European Railway Agency

2014

RAILWAY SAFETY PERFORMANCE IN THE EUROPEAN UNION

Contents

List of abbreviations

ATP	automatic train protection
CSI	common safety indicator
CSTs	common safety targets
CT	Channel Tunnel
ECM	entity in charge of maintenance
ERA	European Railway Agency
ERADIS	European Railway Agency Database of Interoperability and Safety
ERAIL	European railway accident information links
EU	European Union
FWSI	fatalities and weighted serious injuries
IM	infrastructure manager
KPI	key performance indicator
LC	level crossing
NIB	national investigation body
NOTIF-IT	notifications using information technology
NRV	national reference value
NSA	national safety authority
OSP	observed safety performance
p.a.	per annum (per year)
RMMS	rail market monitoring survey
RSD	railway safety directive
RU	railway undertaking
SMS	safety management system

Foreword

This is the fourth biennial report by the Agency on the development of railway safety in the European Union, and my first since taking up the post of Head of Safety. I had hoped that I would be writing to highlight the continued improvement in safety overall and indeed there have been two decades of unprecedented safety improvement for the European Union's railway system. However, the tragic accident near Santiago de Compostela — the worst railway accident in the EU for 15 years — and the accident near Bretigny-sur-Orge, both serve as an important reminder that, underneath the statistics, maintaining railway safety is a daily challenge and one which requires the collaboration of all of those connected with the Railway Sector.

We should also recognise that, away from the headlines, all railway casualties have a heavy impact on the lives of those involved, and that, for some types of accidents, the rate of improvement has stalled. Maintaining the momentum of improvement, including tackling deeper and more complex problems, brings us new challenges. It was Albert Einstein who remarked that, 'The significant problems we face cannot be solved by the same level of thinking that caused them.'

We need to approach railway safety at a European Level from a fresh perspective; one that incorporates the best of safety thinking from other industries, such as Safety Plans and the concept of facilitating a 'just culture' from aviation. Of course, there is still a lot that we can learn from each other within our own community, such as systems to allow incident occurrence reporting across operators and networks.

Recent initiatives from the Commission such as the technical pillar of the 4th Railway Package and the development of a platform for Infrastructure managers in Europe (PRIME) have real potential to bring further safety improvements. The Agency will continue to work collaboratively with National Safety Authorities and National Investigation Bodies, to make sure that the current framework is effective in reducing the risk of accidents. We will also look to our stakeholders to work with us and share our ambition in exploring the best ideas from across industries in the pursuit of railway safety improvements that underpin an increasingly successful railway industry for the European Union.

The year 2014 marks the 10th anniversary of the Agency. While we reflect on all that has been achieved in those ten years, we also need to focus on the future and the daily challenge of maintaining safety on Europe's railways. I am heartened by the range of bold commitments made to this challenge amongst the railway community such as 'Vision Zero' and 'everyone home safe, every day' and I think we should have bold ambitions for safety. In 2014 the Agency will be working on a range of safety initiatives designed to deliver convergence and improvement in safety performance across Europe.

Christopher CARR
Head of Safety Unit

Background

Safety on European railways is relatively high: it is one of the safest modes of transport in Europe. Even so, it is essential to maintain and improve the current level of safety for the benefit of European citizens. A safe railway is more efficient and also a more attractive transport choice, enabling society to address the environmental and economic challenges of the 21st century.

Railways evolved as a regulated industry in which a set of actors share the responsibility for the safe operation of trains. In this setting, the commitment to safety of railway undertakings and infrastructure managers plays a key role. Experience shows that the thorough implementation of a safety management system, underpinned by a genuine safety culture within a railway undertaking is key to unlocking future safety improvements.

The European Railway Agency (ERA) is a cornerstone of the EU strategy for railway safety. It supports national safety authorities (NSAs) and national investigation bodies (NIBs) in their tasks and provides evidence for policy actions at EU level. It develops and promotes the common safety framework as a means for achieving an open railway market in the EU. The Agency provides support to the European Commission for the development of EU legislation.

Monitoring safety performance is one of the key tasks of the Agency. The ERA collects, processes and analyses different sets of data in order to support recommendations on actions to be taken. In this way, the Agency facilitates evidence-based policy-making at the EU level. By continuously monitoring and analysing safety performance, the Agency provides assurance that the objective of maintaining and improving safety where reasonably practicable is achieved.

This report is one of the visible results of the Agency's activities in monitoring safety performance. It is also part of the Agency's effort to provide to its stakeholders a thorough overview of the development of railway safety in the European Union. In accordance with EU legislation ([1]), it has been published by the Agency on a biennial basis since 2006.

The basis for this report is information provided by the National Safety Authorities and National Investigation Bodies. These bodies have a legal obligation to report to the Agency a set of defined information that can be used to assess the development of railway safety in the EU. Notably, the National Safety Authorities gather Common Safety Indicators, defined in legislation, from the railway undertakings and infrastructure managers which provide a footprint for safety performance in Member States and the Union. Although this report is largely based on this data, it also includes additional information gathered from other sources (notably other European Commission services), as well as its own data derived from its oversight activities.

[1] Article 9(2) of the Agency Regulation (881/2004/EC).

Summary

This report is the fourth biennial report on the development of railway safety performance prepared by the European Railway Agency. In accordance with EU legislation, it has been produced every even year by the Agency since it became operational in 2006. It relies on data provided by the NIBs and NSAs of EU Member States and on additional information from the European Commission and other official sources.

The most recent available figures confirm that EU railways remain one of the safest modes of transport in the European Union and worldwide. However, improvement continues to slow; in particular the number of external casualties (trespassers, level-crossing users, suicides) show little improvement, if any.

The safety performance of EU Member States varies considerably, with a more than ten-fold difference in risk for all categories of railway users. This implies that there is clear potential for improvement in numerous areas, as there has been no significant reduction in risk variations over the last ten years.

More than 2 000 significant accidents occur each year on the EU Member States' railways. Their accounted economic costs are as high as EUR 1.7 billion. In these accidents, more than 1 000 people are killed, and a similar number of persons are seriously injured each year. Train collisions and train derailments represent a mere 5% of all significant accidents, while accidents to people caused by rolling stock in motion and level-crossing accidents constitute 87% of railway accidents, excluding suicides.

According to the latest available common safety indicators data, railway safety continued to improve across the EU in 2012, with 2 068 significant accidents resulting in 1 133 fatalities and 1 016 people seriously injured. This represents a 7% drop in the number of significant accidents and a 5% drop in casualties compared to 2011.

Despite a general improvement, there has been no progress in reducing the number of several types of accidents. The number of train collisions, train derailments and fires in rolling stock has stagnated during the last three years, while the number of level-crossing accidents saw only a minor reduction in the same period.

The share of external casualties, as a proportion of all casualties on railways, has grown. In 2012, trespasser, level-crossing and suicide fatalities accounted for more than 97% of all people killed on railways. The upward trend in suicide fatalities on railway premises since 2008 is of a particular concern.

Infrastructure safety saw only limited improvement at EU level, judging by the available figures on the ATP lines equipment and the number of active level crossings with user-side protection. An increased effort is needed should infrastructure improvements drive safety improvements in the future.

There were five fatal train collisions and derailments on EU railways in 2013 and at least two other accidents that would qualify as serious accidents; most of these accidents were investigated by National Investigation Bodies (NIBs). In total, the NIBs opened investigations into 233 accidents and incidents that occurred in 2013. There is a concern to ensure that all EU countries use independent accident investigation as a necessary tool to learn from past accidents and improve safety in the future, as foreseen in the EU legislation.

Safety overview

Outcomes and risk levels

More than 2 000 significant accidents occur each year on the railways of the EU Member States. Accidents to persons caused by rolling stock in motion and level-crossing accidents constitute more than three quarters of railway accidents, excluding suicides. In these accidents, around 1 200 people are killed and a similar number seriously injured each year.

In 2012, railway safety continued to improve across the EU, with 2 068 significant accidents resulting in 1 133 fatalities and 1 016 seriously injured persons in the 28 countries. Accident figures have been decreasing considerably over the last six years; the casualty totals have seen slight, close to uniform, reductions over the same period (Figure 1).

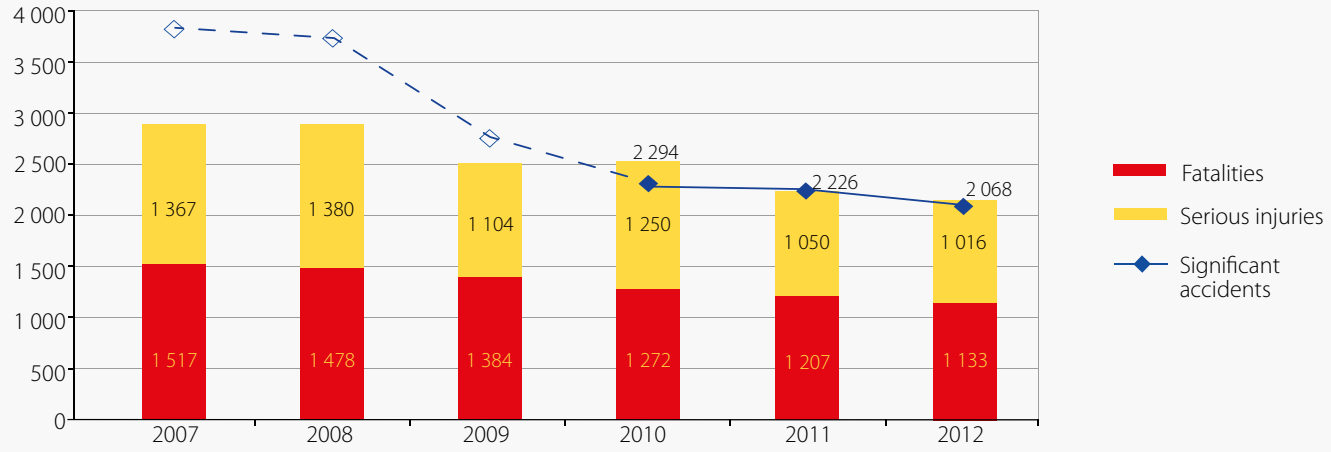


Figure 1: Significant accidents and resulting casualties for the EU-28 (2007–2012) (2)

The recording of significant accidents has only been fully harmonised in the EU since 2010. Since then the trend in significant accidents has been aligned with the trend in casualty numbers. In the past three years, there was approximately one casualty (either fatality or serious injury) per significant accident on average. Significant accidents typically involve one casualty; multiple casualty accidents are far less frequent.

Accident risk, expressed in the number of outcomes per exposure, is probably the best measure of the safety level. The framework for the evaluation of CSTs/NRVs also uses it as a basis for the assessment of safety levels at the level of Member States and the Union. Considering all railway fatalities (excluding suicides), the fatality risk per million train-kilometres (train-km) (system risk) in the period 2010–2012 was 0.3 killed per million train-km in the EU. Similarly, one can estimate the fatality risk of railway passengers (passenger risk). This was 0.15 passengers killed per billion train-km in the period 2010–2012.

Estimating risk levels for different Member States allows us to produce a benchmark highlighting the best and worst performing countries. Here, the railway risk is estimated as a 'hypothetical' third set of National Reference values (NRVs), following the methodology described in the Common Safety Method (CSM) for assessment of achievements of safety targets ([3]). The estimation uses CSI data for the past six years and expresses the risk as the number of fatalities and weighted serious injuries per million train-km in a year. It appears that safety levels vary greatly among Member States (MS). One third of MS have a significantly higher risk than other MSs; the variations in risk within that group of MSs are also significant (Figure 2). It is particularly remarkable that nine MSs have significantly higher risk than the others. A systematic approach to the safety performance improvements of these countries would mean a major step towards genuine EU-wide safety targets in the future.

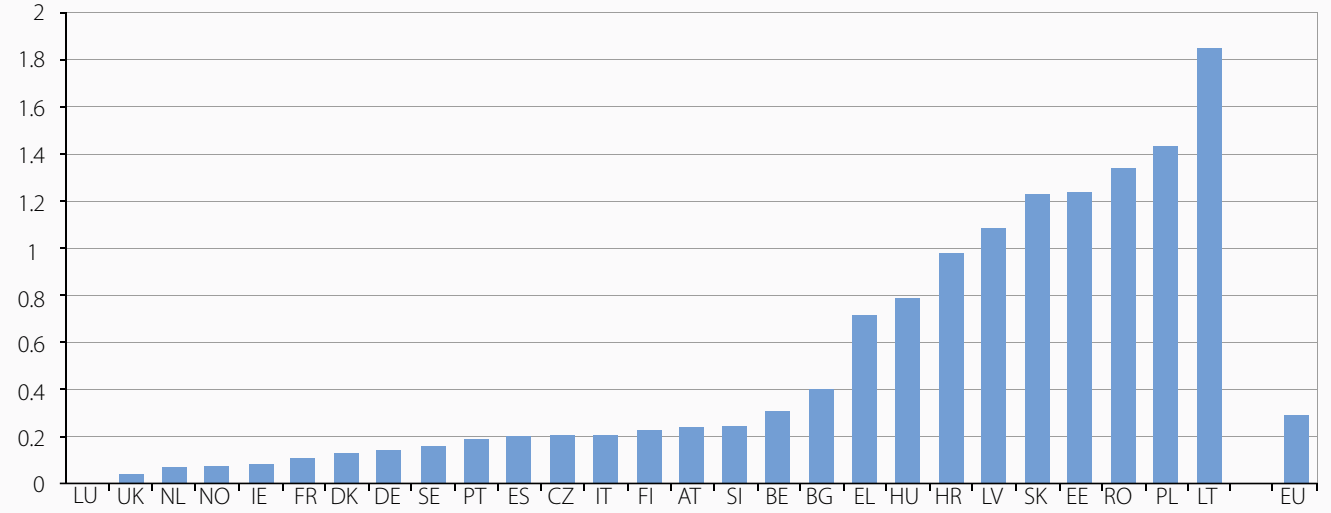


Figure 2: Railway fatalities and weighted serious injuries per million train-km (2007–2012)

(2) EU-27 countries for period 2007-2009 due to the absence of data for Croatia.
(3) Commission Decision 2009/460/EC.

Risk of fatal train collisions and derailments

The overall level of railway safety in Europe, as measured by fatal train collisions and derailments per billion train-km, has gradually improved since 1990, although there is considerable scatter from year to year. The estimated overall trend since 1990 is a 5 % reduction in the accident rate per year. This gives a fall of 70 % from 1990 to 2013 (Figure 3). The estimated underlying average number of fatal train collisions and derailments per billion train-km was about 4.8 in 1990 and 1.5 in 2013.

Despite a positive long-term trend in the risk of fatal train collisions and derailments over the past two decades, the data in Figure 3 suggests that progress has slowed down, in particular since the late 1990s, and came to a standstill in 2004.

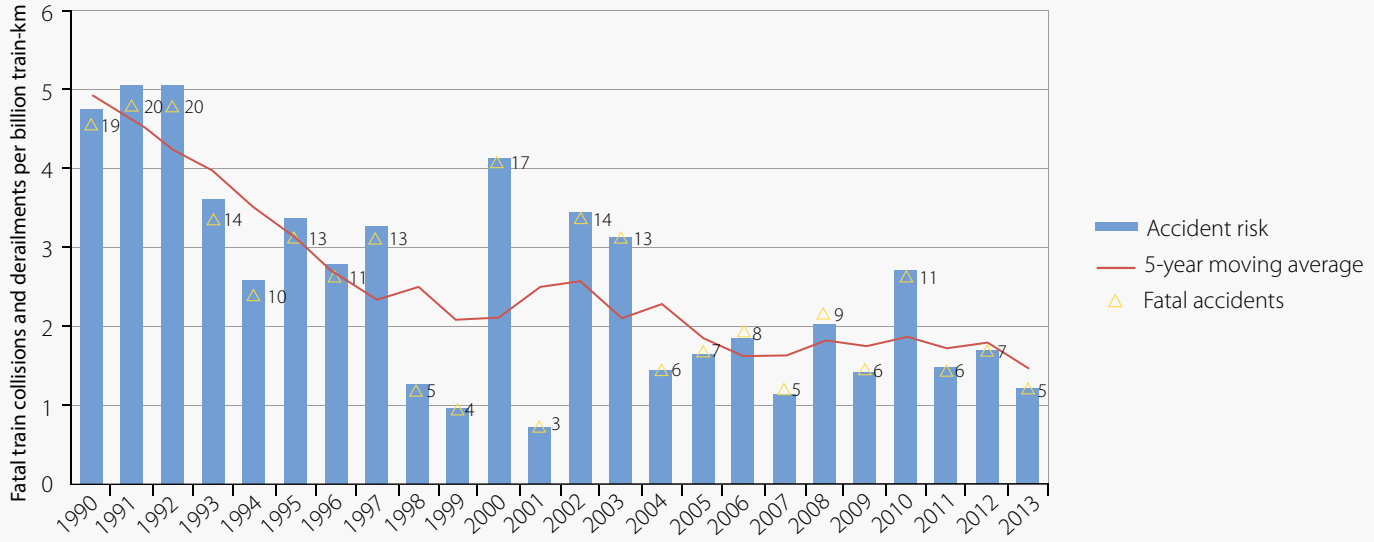


Figure 3: Fatal train collisions and derailments per billion train-kilometres in 1990–2013 for the EU-27, Switzerland and Norway ([4])

The number of fatalities in all railway accidents has seen a distinct, downward trend for all categories of accidents, except for level-crossing accidents. This can be partly explained by the continuous increase in road traffic across Europe, which increases the likelihood of a level-crossing accident.

In conclusion, available historical data on fatal railway accidents shows a solid gradual improvement in railway safety over the past three decades, which has however slowed down since the mid-1990s and further since the mid-2000s. This 'softening' of the trend is observable when analysing both absolute and relative figures for fatal train collisions and derailments in Europe.

Accidents with five or more fatalities

Since past accident records may not always be complete in all EU countries, narrowing the scope to railway accidents with severe consequences may provide more robust confirmation of the trends identified and, at the same time, highlight the most serious events that occurred in the past and their impact on overall accident statistics.

Accidents with multiple fatalities rarely escape the attention of the media and the public, so data on these accidents are assumed to be more complete. Figure 4 is based on data from the historical archive of railway accidents maintained by the Agency; it shows the number of major accidents and resulting fatalities for the 34 years between 1980–2013. It includes not only the train collisions and derailments with five or more fatalities, but also the major level-crossing accidents, train fires and accidents involving groups of people struck by rolling stock in motion.

The trend in the accident rate per billion train-km for accidents resulting in five or more fatalities (for which a longer time series is available) is strongly downward over the period between 1990–2013, but somewhat less steep if taken back to 1980-2013. Figure 4 shows that there were on average eight major railway accidents each year during the 1990s; this figure has now reduced to an average of five accidents per year in the 2000s. There were four accidents with five or more fatalities in Europe in 2013; two derailments, one collision of trains and one level-crossing accident.

