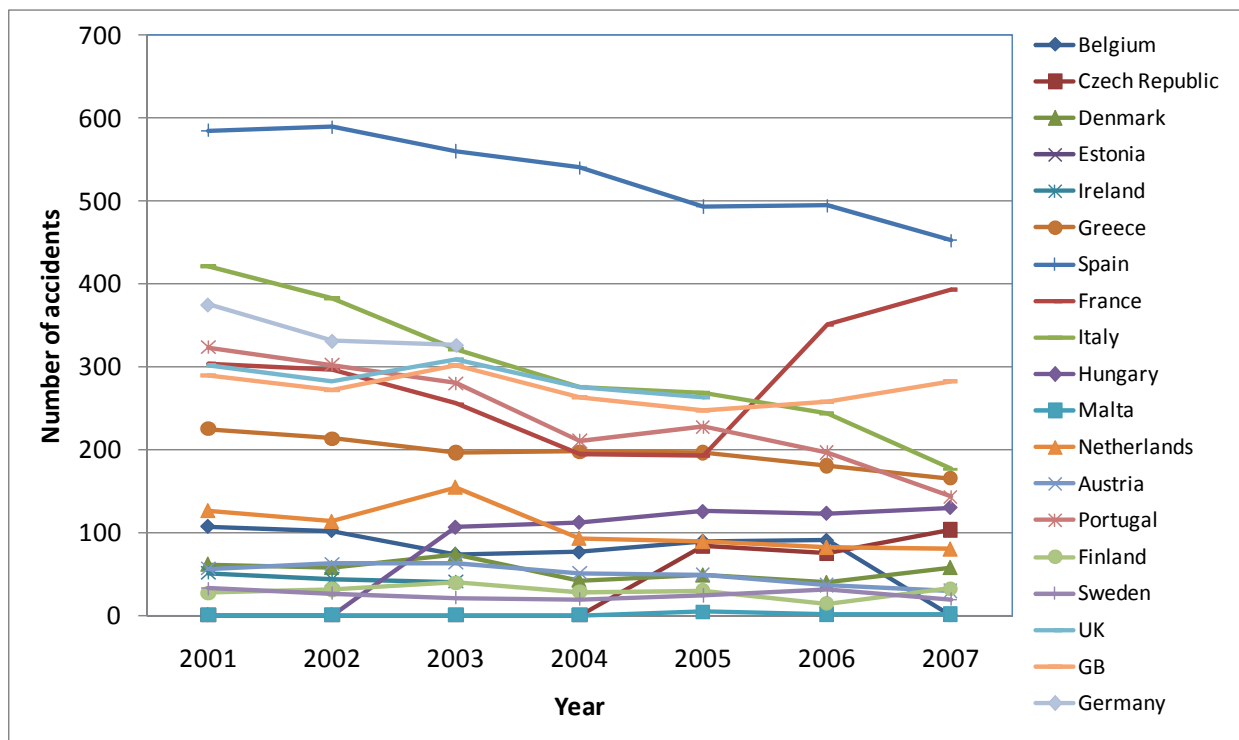


Table 35. Number of fatal accidents involving LGVs by Member State and Year⁴⁶

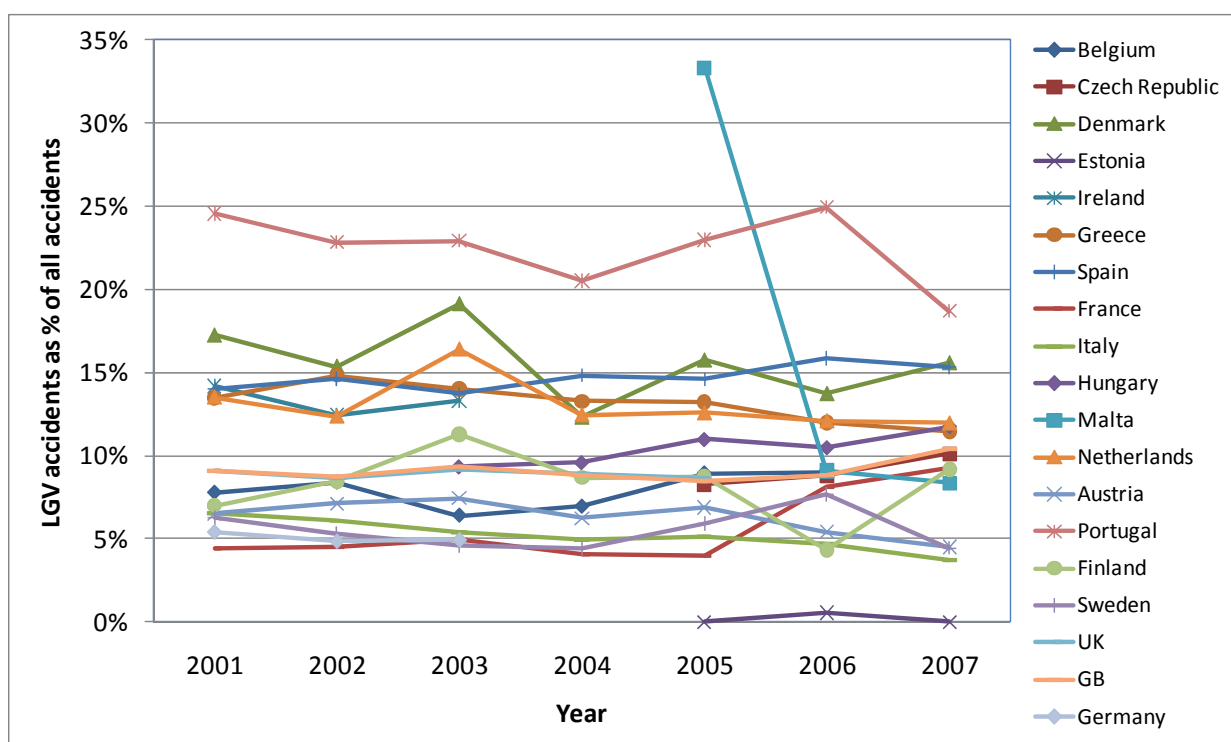
Member State	2001	2002	2003	2004	2005	2006	2007	% change 01-07 ⁴⁷
Austria	56	62	63	51	49	36	29	-48.2%
Belgium	107	102	73	76	89	90		N/A
Czech Republic					83	75	103	N/A
Denmark	61	57	73	42	48	39	57	-6.6%
Estonia						1		N/A
Finland	27	31	39	28	30	14	32	+18.5%
France	304	297	255	195	192	350	393	+29.3%
Germany ⁴⁸	375	331	326					N/A
Great Britain	289	272	302	263	247	257	282	-2.4%
Greece	225	213	196	197	196	180	165	-26.7%
Hungary			106	112	125	123	130	N/A
Ireland	51	43	40					N/A
Italy	421	383	321	276	268	244	176	-58.2%
Malta					4	1	1	N/A
Netherlands ⁴⁹	126	113	154	93	89	82	80	-36.5%
Portugal	323	302	280	210	227	196	143	-55.7%
Spain	585	589	560	540	493	494	452	-22.7%
Sweden	32	26	21	19	24	31	19	-10.6%
United Kingdom	302	283	309	276	263			N/A

⁴⁶ Data taken from CARE database unless otherwise stated.⁴⁷ Where sufficient data are available.⁴⁸ Data taken from IMPROVER Final Project Report (Höhnscheid *et al*, 2006).⁴⁹ Data from SWOV – unexplained sharp decrease in number of accidents in CARE database (4208 in 2003 to 1217 in 2004). SWOV data up to 2003 very similar to CARE data.

For most Member States the absolute number of fatal accidents involving LGVs has either remained steady or shown a downward trend. However, there are some notable exceptions. After a decrease in the number of LGV fatal accidents in France there has been a sharp increase since 2005. The data for the Czech Republic and Hungary have also shown an increasing trend.

Figure 37 and Table 36 show the number of fatal LGV accidents as a proportion of all fatal accidents, providing context for the changes seen in the absolute numbers of accidents.

Figure 37. Fatal accidents involving LGVs as proportion of all fatal accidents, by Member State



For most Member States the proportion of fatal accidents that involved LGVs has remained fairly constant. Portugal has shown the largest reduction in the proportion of fatal accidents involving LGVs, from almost 25% in 2001 to approximately 18% in 2007. France has shown a notable increase in the proportion of fatal accidents that involved LGVs, from approximately 4% in 2001 to approximately 8% in 2007. This increase nearly all occurred in a step change between 2005 and 2006, creating the suspicion that it is the result of a statistical change rather than a real phenomenon. For Malta, the number of fatal accidents in total and involving LGVs is too small for meaningful analysis. The total number of fatal accidents has remained level (12, 11, 12 per year), whereas the number of fatal accidents involving LCVs is more erratic (4, 1, 1 per year) which is reflected by the sharp decrease from 33% in 2005 to 9% in 2006.

Table 36. Fatal accidents involving LGVs as proportion of all fatal accidents

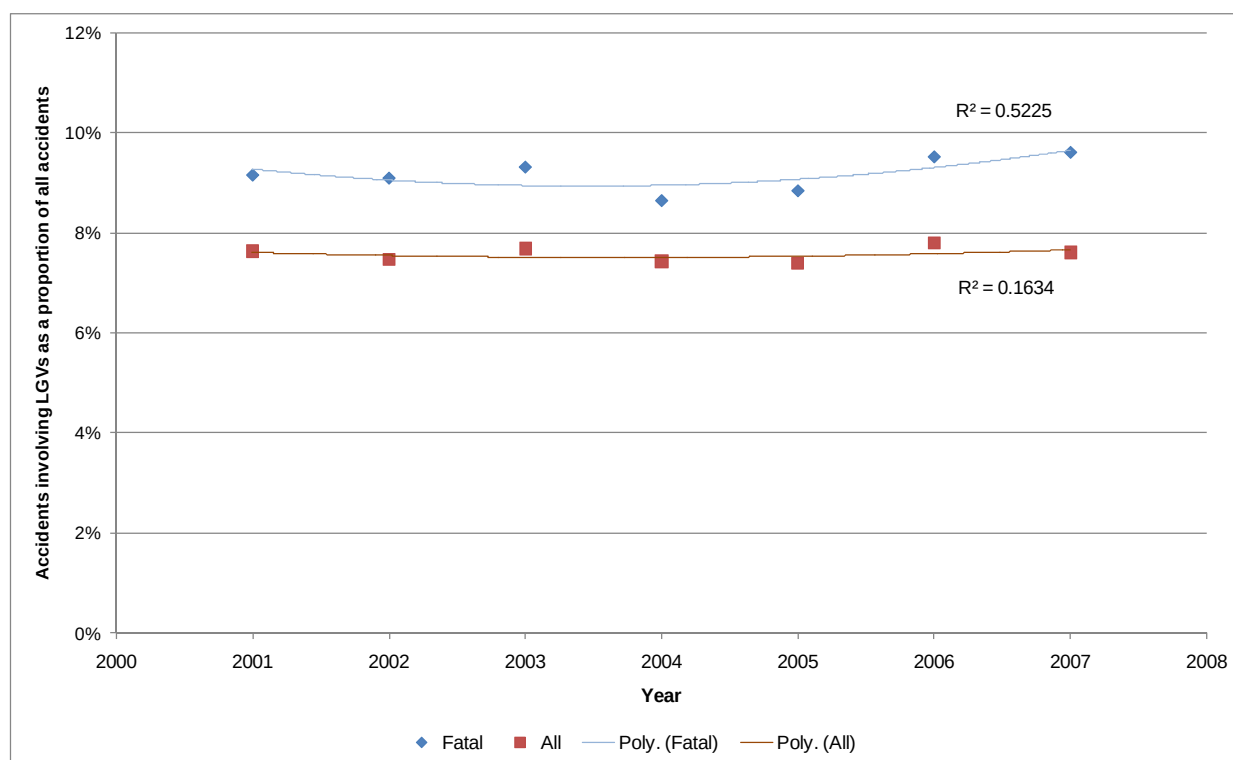
Member State	2001	2002	2003	2004	2005	2006	2007	% change 01-07 ⁵⁰
Austria	5.6%	5.5%	5.3%	5.4%	5.4%	5.4%	5.3%	-5.3%
Belgium	8.2%	8.2%	8.2%	8.6%	9.3%	9.6%		N/A
Czech Republic					6.6%	8.0%	8.5%	N/A
Denmark	12.8%	11.8%	11.8%	11.1%	12.3%	12.0%	11.9%	-7.0%
Estonia					0.0%	0.1%	0.0%	N/A
Finland	9.2%	9.0%	9.2%	9.4%	8.7%	8.4%	9.2%	0.0%
France	4.6%	4.4%	4.7%	4.7%	4.1%	7.2%	7.8%	+25.6%
Germany ⁵¹	5.4%	5.1%	5.1%					N/A
Great Britain	7.6%	7.6%	7.8%	7.2%	7.7%	7.8%	7.6%	0.0%
Greece	11.2%	10.0%	9.9%	10.1%	9.3%	9.0%	8.9%	-20.5%
Hungary			8.6%	9.2%	9.7%	9.3%	9.3%	N/A
Ireland	12.1%	12.4%	12.9%					N/A
Italy	3.7%	3.2%	3.6%	3.5%	3.3%	2.8%	2.5%	-32.4%
Malta					11.9%	14.7%	14.5%	N/A
Netherlands ⁵²	13.6%	12.8%	13.3%	13.6%	13.1%	13.3%	12.5%	-8.1%
Portugal	23.6%	24.5%	24.2%	23.0%	22.6%	22.4%	22.1%	-6.4%
Spain	11.7%	12.1%	12.0%	12.1%	12.3%	13.3%	13.1%	+12.0%
Sweden	7.2%	7.2%	3.3%	3.5%	4.3%	5.3%	5.1%	-29.2%
United Kingdom	7.7%	7.6%	7.8%	7.2%	7.7%			N/A

⁵⁰ Where sufficient data are available.⁵¹ Data taken from IMPROVER Final Project Report (Höhnscheid *et al*, 2006)⁵² Data from SWOV – unexplained sharp decrease in number of accidents in CARE database (4208 in 2003 to 1217 in 2004). SWOV data up to 2003 very similar to CARE data.

There was insufficient data available from individual Member States to allow the data to be presented for EU-15, EU-25 or EU-27. Therefore, in order to identify a European trend, it has been necessary to estimate the total.

The method used to estimate the total was to calculate a weighted average proportion of accidents that involved LGVs. The sum of accidents involving LGVs in each Member State where data were available was divided by the sum of the corresponding number of accidents involving all vehicle types in those Member States⁵³. In some cases, data were available for all accidents but not for LGV accidents and therefore the data were excluded. Using data from 2006, where it was available, the analysis estimated that LGV accidents account for 7.8% of all accidents. In 2006, there were 1.28 million accidents in EU-27, of which it is estimated that 99,715 involved LGVs. The total number of fatal accidents was not available for EU-25 or EU-27 for 2006, therefore the proportion of fatal accidents that involved LGVs has been estimated for 2005 as 8.8%. In 2005, there were 41,274 fatal accidents in EU-25, therefore it is estimated that 3,632 involved LGVs. Figure 38 shows the trend over time in the proportion of accidents that involve LGVs for fatal accidents and accidents of all severities.

Figure 38. Proportion of accidents that involved an LGV



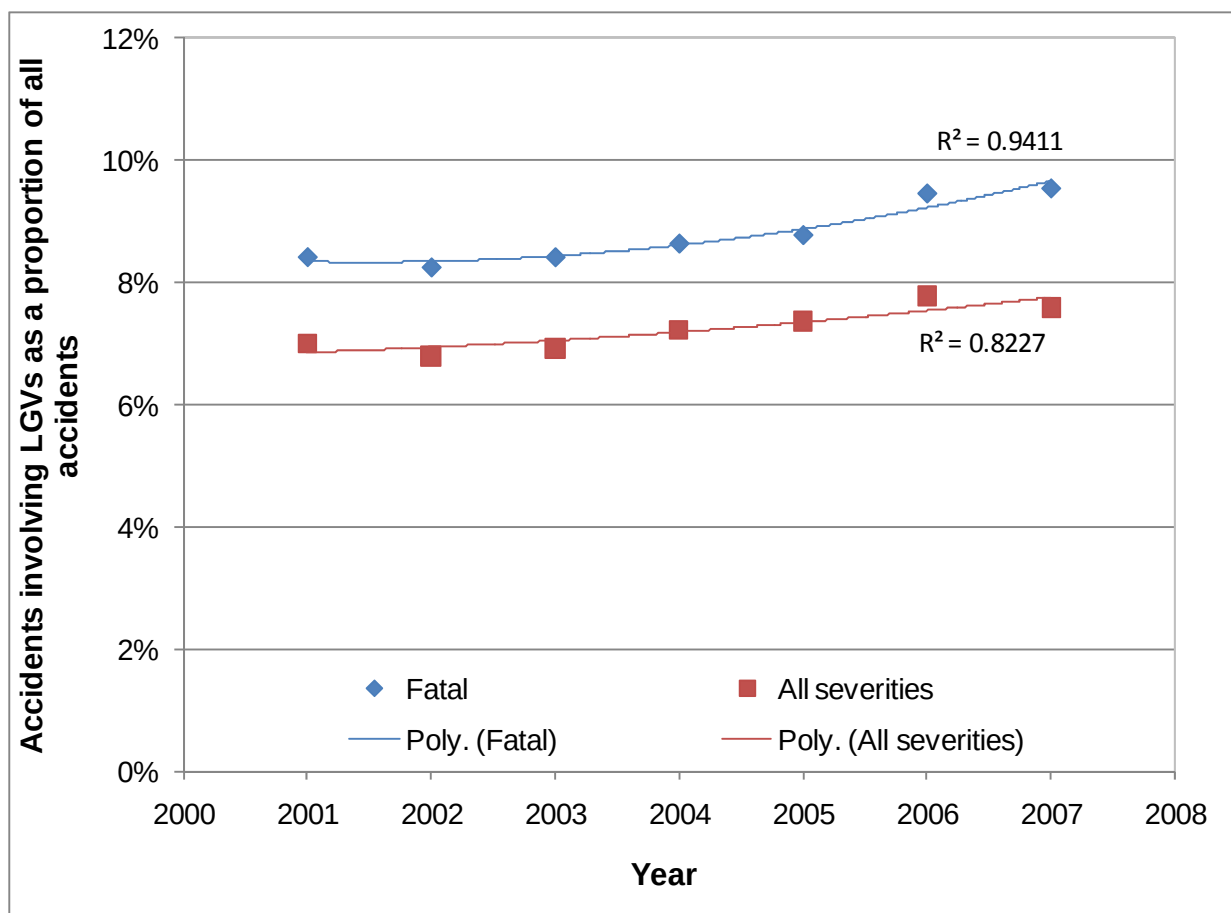
It can be seen that LGVs have been involved in a fairly constant proportion of all accidents in Europe over the period studied. However, there is some suggestion that they have been beginning to represent an increasing proportion of fatal accidents in the most recent years, although the last two years contain data from fewer Member States than earlier years, which could potentially bias the analysis.