[4] Data prior to 2006 retrieved from the database of fatal train accidents and collisions maintained by Andrew W. Evans (Imperial College and University College London) and from the databases on train-km of UIC, Eurostat and the ERA.

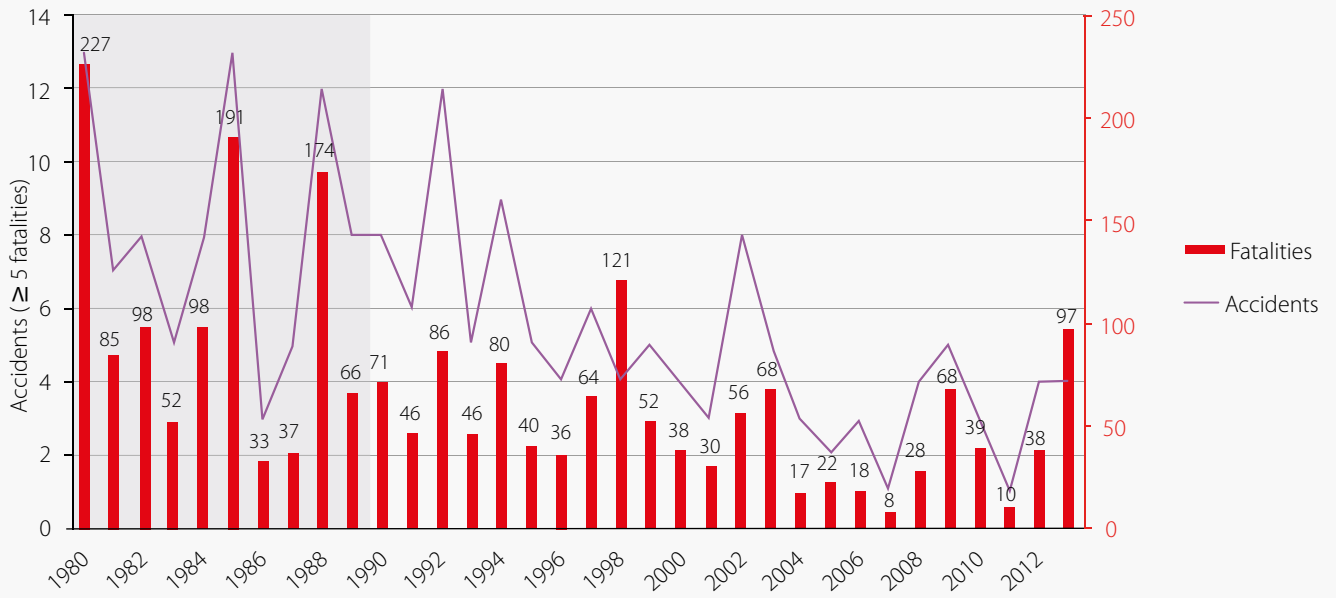


Figure 4: Railway accidents with five or more fatalities (EU-28, 1980–2013) ([5])

The analysis of data in Figure 4 confirms the conclusions drawn from the fatal train collisions and derailments data that the rate of improvement has been 'softening' over the past two decades.

Worldwide railway safety

Railway fatality risk and its development over time can be estimated from the publically available national statistical data for different jurisdictions. The fatality risk for EU-28 countries is plotted against the fatality risk for the USA, Canada, South Korea and Australia. No official data could be obtained from other major developed countries such as Japan or China. For all five countries included in this overview, except one, the trend is strongly downwards over the last decade. The pace of the decrease for the EU-28 is comparable to the trend in the USA and Canada; however it falls short when compared to the trend registered in South Korea.

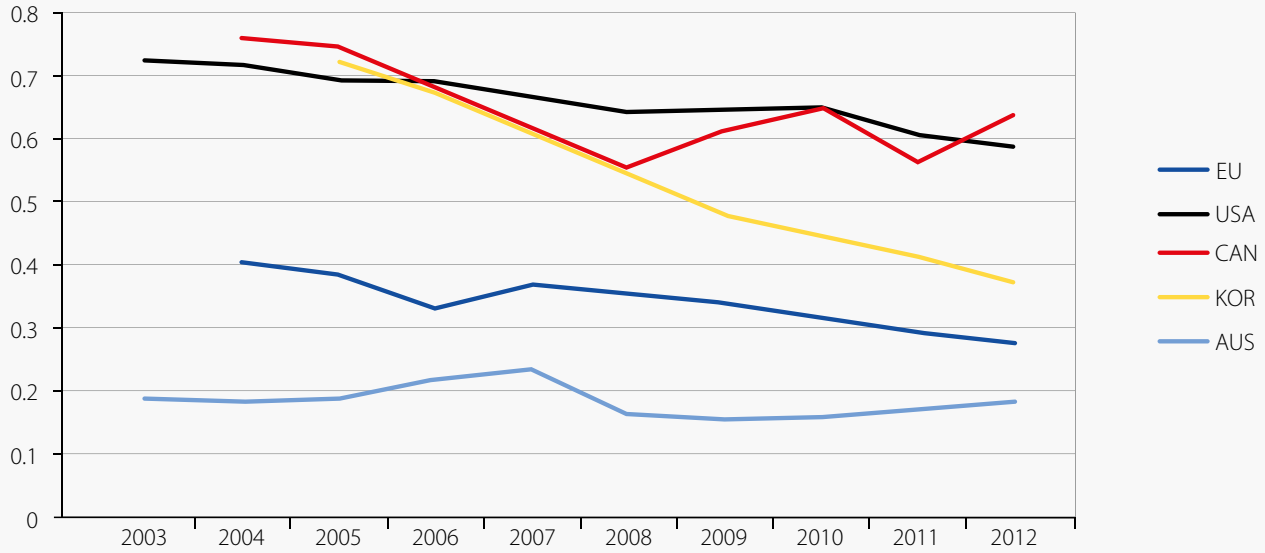


Figure 5: Railway fatalities (excluding suicides) per million train-kilometres in 2003–2012 for the EU-28, USA, Canada, South Korea and Australia ([6])

[5] All EU countries, Norway and Switzerland, excluding Romania and Croatia for the period 1980–1989. Accidents on railway lines not covered by the RSD are also included.

[6] Source of data: USA: Federal Railroad Administration, Safety statistics; Canada: Transportation Safety Board Canada, Statistical summary on railway occurrences 2012; Korea: National Statistical Office; Australia: Australian Transport Safety Bureau, ATSB Transport Safety Reports on rail statistics.

In addition to the trend analysis, the absolute values for fatality risk were estimated from the available national statistics. While the definition of a fatality and train-km are comparable between countries, the reporting practice for trespassers and suicide fatalities may not always be fully comparable. This represents a limitation of the overview presented in Table 1.

Fatality risk (2007–2012)	EU-27	USA	CAN	KOR	AUS
All persons per million train-km	0.32	0.63	0.6	0.45	0.16
Passengers per billion passenger-km	0.13	0.26	0.14	0	NA

Table 1: Railway fatality risk and passenger fatality risk for the EU-27, USA, Canada, South Korea and Australia in 2007–2012 ([7])

Railway fatality risk and passenger fatality risk estimated for the past five years are shown in Table 1; the table reveals that EU train passengers enjoy a high level of safety as compared to other countries, although there are countries that have developed railway systems with better safety performance.

Common Safety Targets

Common safety targets (CSTs) are quantitative measures of risk allowing assessment of whether the current safety levels of the railways in the Member States are at least maintained. In the long term, they could also help to drive efforts to reduce the current differences in railway safety performance. Railway transport is the only mode of transport for which the targets have been prescribed by European legislation. The CSTs are EU-wide maximum risk values, the national reference values (NRVs) are the maximum risk levels set for individual Member States. The risk level is measured in terms of the number of weighted fatalities and serious injuries ([8]) per train-km. There are risk categories for passengers, employees, level-crossing users, unauthorised persons on railway premises, others and those applied to society as a whole.

In accordance with the Common Safety Method, a second set of CSTs/NRVs were applied for the third assessment carried out in 2012. The second set of CSTs/NRVs was adjusted in 2013 following the fourth annual assessment carried out by the Agency. In general, the second set contains reference values that are slightly stricter compared to the values estimated in the first set.

The fifth annual assessment is to be carried out by the Agency in 2014; the fifth assessment will use the risk values estimated for the period between 2008–2012 and for the single year 2012 and compare them with the national reference values of the second set (risk estimated for the period between 2004–2009). It will use Eurostat data as foreseen in the CSM.

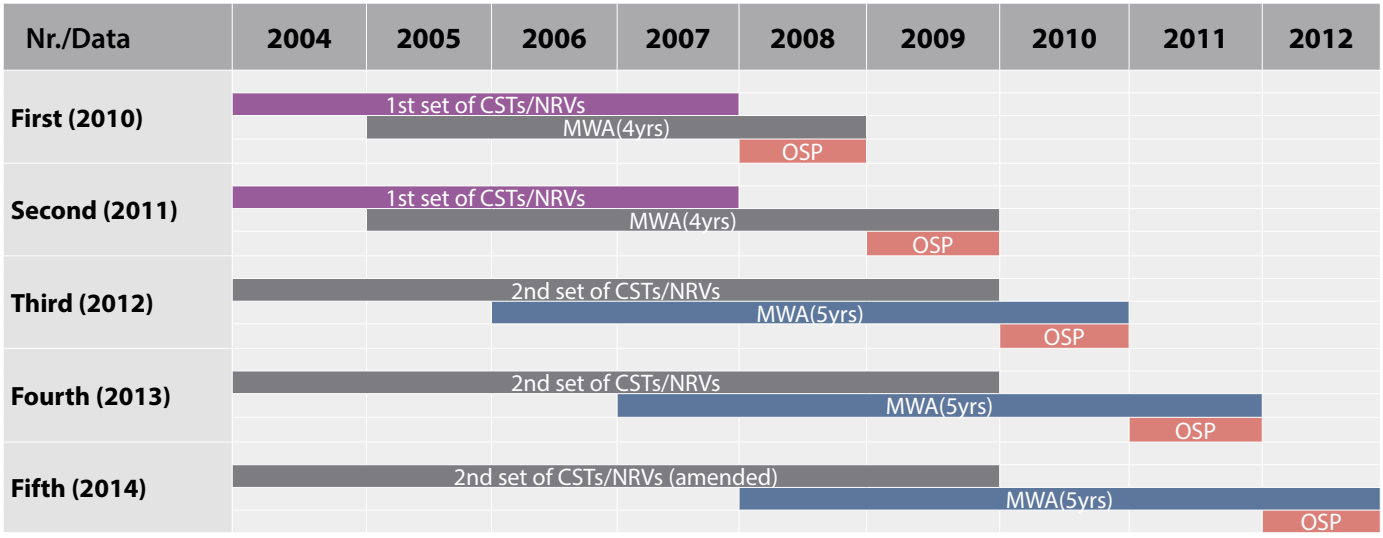


Figure 6: Overview of the annual assessments of achievements of the CSTs/NRVs carried out by the Agency ([9])

[7] Source of data as for Figure 2.

[8] Weighted fatalities and serious injuries (FWSI) are the normalised measure of railway safety outcome. One seriously injured person is considered as 0.1 fatalities and added to the number of fatalities in the given year.

[9] MWA=Moving weighted average, OSP=Observed safety performance.

In general, the results of the annual assessment of achievements of the CSTs/NRVs indicated that railway safety performance remains acceptable at the EU level for all the categories of railway users under consideration. The past assessments of achievements of the CSTs/NRVs rarely resulted in possible or probable deterioration of safety performance for individual Member States (and never for the Union). In these instances, the Member States usually provided a satisfactory explanation for the result obtained.

Member states are more likely to achieve acceptable safety performance in the category of passengers, level-crossing users and other persons. Possible or probable deterioration of safety performance is more frequently registered for employees and unauthorised persons. The low annual numbers of employee fatalities per year make it challenging to maintain the same level of safety performance from year to year and to assure undistributed statistical assessment.

Assessment	Passengers	Employees	Level-crossing users	Other users	Unauthorised persons	Whole society
First (2010)		1	1	1	1	
Second (2011)		1			2	
Third (2012)					1	
Fourth (2013)	1	2+1		1	3	1
Fifth (2014)		4	1	3		

Table 3: Number of member States showing a possible (probable) deterioration of safety performance ([10])

Previous assessments of the achievements of the CSTs/NRVs showed that there is indeed a need for a revision of the CSM and CSTs, which is planned in the CSM for 2015. Notably, the current common safety targets do not provide incentives for countries to improve their safety performance. A proposal for the revised method will be presented by the Agency in 2014 aimed at addressing the weaknesses identified in the CSTs and CSM concept.

Railway safety compared to other transport modes

Although the different transport modes have different roles in the transport system arising from their inherent advantages, a direct comparison of safety is possible using certain travel scenario hypotheses. One such scenario is the risk of fatality for a passenger travelling over a given distance using different transport modes.

Comparisons of fatality risks for travelling passengers (occupants) reveal that rail is one of the safest modes of transport in Europe. The fatality risk for an average passenger is about 0.13 fatalities per billion kilometres, comparable with the risk of commercial flight passengers of 0.06 fatalities per billion passenger kilometres. The fatality risk for train passengers is one third lower compared to the risk for a bus/coach passenger (Table 2).

Transport mode used by user	Fatalities per billion passenger kilometres
Airline passenger ([11])	0.06
Railway passenger	0.13
Bus/Coach occupant ([12])	0.20
Car occupant	3.14
Powered two-wheelers	48.94

Table 2: Fatality risk of passengers using different modes of transport (EU-27 in 2008–2012) ([13])

One should note however that the risk estimated for commercial air travel, but also for bus and train travel is subject to wide variations, as one single accident may result in dozens of fatalities. Thus the risk estimated for a relatively short period, in this case, for five years, should be read with caution.

[10] Results of the annual assessments of achievements of CSTs/NRVs prepared by the Agency for the European Commission in accordance with the Commission Decision 2009/460/EC. Results of the 2014 assessment were not available at the time of the publication of this report.
[11] Fatalities over EU-27 territory by any operators.
[12] Fatalities per type estimated from available figures (CARE database).
[13] Source of data: EU transport in figures (Statistical Pocketbook 2012), DG MOVE 2012, European Commission.

Accident outcomes

Significant accidents

More than 2 000 significant accidents occur each year on the railways of the EU Member States. Collisions and derailments represent a mere eight per cent of them. Accidents to persons caused by rolling stock in motion and level-crossing accidents constitute the majority of significant accidents, excluding suicides. The number of significant accidents per accident type in the period 2010–2012 is shown in Figure 7. Compared to previous years, it includes data reported by Croatia and reflects a revision of past values done by one Member State.

While the number of all significant accidents has decreased consistently over the past three years, the trends for individual accident categories show some variations.

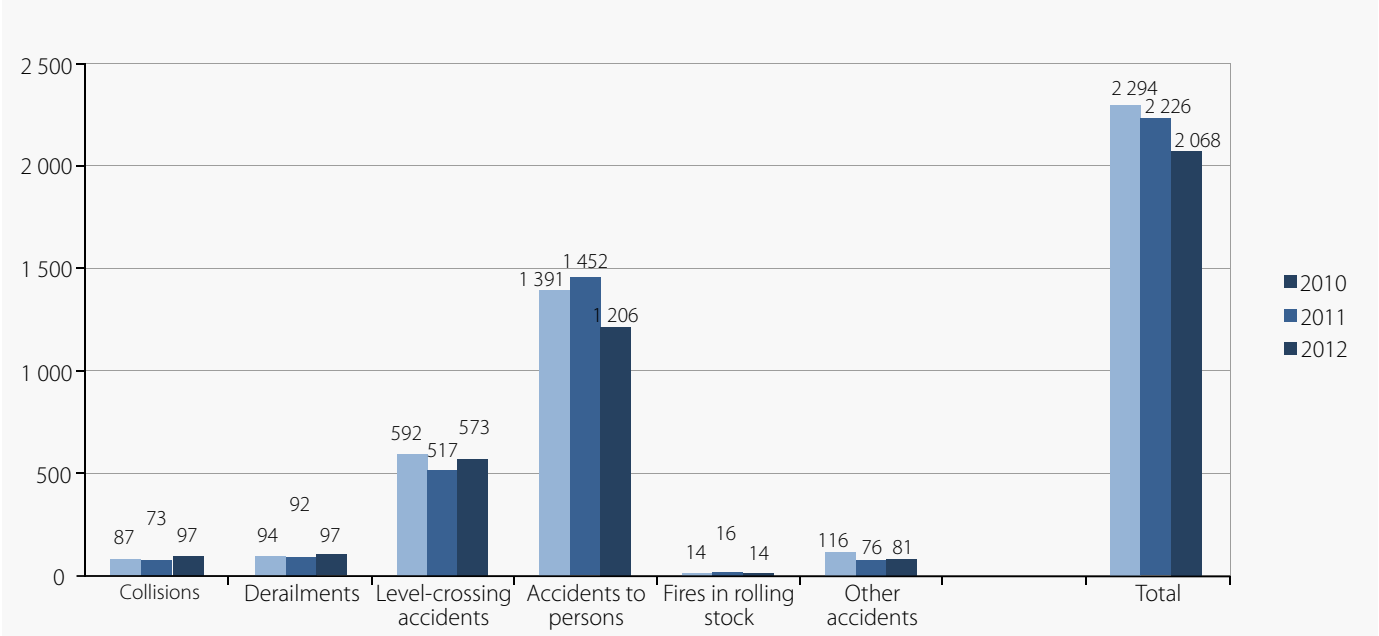


Figure 7: Significant accidents per type of accidents (EU-28: 2010–2012)

The reported number of collisions and derailments (97 of each in 2012) is the highest in the three-year period for which fully comparable data are available. On average a derailment or a collision is reported at least every second day in the EU, causing significant disruptions to railway operations.

For accidents to persons, level-crossing accidents and fires, the reported number of accidents in 2012 was lower than in the previous year. Member States reported 1 206 accidents to persons caused by rolling stock in motion in 2012. This represents a 20 % drop from the previous year. Two countries, Bulgaria and Poland, together accounted for half of this decrease. The risk of this type of accident is relatively high in the three Baltic countries and in some Central and East European countries (Hungary, Slovakia, Poland, and Romania).

There was a twist in the trend for level-crossing accidents, with 573 accidents recorded on railways of the EU-28 countries in 2012, compared to 592 accidents in 2010 and 517 accidents in 2011. Only ten EU countries saw a consistent decrease in level-crossing accidents over the past three years.

The number of fires in rolling stock reported for 2012 (14) is similar to the number of fires reported in previous years (14 in 2010 and 16 in 2011). Sixteen countries reported no fires in rolling stock in motion in 2012.

A wide range of accidents, not included within the specific types of accidents, are included in the category of other accidents. The 81 cases reported in 2012 include collisions and derailments of shunting rolling stock/maintenance machines, dangerous goods released during transport, objects projected by the running train and electrocution in connection with rolling stock in motion.

Figure 8 provides a breakdown of significant accidents per type estimated for the past three years. It shows that accidents to persons account for 61 % of all accidents reported, followed by level-crossing accidents (26 % of all accidents). Collisions, derailments and other accidents each account for 4 % of all accidents.