After the initial analysis that generated Figure 38, data from Germany was identified. The data were only available for 2001 to 2003 inclusive, but were added using the same

⁵³ Based on data from Belgium, Czech Republic, Denmark, Estonia, Greece, Spain, France, Italy, Hungary, Malta, the Netherlands, Austria, Portugal, Finland, Sweden, and Great Britain.

method described above (weighted average). The result of adding the three years of German data is shown in Figure 39.

**Figure 39. Proportion of accidents that involved an LGV
(including data from Germany 2001-2003)**



The data now suggest a clear increasing trend in the proportion of accidents involving LGVs. However, the proportion of accidents involving LGVs in Germany is lower than in other Member States (approximately 5%) and Germany has one of the highest number of accidents in Europe. This has resulted in the reducing the average for the period 2001 to 2003, while the average proportion for 2004 to 2007 has remained the same. Thus the increasing trend seen is a statistical artefact only and would be highly misleading. This highlights the importance of full data sets, particularly where the analysis is accounting for the distribution of accidents by Member State.

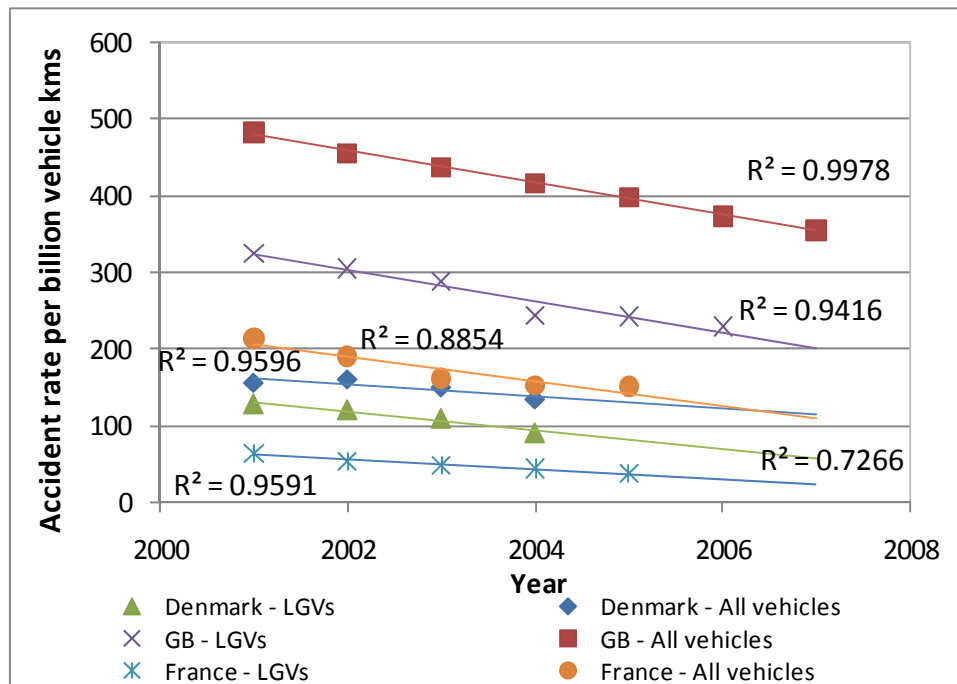
A3.2 Accident rates

The safety performance of the vehicle fleet (e.g. the number of accidents) can be expressed as a function of the risk of an individual vehicle becoming involved in an accident and the exposure to risk. Typically, when comparing the safety performance of different vehicle types, the collective distance driven (i.e. vehicle kilometres) by the relevant vehicle types is taken to represent the exposure to risk. Reviewing the data sources available, the distance travelled by LGVs was only identified for France⁵⁴, Great

⁵⁴ Vehicle km data from France for LGVs is only French registered LGVs. However the total vehicle kms for all vehicles includes those not registered in France. The LGV accident rate and relative accident rate will therefore be over-estimated. French registered vehicles account for 92% of all traffic.

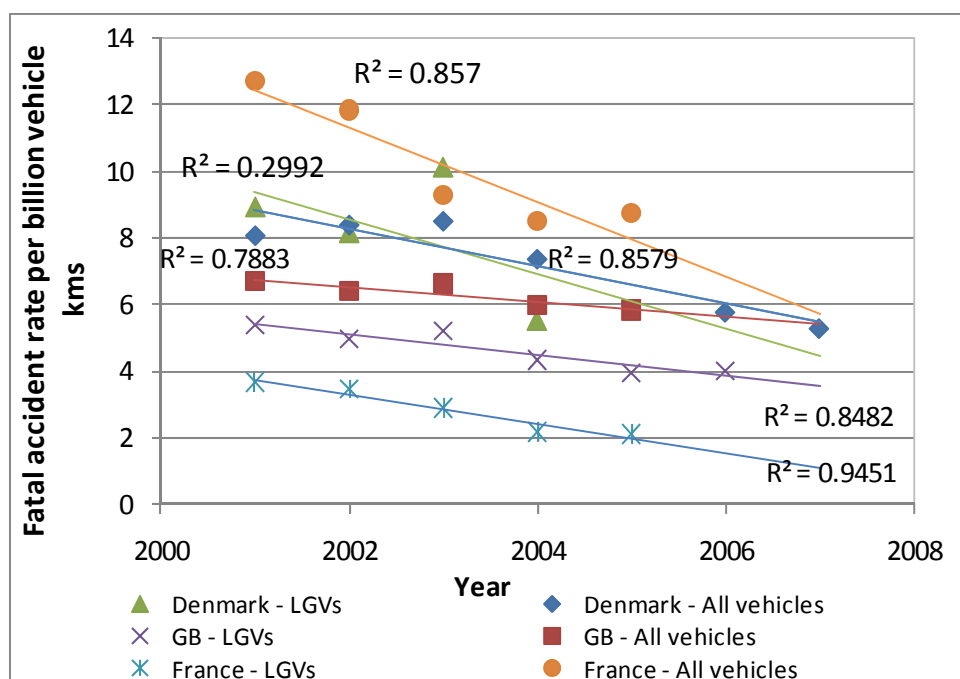
Britain and Denmark. Figure 40 shows the accident rates for accidents of all severities, comparing LGV accidents with all accidents where possible.

Figure 40. Comparison of accident rate for all severities between all vehicle accidents and LGV accidents



These data show that the accident rate for all severities of accident has been decreasing in Denmark, Great Britain and France, for all accidents and for those involving LGVs. The accident rate for all vehicles has decreased at a marginally lower rate in Denmark compared to France and GB. For LGV accidents the rate in France appears to have decreased at a slightly lower rate than in GB and Denmark. The accident rate for LGVs in Great Britain is consistently higher than in Denmark and France. Figure 41 shows the fatal accident rates.

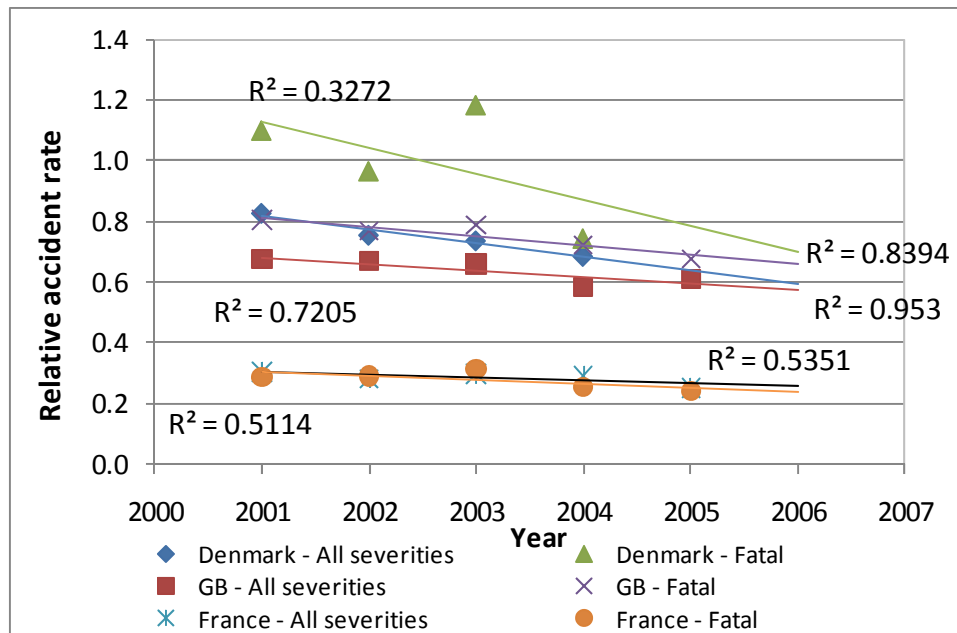
Figure 41. Comparison of fatal accident rate between all vehicle accidents and LGV accidents



France has the highest overall fatal accident rate, but it appears to be decreasing at a faster rate than for all accidents in GB and Denmark. The LGV fatal accident rate is highest in Denmark and lowest in France. The data also show that the fatal accident rate for LGV accidents in Denmark starts higher than the overall fatal accident rate, but has shown a sharper reduction over time. However, there has been more fluctuation in the fatal LGV accident rate, so without more recent data for Denmark it is not clear if this trend is accurate. The fatal accident rate for LGVs in Great Britain has decreased at a similar rate as the overall fatal accident rate.

The relative accident rate (accident rate for LGVs/Overall accident rate) can be used to compare the road safety performance of LGVs against the general vehicle fleet. Figure 42 shows the relative accident rates for all severities and for fatal accidents in France, Denmark and Great Britain.

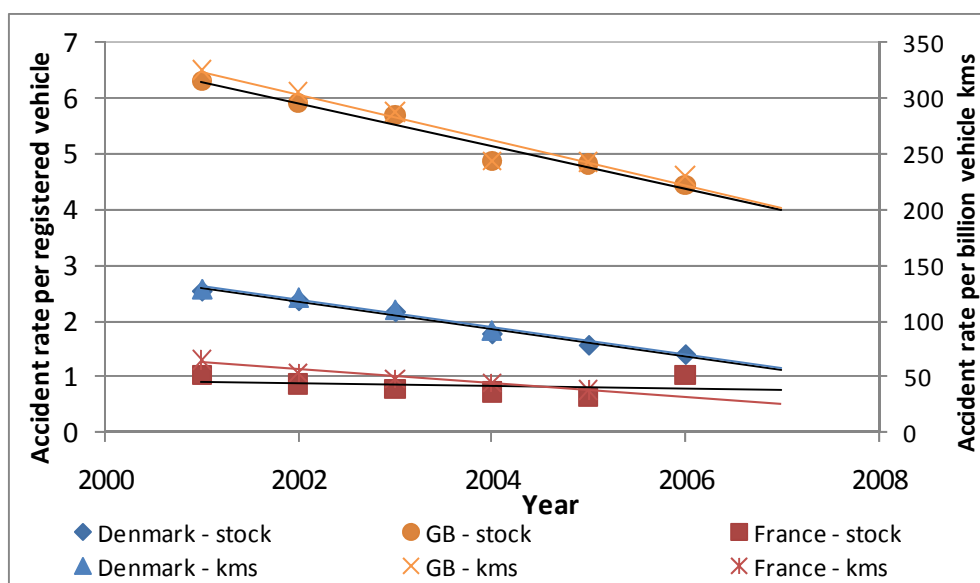
Figure 42. Comparison or relative accident rate for GB and Denmark for fatal accidents and accidents of all severities



A relative accident rate of one indicates that the accident rate for LGVs is equal to that of all vehicles. A value less than one indicates that the accident rate is lower than for all vehicles. A downward trend in the accident rate as shown, particularly for GB and Denmark, indicates that the accident rate for LGVs is decreasing at a greater rate than the accident rate for the whole vehicle fleet. The relative accident rate for Great Britain has been below 1 since 2001 and has shown a downward trend, which is also the case in Denmark when considering all severities of accident. There is a less clear trend for the relative fatal accident rate in Denmark, which indicates that the accident rate for LGVs was higher than that of the overall vehicle fleet but has decreased strongly to below one in 2004. However, the relatively low number of fatal accidents involving LGVs in Denmark means that there is considerable fluctuation in the data that reduces confidence in the trend analysis. Overall, the data suggest, at least for Great Britain and all severities of accident in Denmark, that LGVs have represented a decreasing safety risk in recent years. For France, the relative accident rate is very low for both severities suggesting that the risk associated with LGVs is low compared to other vehicle types, but has remained fairly constant during the period studied.

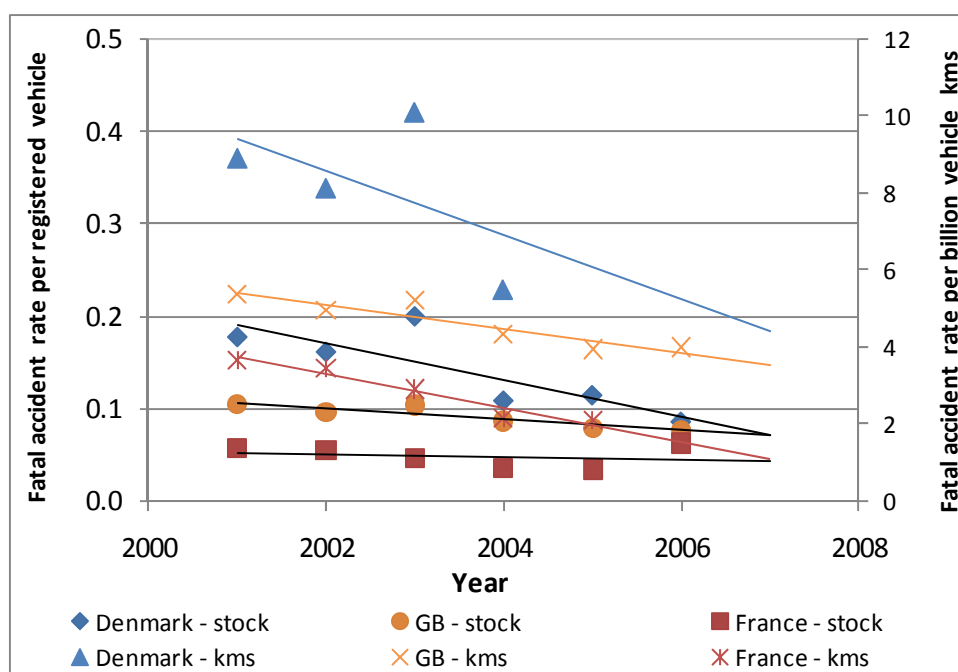
It has not been possible to make an estimate of the accident rates for Europe with the data that were available for traffic performance. However an alternative measure of exposure is the number of vehicles registered. Although the number of vehicles registered (vehicle stock/fleet) is not as true a measure of exposure as traffic performance (vehicle kms), the data are available for more Member States. Where the traffic performance data are available, the accident rate per vehicle registered is compared to the accident rate per billion vehicle km in Figure 43.

Figure 43. Comparison of accident rates using traffic performance and vehicle stock as measures of exposure



These data suggest that the effect of using vehicle stock as the measure of exposure has minimal effect on the overall accident rate for LGVs, particularly for Denmark and GB. The effect on the French data are more noticeable, particularly as the downward trend is replaced by a constant accident rate. Figure 44 shows the comparison for the fatal accident rate for LGVs.