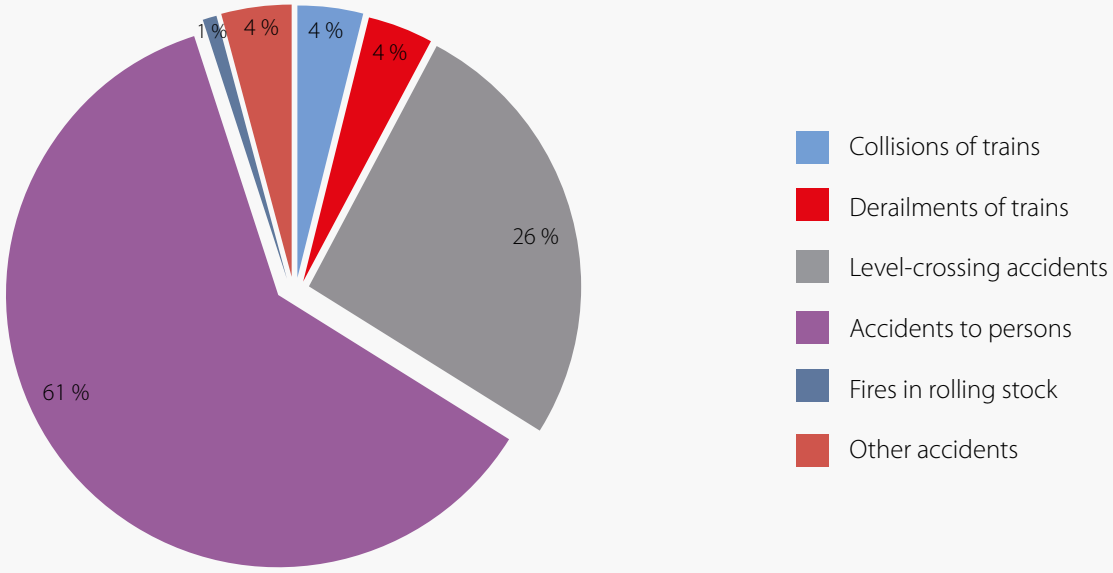


Figure 8: Breakdown of significant accidents per type (EU-28: 2010–2012)

In 2013, the number of collisions and relevant outcomes was reported to the Agency by type for the second time, on a voluntary basis. Among 97 collisions reported in 2012, only 12 were collisions of a train and a rail vehicle, the remaining 85 collisions involved a train hitting an obstacle within the clearance gauge (Figure 9).

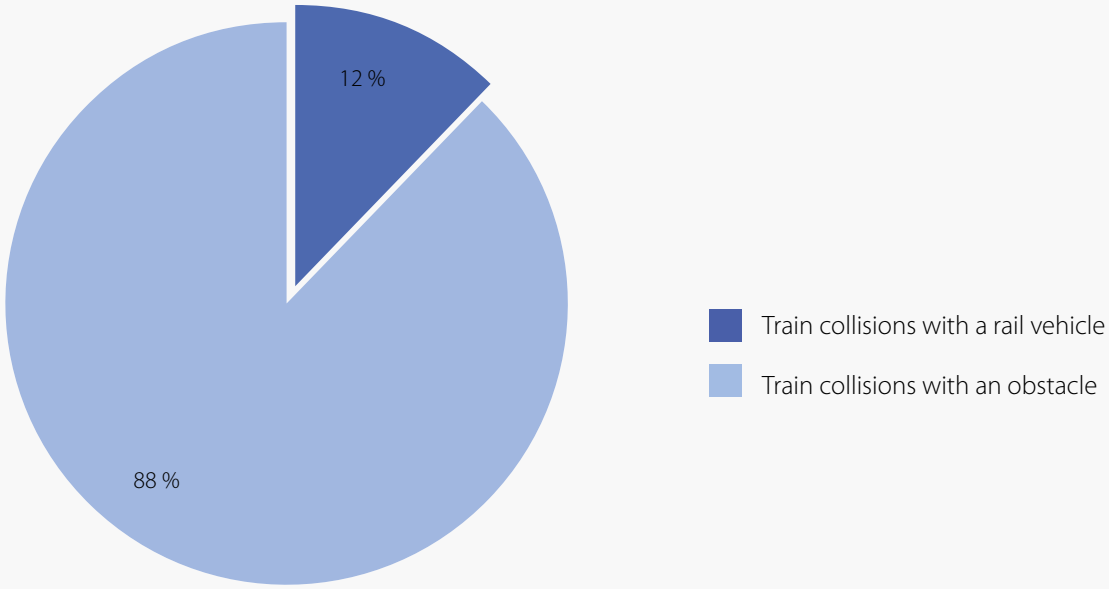


Figure 9: Train collisions by type (EU-28 in 2012)

Casualties from significant accidents

In parallel with the decrease in railway accidents, the total number of casualties, excluding suicides, has fallen steadily in recent years. There were 1 133 fatalities reported for the year 2012, a six per cent decrease from the previous year (1 207 fatalities recorded in 2011).

Between 2006 and 2012, the number of railway fatalities decreased by 22 % (5 % p.a. on average). The number of unauthorised person fatalities decreased at the same pace, while the number of level-crossing user fatalities and employees saw an almost stagnating trend over the past seven years.

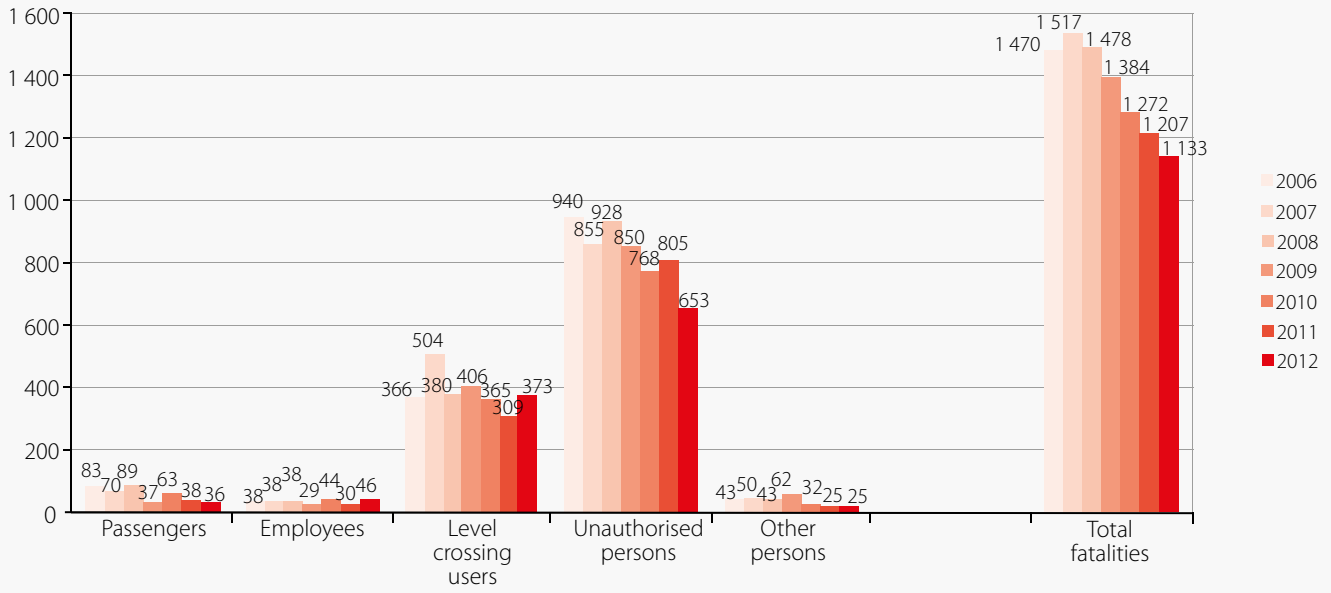


Figure 10: Number of fatalities per victim category (EU-28: 2006–2012)

Figure 10 shows the number of fatalities in different categories of persons over the period between 2006–2012. With 653 fatalities in 2012, unauthorised persons represented 58 % of all persons killed on railway premises, suicides excluded. Unauthorised person fatalities have fallen over the past seven years, even if the year-to-year reduction was not consistent over the period.

It also shows that the number of employee fatalities in 2012 (46) was the highest ever recorded. The number of passenger fatalities reached a historically low level in 2012 (36 killed passengers), although, due to its nature, it is subject to important variations over time.

After a significant drop in the number of level-crossing fatalities in 2011, the number of fatalities recorded in 2012 is comparable to records for the years 2006, 2008 and 2010. The 2012 figure represents 33 % of railway fatalities, but only 1.3 % of road-user fatalities. Level-crossing safety might therefore be perceived as a marginal problem by the road sector, while it is a key problem for the railway — also because of its impact on railway operations.

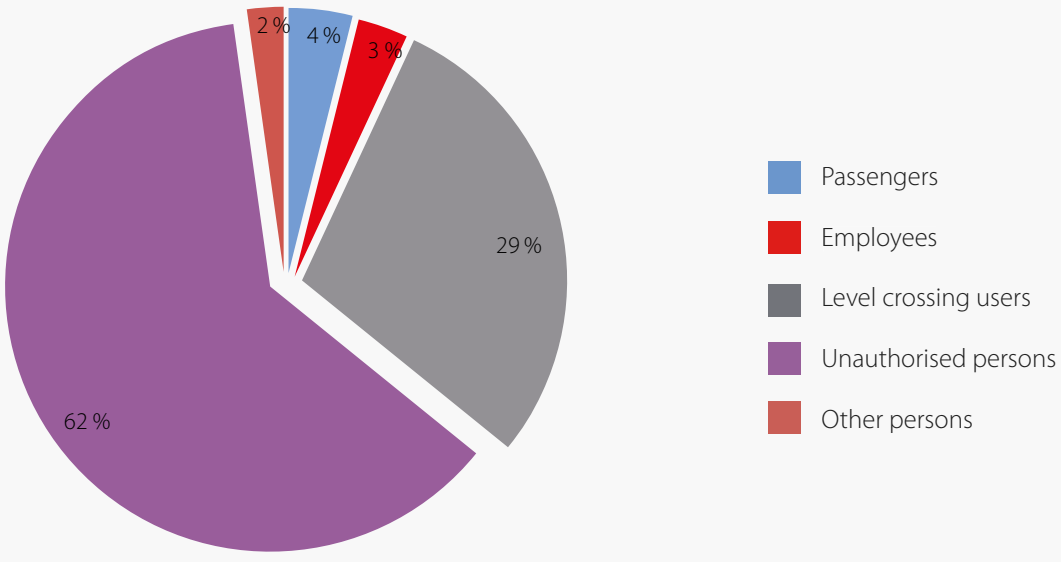


Figure 11: Relative share of fatalities per victim category among all fatalities (2010–2012)

Figure 11 shows that if we exclude suicide fatalities, the majority of fatalities on railway premises are unauthorised persons. Level-crossing accidents account for 25 % of fatalities, whereas passenger and employee fatalities make up 6 % of the total number of deaths on railways. People strictly internal to railway operation (passengers, employees and other persons) represent only 3 % per cent of people killed on EU railways.

Suicides are reported separately from accident fatalities. They represent 70 % of all fatalities on railways and, together with the unauthorised person fatalities, constitute 88 % of all fatalities occurring within the railway system. In 2012, on average more than eight suicides were recorded every day on EU railways, totalling 2 997, a record number since 2006. Several European countries registered a significant increase in railway suicide events on railway premises in 2012; in the UK, Sweden, Poland, Portugal and Lithuania, their number increased at least by 25 % on year-to-year basis.

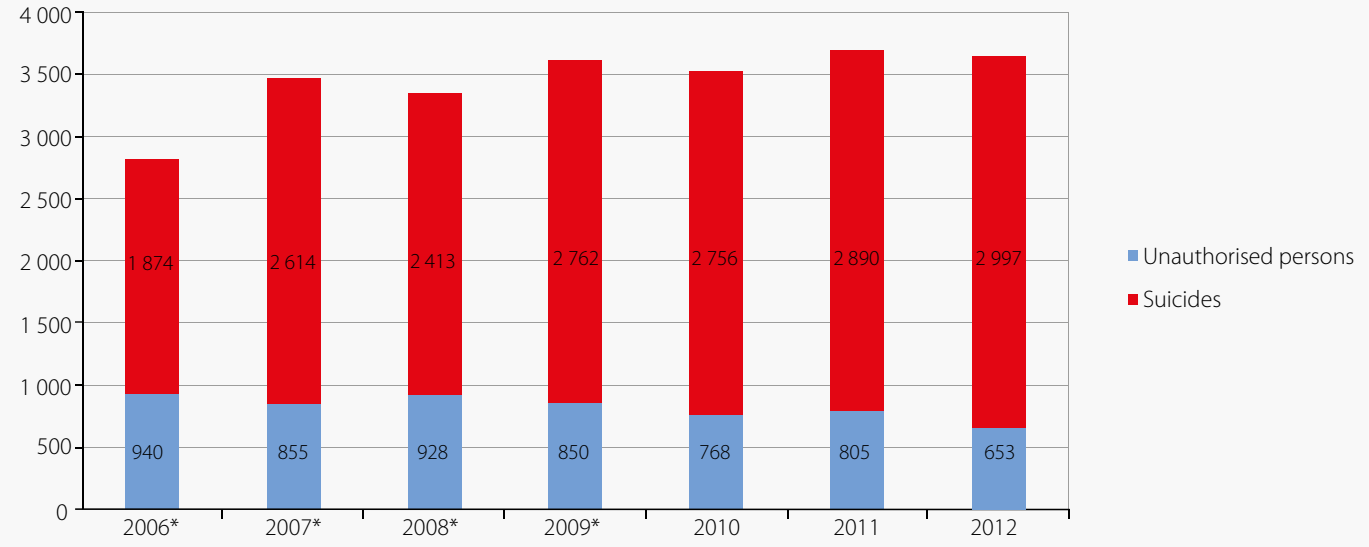


Figure 12: Unauthorised person fatalities and suicides on railway premises (EU-28 in 2006–2012) ([14])

Suicide fatalities on railways have been on the rise in the EU since 2006, at an average yearly rate of about 6 %. As shown in Figure 12, a decrease in the number of unauthorised person fatalities did not sufficiently compensate this rising trend in the number of persons killed on railway premises.

Over and above the number of fatalities, a large number of people are seriously injured each year on the railways. Over the past five years, for each 10 people killed, Member States reported some nine seriously injured persons. This ratio, illustrating the seriousness of accidents, has been constant over time, with the exception of 2009, in which there were only eight seriously injured per 10 persons killed in significant railway accidents.

In 2012, 1 016 persons were seriously injured, a decrease of 34 recorded in 2011 when 1 050 serious injuries were reported (Figure 13).

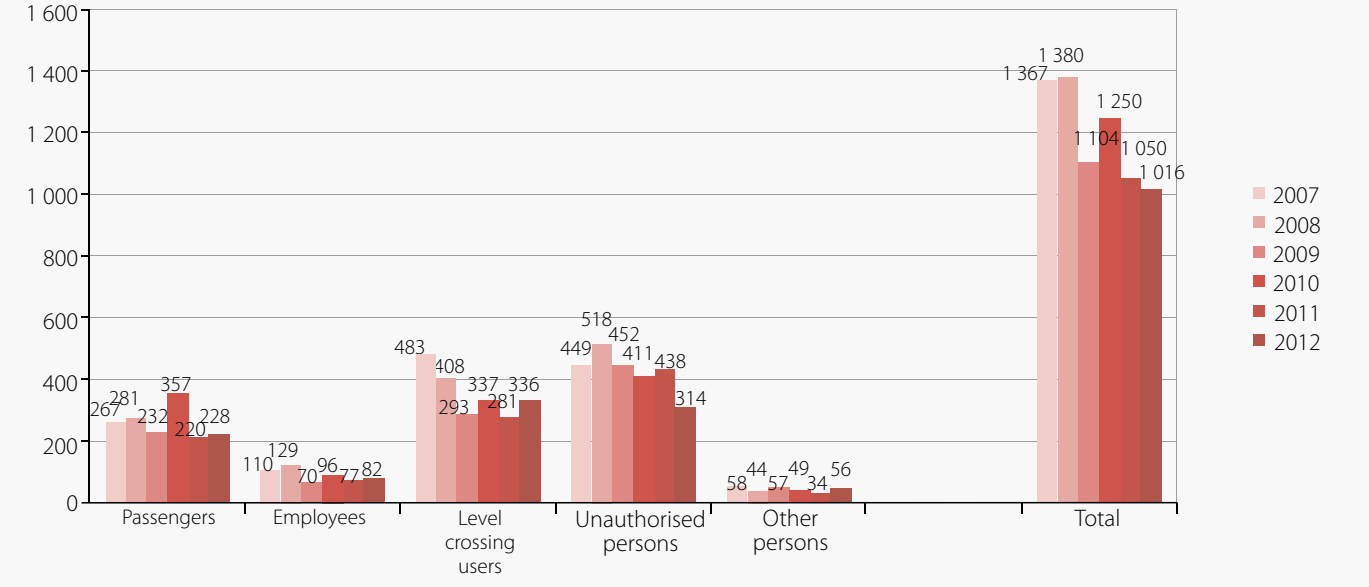


Figure 13: Seriously injured persons per victim category (EU-28: 2007–2012)

[14] Data not available for Croatia in the period 2006-2009 and for Luxembourg in the period 2006–2008.

Over the past five years, there were 11 fatalities per 10 seriously injured persons on EU railways. People being hit by a train are the users most likely to die from the injuries sustained. There are almost two killed trespassers per one seriously injured trespasser. Among all railway users, passengers are most likely to survive in significant accidents. This is shown in Figure 14, in which a ratio between people killed and seriously injured railway fatalities is estimated for categories of persons.

Statistics on seriously injured persons are slightly less reliable than statistics on deceased persons. This is because reporting and hospital procedures may vary in Member States and may be evolving over time. This has only limited impact on the CST framework, where the weight attributed to a seriously injured person is relatively low, but may have an impact on casualty statistics.