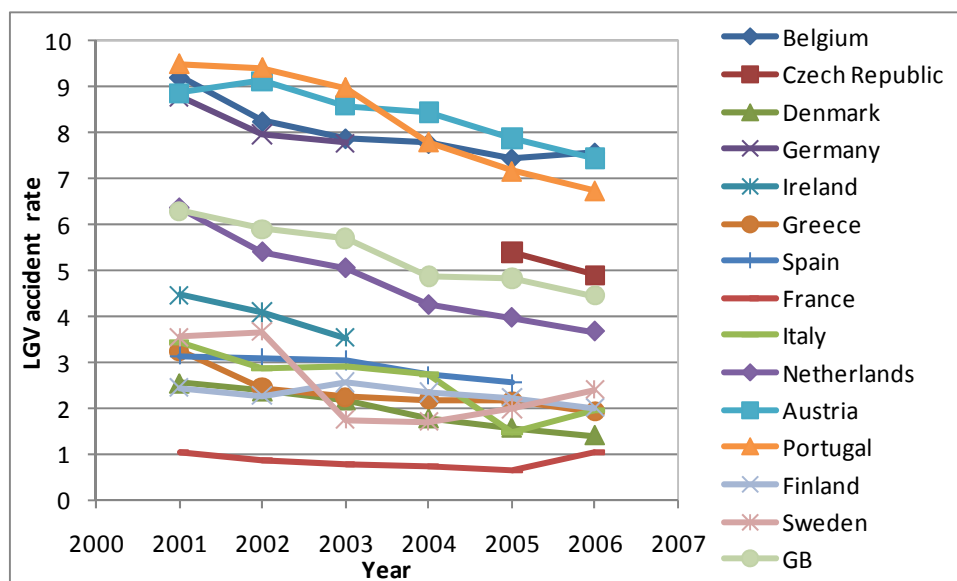
Figure 44. Comparison of fatal accident rates using traffic performance and vehicle stock as measures of exposure



Changing the measure of exposure has had a greater effect on the fatal accident rate than for the overall accident rate. The use of vehicle stock as the exposure measure underestimates the fatal accident rate. The change in the fatal accident rate in France has also been affected by changing the exposure data.

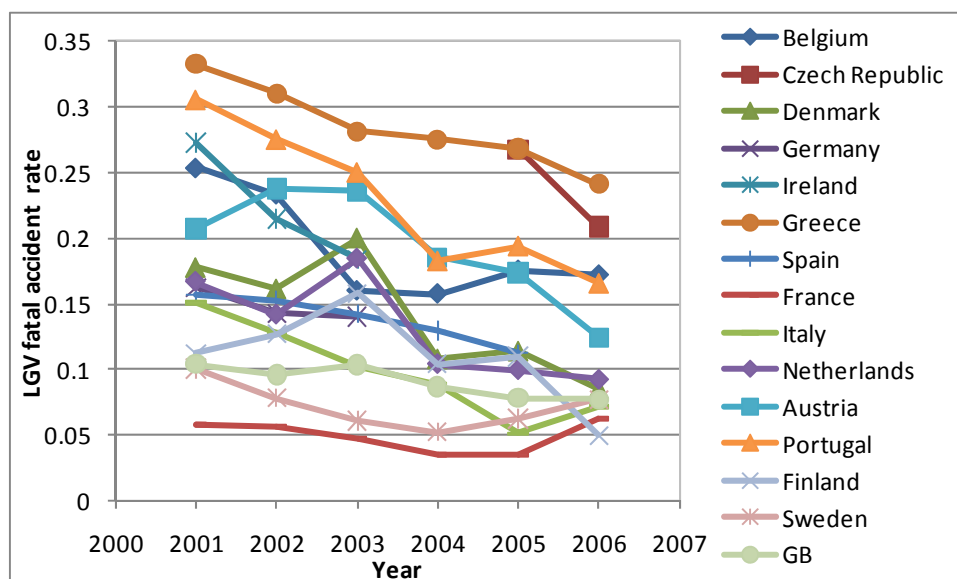
There was data available to calculate the accident rate and fatal accident rate per vehicle registered for 15 Member States. Figure 45 shows that LGV accident rate per vehicle registered.

Figure 45. LGV accident rate per vehicle registered



The data shows that in general, the LGV accident rate per vehicle registered in each Member State has decreased from 2001 to 2006. The only notable exception is France, which after showing an initial decrease, showed an increase between 2005 and 2006 to a similar level to that in 2001. The accident rates for Portugal, Austria, Belgium and Germany are more than twice that of States such as Sweden, Finland, Italy, Denmark, Spain, France, Ireland and Greece. The Accident rates in GB, the Netherlands and Czech Republic are in-between these two groups. Figure 46 shows the fatal accident rates per vehicle registered.

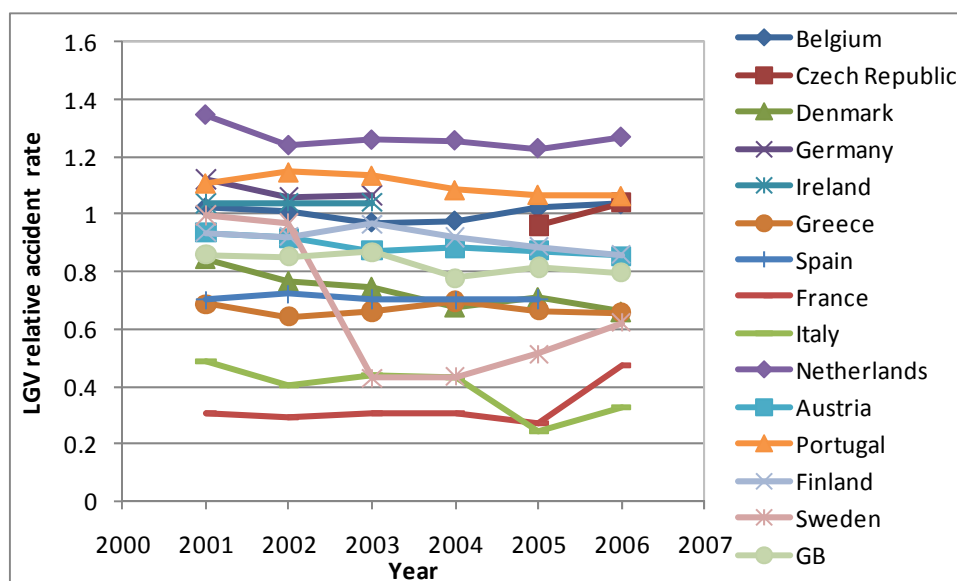
Figure 46. LGV fatal accident rate per vehicle registered



The data shows a general downward trend in the LGV fatal accident rate. Some Member States (France, Italy, Belgium and GB) have seen a levelling off or slight increase in accident rate in the most recent years. In Finland the accident rate increased up to 2003 before starting to decrease. Based on the data in Figure 44, it is likely that the fatal accident rate has been underestimated.

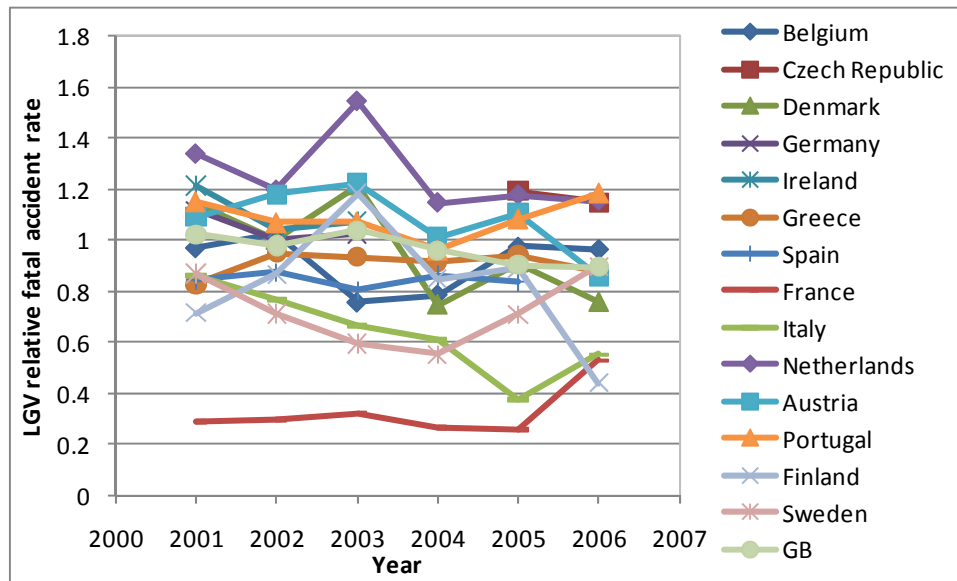
Figure 47 and Figure 48 compare the accident and fatal accident rates for LGVs to the accident and fatal accident rates for all vehicles.

Figure 47. LGV accident rate relative to accident rate for all vehicles (using vehicles registered)



The data available shows that for most Member States, the LGV accident rate is lower than that for all vehicles (relative rate is less than 1) and generally the change in the LGV accident rate is similar to that of the overall accident rate (horizontal line). However, there are some exceptions, the LGV accident rate in Belgium, Portugal Germany and Ireland is higher than the overall accident rate. In Sweden, since 2003 the LGV accident rate has increased more than the overall accident rate, which can also be seen for France and Italy since 2005.

Figure 48. LGV fatal accident rate relative to fatal accident rate for all vehicles (using vehicles registered)



The relative fatal accident rate shows similar trends, although there is a greater amount of fluctuation. Ireland, Portugal, the Netherlands, Czech Republic, Germany and Austria start with an LGV fatal accident rate that is higher than the overall accident rate. Similar trends as described for the overall relative accident rate can be seen for France, Italy and Sweden.

A3.3 Number of casualties

The following section presents data on the number of casualties that occur in all road accidents and road accidents involving LGVs. The majority of the data is taken from the CARE database, but is supplemented by other sources such as publicly available Estonian National Statistics, the Czech Transport Yearbook and UNECE statistics.

Table 37. Summary of data availability in CARE database⁵⁵

Country	Data availability	Remarks	Country	Data availability	Remarks
Belgium	1991-2006		Luxembourg	1991-2004	
Bulgaria		Not yet available	Hungary	2003-2007	
Czech Republic	2005-2007		Malta	2005-2007	
Denmark	1991-2007		Netherlands	1991-2007	
Germany		No data	Austria	1991-2007	
Estonia	2005-2007		Poland	2005	
Ireland	1991-2003		Portugal	1991-2007	
Greece	1991-2007		Romania		Not yet available
Spain	1991-2007		Slovenia		Not yet available
France	1991-2007		Slovakia		Test data
Italy	1991-2007		Finland	1991-2007	
Cyprus		Test data	Sweden	1991-2007	
Latvia	2006-2007		United Kingdom	1991-2007	Northern Ireland data available until 2005
Lithuania		Not yet available			

A3.3.2 All Casualties

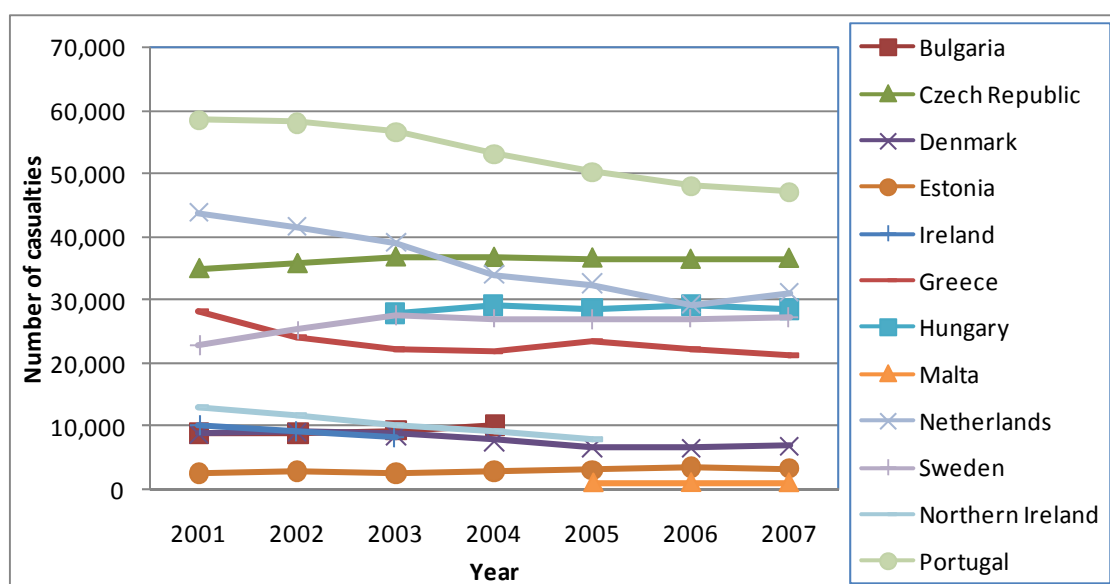
The data relating to the number of casualties in road accidents are shown in Figure 49 and Figure 50, grouped by number of casualties. The data are shown in Table 38.

⁵⁵ http://ec.europa.eu/transport/road_safety/observatory/statistics/care_en.htm

Table 38. Number of casualties by Member State

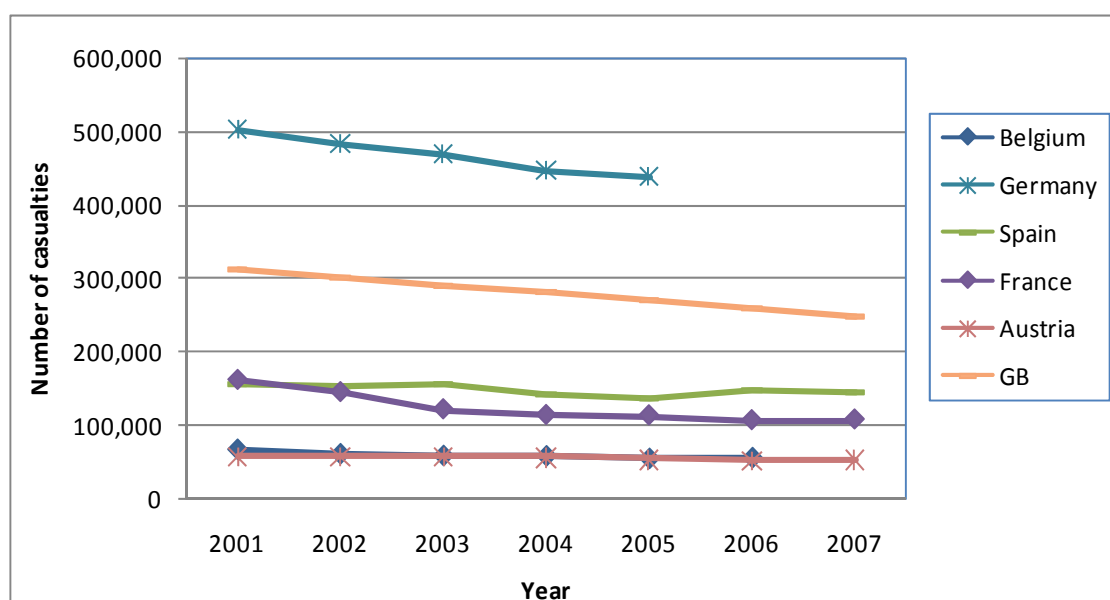
Member State	2001	2002	2003	2004	2005	2006	2007	% change 01-07 ⁵⁶
Austria	57223	57640	57809	56735	54002	52660	53902	-5.8%
Belgium	66780	60854	58539	57976	54699	55684		N/A
Bulgaria	8995	9059	9448	10251				N/A
Czech Republic	35010	35820	36885	36820	36724	36501	36659	+4.7%
Denmark	8894	9253	8843	7913	6919	6821	7062	-20.6%
Estonia	2642	3091	2703	3045	3197	3712	3467	+31.2%
France	161665	145081	121660	113959	113394	106834	107821	-33.3%
Germany ⁵⁷	501752	483255	468783	445968	438804			N/A
Great Britain	313309	302605	290607	280840	271017	258404	247780	-20.9%
Greece	28216	24093	22324	21849	23706	22332	21378	-24.2%
Hungary			27953	29350	28783	29280	28683	N/A
Ireland	10229	9332	8349					N/A
Malta					1160	1192	1164	N/A
Netherlands ⁵⁸	43803	41669	39004	34106	32578	29289	31059	-29.01%
Northern Ireland	13142	11914	10325	9507	8159			N/A
Portugal	58510	58054	56614	53144	50343	47987	47172	-19.4%
Spain	155116	152264	156034	143124	137251	147554	146344	-5.7
Sweden	22913	25307	27632	27062	26899	27081	27220	+18.8%

⁵⁶ Where sufficient data are available.⁵⁷ Fatal data from Eurostat, non-fatal data from UNECE statistics.⁵⁸ Data from SWOV – unexplained sharp decrease in number of accidents in CARE database (4208 in 2003 to 1217 in 2004). SWOV data up to 2003 very similar to CARE data.

Figure 49. Total number of casualties in all road accidents (part 1)

There is a general downward trend in the total number of casualties for most Member States shown. However, Sweden has seen an increase and the number of casualties has remained steady in Bulgaria, Hungary, Estonia and Czech Republic.