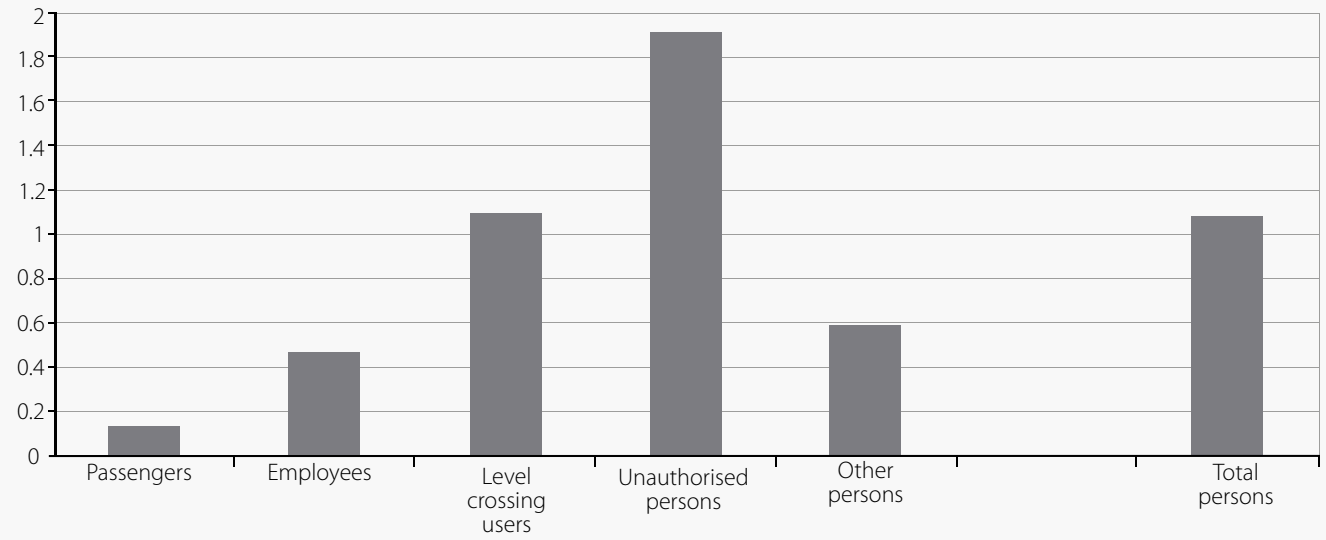


Figure 14: Ratio of fatalities to serious injuries by type of person (EU-28: 2010–2012)

Precursors to accidents

As accidents on railways are rare, monitoring events with less serious consequences that occur on railways is an essential tool of a proactive SMS. 'Precursors to accidents' are indicators of incidents that under other circumstances could have led to an accident. The indicators reported to the Agency are: broken rails, track buckles, danger signals passed, wrong-side signalling failures, broken wheels and broken axles (Figure 15). Despite gradual improvements in the precursor data quality, the data may not yet be fully comparable between Member States, so certain caution should be exercised when interpreting these data.

Over the period between 2010–2012, EU countries reported more than 10 000 precursors to accidents as defined under CSIs per year; this is a ratio of up to five precursors to one significant accident. However, if we discard accidents to persons caused by rolling stock in motion, the ratio between the precursors and accidents rises to 12:1. This unveils the great potential benefit in analysing precursors in the proactive monitoring of railway safety.

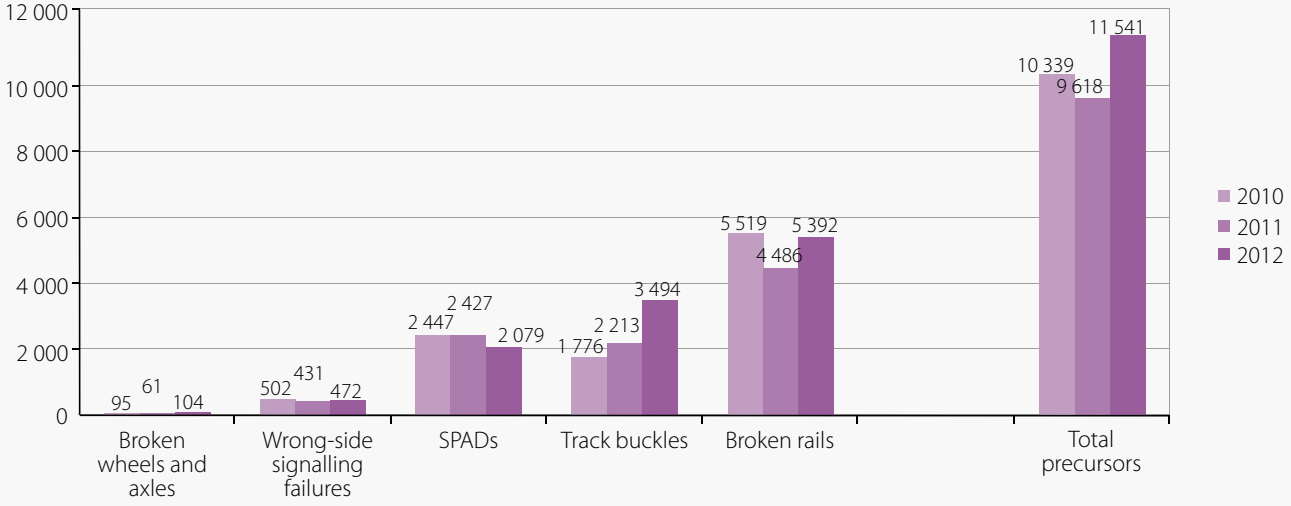


Figure 15: Accident precursors (EU-27: 2010–2012)

Broken rails are the most common type of common accident precursors; they alone account for almost half of all reported precursors. A relatively high number of broken rails were reported by Hungary, Poland, Romania and Greece in 2012.

Track buckling is the second most prevalent type of precursor, with 3 494 cases reported in 2012. The majority of tracks buckles were recorded in Southern European countries, notably in Italy and Spain. The increase recorded in 2012 is largely the result of increases reported by Italy, Sweden and France.

Signal passed at danger is the most common type of accident precursor and one of the most serious incidents in the operation of trains. The number decreased between 2011 and 2012 in two thirds of Member States, leading to an annual decrease of 17 % for all EU-27 countries.

Wrong-side signalling failure is a less common type of accident precursor. Altogether, 13 EU Member States reported zero incidents of this type in 2012. The majority of wrong-side signalling failures was reported by Hungary.

The number of broken wheels and broken axles reported in 2012 increased for both types totalling at 104 in 2012. 10 Member States reported zero broken rails and axles in 2012.

Due to their high potential risk some accident precursors are subject to independent accident investigation in Member States. Signals passed at danger is the most commonly investigated type of incident as shown by the overview of the number of incidents investigations carried out by the NIBs since 2006 (Figure 16). In the past three years (2010–2012), there were on average 14 SPADs investigated by NIBs, compared to four other types of accident precursor for which an investigation has been carried out by a NIB.

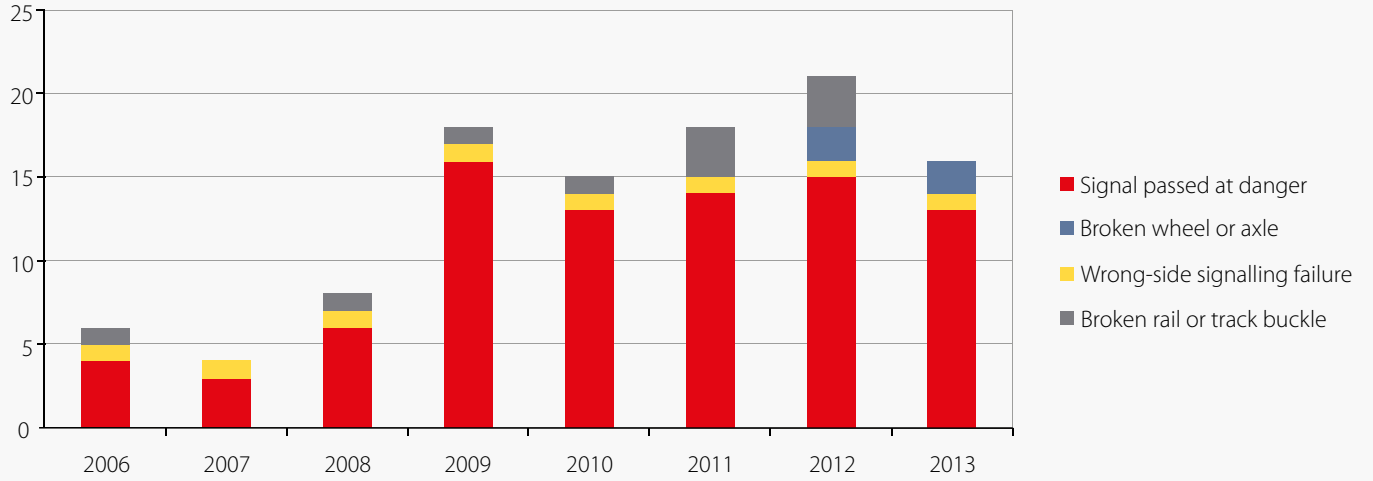


Figure 16: Accident precursors investigated by NIBs (EU-27: 2006–2013)

CSI data on accident precursors provide additional information on the level of safety performance; however its value in supporting effective safety management at the EU and national level is limited. A survey carried out among the NSAs in 2013 also showed that accident precursor indicators are not always systematically used by NSAs as part of safety monitoring to plan safety supervision. It also became clear that the monitoring of railway occurrences that do not result in an accident varies considerably between Member States. This may become an obstacle for the effective joint monitoring and supervision of railway undertakings operating in more than one Member State.

Accident costs

The cost of accidents considered in the Annex I to the RSD are the economic impact of fatalities and serious injuries, cost of delays, cost of material damage to rolling stock or infrastructure and environmental cost. They are estimated using common methodology. While the economic impact of casualties is known for all countries, the cost of delays is only available for 16 Member States. Nine Member States reported no material damage, although all but one of them recorded at least one significant accident.

The economic impact of significant accidents in 2012 is shown in Figure 17. The cost of casualties represents the majority of cost of significant accidents. For countries that reported across all five categories of costs, the costs of casualties represented at least 75 % of all reported accident costs.

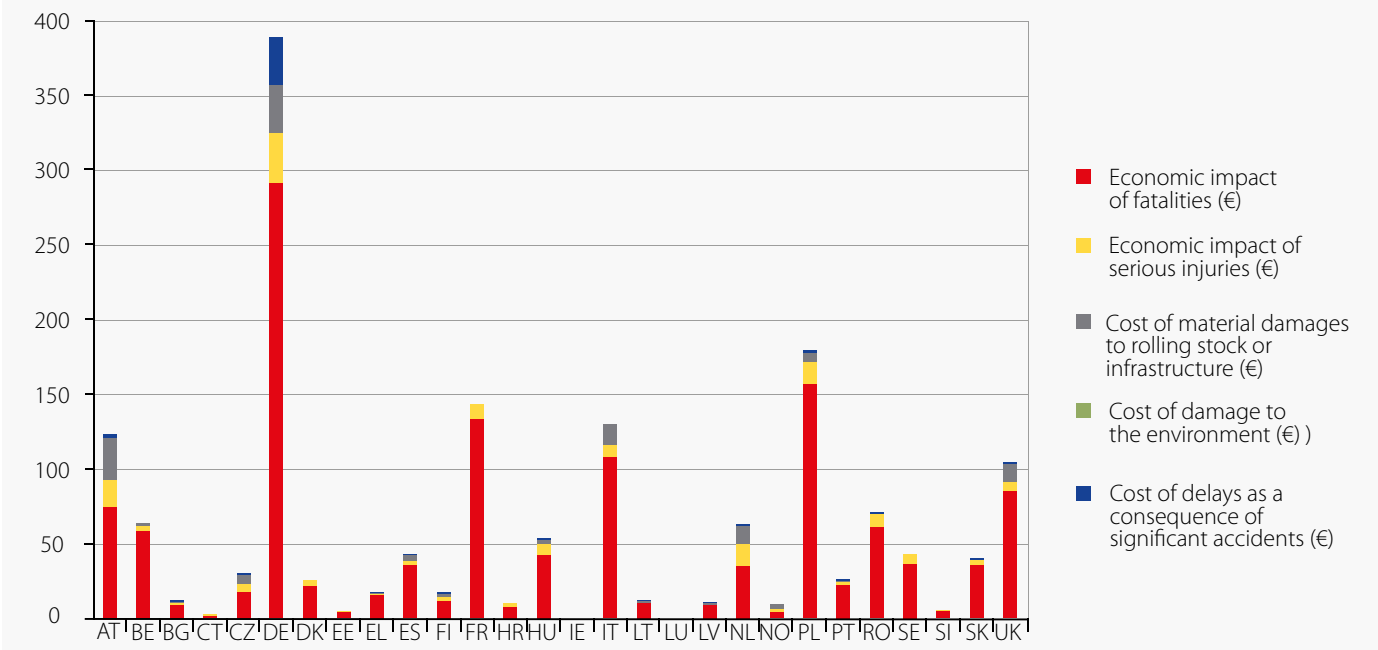


Figure 17: Economic impact of significant accidents in 2012 in EU-28 countries (in million EUR)

By adding together the costs of fatalities and of serious injuries, we obtain a value of EUR 1.5 billion, which gives a broad idea of the overall economic burden of rail casualties in 2012. Other reported costs of accidents for all EU countries account for little more than EUR 170 million.

The significant accident costs of material damage to rolling stock and infrastructure per train-km were relatively high in 2012 in Finland, the Netherlands and Norway (more than EUR 50 per 1 000 train-km).

Accident categories with the highest costs are train collisions and derailments; however the cost of accidents involving external parties may also be high. Based on other data available at the Agency, an average level-crossing accident (recorded and classified as significant at EU level) may cost as much as EUR 1.7 million.

Safety of infrastructure

CSIs collected at the EU level include two types of indicators measuring the safety of railway infrastructure. The first type focuses on the extent to which automatic train protection (ATP) systems are installed and used, the second type focus on the safety of level crossings.

ATP ([15]) systems are considered to be the most effective railway safety measure that infrastructure managers can implement to reduce the risk of collisions and derailment on mainline railways ([16]). ATPs are the most advanced type of train protection systems. They enforce obedience to signals and speed restrictions by speed supervision, including automatic stopping at signals.

In 2012, 25 NSAs reported the percentage of lines equipped with such a system (Figure 18). In addition to reporting the percentage of ATP lines, 21 NSAs also reported the percentage of train-km with ATP in operation. This percentage is higher than that of ATP lines, however a relatively small difference is surprising for many countries, since one would expect intensive use of ATP-equipped infrastructure, typically installed on lines with the highest traffic volumes.

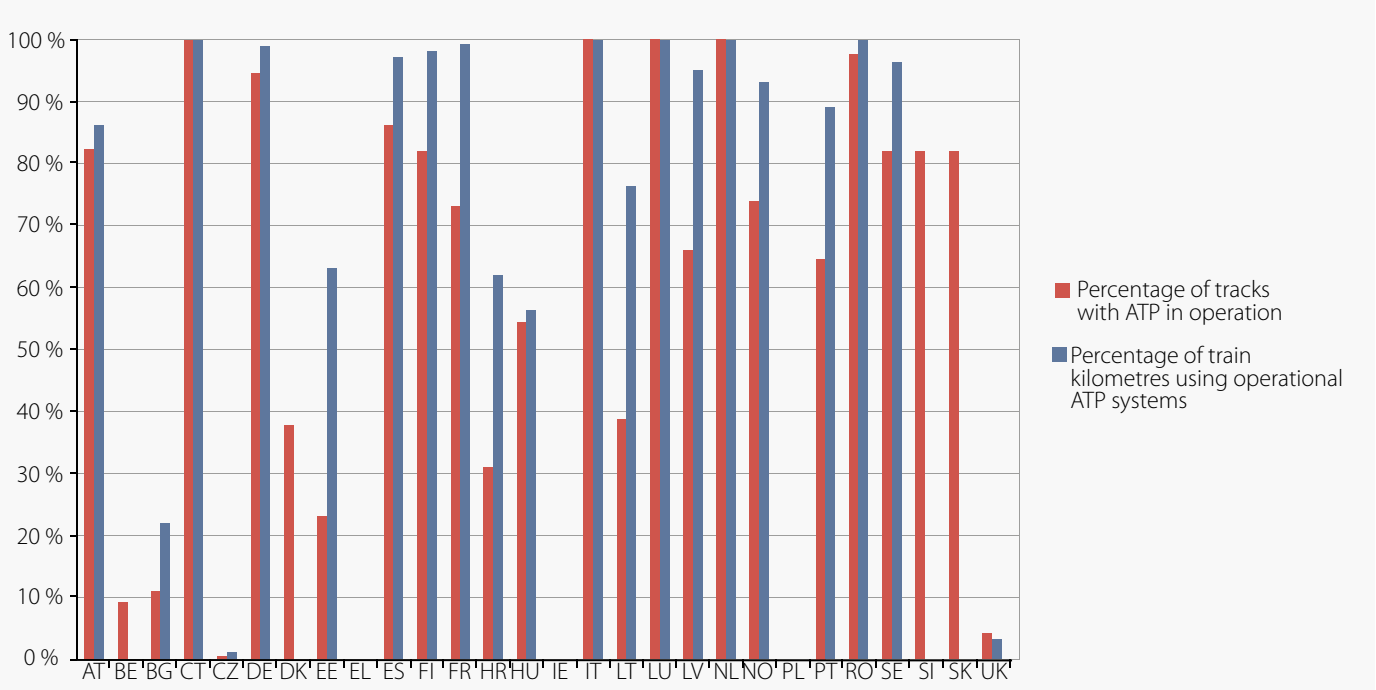


Figure 18: Percentage of tracks equipped with ATP and percentage of train kilometres using operational ATP systems in 2012

It seems from the reported data that many NSAs have a wrong understanding of the criteria required by ATP systems. This is why the Agency ran a survey among NSAs in 2013 in order to establish more firm criteria and improve future reporting. As a result, the NSAs agreed that in the context of ATP definition under CSIs, by obedience to signals, a protection of danger points is meant; while by speed supervision, continuous speed supervision is meant. The NSAs further agreed to enlarge the scope of reporting on train protection systems to new categories that have lower functionality requirements compared to ATP systems. These changes are part of the revised Annex I of the RSD that will enter into force in 2015.