There was a sharp decrease in the number of casualties for the Netherlands between 2003 and 2004 (not shown) when using the CARE data. However, this is not present when using data from SWOV (as shown). The difference in the number of casualties is related to the non-fatal injuries because the number of fatalities from both sources is the same.

Figure 50. Total number of casualties in all road accidents (part 2)

The number of casualties in Austria, Belgium and Spain has remained steady. There have been clear reductions in Germany, Great Britain and France during the period shown.

Figure 51 shows the total number of fatalities for Europe. The fatality numbers are dominated by the EU-15.

Figure 51. Total number of fatalities in all road accidents

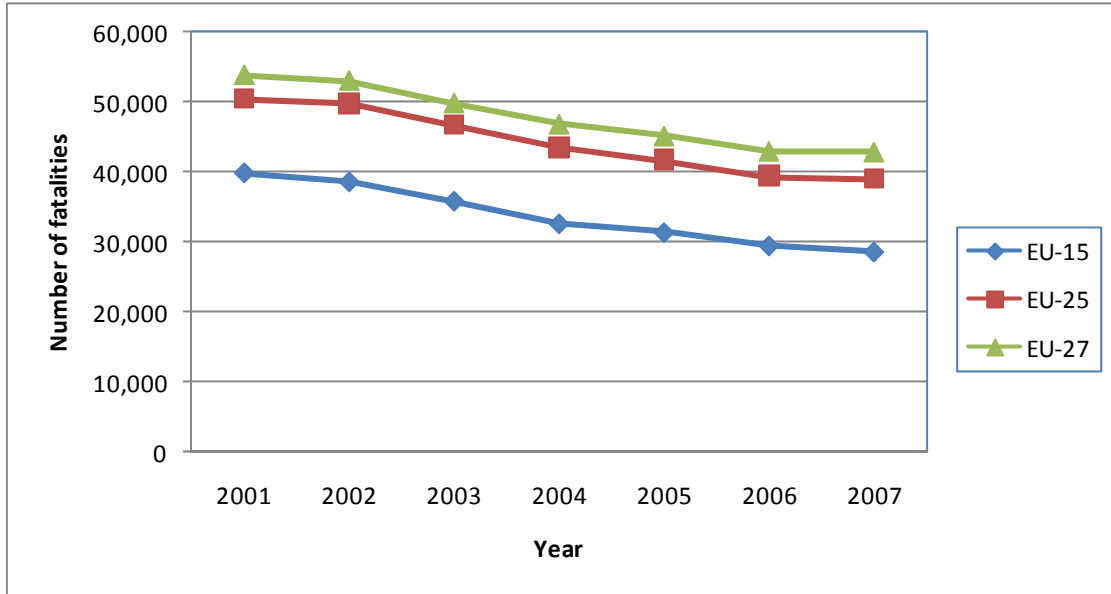


Figure 52 and Figure 53 show the trends in the number of fatalities by Member State.

Figure 52. Total number of fatalities in all road accidents (part 1)

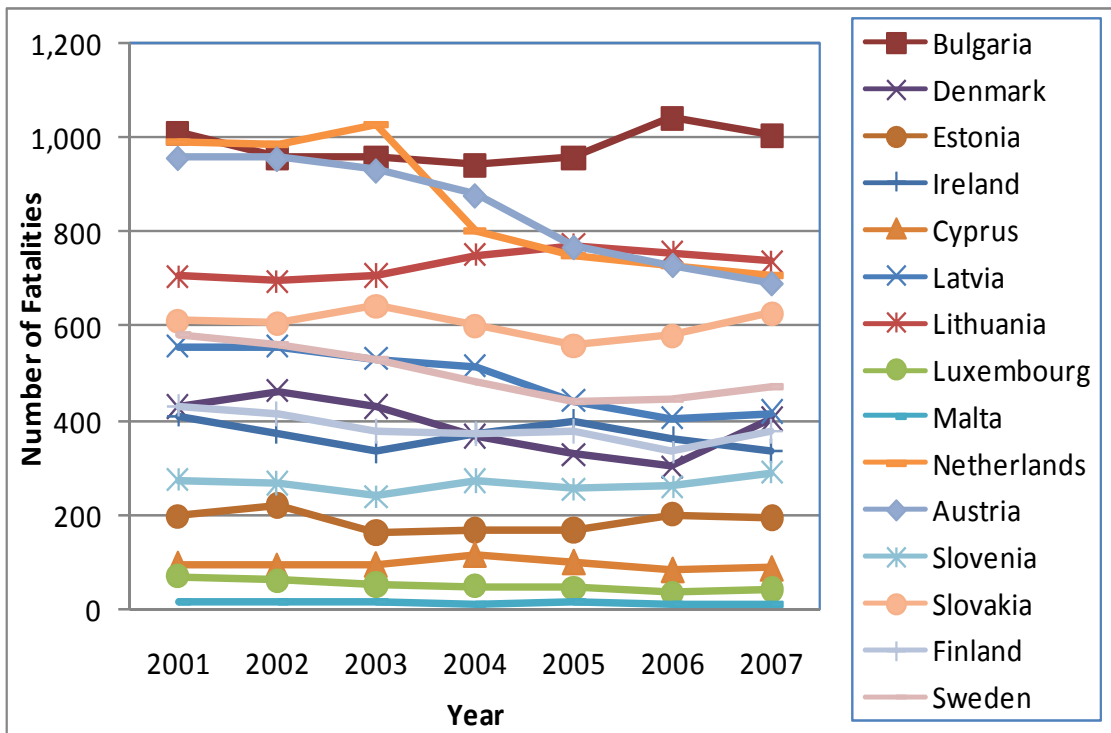
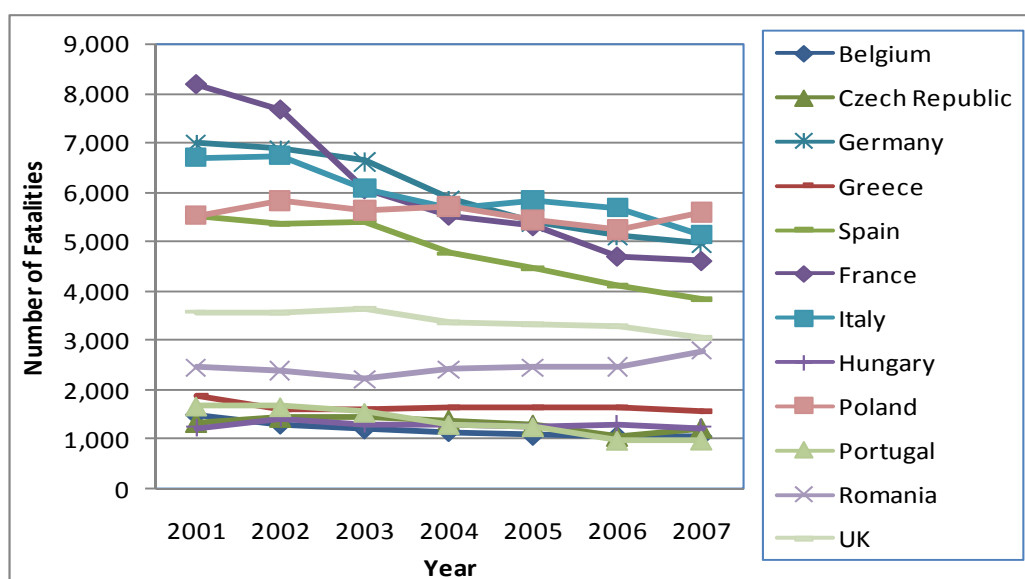


Figure 53. Total number of fatalities in all road accidents (part 2)

There is a clear downward trend for a number of Member States (France, Spain, Germany, Italy, the Netherlands, Austria and Latvia). There is a clear increase in the number of fatalities for Romania and Lithuania, whereas the number of fatalities in other Member States has remained at a similar level for the period observed, with some fluctuations.

A3.3.2 Casualties from accidents involving LGVs

Data from CARE in general is consistent with the data from Eurostat, however the data are more complete in Eurostat in terms of number of fatalities. The following analysis is based on the number of fatalities because it is recognised (as discussed previously) that under-reporting is less of an issue for fatal accidents compared to lower severity accidents. Figure 54 shows the trends in the total number of fatalities in accidents involving LGVs by Member State.

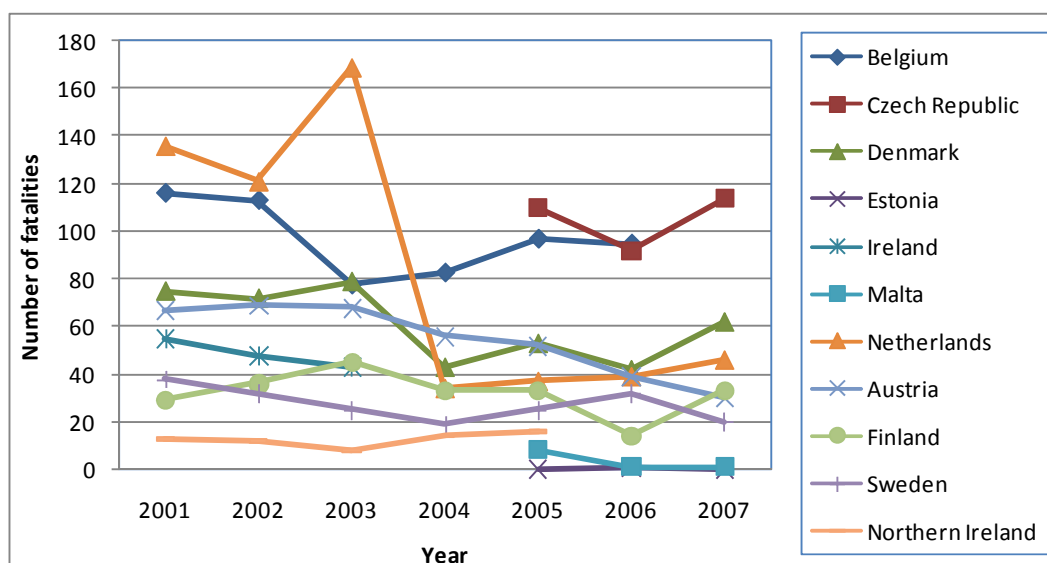
Figure 54. Number of fatalities in accidents involving LGVs, by Member State (part 1)

Table 39. Number of fatalities in accidents involving LGVs, by Member State

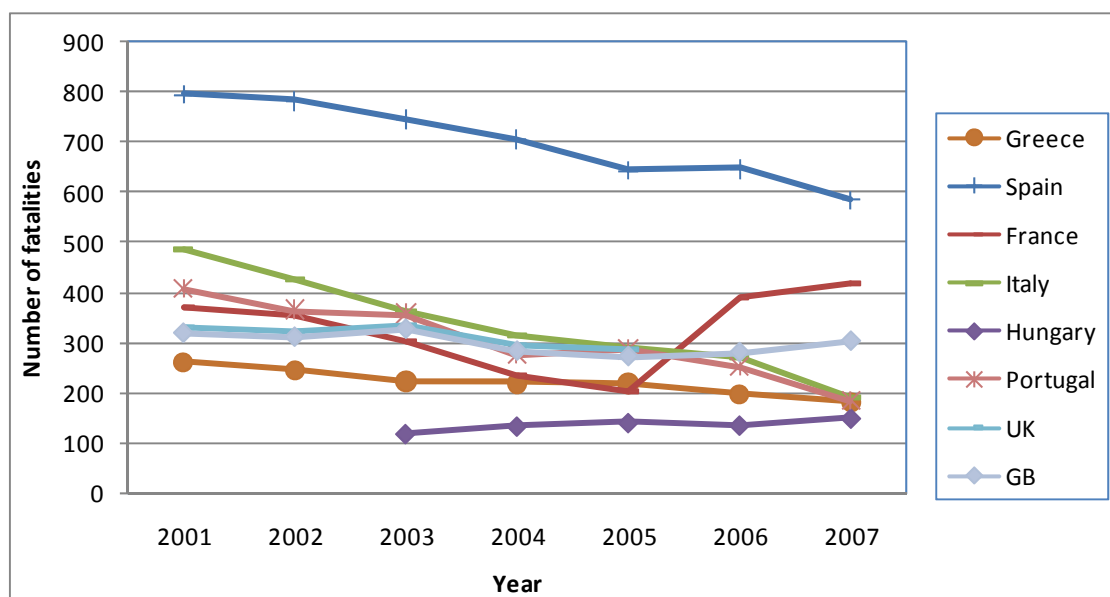
Member State	2001	2002	2003	2004	2005	2006	2007	% change 01-07 ⁵⁹
Austria	67	69	68	56	52	39	30	-55.2%
Belgium	116	113	78	83	97	95		N/A
Czech Republic					110	92	114	N/A
Denmark	75	72	79	43	53	42	62	-17.3%
Estonia					0	1	0	N/A
Finland	29	36	45	33	33	14	33	+13.8%
France	369	353	304	234	203	391	418	+13.3%
Great Britain	319	311	327	283	272	280	303	-5.0%
Greece	261	245	223	220	219	198	182	-30.3%
Hungary			119	134	141	136	150	N/A
Ireland	55	48	43					N/A
Italy	488	429	363	314	289	271	190	-61.1%
Malta					8	1	1	N/A
Netherlands ⁶⁰	136	121	169	34	37	39	46	-6.2%
Northern Ireland	13	12	8	14	16			N/A
Portugal	407	365	357	275	286	252	184	-54.8%
Spain	796	783	746	706	644	647	585	-26.5%
Sweden	38	32	25	19	25	32	20	-47.4%

The number of fatalities for the Netherlands falls sharply between 2003 and 2004 in the data taken from CARE. This was also seen for all casualties in road accidents; however, the equivalent data were not available from SWOV as they were for all casualties, so this could not be investigated further.

There is a clear downward trend in the number of fatalities in LGV accidents in Austria, and there has been an overall reduction in Belgium, Denmark and Sweden although the numbers are more erratic.

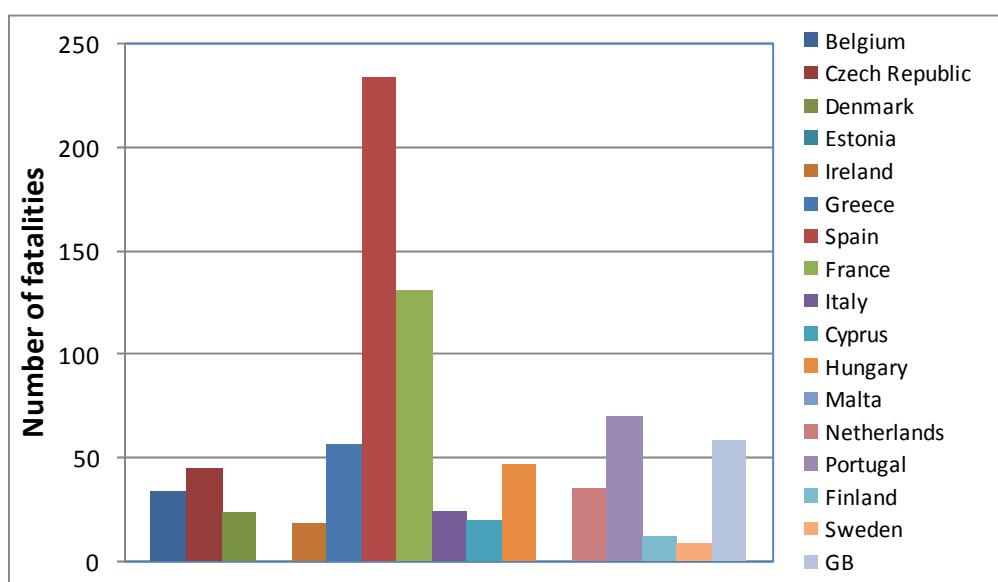
⁵⁹ Where sufficient data are available.

⁶⁰ Data from CARE – unexplained sharp decrease in number of fatalities in CARE database, equivalent data from SWOV not available for further investigation.

Figure 55. Number of fatalities in accidents involving LGVs, by Member State (part2)

There has also been a clear downward trend in the number of fatalities from accidents involving LGVs in Spain, Italy, Portugal, and Greece. The number of fatalities in GB was initially falling, but has increased in the last two years. The number of fatalities in France has increased sharply since 2005, following a steady reduction. This appears anomalous.

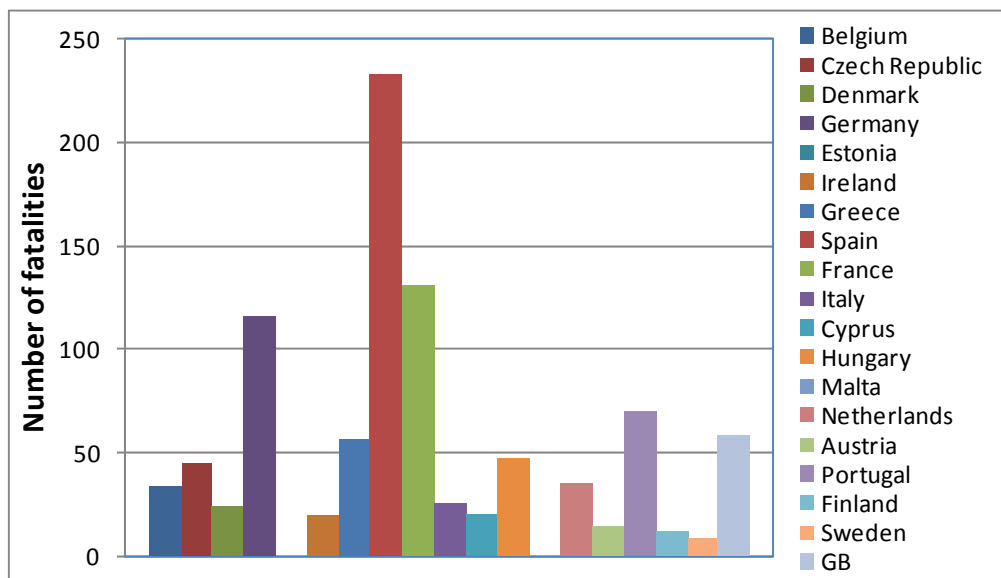
Figure 56 and Figure 57 show the number of LGV occupant casualties and LGV occupant fatalities for the most recent data available (2007) for each Member State.

Figure 56. Number of LGV occupant casualties, by Member State, most recent data available⁶¹

⁶¹ Data for 2007 except for Ireland 2003 and Belgium 2006.

Spain has the largest number of LGV occupant casualties, followed by Great Britain and Portugal. Malta has a very low number of LGV occupant casualties, but this is to be expected because of the low number of accidents involving LGVs.

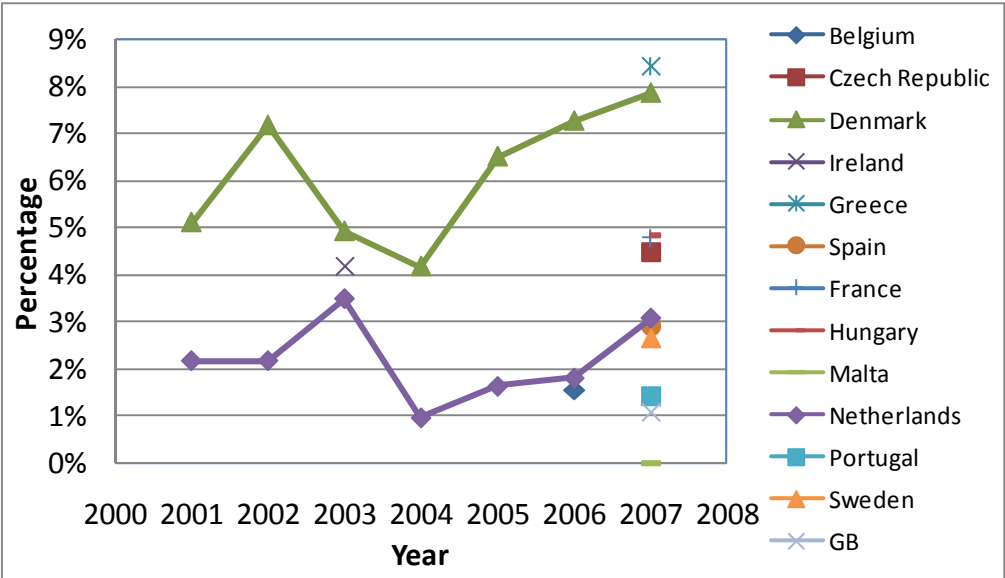
Figure 57. Number of LGV occupant fatalities, by Member State, most recent data available⁶²



Spain also has the largest number of LGV occupant fatalities. Consultation with Spanish organisations did not identify any specific reason for the high number of fatalities. Two possible explanations were provided; that the definition of LGV is not clear in the data collection process; or that the number of vehicle kilometres driven by these vehicles has increased. However, traffic performance data (used as a measure of exposure) for LGVs is not collected in Spain. France has the second largest number of LGV occupant fatalities, followed by Germany. To understand the relative importance of providing protection for LGV occupants, the proportion of LGV occupants that are fatally injured can be analysed. Figure 58 shows the proportion of LGV occupant casualties that are fatally injured.

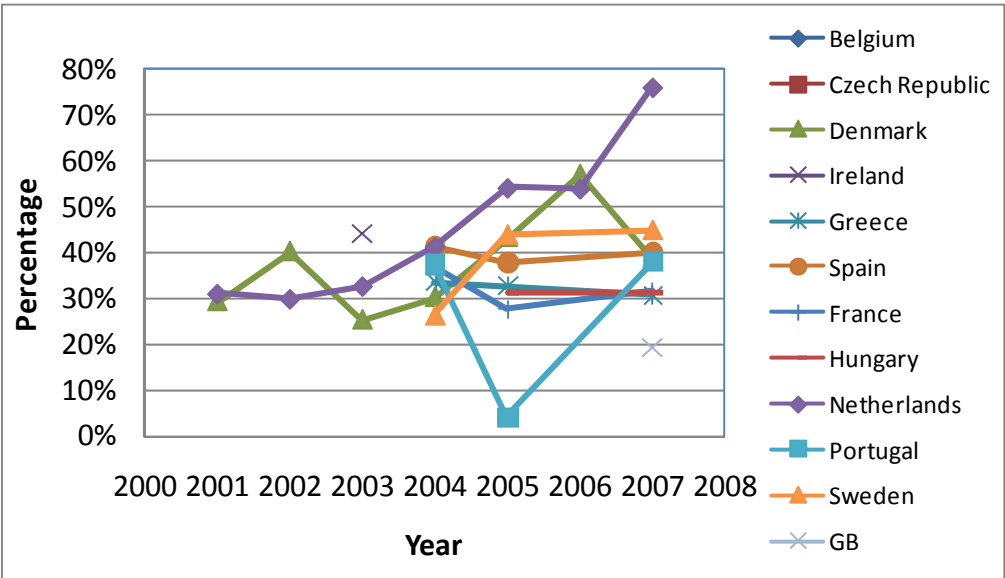
⁶² Data for 2007 except for Ireland 2003, Cyprus 2006, Belgium 2006 and Germany 2004.

Figure 58. Proportion of LGV occupant casualties that are fatally injured



In general, between 1% and 8.5% of LGV occupant casualties are fatally injured. However, it is likely that a substantial proportion of the variation between different Member States could be attributed to differing levels of under-reporting of serious and slight accidents. Where data were available for multiple years (Denmark and the Netherlands) there has been an increase in the proportion of LGV occupant casualties that are fatally injured since 2004. The proportion of LGV occupant casualties fatally injured in Denmark has consistently been greater than in the Netherlands. Another measure of the relative importance of LGV occupant fatalities is to compare the number of LGV occupant fatalities to all fatalities from accidents involving LGVs, as shown in Figure 59.

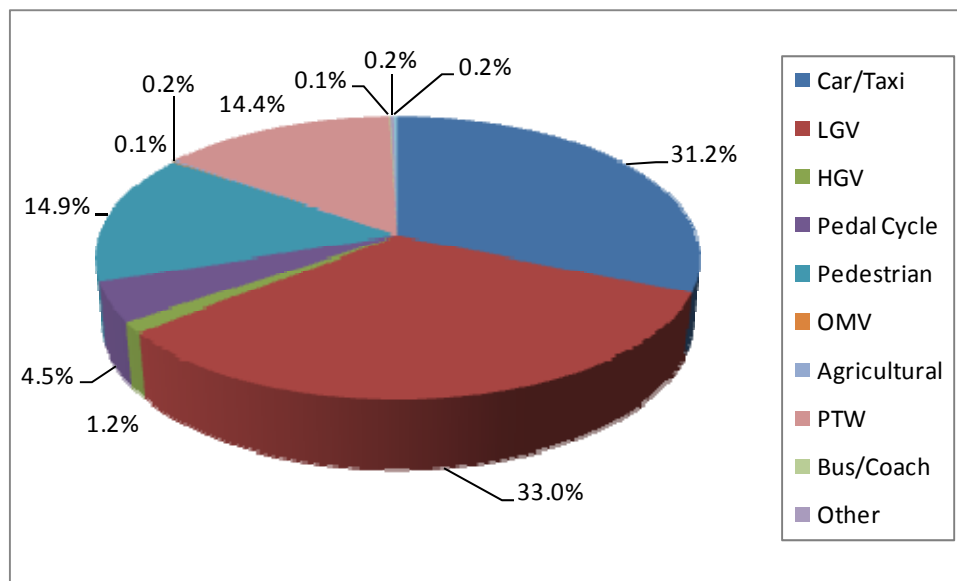
Figure 59. LGV occupant fatalities as percentage of all fatalities in LGV accidents



In 2007, LGV occupant fatalities accounted for between 20% and 75% of all fatalities in accidents involving LGVs, although for most Member States between 30% and 45% of fatalities in LGV accidents were LGV occupants. The data for the Netherlands shows a sharp increase from 30% in 2001 to 75% in 2007. This change is replicated in the Danish data between 2003 and 2006. It should be noted that many of those countries with the more extreme proportions are those with a low overall number of fatalities. The range for those countries with larger sample sizes is much smaller but still quite substantially differing.

Figure 60 shows the distribution of fatalities by type of road user for all accidents and accidents involving LGVs.

Figure 60. Distribution of fatalities by road user type for accidents involving LGVs, EU-21.⁶³



Car occupants and LGV occupants account for a similar proportion of fatalities, 33% and 31% respectively. Pedestrians and PTW riders also account for similar proportions, 15% and 14%.

A3.4 Accident characteristics and causation factors

Many of the publicly available data sources that have been identified and used so far do not contain sufficient level of detail to answer the questions posed about the accident patterns and causation factors. Therefore the following sections describe information identified from a review of literature and analysis of data where it was available.

Neiwöhner *et al* (2001) reported an analysis of accidents involving goods vehicles up to 7.5t (<7.5t) referred to as "transporters". Although the study considers vehicles up to 7.5t rather than the 3.5t limit defined in this report, the data can provide some insight into the types of accidents in which lighter goods vehicles are involved. The accident sample contained 97 accidents between 1995 and 2000 involving 100 transporters, where DEKRA experts were required to reconstruct the accidents. The sample is biased towards accidents in rural areas or on motorways when compared to Federal Statistics

⁶³ Data taken from CARE database which contains data from 21 Member States; however data relating to LGV accidents were not available for Luxembourg, Latvia or Poland. Data for most recent year available (2007 except for Ireland (2003), Belgium (2006), Luxembourg (2004) Northern Ireland and Poland (2005).

for 1999, because accidents are more likely to be included in the sample if they are more severe.

Berg *et al* (2003) reported an analysis of the DEKRA sample of transporter accidents (goods vehicles <7.5t). The sample had increased in size to 186 cases occurring between 1995 and 2001. Again, the definition of a transporter does not match the definition of LGV. However, Berg *et al* (2003) report that 96% of the cases in the sample involved goods vehicles up to 3.5t, i.e. LGVs. The sample was again biased towards more severe accidents, those occurring in rural areas rather than urban areas. Berg *et al* (2004) reported on a more recent version of the database that contained 204 cases, 96% of which included vehicles with a GVW up to 3.5t.

Schepers and Schmidt (2004) carried out an in-depth analysis of accidents involving vans in Germany, using official road traffic accident statistics and vehicle registration data. Vans are not specifically identified in the data, so they were selected based on vehicle type (lorries with a normal body without a tipping mechanism) and the permissible total weight (PTW). The trend analysis showed that since 1997 there was a sharp increase in accidents involving vans with a PTW between 2.8t and 3.5t. However, for vans with a PTW between 2.0 and 2.8t, the number of accidents remained constant and decreased from 2001. The authors introduce the paper by mentioning that the speed limits for vans with a PTW greater than 2.8t was abolished in 1997, which may provide some explanation for the increasing number of accidents. The detailed analysis was based on data from 2002.

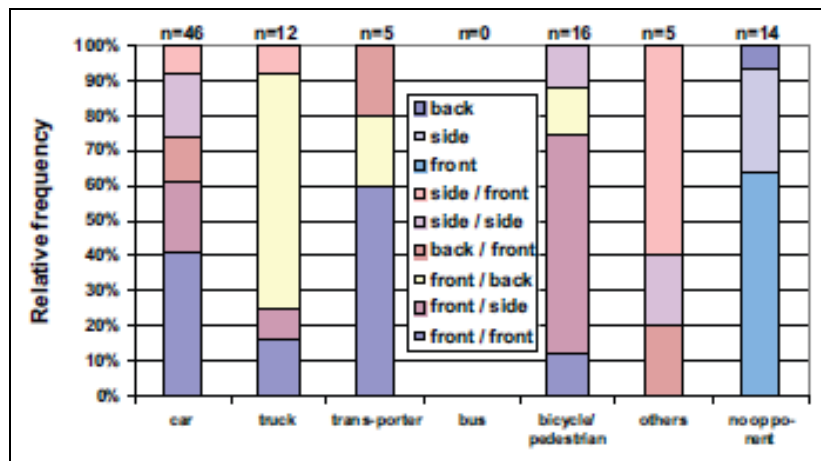
Smith and Knight (2005) carried out an analysis of accidents involving goods vehicles with GVW up to 3.5t, excluding car-derived vans. The accident sample was the HVCIS fatal accident database release 1a. This database is compiled from case-by-case review of police fatal accident reports.

Smith *et al* (2007) carried out a review of commercial vehicle safety research priorities for Great Britain. The research included extensive analysis of the GB National Statistics (STATS19) and in-depth data sources. The analysis included goods vehicles up to a GVW of 3.5t as light commercial vehicles (LCVs). However, the HVCIS fatal accident database (release 1h) excluded vans that were based on a car chassis. The STATS19 analysis covered the period 2003-2005 inclusive.

A3.4.1 Accident patterns

Figure 61 shows the impact partners for the transporter vehicles and categorises the accidents by impact type Neiwöhner *et al* (2001).

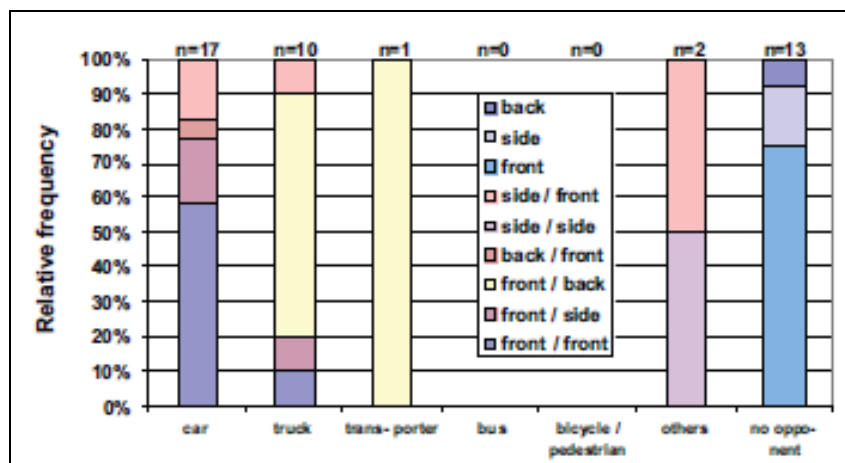
Figure 61. Impact partner /configurations for transporter accidents. (Neiwöhner et al, 2001)



The largest group of accidents is those involving cars (47%), followed by impacts with pedestrians/cyclists (16%), then single vehicle accidents (14%). Approximately 40% of the car accidents are head on. The most frequent impact configuration for transporter accidents involving cyclists or pedestrians are front-side impacts.

Of the transporter occupants, 42% were severely or fatally injured. Figure 62 shows the impact partners and configurations for accidents which resulted in fatally or severely injured transporter occupants.

Figure 62. Impact partner /configurations for accidents resulting in severely or fatally injured transporter occupants (Neiwöhner et al, 2001)



The more recent analysis by Berg *et al* (2003) still showed car occupants as the most frequent opponent to transporter vehicles, 45%. However, the proportion of LGVs that did not have an impact partner and the proportion that collided with a truck were both 13%. Details for cyclists and pedestrians are reported separately as 7% and 10% respectively, but, when combined, they maintain their position as second most frequent impact partner for LGVs.

Berg *et al* (2003) presented information about the impact types and speeds of the transporters, but these were not broken down by collision partner, as seen for the paper by Neiwöhner *et al* (2001). The Berg *et al* (2003) analysis showed that 29% of the transporter collisions were front/side and 25% were head-on. The median travel speed of

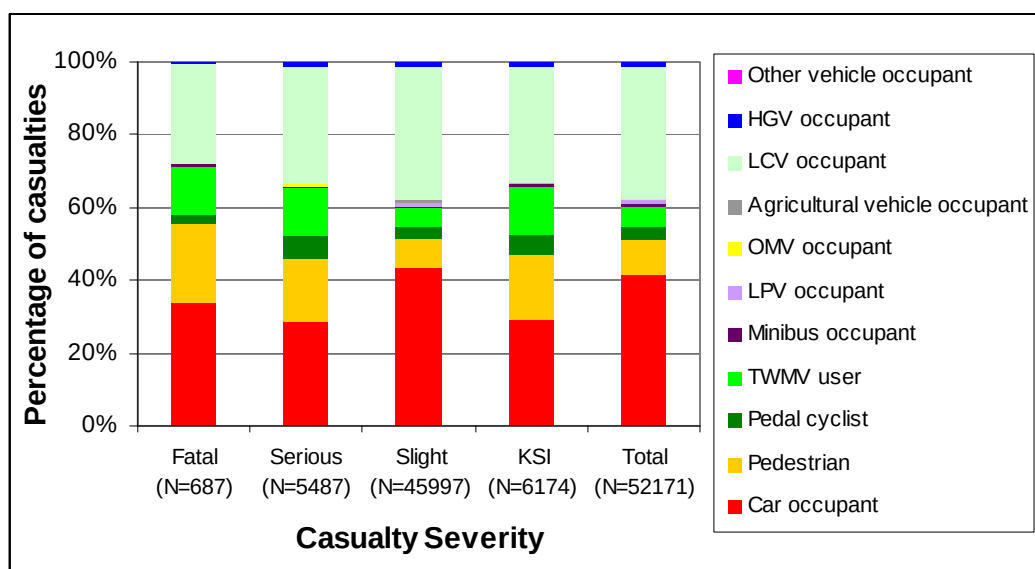
the transporter was between 61 and 70km/h and the median collision speed between 51 and 60km/h.