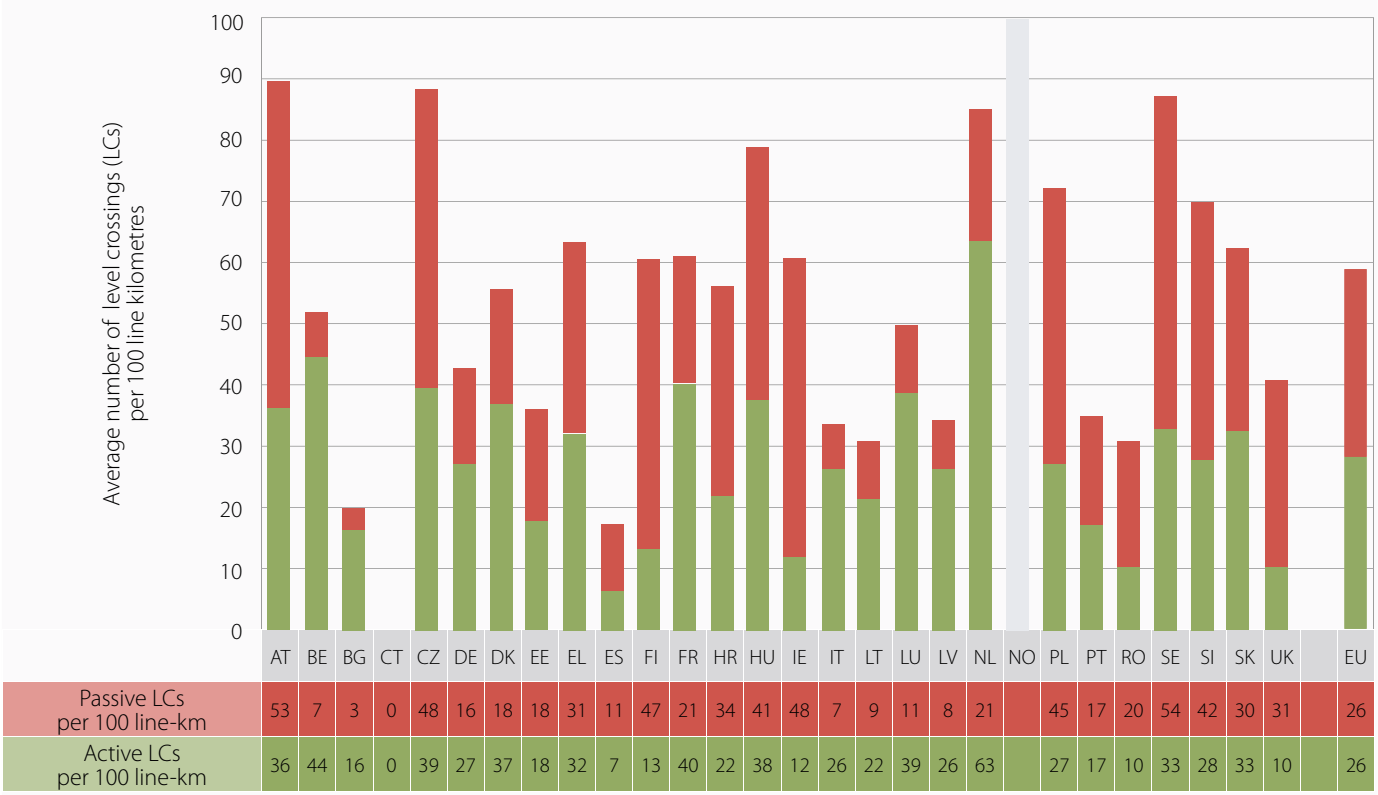
The number of **level crossings** per type is another indicator of infrastructure safety available under CSIs. There were more than 118 000 level crossings in the 28 EU countries in 2012. Their number saw a continuous slight decrease of about 2 % per year over the past five years across Europe. At the current rate of reduction only half of these level crossings will remain by 2050.

On average, there are five level crossings per 10 line-km in the EU; only 24 % of them are active level crossings with user-side protection ([17]). Sweden, Austria, the Czech Republic, Hungary and the Netherlands have the highest density of level crossings in terms of level crossings per line-km (more than 75 per 100 km). Of these, the Netherlands has the highest ratio of active level crossings to all level crossings. A low ratio of active level crossings to all level crossings is typical for the less densely populated countries (Figure 19). Spain has the lowest average number of level crossings per line-km: there is one level crossing per five line-km.

[15] Automatic train protection (ATP) means a system that enforces obedience to signals and speed restrictions by speed supervision, including automatic stop at signals. Systems where track signalling information is substituted and/or supplemented by cab signalling are included.

[16] Interfleet (2011). *Investigating the links between historic accident rate reduction and the underlying changes,* Report prepared for the ERA in 2011. Report can be downloaded from the ERA website.

[17] Protection is typically provided by automatic arm barriers.



	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK		EU
Passive LCs per 100 line-km	53	7	3	0	48	16	18	18	31	11	47	21	34	41	48	7	9	11	8	21		45	17	20	54	42	30	31		26
Active LCs per 100 line-km	36	44	16	0	39	27	37	18	32	7	13	40	22	38	12	26	22	39	26	63		27	17	10	33	28	33	10		26

Figure 19: Number of active and passive level crossings per 100 line-km in 2012

Detailed statistics are available on the type of active level crossings at European level. In Figure 20, the data for 28 EU countries ([18]) show that level crossings with automatic user-side protection and warnings (arm barriers with flashing lights) are the most common type of active crossings (23 %), followed by level crossings with user-side warnings (11 %). Level crossings that combine full road-side protection with rail protection account for 5 % of all level crossings (5 277 in absolute terms). Passive (unprotected) level crossings represent 53 % of all level crossings in the EU. These level crossings are usually equipped with a St Andrew cross traffic sign, but do not provide any active warning to road users.

Accident rates per type of level crossing are not yet available at the EU level, but a survey among NSAs ([19]) shows that 85 % of significant accidents occur on passive level crossings and on level crossings with user-side warnings. Accidents on rail-side protected level crossings are extremely rare.

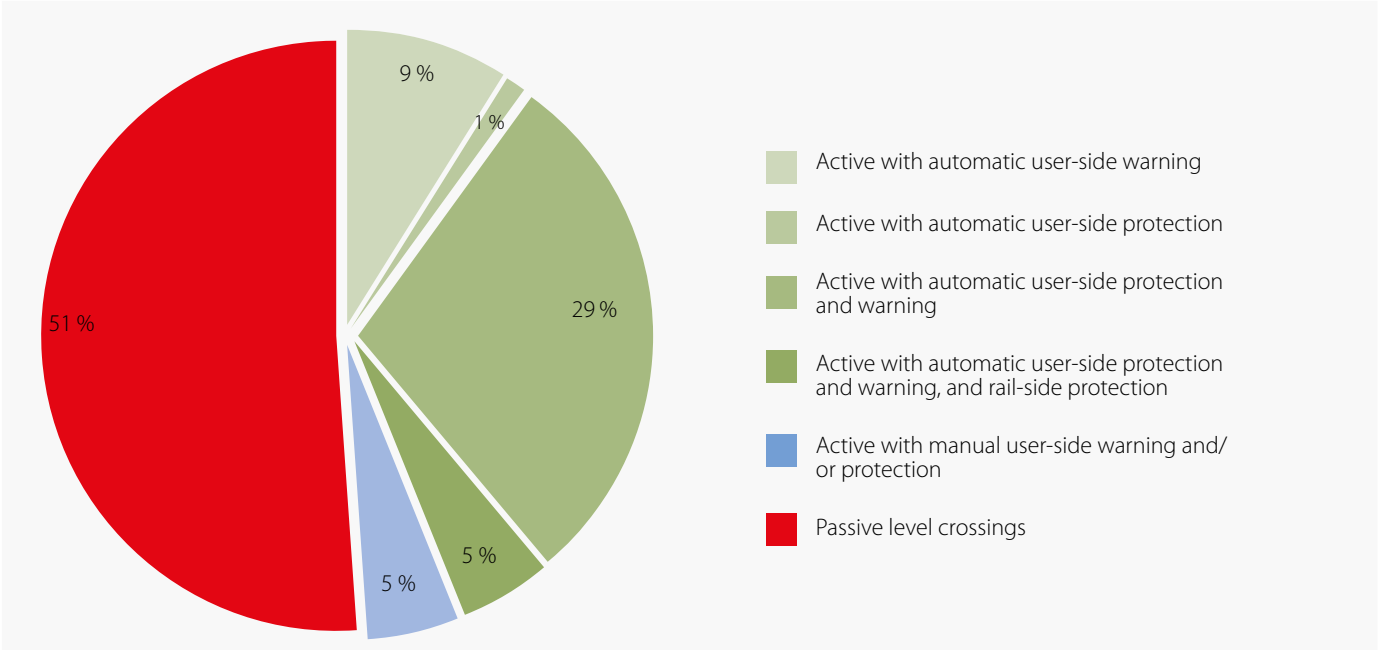
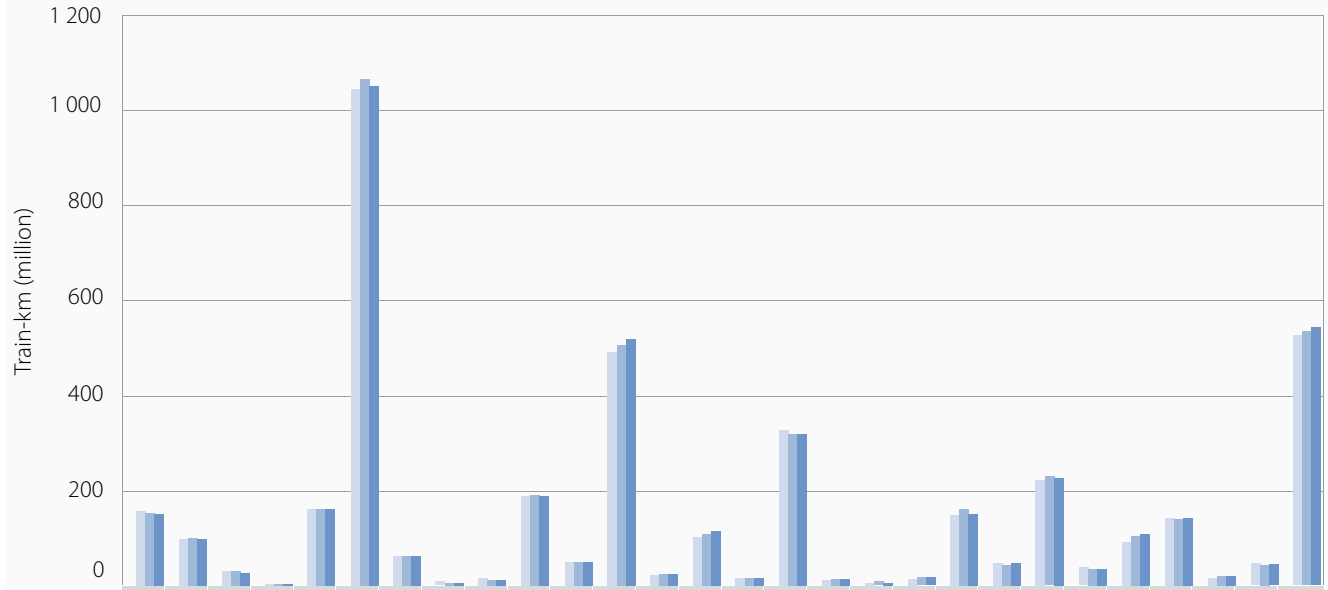


Figure 20: Breakdown of level crossings according to type in 2012 (EU-28)

[18] EU-27 countries excluding Denmark and France.
[19] Dataset included data from 14 Member States for 2012.

Traffic volumes

Trains run over more than four billion train-km in the EU every year (4.1 billion in 2012). Passenger trains performed 79 % of the total number of train-km (3.2 billion in 2012). Traffic volumes are relatively stable from year to year, thus having an insignificant impact on expected accident outcomes.



	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK
2010	156	98	31	5.7	160	103	64	8.9	17	187	51	485	24	103	18	324	14	8.2	17	146	46	219	40	94	141	19	48	520
2011	152	101	31	5.6	161	105	65	7	13	191	51	502	26	110	18	317	15	8.9	18	161	46	227	37	104	140	20	45	528
2012	150	99	28	5.8	161	103	63	7	12	189	51	512	26	116	18	317	15	8.8	19	150	47	224	37	108	140	20	46	536

Figure 21: Number of million train-kilometres (2010–2012)

Germany has the highest number of train-km, accounting for one quarter of all train-km in the EU. It is followed by the UK and France, each reporting more than 500 million train-km in 2012. Over the past five years, the traffic volume increased in 11 EU countries, with the highest increases registered in Romania (12 %), Ireland (9 %) and the Netherlands (7 %). The traffic volume dropped significantly in Greece (41 %) and Bulgaria (23 %).

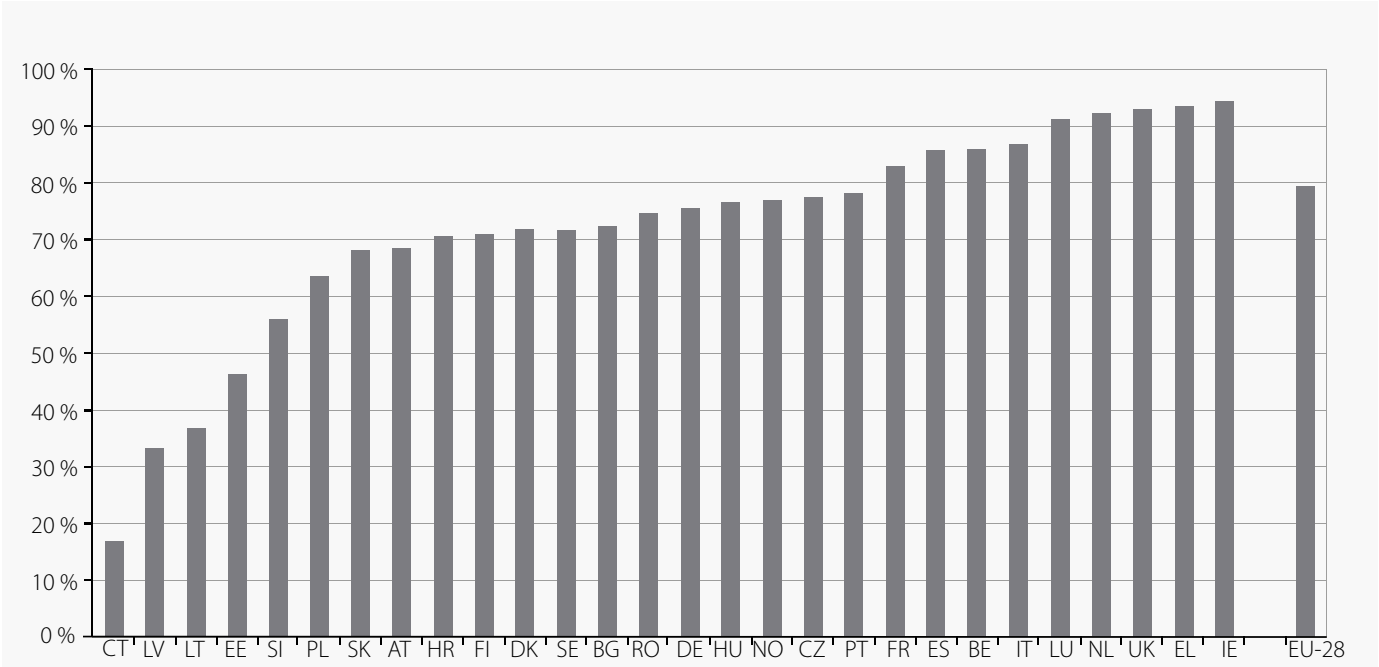
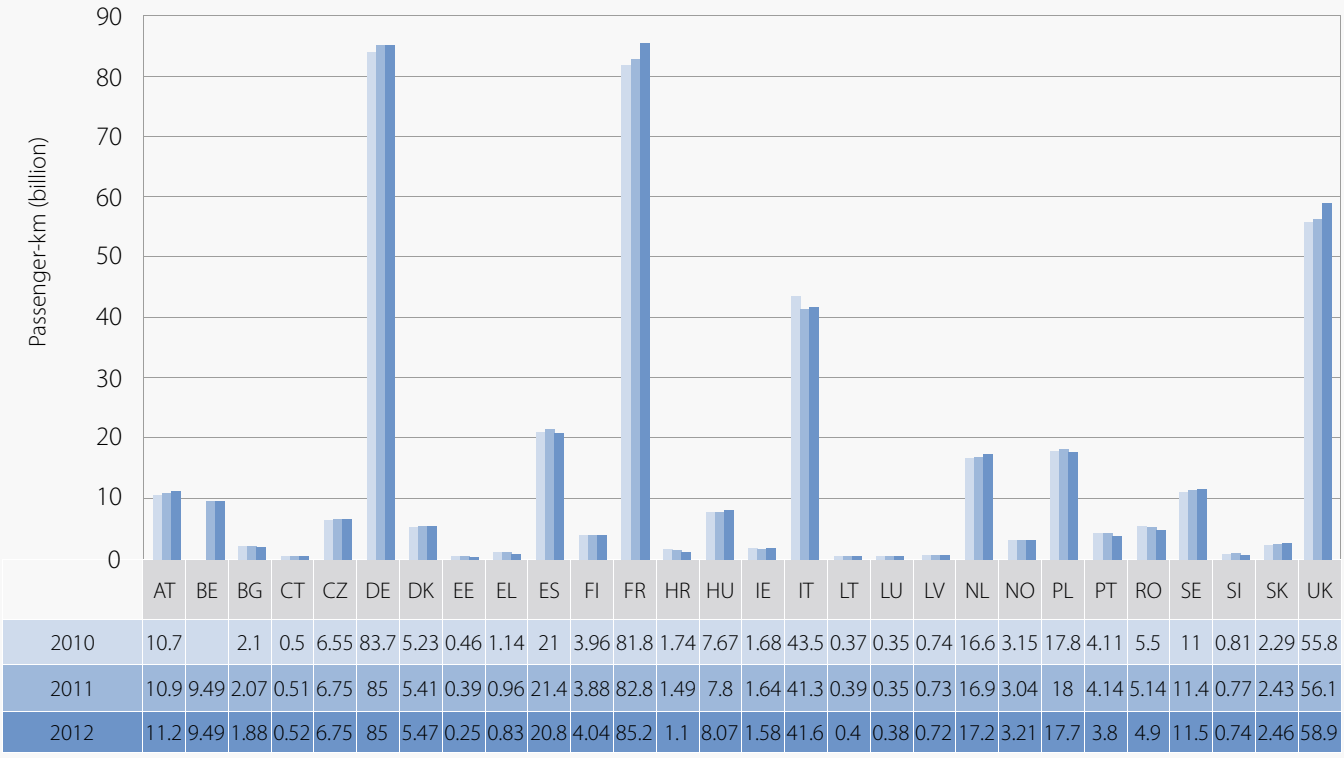


Figure 22: Percentage of passenger train-kilometres among all train-kilometres in 2012 per country

Looking at figures for passenger train-km and freight train-km separately allows identification of countries with a significant share of freight train traffic (three Baltic countries, Slovenia and Poland). At Union level, passenger traffic represents 79 % of all train-km. The share of passenger train-km exceeds 90 % in Ireland, Greece, the UK, the Netherlands and Luxembourg (Figure 22).

Passenger kilometres are reported in addition to passenger train-km, allowing a rough understanding of the relative use of capacity of the railway system. In 2012 alone, passengers travelled 400 billion kilometres on board passenger trains. This means a theoretical average passenger train load of 125 passengers in 2012. This is slightly higher than two years before, with a load ratio of 120. The load ratio broadly reflects the spectrum or railway services in each country. It is highest in France, Italy, Portugal and Spain and lowest in Luxembourg, Czech Republic and Romania.



	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK
2010	10.7		2.1	0.5	6.55	83.7	5.23	0.46	1.14	21	3.96	81.8	1.74	7.67	1.68	43.5	0.37	0.35	0.74	16.6	3.15	17.8	4.11	5.5	11	0.81	2.29	55.8
2011	10.9	9.49	2.07	0.51	6.75	85	5.41	0.39	0.96	21.4	3.88	82.8	1.49	7.8	1.64	41.3	0.39	0.35	0.73	16.9	3.04	18	4.14	5.14	11.4	0.77	2.43	56.1
2012	11.2	9.49	1.88	0.52	6.75	85	5.47	0.25	0.83	20.8	4.04	85.2	1.1	8.07	1.58	41.6	0.4	0.38	0.72	17.2	3.21	17.7	3.8	4.9	11.5	0.74	2.46	58.9

Figure 23: Number of billion passenger-kilometres (2010–2012)

Four countries with the highest passenger volumes (Germany, France, Italy and the UK) together account for two thirds of all passenger-kilometres. All of them except Italy saw passenger volumes increasing over the past three years.