Berg *et al* (2004) reported that 45% of cases involved a car as the collision partner, with 13% each involving either a goods vehicles or no other vehicle. The front of the transporter was involved in 65% of the accidents, whereas the rear was involved in 8%.

Smith *et al* (2007) considered the types of road users that were injured, rather than the vehicles involved (as Neiwöhner *et al*, 2001) and therefore the data are not directly comparable to that presented above. Additionally, the use of a different vehicle definition also means that the data are not directly comparable.

Figure 63 shows the distribution of casualties by road user type and injury severity in Great Britain from the analysis by Smith *et al* (2007).

Figure 63. Distribution of casualties by road user type and severity where the first point of impact is with an LCV⁶⁴ (Smith *et al*, 2007)



For fatal accidents involving LCVs, car occupants are the most frequently injured road users (34%) followed by LCV occupants (27%). The proportion of car occupant fatalities is very similar to that for EU-21 (Figure 60) although the proportion of LCV occupants is slightly lower than the 31% for EU-21. LCV occupants account for the highest proportion of seriously injured road users (33%), followed by car occupants (29%). Pedestrians are the third most frequent casualty group at all severities.

Both Neiwöhner *et al* (2001) and Smith *et al* (2007) show from their analyses that cars and the LCVs are important participants in these accidents with respect to the injury outcome. The following sections describe more detailed information about accidents involving these traffic participants and their occupants. Pedestrians are also included.

Schepers and Schmid (2004) reported that in Germany one in ten accidents involving vans with a PTW between 2.8 and 3.5t do not involve any other road user (i.e. single vehicle accidents), the most common of which are those where the vehicle leaves the carriageway (13% of all injury accidents involving these vehicles). For vans with PTW between 2 and 2.8t, the equivalent proportion of single vehicle accidents is 6.7%; for

⁶⁴ LCV is defined as light commercial vehicle, which means a goods vehicle with a maximum mass of up to 3.5 tonnes and is therefore equivalent to the term LGV used in the glossary and the main body of this report

goods vehicles 3.5 to 7.5t it is 3.7% and 13.3% for passenger cars. The most common types of accident, each accounting for 25% of accidents involving vans with PTW 2.8t to 3.5t, are:

- Collisions with other vehicles;
- Accidents caused by turning into road or crossing it; and
- Rear-end collisions.

A3.4.1.1 LGV accidents involving cars and car occupant casualties

Smith *et al* (2007) analysed the types of accidents that resulted in car occupant casualties. Table 40 shows the impact configurations for accidents resulting in car occupant fatalities or fatal and serious injury to car occupants (KSI) based on analysis of the STATS19 database.

Table 40. Impact configurations for car occupant casualties in impacts with LCVs

	1 st point of impact on car	1 st point of impact LCV					
		Front	Back	Offside	Nearside	Side*	NI**
Fatal (N=234)	Front	47.4 %	3.8%	0.4%	2.6%	3.0%	0.0%
	Back	6.0%	0.9%	0.0%	0.0%	0.0%	0.0%
	Offside	13.2%	0.4%	1.3%	0.4%	1.7%	0.0%
	Nearside	21.4%	0.4%	0.9%	0.0%	0.9%	0.0%
	Side*	34.6 %	0.9%	2.1%	3.0%	5.1%	0.0%
	NI	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%
KSI (N=1792)	Front	41.5 %	10.8%	7.0%	5.4%	12.4%	0.3%
	Back	9.6%	0.6%	0.1%	0.3%	0.4%	0.1%
	Offside	10.1%	0.6%	2.0%	1.2%	3.2%	0.1%
	Nearside	7.3%	0.3%	1.7%	0.4%	2.1%	0.0%
	Side*	17.4 %	0.9%	3.7%	1.6%	5.3%	0.1%
	NI	0.2%	0.1%	0.0%	0.0%	0.0%	0.4%

* Side is the sum of the offside and nearside

A higher proportion of car occupants fatalities are caused when the first point of impact for each vehicle is the front. Head-on collisions also account for the highest proportion of KSI casualties, however a slightly lower proportion than for the fatalities (highlighted in bold). Impacts where the front of the LCV collides with the side of the car are the second most frequent impact configuration for fatalities (highlighted in bold italics) and KSI casualties; however, the proportion of KSI casualties in impacts of this configuration is approximately half that of the fatalities. Neiwöhner *et al* (2001) also showed the impact distribution of impact location for the LGV where it was in collision with a car. Table 41

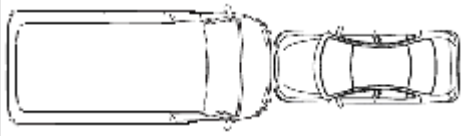
summarises the information about German transporter accidents and GB LCV accidents. Although the data are not directly comparable, similar trends towards impacts with the front of the LCV can be seen, although there is a higher incidence of impacts with the side of the LGV in the German sample.

Table 41. Comparison of impact locations on LGVs for GB and German accidents

Impact location on LGV	STATS19 Fatal (Smith <i>et al</i> , 2007)	STATS19 KSI (Smith <i>et al</i> , 2007)	DEKRA sample (Neiwöhner <i>et al</i> , 2001)
Front	88% of car occupant fatalities	69% of car occupant KSI casualties	61% of LGVs involved in impact with cars
Back	6% of car occupant fatalities	12% of car occupant KSI casualties	13% of LGVs involved in impacts with cars
Offside	3% of car occupant fatalities	11% of car occupant KSI casualties	6% of LGVs involved in impact with cars
Nearside	3% of car occupant fatalities	7% of car occupant KSI casualties	20% of LGVs involved in impact with cars

Further analysis by Smith *et al* (2007) was carried out to determine more detailed information about fatal accidents involving LGVs. Head-on collisions were the most frequent type of accident resulting in car occupant fatalities, so these were analysed further with respect to impact overlap, manoeuvre, speed and seating position. The sample of fatal accidents included 47 fatalities.

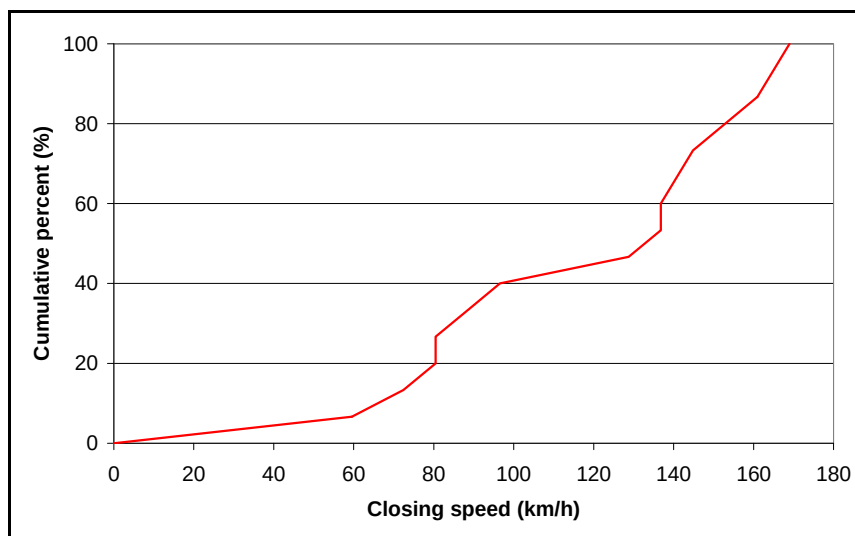
**Table 42. Impact overlap for head- on collisions between cars and LGVs
(Smith *et al*, 2007)**

Ref No.	Impact Overlap	Description	Number of fatalities
1		Full overlap, impact fully distributed across front of car and front of HGV	11 (23.9%)
2		Full overlap with offset, damage to full width of car and between one and two thirds of the width of the HGV. Offset to either left or right of the HGV	8 (17.4%)
3		Low overlap, damage to up to one third of the width of each vehicle. Offset to either left or right	8 (17.4%)
4		Partial overlap. Damage to between one and two thirds of the width of both vehicles. Offset to either the left or right	6 (13.0%)
5	Other		13 (28.3%)

The most frequent combination of manoeuvres for head-on collisions was where the vehicles were travelling around opposing bends (34%), followed by accidents where both vehicles were not making a specific manoeuvre (26%). Six percent of the car occupant fatalities resulted from accidents where the car was overtaking and the LGV was not making any specific manoeuvre.

When the impact speed of both vehicles involved is known, then the closing speed for the head-on impact can be calculated. The impact speed was known for 15 pairs of vehicles and Figure 64 shows the cumulative distribution of closing speed on impact.

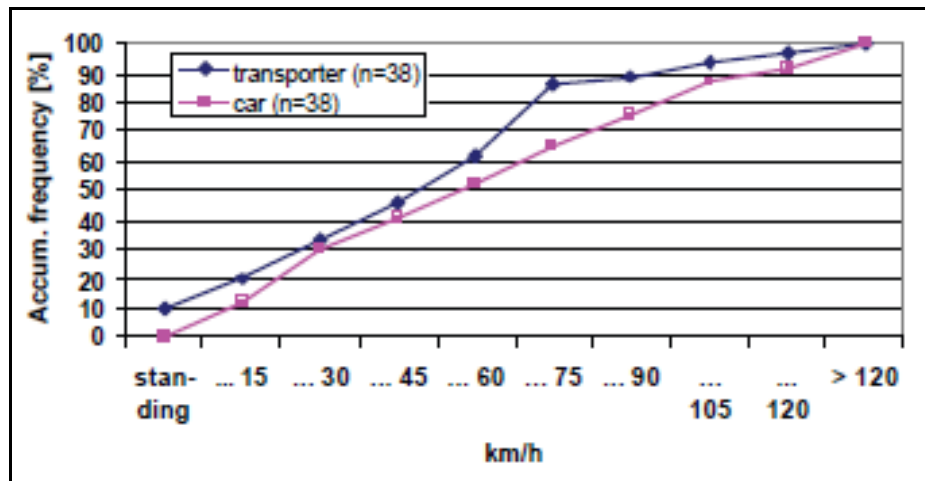
Figure 64. Cumulative distribution of closing speed for LGV-Car head-on collisions (Smith *et al*, 2007)



The median closing speed was approximately 130km/h, with half the closing speeds being below and half above. The mass ratio between cars and LGVs is not as great as it is for cars and HGVs, therefore closing speed is a less accurate surrogate for Delta-V. If a 1.5 tonne car and a fully loaded 3.5 tonne LGV approached each other at 50 km/h the closing speed would be 100 km/h. However, the Delta-V for the car would be approximately 70 km/h. Using the same principle to calculate the expected closing speed for a Delta-V of 56 km/h (the speed at which cars are designed to protect occupants) suggests that a closing speed of 80 km/h would be comparable. Approximately 20% of the collisions occurred at closing speeds of 80 km/h or less. However, this mass ratio will not always be the case because some vehicles classed as passenger cars can weigh as much as 2.5 tonnes and sometimes more, and not all LGVs are designed for the maximum weight of 3.5 tonnes.

Neiwöhner *et al* (2001) also included an analysis of impact speeds for car to transporter accidents. However, the impact speeds for each vehicle were reported separately (not combined into a closing speed). The analysis considered all impacts between cars and transporters (not just head on collisions). Figure 65 shows the cumulative frequency for impact speeds of cars and transporters. An impact speed of 60km/h encompasses 52% of the cars and 62% of the transporters, indicating that the cars had higher impact speeds than the transporters.

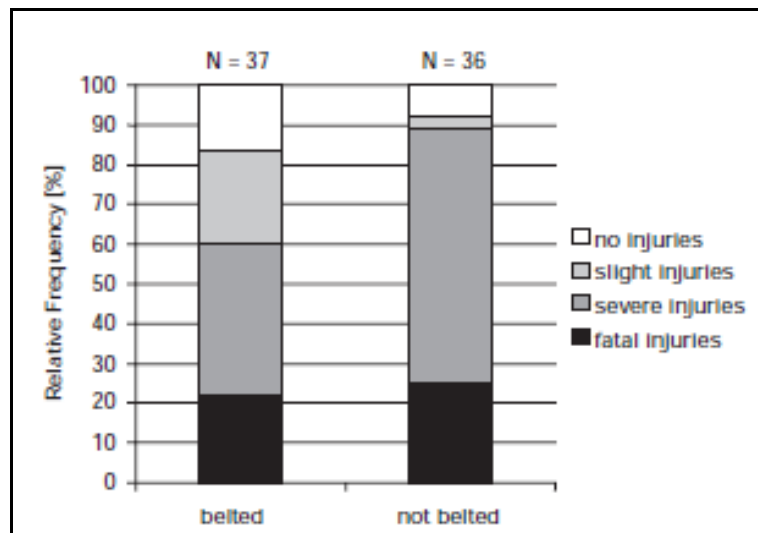
Figure 65. Impact speeds of transporters and passenger cars (Neiwöhner *et al* (2001))



A3.4.1.2 Single vehicle LGV accident or those resulting in LGV occupant casualties

Berg *et al* (2003) considered the effect of seat belt use on the severity of injury sustained by the front seat occupants of transporter vehicles. Figure 66 shows the severity distributions of belted and unbelted transporter occupants.

Figure 66. Severity distribution for belted and unbelted transporter occupants



Approximately 89% of the unbelted occupants received fatal or severe injuries, compared to approximately 60% of the belted occupants. The 2004 paper by Berg *et al* reported that approximately 87% of the unbelted occupants were fatally injured compared to approximately 58% of belted occupants.

Analysis of an in-depth database of van accidents in Great Britain by Berg *et al* (2003) showed that there was evidence that 47% of the 492 van drivers were wearing their seatbelt, and a further 9% claimed to have worn the seatbelt. There were 31% that were not belted and a further 13% where the seatbelt use was unknown. The use of seatbelts by co-drivers and passengers was lower than for drivers, with 46% and 62% not wearing seatbelts respectively. When considering the effect of seatbelt use in relation to injury

severity a comparison between the proportion of casualties not wearing seatbelts in relation to fatal, serious and slight casualties can be used. For fatalities, 77% were not wearing a seatbelt, and for serious casualties (MAIS2+) 43% were not belted and for slight casualties/uninjured 37% were not belted.

Analysis of fatal accidents by Smith and Knight (2005) considered the use of seatbelts by LGV occupants. The use of seatbelts was known for 84% of the 68 LGV drivers, 63% of whom were not using a seatbelt; therefore approximately half the drivers were definitely not wearing a seat belt. The use of seatbelts was known for 13 of the 17 front seat passengers, with 77% not wearing a seatbelt. This shows a similar trend to Berg *et al* (2003) in that the use of seatbelts is lower for passengers in LGVs when compared to drivers.

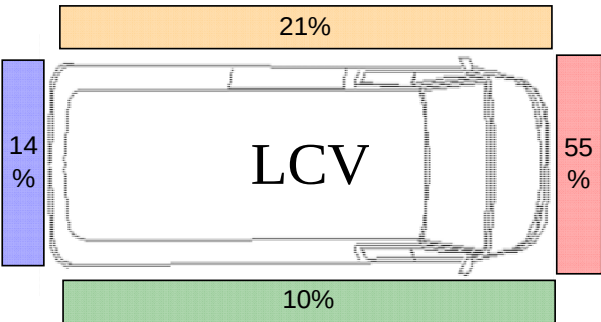
Analysis of the CCIS database (CCIS, 2008) considered the use of seatbelts by type of car, which included car-derived vans. The analysis showed that approximately 67% of fatal or seriously injured occupants of car-derived vans were wearing a seatbelt. For other types of car, the use of seatbelts ranged from 70% in off-road type vehicles to 82% in convertibles.

Accidents where LGVs collide with trucks can often lead to severe injuries for the LGV occupant. Neiwöhner *et al* (2001) identified 12 accidents from the sample of 97 where a transporter collided with a truck. The impact speeds of the transporters ranged from 30 to 120km/h with a mean value between 30 and 45km/h. The impact speeds for the trucks were between 0 and 90km/h with a mean value between 75 and 90 km/h. In 11 of the 12 cases, the transporter was impacted on its front.

A3.4.1.3 LGV accidents involving pedestrian casualties

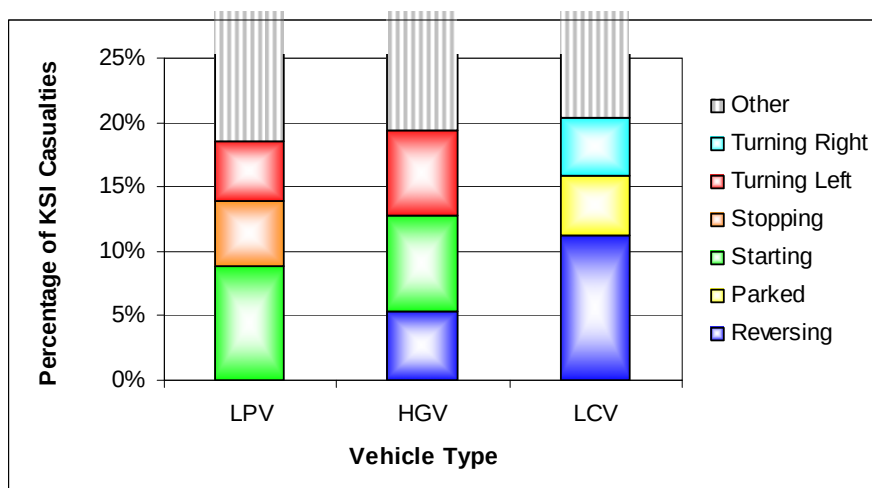
Smith *et al* (2007) reported an analysis of LGV-pedestrian accidents in Great Britain (excluding car-derived vans). Figure 67 shows the impact locations on the LGV.

Figure 67. Impact locations on LGVs for killed and seriously injured pedestrians, STATS19 (Smith *et al*, 2007)



Impacts to the front of the LGV were the most frequent, accounting for just over half of the casualties. Impacts to the nearside were the second most frequent, followed by impacts to the rear. The majority of LGVs, 63%, were described as “going ahead, other” which means that they were not making any particular manoeuvre, probably just travelling straight ahead. Figure 68 shows the three most frequent manoeuvres for LGVs (LCVs) excluding “going ahead, other”. The paper compared pedestrian accidents involving LGVs with pedestrian accidents involving other types of commercial vehicle (large passenger vehicles and heavy goods vehicles).

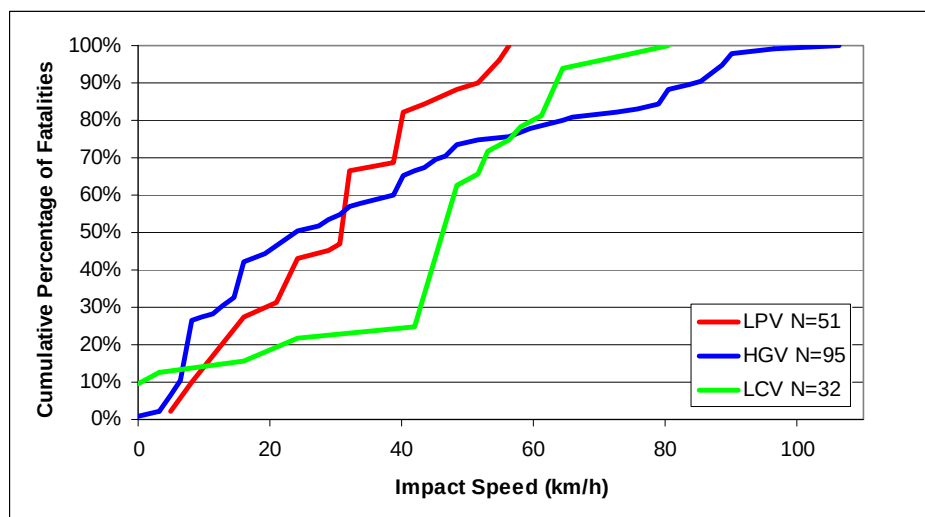
Figure 68. Top three manoeuvres for KSI pedestrian accidents, excluding going ahead other (Smith *et al*, 2007)



Excluding “going ahead other”, reversing was the most frequent manoeuvre being performed by the LGVs involved in impacts with a pedestrian. Accidents where the LGV was parked can include those where a vehicle has been hit by a second vehicle pushing it into the pedestrian, or where a parked vehicle has rolled into a pedestrian, for example if the hand brake has not been correctly applied or fails.

Figure 69 shows the cumulative distribution of impact speed for LGV-pedestrian accidents taken from the Heavy Vehicle Crash Injury Study (HVCIS) Fatal Accident Database (Smith *et al*, 2007).

Figure 69. Comparison of vehicle speed at impact for different vehicle types, HVCIS (Smith *et al*, 2007)

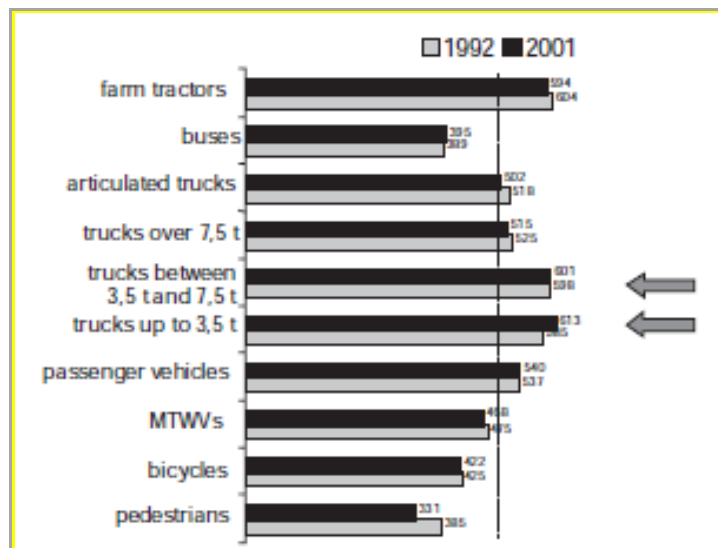


These data show that approximately 25% of LGV-pedestrian accidents occur at speeds up to 40km/h. There is then a sharp increase between 40km/h and 60km/h, accounting for approximately 55% of the LGVs. The maximum impact speed for LGVs was 80km/h.

A3.4.2 Driver contributory factors

Berg *et al* (2003) reported the distribution of the responsibility for accidents, using data from the German Federal Statistics Bureau (StBA).

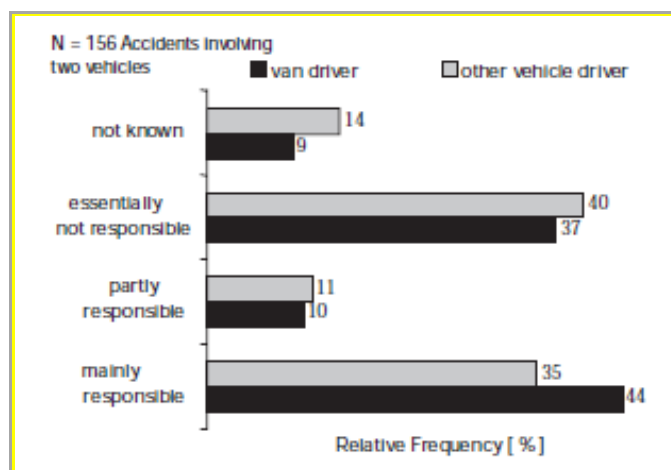
Figure 70. Main person responsible for causing accidents with casualties, per 1000 persons involved in accidents



These data indicate that in 2001, the proportion of drivers of trucks up to 3.5t who were considered responsible for causing the accident was the highest for all vehicle types. The proportion of drivers who contributed to the accident had also increased from 1992. Similar data for 2003 was presented by Berg *et al* (2004), although the drivers of goods vehicles up to 3.5t were not identified separately.

Analysis of the DEKRA detailed accident sample with respect to the contribution to the cause of the accident by the transporter driver showed that there is a tendency for transporter drivers to be at fault more often than the other vehicle drivers as shown in Figure 71.

Figure 71. Distribution of responsibility for 156 two-vehicle accidents

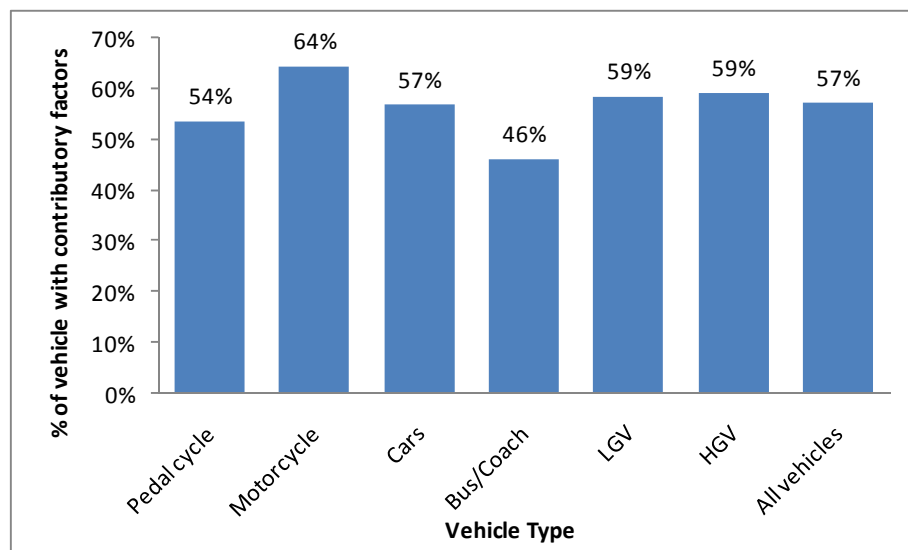


Of the 156 accidents studied, 44% of van drivers were considered to be mainly responsible, compared to 35% of other drivers.

Schepers and Schmidt (2004) showed that in 2002 in Germany, 66% of drivers of vans with PTW 2.8t to 3.5t were the main contributors to the cause of the accident, compared to 54% of drivers of passenger vehicles and 60% of lorries with PTW 3.5t to 7.5t. Speed (that is not adapted to the locality, weather, light conditions and traffic situation) is the most frequently recorded driver behaviour factor, for 19% of drivers of vans with PTW 2.8t to 3.5t. "Distance" and "accident caused by turning off road, turning back" were cited as next most frequent, approximately 18% and 16% respectively. The analysis showed that the number of motorway accidents involving these vans had increased by 350% up until 2001.

Road Casualties Great Britain 2007 (DfT, 2008) reports the assignment of contributory factors to drivers involved in accidents. Contributory factors are only recorded if a police officer attends the scene of an accident and it should be noted that they are assigned on the basis of data available very soon after the accident and not as a result of in-depth expert investigation. 94% of fatal accidents, 88% of serious and 75% of slight accidents have contributory factors assigned, resulting in an average of 77% of accidents overall. When separated by vehicle type, 59% of LGVs involved in accidents are assigned contributory factors. For comparison, the proportion of the different vehicle types that are assigned contributory factors are shown in Figure 72.

Figure 72. Vehicles assigned contributory factors



There are 77 factors that can be assigned. The five most frequent contributory factors coded for LGV drivers are:

1. Failed to look properly, 39.5%;
2. Failed to judge other person's path or speed, 23.0%;
3. Careless, reckless, in a hurry, 18.5%;
4. Poor turn or manoeuvre, 14.9%; and
5. Following too close, 9.5%.

When compared to the proportion of all vehicles that are assigned these contributory factors, the proportion of LGV drivers is higher for four of the five factors. Poor turn or manoeuvre is the only factor that is lower for LGV drivers when compared to all drivers.

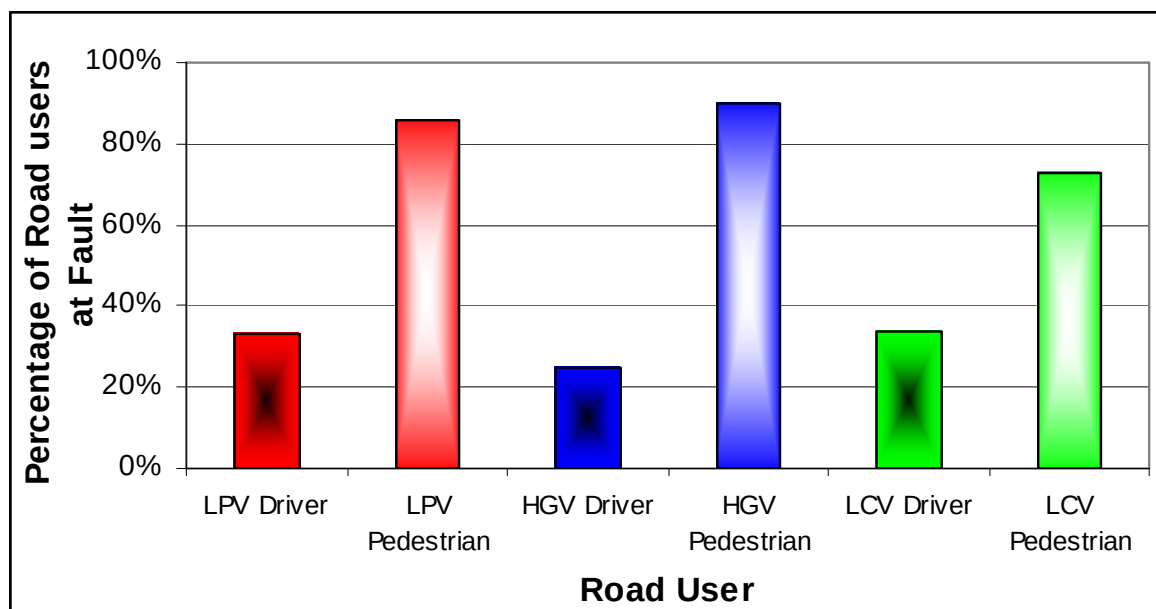
Analysis of fatal accidents by Smith and Knight (2005) showed that the behaviour of 44% of LCV drivers contributed to the cause of the accident in which they were involved. The most frequent behaviour factors were:

- Lack of attention, 24%;
- Excessive speed for conditions, 11%;
- Fatigue, 5%; and
- Error of judgement, 5%.

In comparison, the behaviour of 51% of the drivers of the other vehicles involved was considered to have contributed to the cause of the accidents.

Smith *et al* (2007) reported an analysis of pedestrian accidents involving HGVs, LGVs and LPVs. Figure 73 compares the contribution of the behaviour of the drivers against that of the pedestrians based on analysis of the HVCIS fatal accident database.

Figure 73. Road user whose behaviour was considered a contributory cause, HVCIS (Smith *et al*, 2007)



Further analyses of the HVCIS accident database was undertaken in 2009 as part of an investigation of the role of fatigue in accidents involving different types of large vehicle. The results are shown in Table 43 below.

Table 43. Contributory factors for accidents involving different types of commercial vehicle

Drivers	Commercial Vehicle Type			
	HGV	LGV	Bus/coach	All ⁶⁵
All	1851 (100%)	745 (100%)	473 (100%)	5355 (100%)
Without behavioural factors	1160 (62.7%)	360 (48.3%)	332 (70.2%)	2603 (48.6%)
With behavioural factors	691 (37.3%)	385 (51.7%)	141 (29.8%)	2752 (51.4%)
<i>Fatigue</i>	76 (4.1%)	41 (5.5%)	5 (1.1%)	213 (4.0%)
<i>Excess hours</i>	36 (1.9%)	3 (0.4%)	0 (0.0%)	43 (1.6%)
<i>Fatigue & Excess hours</i>	18 (1.0%)	1 (0.1%)	0 (0.0%)	21 (0.4%)

These data suggest that the drivers of LGVs are more likely to be contributory to the cause of a fatal accident than the drivers of HGVs or buses, but contribute at a similar level to drivers of other vehicles such as cars. The contribution of fatigue and excess hours together was about 6% for both accidents involving HGVs and those involving LGVs. Within this the amount coded as excess hours was almost none for LGV drivers. This is perhaps unsurprising because in general people are less aware of the legal hours limits for LGVs and there is rarely a tachograph present in the vehicle to provide objective enforcement of hours rules. However, it is important to note that driving time has been shown to be a relatively poor indicator of the risk from fatigue. It is quite possible for a driver who has exceeded the mandated hours to be alert and responsive while it is equally possible for a driver well within the hours limit to be fatigued and sleepy with dangerously slow reactions. Thus the presence of a tachograph does not readily allow fatigue to be identified.

The assessment of fatigue as a cause in this accident data therefore often relies on witness statements from the drivers themselves, employers in relation to driving time and other work, and friends and family in relation to the quantity and quality of rest obtained recently. The drivers of LGVs were also found to be more likely to be suffering from fatigue without exceeding hours limits than HGV or bus drivers, but this could be related to the higher hours limits permitted for LGVs.

A3.4.3 Load restraint

The load carried by LGVs has the potential to contribute to the cause of an accident or to contribute to the severity of an accident once it has occurred. Analysis of UK national statistics shows that poorly loaded or overloaded LGVs represented 1.2% of LGVs that were assigned a contributory factor (i.e. 0.7% of all LGVs in accidents). The HVCIS fatal database (release P2J) contained information on 860 LGVs involved in fatal accidents. It showed that, where the loading condition was known, the vehicle was empty at the time of 31% of the fatal accidents. It was found that 1.9% of the LGVs where the vehicle was

⁶⁵ Including cars, motorcycles etc.

known to be loaded suffered load movement before the collision and, where known, this was a contributory factor in 1.6% of the fatal accidents. In contrast 18% of the loaded LGVs experienced some form of load movement after the collision. For approximately 11% of the loaded HGVs this was considered to have contributed to the severity of the injuries received.