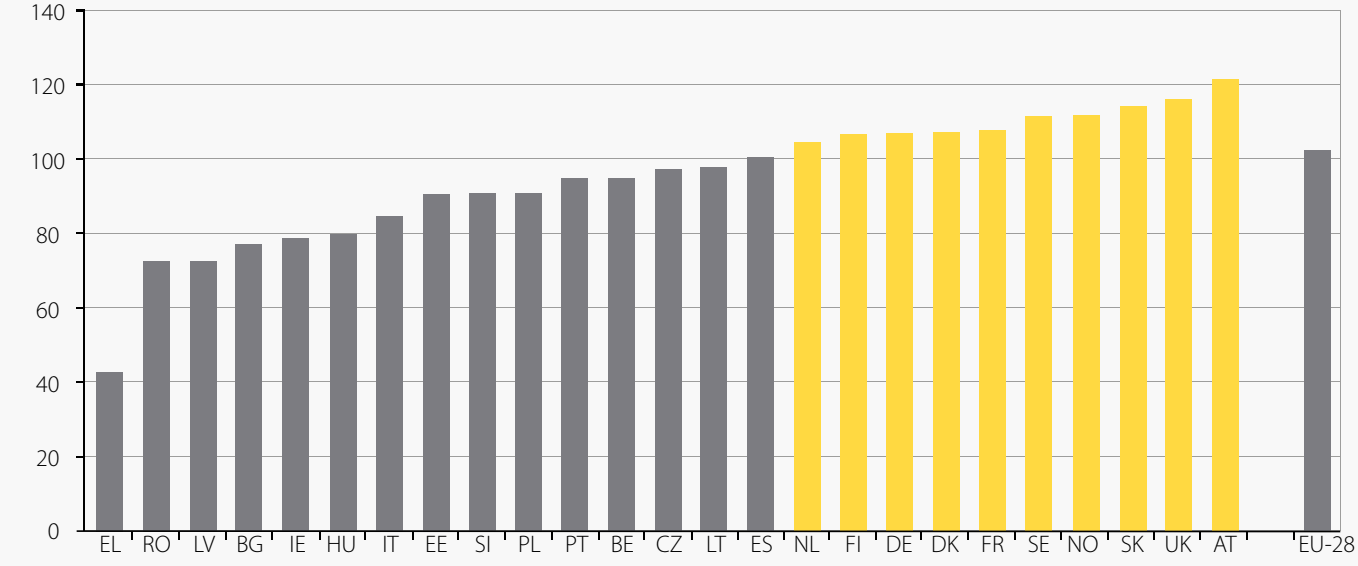


Figure 24: Relative change in the number of passenger kilometres between 2007 and 2012 (2007=100)

Over the past five years, the number of passenger kilometres increased by 3 % at EU level (Figure 24), however 14 countries registered decreases in passenger kilometre numbers. It is probably not a coincidence that in most of these countries, the passenger satisfaction with train services is relatively low. On the other side of the spectra, among the 10 countries in which passenger traffic increased more than the EU average, all but two had above-average passenger satisfaction ([20]).

[20] Satisfaction index of railway stations and travels (combined index of high and good replies). Europeans' satisfaction with rail services, Flash Eurobarometer 382a, TNS political and Social, 2013.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Focus key areas of railway safety performance

The safety overview gave a global picture of railway safety in the EU and of its development in the past six years. It also contained a benchmark on safety performance for individual Member States. This allowed countries with a relatively high level of risk to be identified. The Agency considers these countries as priority countries for its work, as the variation in risk between Member States remains unacceptably high. We will work with these countries more closely and systematically with a view to improving their safety performance.

In this chapter, we provide more details on the areas of railway safety that may deserve higher attention from all actors due to a less satisfactory development in risk at EU level. These areas are railway suicide events and level-crossing safety. In addition, further insight is provided into two subjects that are of concern for the general public: the transport of dangerous goods by rail and the impact of market opening on safety.

Suicides on railways

The number of suicide events on railways continues to rise across the EU. Every year, close to 3 000 suicide fatalities and an additional 800 trespasser fatalities occur on EU railways (Figure 25). This means that an average train and its driver experience suicide accidents once every 1.4 million train km. Assuming that an average train driver drives close to 100 000 km per year, he/she would experience a suicide accident every 15 years.

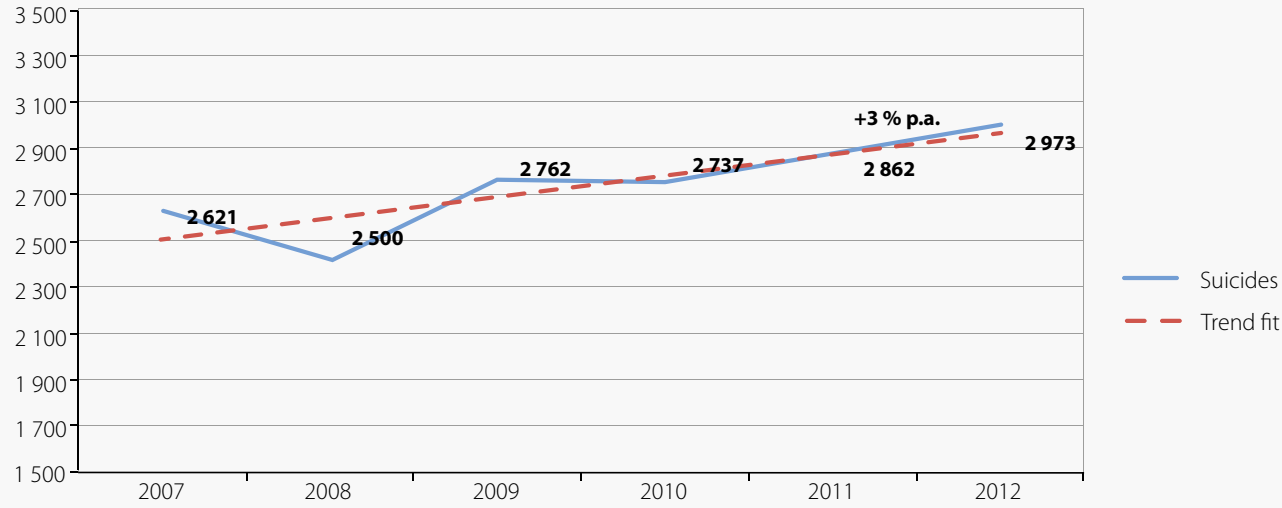

Figure 25: Suicide and unauthorised person fatalities (EU-27: 2007–2012)

Suicides on railway premises have been on rise since 2008 at EU level, with the average annual increase of 3 % p.a. This is shown in Figure 25 which contains data for 27 EU countries.

According to Eurostat figures, suicides on railway premises account for about 8 % of all suicides and represent 70 % of all railway fatalities. The societal impact of suicides on railways remains considerable. The consequences are not only loss of life and trauma for all parties involved, but also significant costs incurred by delays, deployment of rescue services, loss of productivity or employees involved etc.

The costs of delays due to suicides represent a significant share in the total cost of delays incurred to railway undertakings. It typically takes up to two hours to open a railway line when a person is struck by a train. This is a significantly longer time compared to delays caused by technical failures.

Besides the direct costs of railway suicides, the indirect costs may also be important. Delays and accidents undermine the attractiveness of railways as a modal choice and reduce its societal benefits.

Suicides on railways are deaths recorded and classified as suicide by competent national authorities. While the classification approach is mature in most Member States, some incertainty prevails in a few countries, where suicide fatalities may be confused with trespasser fatalities. Similarly, national legal frameworks and health and insurance policies may have an impact on the reliable reporting of railway suicides.

Suicides on railways, and more generally, all suicides, are relatively well correlated with unemployment rates. This may partly explain an increase in railway suicide fatalities in 2007 and 2009, visible at EU level. This correlation is however not evident at country level.

The risk of suicide is currently expressed as a rate between the suicides and train-km. Figure 26 shows that the railway suicide rates vary across EU countries, with the highest rates in the Czech Republic followed by Netherlands, Portugal and Hungary. In these four countries, the suicide rate is above one suicide per million train-km. The rates are relatively low in Greece, Norway, Estonia and Poland (less than 0.25 suicides per million train-km); countries with a relatively low intensity of the use of infrastructure. Notably Greece and Estonia are the two Member States with the lowest number of train kilometres per kilometres of track (less than 10 per day in 2012 on average).

While the differences in risk for Member States could be partly explained by cultural background, religion, extent of railway line fencing and urbanisation types, the impact of reporting practices remains significant. According to an earlier ERA survey among NSAs, in a few Member States, neither the Police nor the Prosecutor has to be involved in classifying the victim.

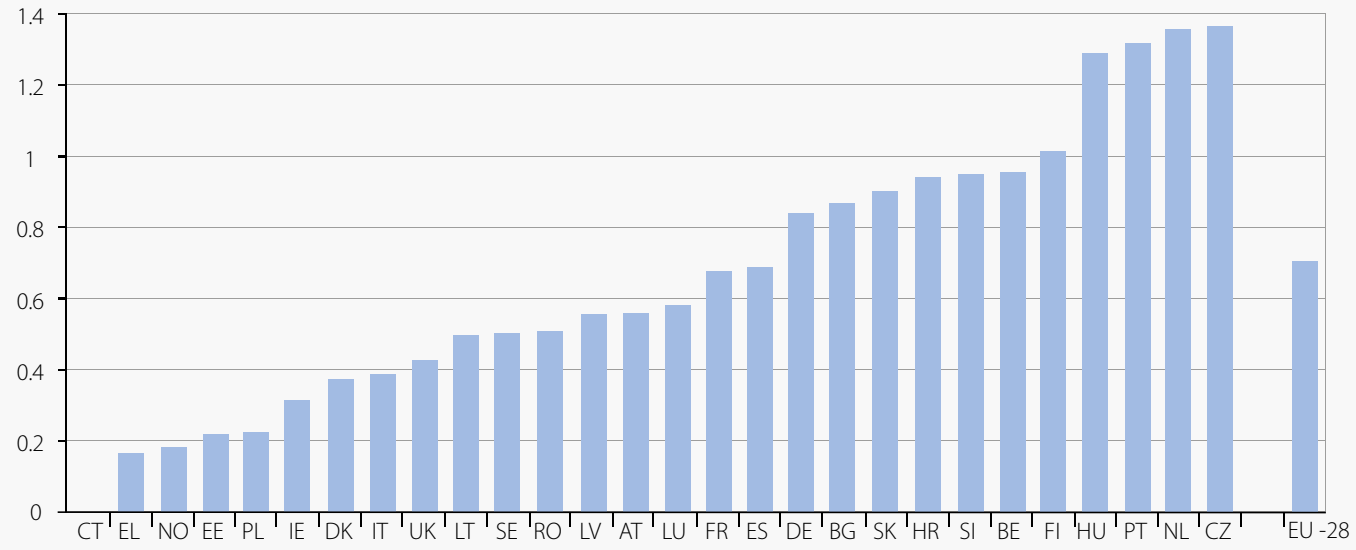

Figure 26: Suicide rates: number of suicide fatalities per million train-kilometres (EU-28: 2010–2012)

Dangerous goods accidents

The safety of transporting dangerous goods can be understood in two ways: Either from a statistical point of view, for example, the number of accidents or incidents involving wagons transporting dangerous goods, or in terms of the resulting impact, for example whether dangerous substances have been released, with or without human or environmental consequences.

When a railway accident involves dangerous goods, whether substances are released or not, it must be reported under a separate category of accident: accidents involving dangerous goods. Depending on the type and consequences, such accidents may also be reported as a significant accident.

In 2012, Member States reported a total of 36; in ten of these, the dangerous goods being transported were released during the accident. These 36 accidents involving dangerous goods occurred in only 11 EU Member States.

Dangerous goods accidents	2010	2011	2012
Total number of accidents involving at least one railway vehicle transporting dangerous goods	54	28	36
Number of accidents involving at least one railway vehicle transporting dangerous goods in which **dangerous goods ARE released**	37	9	10
Number of accidents involving at least one railway vehicle transporting dangerous goods in which **dangerous goods are NOT released**	17	19	26

Table 4: Railway accidents involving dangerous goods (EU-27: 2010–2012)

Transporting dangerous goods by rail in the EU is safe comparative to other transport modes: below 0.1 fatality per billion tonne kilometre, which is at least ten times lower than the fatality risk for the transport of dangerous goods by road.

Some accidents involving transport of dangerous goods have been investigated by NIBs. In 2013, there was only one occurrence notified to the Agency by NIBs which involved wagons transporting dangerous goods. The derailment on the 4 May 2013 of a freight train on the line between Schellebelle and Wetteren in Belgium caused one fatality, significant environmental damage and disruption to operations.

Notwithstanding that statistically the likelihood of an accident related to the transport of dangerous goods is very low compared to other railway accidents, the potential consequences of these accidents are significant. A proportionate approach to managing these risks requires that reducing safety incidents for this type of transport must be a priority.

Since 2007, the Agency has focused on reducing the number of railway accidents involving freight trains and limiting the potential release of dangerous substances when an accident does occur. This work can only be effective if there is good collaboration between those responsible for the development of general railway safety laws and those for the carriage of dangerous goods.

Any accidents involving dangerous goods may have catastrophic consequences in terms of human victims or environmental damage. This is why, in addition and without prejudice to the general EU legislation on railway safety, specific requirements on the classification, containment and loading/unloading of substances apply. These requirements are defined in the RID ([21]) which is transposed in EU legislation by the EU Directive 2008/68 on the inland transport of dangerous goods.

This is why, in 2013, the European Railway Agency signed administrative arrangements with the Intergovernmental Organisation for International Carriage by Rail (OTIF) and the European Commission's Directorate-General for Mobility and Transport (DG Move), establishing more effective collaboration and coordination. This will allow better coordination between the EU legislation on railway safety, which is mainly aimed at preventing the occurrence of accidents, and the RID requirements, which is mainly concerned with the classification of substances, their means of containment and loading/unloading requirements. The Agency has also established a collaboration with the UNECE Joint Meeting of the ADR/RID/ADN experts on the carriage of dangerous goods.

Level-crossing safety

Level crossings constitute a significant safety concern. In recent years, on average, every day, one person has been killed and close to one seriously injured at level crossings in Europe. This is shown in Figure 27 that summarises the development of level-crossing accidents and the resulting casualties in the EU over time.

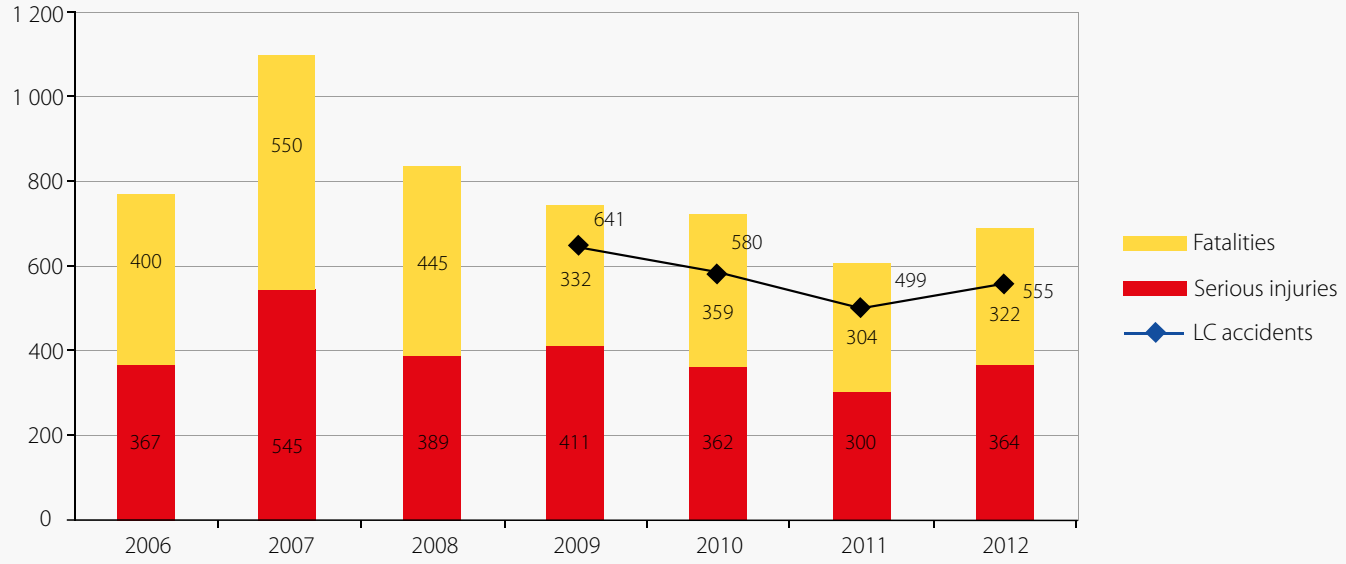

Figure 27: Level-crossing accidents and the resulting casualties (EU-27, 2006–2012)

Level-crossing accidents and fatalities represent more than one quarter of all railway accidents on EU railways (Figure 28). However, level-crossing fatalities make up only one per cent of all road deaths. This may partly explain that while level-crossing safety is viewed as a road-safety problem by railway infrastructure managers, it is viewed as a secondary problem by the road authorities. It appears that the concept of shared and delegated responsibility in road safety often fails to deliver the targeted results when it comes to level-crossing safety.

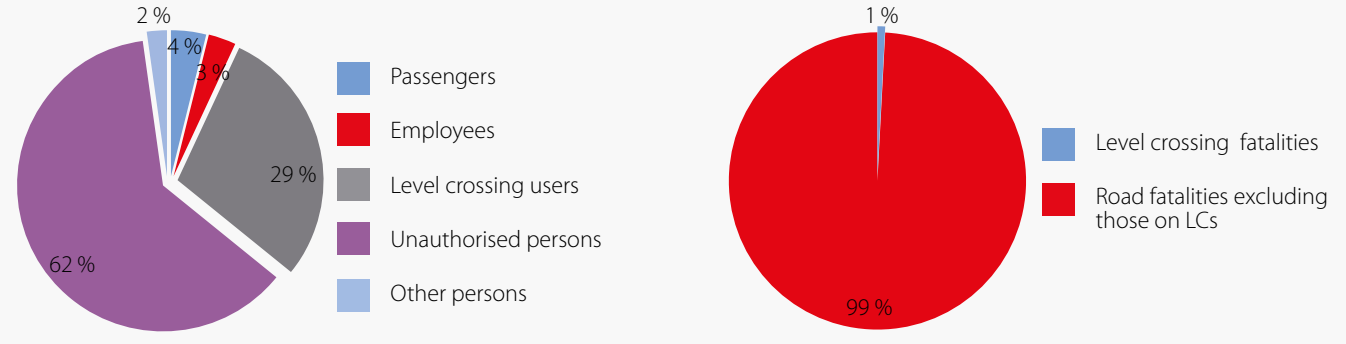

Figure 28: Share of fatalities for level-crossing accidents out of all other railway and road accidents (EU-28: 2010–2012)

([21]) RID: the Regulations concerning the International Carriage of Dangerous Goods by Rail, appearing as Appendix C to the Convention concerning International Carriage by Rail (COTIF) concluded at Vilnius on 3 June 1999.

Pedestrians represent about 40 % of the people killed. The fatality risk at level crossings in EU countries was estimated for the period between 2008-2012 and the countries ranked (Figure 29). The difference in risk between the countries with the smallest fatality risk at level crossings (Ireland with 11 deaths per billion train km) and the country with the highest level of risk (Greece with 550 deaths per billion train km) is huge, there is a 50-fold difference in the estimated risk of level-crossing user fatality. The variance in risk remains significant, even if we disregard the tenth percentiles of countries with the highest and lowest risk levels.

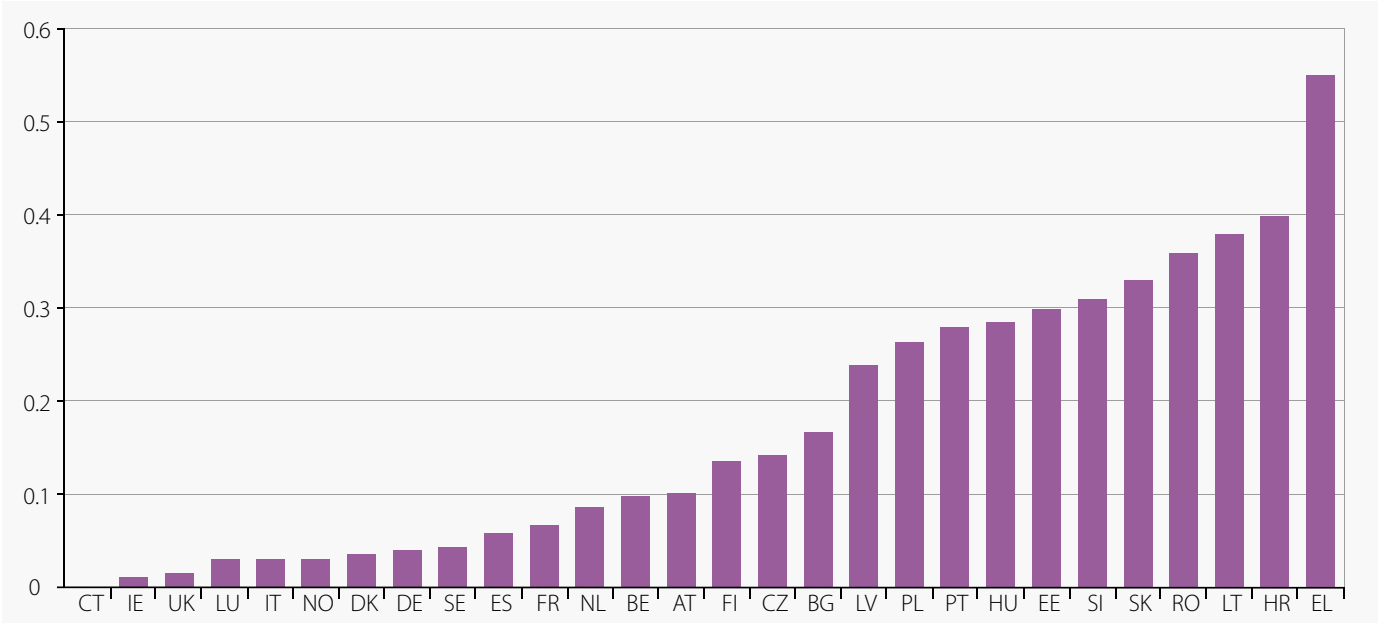

Figure 29: Fatality risk at level crossings: Level-crossing fatalities per million train-km (EU-28: 2010–2012)

The estimation of trends in accidents and other safety outcomes for EU countries reveals that while the number of significant accidents on level crossings has been decreasing at a steady pace since 2006, the number of fatalities was almost constant. At the same time, fatalities on railways as a whole have been decreasing by more than 5 % per year, on average. The reduction of road fatalities over the same period was even greater, with up to 8 % annual average reduction.

Fatalities per type	% change p.a. over period 2006–2012
LC fatalities	- 3.4 %
All other railway fatalities	- 5.4 %
All other road fatalities	- 7.7 %

Table 5: Average annual reduction in accident fatalities over the period 2006–2012 (EU-27)

The outcomes of level-crossing accidents are tragic and have significant impact on society. However, there is also a huge negative impact on the railway sector and its operations. Each of the 573 significant level-crossing accidents that occurred on EU-98 railways in 2012 also resulted in significant infrastructure and vehicle damage costs, together with other indirect costs, such as the cost of traffic disruption. Using the common EU method for calculating the costs of accidents defined in Appendix to Annex I of the Railway Safety Directive, and relying on a set of accident investigation reports available to the Agency, it was possible to estimate the average cost of a significant level-crossing accident in the EU in 2012. Relying on conservative estimates and including the main direct and indirect costs involved, the estimated economic impact of an average significant level-crossing accident in the EU could be as high as € 1.7 million.

Independent investigation into level-crossing accidents helps to shed light on the underlying and root causes of these occurrences. Inadequate maintenance of the level crossing is often identified, in some instances the rules and procedures are put into question. With about 50 accident investigations into level-crossing accidents by NIBs per year, not even one tenth of all fatal level-crossing accidents are subject to independent investigation. In many cases, these investigations do not seek root and underlying causes, significantly limiting their value. Although thorough investigations require resources, it is a worthwhile investment, if we consider the costs to society of these accidents.

One of the main barriers to systematic and efficient safety improvements is an insufficient communication between the road and rail infrastructure managers who often have different visions of each other's responsibility and liability. Since the impact for rail operations of level-crossing accidents is far greater that for road traffic, including costs and the number of people affected, it is reasonable to expect the IMs to have comprehensive strategies and tools for the proactive management of level-crossing safety.

One aspect of this strategy is a systematic removal of existing level crossings or their upgrade to use active protective devices. Nowadays, only 28 % of level crossings provide barrier protection to the road user. At the Member State level, this share can be as low as 3 % as in countries such as Poland, Lithuania and Ireland; it exceeds 60 % in Luxembourg, Belgium and Italy. While these differences partly stem from urbanisation characteristics and national requirements, the proportion of unprotected level crossings in some Member States is a source of concern. The absence of a common market for the protective devices may be part of the problem.

Market opening and safety

Creation of a more efficient rail market in Europe has been at the heart of EU policy-making for nearly 15 years. In order to assure that safety is at least maintained during the gradual opening of national railway markets, a common safety framework was introduced into the EU legislation. The common safety regulatory framework that notably consists of a number of common safety methods provides for consistent safety management across the rail operators in the whole Union. Its effective implementation is assessed and monitored directly (transposition checks, audits, assessments) and indirectly (monitoring of Member States' railway safety performance).

Measuring the impact of market opening for rail services in terms of railway safety performance has its limitations, rising notably from the methodological issues. Measuring the extent of market opening is relatively complex, even if only focusing on the provision of transport services. However, one measurement index, the rail liberalisation index, has recently gained recognition by the railway community. The index has been produced by IBM Global Business Services ([22]) since 2002. It reflects legal and ***de facto*** barriers to market access from the perspective of an external railway undertaking seeking access to the market. It also details the market shares enjoyed by external RUs in addition to the incumbent, to give a practical indication of existing barriers to an open market. The last edition of the index, published in 2011, benchmarked the rail market opening of MSs as of 1 January 2011 and ranks countries from those most advanced to those delayed in terms of rail market opening. Three categories of countries are considered based on the value of the index: six countries are considered as delayed, 15 countries on schedule and six countries advanced, in terms of rail market opening. The advanced countries are, according to the index, Austria, Germany, Denmark, Netherlands, Sweden and the UK.

The IBM rail liberalisation index is plotted against the casualty risk for passengers and employees in Figure 30: Casualty risk versus the rail liberalisation index (IBM 2011) for EU . While we do not draw a causal link between the two variables, it appears that countries from the advanced group have lower casualty risk than the countries in the two other groups. The reduction of risk in the advanced group of countries is then comparable with the development of safety for other countries.

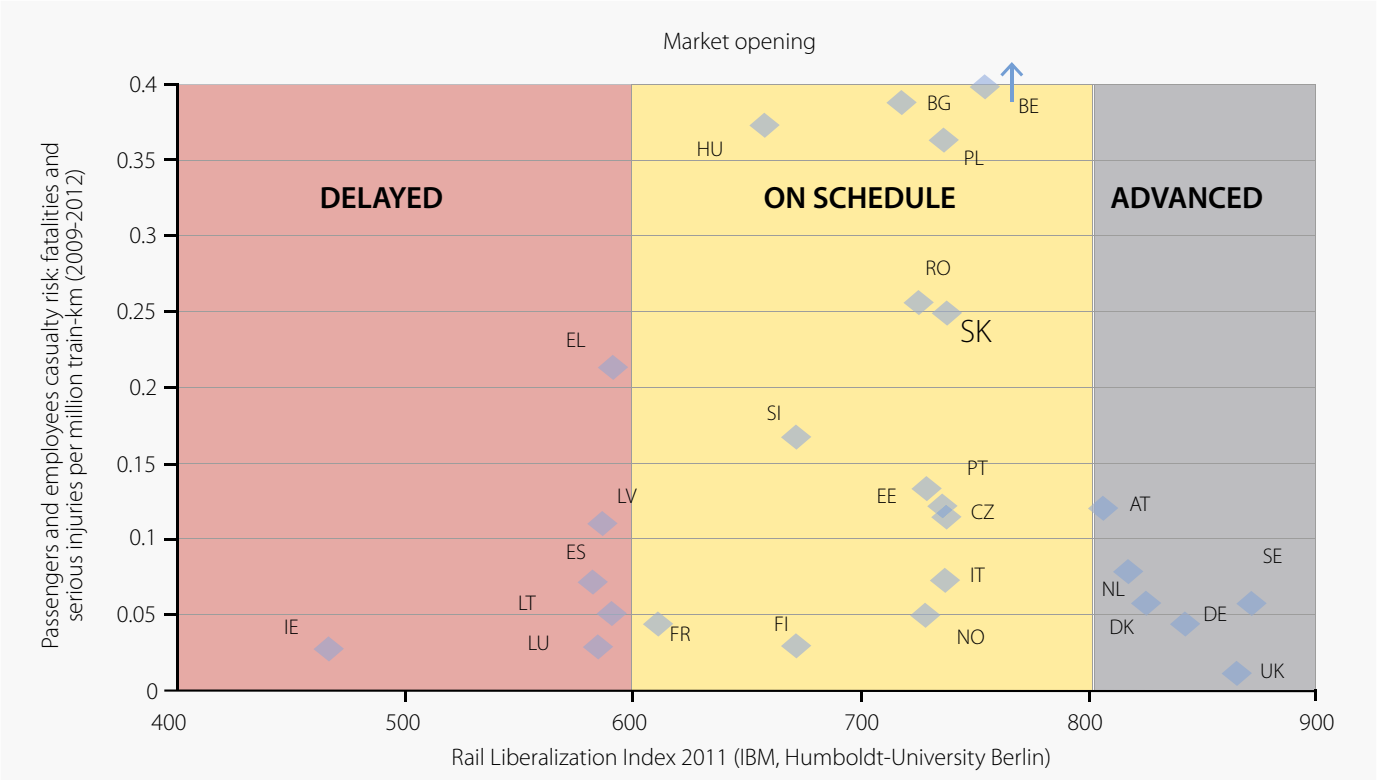

Figure 30: Casualty risk versus the rail liberalisation index (IBM 2011) for EU Member States

[22] Rail liberalisation index 2011, IBM Germany with Prof. Kirschner, Deutsche Bahn, 2011.

Managing safety

Introduction

Effective safety management is a prerequisite for maintaining and improving the safety of the railway system over time. Safety management systems of railway undertakings and infrastructure managers are the cornerstones of the EU approach to assuring the safety of train operations in the EU.

A safety management system is a pro-active system that identifies the hazards of the activity, assesses the risks that those hazards present, and takes action to reduce those risks to acceptable levels. It involves continuous checks to confirm the effectiveness of actions and timely identification of new hazards. An application of safety management systems is not limited to the operational level; it can also be successfully applied at a regulatory level, for example, to the NSAs and to the ERA itself. The Single European railway area eventually implies a need for a safety management system at EU level, since hazards are not always limited geographically and sometimes their identification may only be possible by analysing relevant data available across the EU.

The RSD contains a number of concrete instruments for the effective management of railway safety, such as harmonised safety certification, vehicle authorization, supervision, or risk assessment. They are meant to support the overarching objective to create an internal market for railway vehicles and train services across Europe having no detrimental impact on railway safety. The revised Directive should contain some additional elements enabling an effective safety management at EU level, notably tangible safety targets, common occurrence reporting, harmonised supervision and improved risk management at EU level.

Safety regulation

In several Member States, the safety regulatory framework is still undergoing significant development. The evaluation of the national measures transposing the RSD in the Member States identified some key findings relating to the setting up and independence of the NSAs and NIBs, the functioning of the Safety Management System, the separation of safety certificates into part A and part B and the investigation of accidents, including the follow-up of investigation recommendations.

The transparency and availability of the national safety rules applied by the RUs operating on the railway network is important for market opening and removal of regulatory barriers. The RSD requires Member States to notify the Commission of new and amended national safety rules ([23]). The Agency evaluates these notifications using the Commission's public database, NOTIF-IT. The Commission monitors the introduction of new national rules in order to prevent the creation of new barriers to market opening. In 2013 the Commission and the Agency worked closely on a new Notif-IT module for the notification of draft national safety rules by the Member States for the purpose of their evaluation by the Commission ([24]). This module will be made available for use in the first half of 2014 and will facilitate public consultation of all interested parties across the EU.

The long-term objective of the Railway Safety Directive is the gradual reduction of national rules in order to move towards a more harmonised European approach to safety. Many of these national rules are redundant as common requirements have now been enacted at EU level. It is therefore timely to review and clarify the scope that remains for national safety rules in the Member States. Also, as substantiated by Agency reports and feedback from the sector, there is a need to increase transparency in how national safety rules are established, published and made available.

These issues were considered by the Task Force on National Safety Rules set up under the auspices of the Railway Interoperability and Safety Committee (RISC). The Final Report of January 2013 provides relevant guidance to Member States with examples of good practice, as well as the Rule Management Tool that simplifies the compliance checks and the relevance of the national safety rules in relation to the common safety regulatory framework. Consequently, the Agency launched a number of follow-up activities in 2013. Dissemination activities facilitate the discussion on priorities and steps to be taken in the individual Member States, with the aim to promote faster improvements.

Safety oversight

There are certain limitations to the current EU railway safety monitoring approach. It relies exclusively on outcome indicators, such as the number of accidents and resulting casualties. As detailed in this report, there is a long-term downward trend for these indicators, with zero values becoming more common in some categories at country level. Relying on these very rare occurrences alone can lead to regulatory planning that is too reactive and fails to capture the available and important information about underlying safety issues. The Agency has therefore started to develop new methods for monitoring and evaluating the safety of the railway system at EU level.

[23] Article 8(4), Railway Safety Directive 2004/49/EC.
[24] Article 8(7), Railway Safety Directive 2004/49/EC.

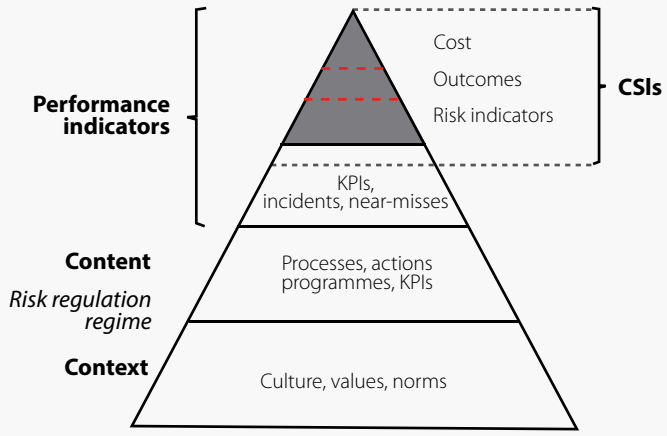

Figure 31: Pyramidal model for railway safety management

Since railway safety in the European context is managed at three different levels — at the level of operators, Member states and the EU — the monitoring tools must be universal and at the same time proportionate to the benefits of monitoring. It should cover all levels of safety management, which can be summarised by the concept of the safety management pyramid shown in Figure 31. It depicts how the negative consequences of accident outcomes are rooted in the design of the risk regulation regime. A risk regulation regime can be understood as the combination of the institutional framework, rules and practices that are associated with the regulation of a particular risk or hazard. The regulatory regime is thus more than standards, reporting or prioritisation; it embraces integration and accountability within relevant organisations. Since the (effectiveness of) the risk regulation regime directly impacts upon the safety performance of the system, a holistic evaluation of the railway system includes evaluating the risk regulation regime and its components. This extension of monitoring to the foundation levels of the safety pyramid represents a major innovation for railway safety management at EU level.

In 2013, the Agency developed a first proposal for a tool for assessing the effectiveness of the regulatory regime of individual Member States and started to apply it in a pilot programme. The Regulatory Monitoring Matrix covers five areas of effective management (steering, organising, staffing, performing and evaluating), which are further articulated into 26 sub-elements. For each of the sub-elements, a five-scale evaluation scheme was defined.

This development is in parallel with the revision of the outcomes monitoring scheme, currently limited to the CSIs. It is envisaged to extend the scope of the existing common outcomes reporting scheme in the future, to support a common supervision approach and risk-based safety management. The first steps were completed in 2013 by analysing the current approaches in individual Member States (NSAs, RUs, IMs) and determining a new series of incident indicators that could be the subject of common reporting in the future.

NSA cross-audits

Supported by the Agency, the NSAs agreed to a programme of audits, to evaluate the performance of their three main activities required by the Safety and Interoperability Directive: safety certification and safety authorisation, supervision and authorisation for placing into service of vehicles, and to share best practices. Following a two year pilot, the first full audit cycle of all NSAs began in 2013.

At this stage, the audit programme focuses on the quality of NSA processes, and does not look critically at the decision-making or risk assessment applied as part of those processes. Early indications are that, while all NSAs appear committed to continuous improvement, many are at an early stage in terms of developing and implementing quality processes. Nevertheless, the programme has proved successful at driving improvement within those NSAs audited and those providing auditors. In addition, the audits provide a structured and consistent way to understand how well these key elements of national regulatory frameworks are functioning. Within the agreed boundaries of the programme (the audit findings are not public), this information can also help the Agency by complementing the statistics and other information available to develop a fuller picture.