A separate study found that load movement could have contributed to the severity of injury for up to approximately 10% of car-derived LGV occupants.

Existing codes of practice on commercial vehicle load security (e.g. European Best Practice Guidelines for cargo security⁶⁶) typically focus on restraining the load under normal driving practices. The accident data suggests that for LGVs few fatal accidents are caused by insecure cargoes but that if loads could be restrained under crash conditions, which is considerably more challenging, then a significant minority of fatalities could be positively influenced.

A3.4.4 Vehicle defects

The HVCIS fatal database (release P2J) shows that approximately 16% of LGVs involved in fatal accidents in GB had some kind of defect and that for 20% of these defective vehicles (3% of all LGVs) the fault could have contributed to the cause or severity of the accident. Just over 7% of all LGVs were found to have a tyre defect (e.g. low tread depth, incorrect inflation pressure etc.) at the time of the accident but only for around 23% of these (1.7% of all LGVs) was the tyre defect considered to have contributed to the cause of the accident. The next most common defect was to the braking system where 5% of LGVs were defective, with 20% (1% of all LGVs) where the brake defect was contributory to the accident.

Knight (2000) found that the comparable figures for HGVs were that 15% of HGVs had defects of which 40% (6% of all HGVs) could have been contributory to the accident. This suggests that roadworthiness is an issue for LGVs but less so than for HGVs, particularly given the fact that HGVs are typically subject to more “in-service” regulation, such as operator licensing, and typically more stringent periodic technical inspections and roadside enforcement.

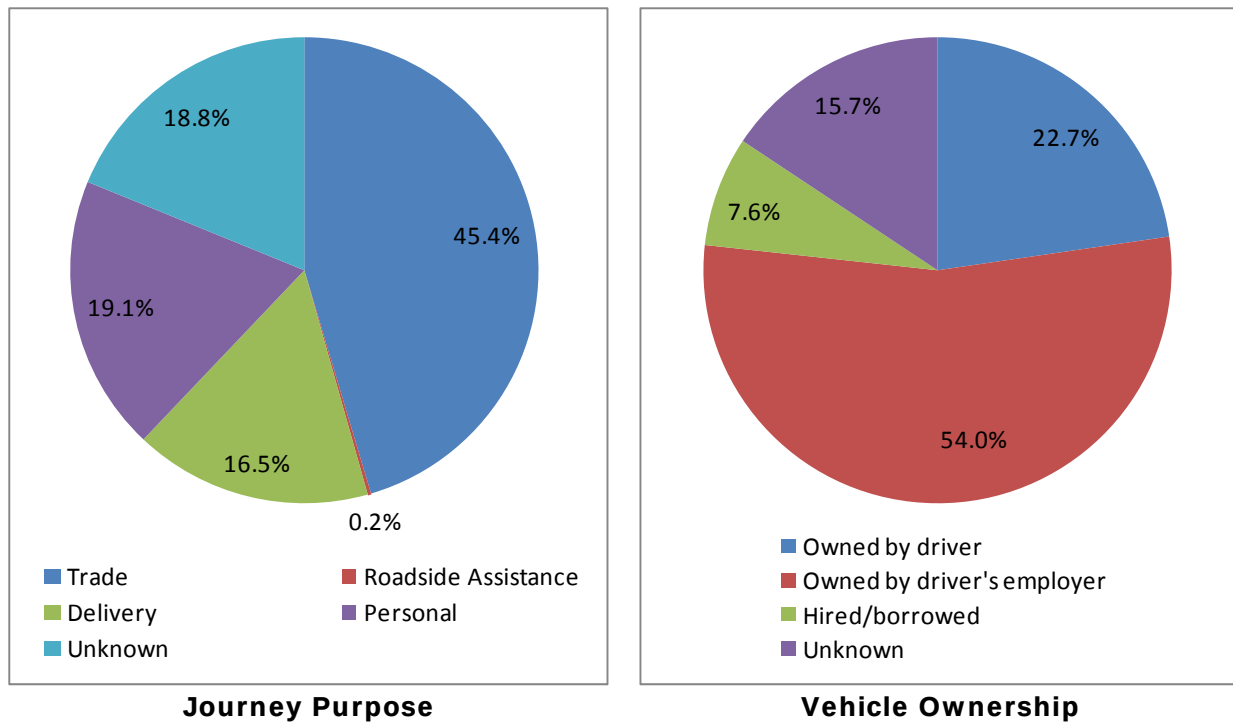
A3.4.5 Work related driving

Clarke *et al* (2008) analysed a sample 2111 collision reports from three UK police forces covering the period 1996-2004 inclusive. The analysis calculated a blameworthiness ratio for drivers involving in work-related accidents, with a value of one meaning the driver is more likely to cause accidents rather than be involved as a blameless or passive driver. Van/pick-up drivers had the second highest ratio of 2.08 compared to HGV drivers with 2.46. This showed that only HGV drivers were more likely to be involved in work-related accidents. The only statistically significant difference in the type of contributory factors for LGVs compared to drivers of other vehicle types was that they were more likely to contribute to an accident through poor observation.

The Heavy Vehicle Crash Injury Study (HVCIS) Fatal Accident Database includes accidents involving LGVs (but excluding those that are derived from a car chassis). For each LGV, the purpose of the journey and the ownership of the vehicle are recorded. Analysis of the most recent release of the database (release 2j, March 2009) contained 839 LGV accidents involving 855 LGVs. Figure 74 summarises the data that are available.

⁶⁶ http://ec.europa.eu/transport/road_safety/vehicles/guidelines_cargo_securing__en.htm

Figure 74. Journey purpose and vehicle ownership of LGVs involved in fatal accidents in Great Britain (HVCIS database)



Almost half of the LGVs were being used for trade at the time of the accidents, with the remaining vehicles being more evenly distributed between delivery and personal use or unknown use.

Just over half of the LGVs were owned by the driver's employer. The second most frequent group was those where the driver owned the vehicle. Hired or borrowed vehicles were the smallest group, approximately 8%. Allen and Browne (2008) found that at the end of 2006, 52% of LGVs were company owned and 48% privately owned. The categories used in the accident database do not exactly match those used in the exposure data. However, if it is assumed that those owned by the driver are privately owned and those owned by the employer, hired or borrowed are all company owned and the distribution of the "unknowns" is the same as the "knowns" then it can be estimated that the 48% of privately owned LGVs are involved in only 27% of the fatal accidents and are, thus under-represented on a per vehicle basis. However, the number of vehicles registered is a poor exposure measure because it may be that company owned vans undertake considerably more mileage than privately owned and are thus exposed to more risk.

Allen and Browne (2008) also estimate that 69% of LGV traffic (vehicle kms) is by company owned vans and just 31% is by privately owned vans. In comparison with the fatal accident data it still appears that privately owned vehicles are under-represented in fatal accidents and company owned over-represented, but the difference is now very small and unlikely to be statistically significant.

Allen and Browne (2008) also divide LGV traffic into categories, as follows:

- Commercial: non-freight (25%)
- Commuting (36%)
- Commercial: Freight (30%)
- Personal (8%)

Again, the categories do not exactly match the categories in the accident data but it can be assumed that commercial non freight is equivalent to trade and roadside assistance; commercial freight is equivalent to deliveries; commuting and personal (Allen and Browne) is equivalent to personal (accident data), and it is assumed that the unknowns in the accident data have the same distribution as for the known data. The comparison in Table 44, below, have been based on these assumptions.

Table 44. Comparison of distance travelled and fatal accident involvement by type of journey

Type of journey	Proportion of vehicle kms	Proportion of fatal accidents
Commercial non-freight	25%	56%
Commercial freight	30%	20%
Personal and commuting	44%	24%

It can be seen that commercial non-freight use of LGVs (for example, engineers undertaking service tasks, construction workers, plumbers etc.) appears to be disproportionately involved in fatal accidents. By contrast, commercial freight, personal and commuting journeys appear to be substantially under-represented in the fatal accident data.

ANNEX 4:**CONSULTATION LETTER AND ORGANISATIONS CONTACTED****A4.1 Organisations contacted****Table 45. Member States representatives consulted**

Member State	Organisation / Department	Response
Belgium	Belgium – Federal Public Service Mobility and Transport	
	Belgium DfT	
Bulgaria	Ministry of Transport	
Czech Republic	Ministry of Transport	
Netherlands	Dutch Directorate Road Infrastructure and Traffic Safety	
	Dutch Ministry	Y
	Dutch vehicle standards development	
Estonia	Ministry of Economic Affairs and Communications	
Finland	Ministry of Transport – Motor vehicles	
	Ministry of Transport – Road Safety	
	Finnish Motor Vehicle Registration Centre	
	Ministry of Transport – Transport and Logistics	
Greece	Hellenic Ministry of Transport and Communications	
Hungary	Ministry of Transport, Telecommunication and Energy	
Iceland	Icelandic Road Administration	
Lithuania	Ministry of Transport	
Luxembourg	Ministry of Transport	
Malta	Malta Transport Authority	
Norway	Norwegian Public Roads Administration	
Poland	Ministry of Infrastructure	
Romania	Ministry of Transports	
Slovakia	Ministry of Transport	
Sweden	Sweden – VTI	
	Swedish Transport Agency	
	Swedish Board of Transportation	Y
UK	Department for Transport	Y

	Environment Agency	
EC	DG TREN	

Table 46. Industrial organisations consulted

Organisation	Response	Organisation	Response
Anglican Water Services		Mondial Assistance (UK)	
Bott- Vehicle Enhancement Centre		National Grid	
British Energy Generation Ltd		Nissan	
BT Fleet		Norwich Union	
Cemex		Royal Mail	Y
Central Networks		Scanning Resources	
Company		Scottish & Southern Energy plc	
		Scottish Power plc	
Dairy Crest (Liquids)		Scottish Water	
Deutsche Post World Net	Y	Severn Trent Water Ltd	
DHL		Southern Water Services Ltd	
Driving Services UK Ltd		Starfasteners UK	
EDF Energy Plc		Swissport Cargo Services	
E-on		Thames Water Utilities	
Ford		Top Fleet Ltd	
Hughes Electrical		United Utilities	
Inchscape Fleet Solutions		Vehicle Lease & Services Ltd	
Iveco		Veoliawater	
JKY Consulting		Western Power Distribution	
London Ambulance Service, NHS Trust		Yorkshire Water Services Ltd	
Masterlease			
Metropolitan Police Service			

Table 47. Other organisations consulted

Organisation	Response
ADAC	
Dekra Automobil AG	
Dutch vehicle standards development	
Freight Transport Association	Y
Institute of German Insurers (GDV)	
Institute of Transport Economics	Y
Heriot-Watt university	
IDIADA	
International Road Transport Union (IRU)	Y
Motor Transport Institute	
OECD international transport forum	
SMMT	Y
Statistics Finland	
Statistics Norway	Y
VTT Technical Research Centre of Finland	

Table 48. Organisations contacted directly

Organisation
IDIADA
Institute of German Insurers (GDV)
The Ministry of Economic Affairs and Communications – Estonia
Statistics Estonia
Road Administration on Traffic and Traffic Accidents – Estonia
Latvian Statistical Office
Ministry of Transport – Latvia
Lithuanian Statistics Office
Ministry of Communications of Lithuania
Participant in the SafetyNet Project
ACEA
Hungarian Central Statistical Office

A4.2 Consultation letter

10th March, 2009

By e-mail



Direct Tel: +44 (0)1344 770696
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Email: tsmith@trl.co.uk
Our Ref: 11110057

Dear Sirs,

Re: The road safety performance of commercial light goods vehicles

TRL have been contracted by the European Parliament to undertake a study to review the road safety of commercial light goods vehicles (LGVs, goods vehicles with a maximum permitted weight of up to 3,500kg) within the European Union. This study is expected to provide the European Parliament with background information on this subject to assist with future regulatory negotiations relating to commercial light goods vehicles.

TRL already have access to some of the information required for this study. However, additional information would enable a more thorough review to be carried out, enabling a more robust assessment of the current situation. There are three main aspects to the study:

- LGV market trends;
- Road safety legislation governing LGVs; and
- Road safety performance.

Each of these subject areas are described in more detail in the attached document. The information that is available may be in a number of different formats (e.g. websites, published data tables, literature). Please can you provide a link to, or a copy of, any information that you consider relevant to this study. If this is not possible then please provide alternative contact details for the information or forward this request to a representative of an institution that can provide the information.



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We will be collecting responses to this letter until **24th March 2009**, so please send us any relevant information by that date. If you have any questions regarding this request for information or would like to discuss the information that has been requested, please feel free to contact myself or one of my colleagues listed below:

- Market trends/accident data - Wesley Hulshof whulshof@trl.co.uk +44 (0)1344770321; or
- Legislation - James Sparey jsparey@trl.co.uk +44 (0)1344770069.

Yours faithfully,

Tanya Smith

Senior Research Engineer

LGV market trends

This part of the research is intended to provide an overview of how the market has changed in the last decade, with respect to the following measures:

- Number of LGVs (new and total registrations) compared with other vehicle types;
- Total vehicle kilometres for LGVs and all vehicle types for comparison;
- Freight activity for LGVs compared to all goods vehicles (tonne-kilometres);
- Vehicle ownership (privately owned vs company owned);
- Vehicle body type (panel vans, box body, flat-bed etc).

We already have data from EuroSTAT and some data from individual Member States but we would be very grateful if you were able to provide any additional data for your particular country that is not recorded by EuroSTAT, or to direct us to contacts, web-sites or books where we may be able to obtain the data directly. In addition to this we would welcome any data or expert opinions you may have on the reasons for the changes shown by the past data or how you expect these trends to develop in the future. For example:

- Are growth trends solely linked to the growth in the internet economy and home delivery or are there other factors that are of influence?
- Where has the freight growth come from for LGVs, i.e. transfer from larger goods vehicles, transfer from passenger cars (in relation to home delivery) or newly generated freight?



- What are the advantages and disadvantages of using LGVs compared with other types of vehicle?
- What do these trends mean in terms of the efficiency of goods transport in general?

Road safety legislation governing LGVs

In many areas, minimum standards of road safety performance of LGVs are prescribed by European Legislation in all Member States. However, some of that legislation allows flexibility in the approach taken by Member States and in other areas the Member State has sole responsibility for regulation. Road safety regulation could, therefore, vary quite considerably in different Member States. For example, in the UK, the following areas of LGV safety vary from the requirements set in Europe:

- The frequency (annual) and technical depth of mandatory periodic roadworthiness inspections for LGVs exceeds the minimum standard required by the EU Directive
- Driver's of LGVs must conform with the requirements of GB Domestic Driver's hours regulations
 - maximum of 10hrs daily driving and 11 hours duty and a minimum of 13 hours rest.
- Driver licensing
 - minimum age limit of 17
 - driving test and examination must be passed
- UK health and safety at work regulations apply and influence, for example
 - vehicle loading and unloading
 - restraint of cargo
- LGVs can be subject to different speed limits compared with other vehicle types, e.g;
 - Motorways: LGVs 70mile/h (113 km/h), passenger cars 70mile/h (113 km/h).
 - Dual carriageways: LGVs 60mile/h (97 km/h), passenger cars 70mile/h (113km/h).
 - Single carriageway: LGVs 50mile/h (80 km/h), passenger cars 60mile/h (97 km/h).

Please could you identify where the road safety legislation in your country varies from or exceeds the European minimum standards.

In addition to this, we would welcome your views on any areas where:

- The scope of existing legislation (European or National) should be extended to include LGVs;
- New legislation is required to improve the road safety performance of LGVs;
- LGVs should be removed from legislative (European or National) requirements.



Road safety performance

The final part of the project reviews the road safety performance of LGVs. Again, data on the annual number of accidents for Europe and the Member States has been obtained from EuroSTAT and additional data will be generated, for those Member States included, from the CARE database. However, some of the main information that the research is attempting to identify is:

- the distribution of casualties between the LGV occupants and their opponents;
- factors that were contributory to the cause of the accidents;
- accident configurations (impact locations/impact partners);
- risk factors (e.g. time pressure, loading issues, driver distraction);
- differences between private and commercially owned vehicles;
- differences between self-employed/employed drivers;
- variations by business sector etc.

Much of this data is not available from European data sources. While TRL has access to UK national statistics, some other publicly available national statistics, existing research literature and UK in-depth accident data (e.g. Heavy Vehicle Crash Injury Study), we would be grateful if respondents could help by providing data related to these questions for other individual Member States or by pointing us in the direction of where relevant literature, data sources or data analyses can be found.

In addition to this, we would welcome stakeholders' subjective views on the performance of LGVs in terms of road safety. For example:

- Do you consider that LGVs have relatively good or poor safety records or are they comparable to other vehicle types?
- Is their safety record is getting better or worse?
- Is any particular vehicle type more or less safe than another?
- Is any particular use (e.g. private, trade (plumber/electrician), delivery etc) more or less safe than another?
- What are the most important types and causes of LGV accidents?
- What new safety measures could improve the safety performance of LGVs?

DIRECTORATE-GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT **B** STRUCTURAL AND COHESION POLICIES

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