The current cycle is scheduled to end in 2018, by which time the revisions of the fourth package are likely to shape the revision of the programme.

NIB voluntary assessments

The first NIB assessment programme was launched by the Agency in 2013. The objective of these voluntary assessments of NIBs is to support NIBs, who have a leading role in rail accident investigation in their own Member States, to share good practices and to identify practical improvements to their work, by assessing their current performance. The assessments are made on request, reflecting the individual commitments of NIBs to continuously improve their organisations in a structured and systematic way.

The voluntary assessment relies on the method developed by the NIBs in cooperation with the Agency. After a successful pilot assessment of the Hungarian NIB in 2012, two assessments started in 2013. At the same time, two audits were carried out at the request of the European Commission and the National Parliamentary Committee of one Member State in 2013. The assessments were conducted by ERA staff and showed that the two NIBs manage their performance: they deliver good investigation reports including recommendations with the

intention to prevent reoccurrence and at the same time seek to continuously improve the investigation process by developing and applying defined processes.

These assessments also showed that while all assessed NIBs have effectively carried out investigation into past accidents, the approaches vary greatly between countries. In some instances, the transposition and the implementation of the legal framework created difficulties for the NIB to work effectively and independently. In some others, the amount of available resources had a great impact on the extent and quality of the work of the organisation.

Safety supervision

Safety supervision is assured at the national level by the National Safety Authorities, with two main instruments defined in the railway safety directive as audits and inspections. While the safety audits are typically the result of longer-term planning and follow a well-established comprehensive procedure, inspections are carried out as irregular checks of the specific procedures or operations of a railway undertaking. The NSAs report to the ERA, as part of their annual safety report, the number of audits and inspections that they carried out in the previous year. However, only eight countries reported these numbers in their 2012 annual safety report. Four NSAs performed less than five safety audits in 2012: Bulgaria (4), Slovenia (2), Slovakia (1) and Greece (0). At the same time, Greece and Slovenia reported zero safety inspections carried out in 2012. This raises concerns about the effectiveness of the supervision process in these two Member States.

Even when accounting for possible misclassification of inspections as audits and vice-versa, the variation in the supervision effort across the EU remains significant. The information available to the Agency also shows that the supervision procedures and tools differ substantially between Member States. These variations may represent an obstacle to a common certification and supervision regime in the EU.

In conclusion, there might be a case for working towards a common understanding of the audit and inspection and their content. This would notably enable a more meaningful comparison of supervision work in various NSAs.

Iin paralel, the number of internal audits ([25]) that are carried out by the RUs and IMs and reported to the NSAs. The number of internal audits accomplished in 2012 varied between zero in Greece and more than 3 000 in Italy, with the median value of 80 audits. Figure 32 shows the number of internal safety audits carried out in 2012 in relation to the number of safety certificates valid in the given country. The median value for all MSs is slightly above 1, meaning that more than one audit is carried out by each RU or IM with a valid safety certificate in a year. It is evident that the definition of an internal audit is not applied consistently across the EU and that the reported values do not provide a basis for a meaningful comparison.

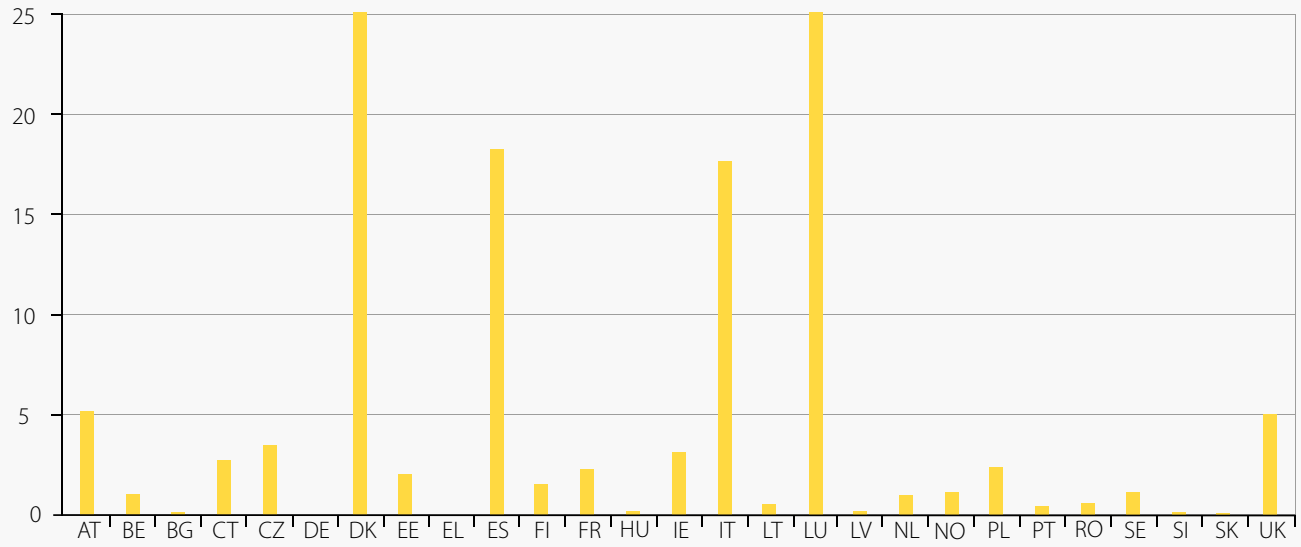

Figure 32: Number of internal safety audits in 2012 per number of valid safety certificates by end 2013

[25] Internal audits accomplished by infrastructure managers and railway undertakings as set out in the documentation of the safety management system, where 'audit' means a systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which audit criteria are fulfilled.

Safety certification

The Railway Safety Directive requires the railway undertakings (RUs) to hold a safety certificate issued by the national safety authority (NSA) to access the railway infrastructure. Similarly, Infrastructure managers (IMs) must obtain a safety authorisation from the NSA to manage and operate a rail infrastructure in a Member State. The NSA assesses the Safety Management System (SMS) of RUs and IMs applying for safety certificates or safety authorisations against the requirements set out in the Directive. For the RUs, they are awarded a Part A safety certificate, which is valid throughout the EU. RUs also need to obtain Part B certificates for each Member State in which they operate, relating to the specific requirements for safe operation on the relevant network, including the authorisation of the vehicles used by the RU.

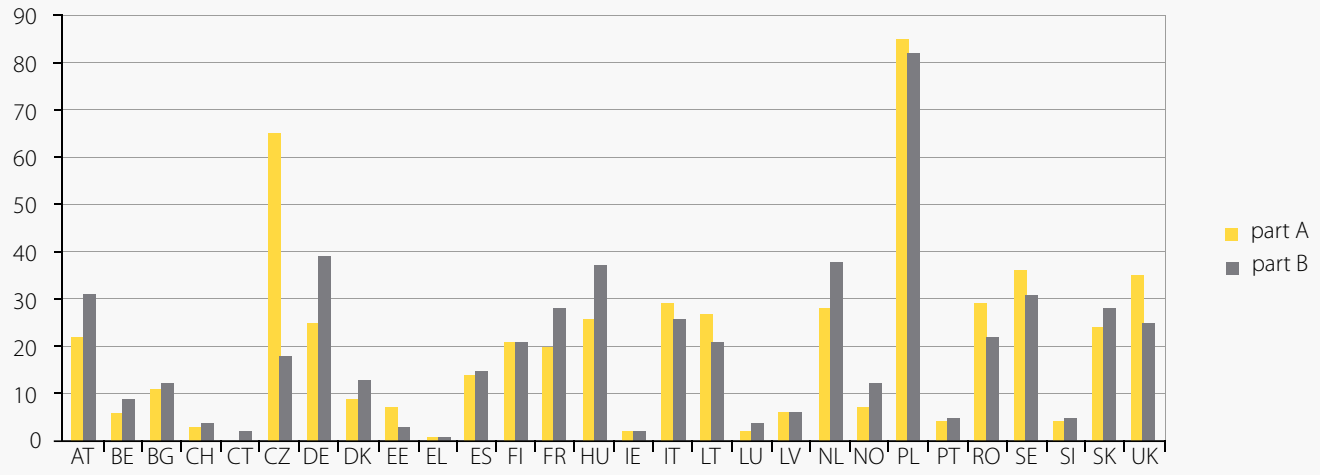

Figure 33: Number of valid Safety Certificates — Part A and B per Member State (ERADIS as of 1 January 2014)

There were a total of 1 088 valid safety certificates in EU-27 countries, Norway and Switzerland (548 part A and 540 part B certificates) issued in accordance with the RSD and valid on 1 January 2014, as shown by records in the ERADIS database. This figure includes all new, renewed or amended safety certificates. A lower number of B certificates compared to A certificates for some Member States indicates that for some the B certificates had already expired and the notification of renewal has not yet been submitted to the ERA.

The number of valid safety certificates issued by the NSAs is shown in Figure 33. The NSAs of Poland, followed by the Czech Republic, Sweden and the UK, issued the highest number of safety certificates. On the other side of the spectra, in eleven countries, the number of certified RUs is lower than 10, possibly indicating a limited development of the railway market in these countries (Figure 33). Another possible global explanation for the fact that the number of issued safety certificates do not match the number of licensed RUs, following the latest exchanges with the NSAs and the sector, is that there are many RUs operating under the safety certificate of another RU.

Figure 34 shows more details on the number of safety certificates per type of service, valid on 1 January 2014 and registered in the ERADIS database. This figure shows the share of international part B certificates ([26]) in comparison with the overall number of issued part A certificates. It shows that a relatively small number of RUs assure cross-border train operations in Europe. (However, there may be some RUs operating under the safety certificate of another RU.) The international part B safety certificates remain rather rare for RUs operating passenger train services; they are more common for RUs operating freight transport services. This is comparable to the numbers registered two years ago.

[26] International part B means the safety certificate part B issued by the NSA from other Member State than the NSA which issued the corresponding part A certificate.

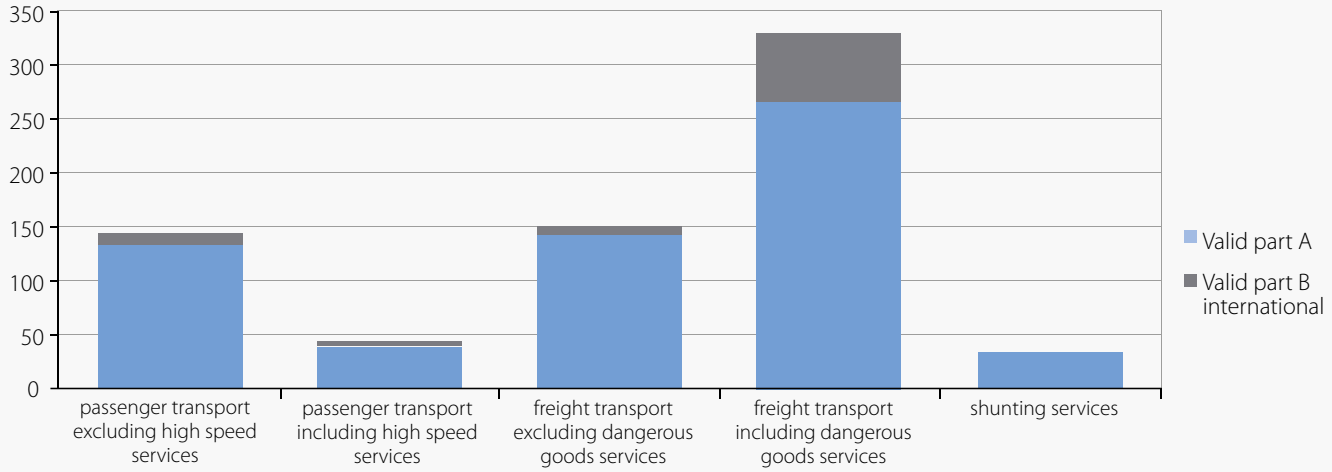

Figure 34: Number of valid Safety Certificates — Part A and B, international operations only, per type of service (1 January 2014)

Safety authorisation

Infrastructure managers (IMs) must obtain a safety authorisation from the NSA to manage the rail infrastructure in a Member State. European IMs are typically state-owned entities with national coverage; a small number of IMs that are privately owned manage small infrastructure networks, typically at ports. Altogether 14 IMs are institutionally independent from any railway undertaking. Detailed information about IMs with valid safety authorisation is currently not available at EU level. A High Level European Rail Infrastructure Managers' Platform was launched in January 2014 by the European Commission; it should help to enhance the cooperation among IMs and assure better implementation of the common safety approach in the EU.

Certification of the entities in charge of maintenance

The proper maintenance of railway vehicles is vital in ensuring that they continue to deliver a safe performance. The certification of Entities in Charge of Maintenance (ECM), according to Regulation No 445/2011, provides evidence of responsibility and traceability of the maintenance undertaken on freight wagons. In line with the provisions of this Regulation, the Member States can either choose between accreditation or recognition, or they can nominate the NSA as certification body. The NSA acts as a certification body in a total of 15 Member States, four MSs chose to accredit other certification bodies and three have chosen to recognise other certification bodies.

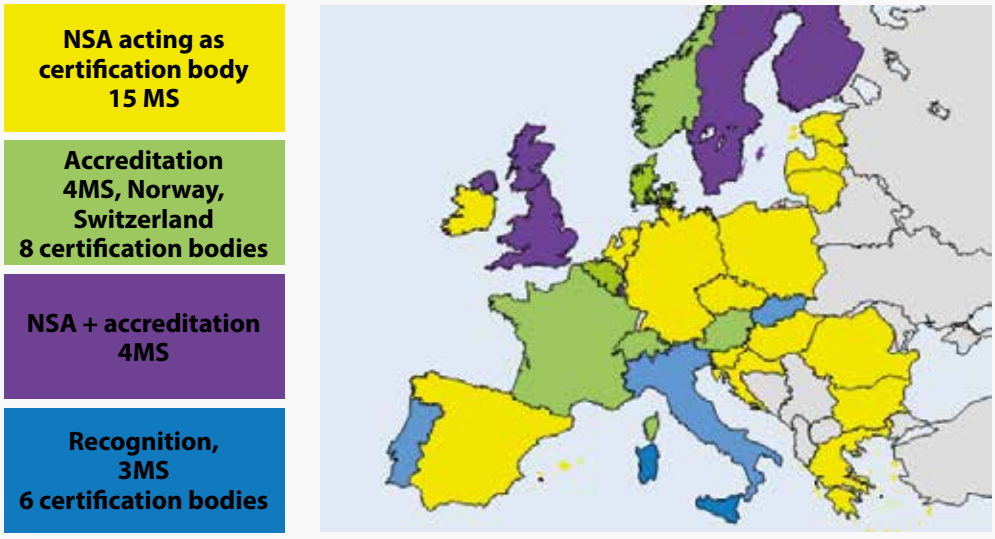

Figure 35: ECM scheme chosen by Member States (as of 31 December 2013)

By mid-January 2014, there were a total of 235 ECM certificates in the ERADIS database. Figure 36 shows the development in the number of ECM certificates over time and the distribution of certificates per Member States.

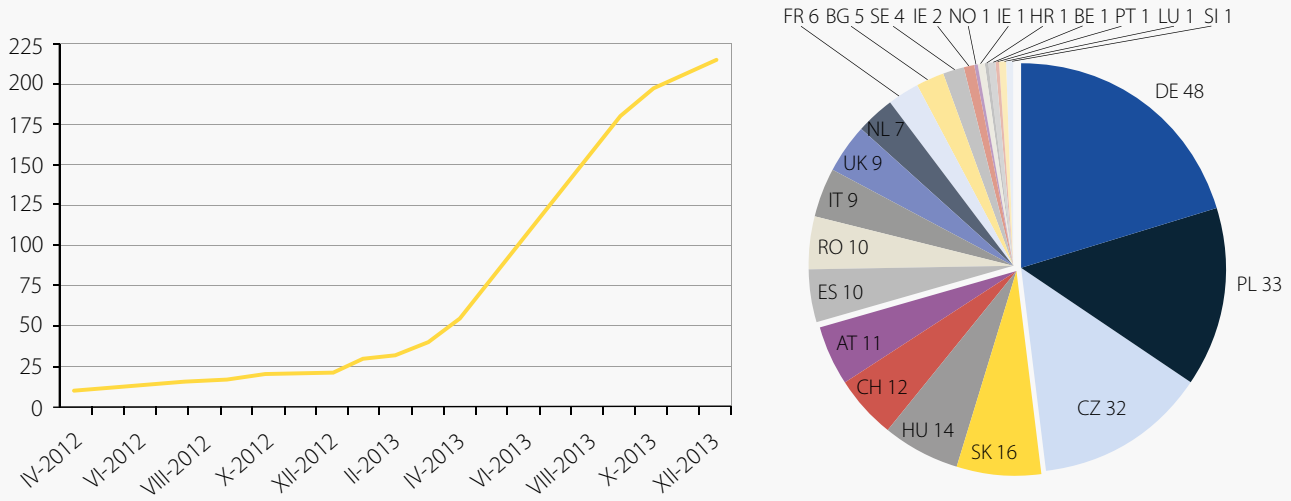

Figure 36: Number of ECM certificates over time and per country (as of 31 December 2013)

Unsurprisingly, there was an increase in the number of ECM certificates issued after May 2013, the date when all ECMs for freight wagons were required by legislation to be certified.

Although the implementation of ECM certification is well advanced, there are still some areas that need improvement:

- Monitoring implementation, where the data collected by ERA must provide a clear and complete overview of the situation in Member States;
- Exchange of information between RUs, wagon keepers and ECMs;
- Clean-up of national rules addressing the maintenance of freight wagons that might adversely impact on the effectiveness of ECM certification.

In 2014, we plan to shift our activities away from implementing the certification scheme towards supporting the surveillance responsibilities of certified ECMs. In particular, the Agency will organise workshops and supplement existing guidance, continue to monitor and report on implementation in accordance with Article 14 of the RSD and start the revision process of Regulation 445/2011, including the extension of scope.


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Independent accident investigation

Introduction

Independent accident investigation into the causes of accidents is invaluable to society in general and in assuring safety. It assures that lessons are drawn from past accidents and that action can be taken to prevent a similar accident from happening in the future.

Independent accident investigation is a responsibility of each Member State, where the role of the Agency is limited to supporting the relevant national bodies in carrying out their tasks. The Railway Safety Directive requires that serious accidents are independently investigated by an independent National Investigation Body (NIB). The list of serious accidents that occurred in 2013 is shown together with basic descriptive information in Annex I.

Occurrences investigated by NIBs

According to the provision of the RSD, the NIBs have to investigate all serious accidents that occur in their territory and may in addition investigate other accidents and incidents. The occurrences investigated by the NIBs are subject to mandatory reporting to the ERA ([27]). Each accident is reported to the ERA twice: as a notification of the opening of an investigation and when the final report is sent to the Agency. Both records are available in the Agency's database ERAIL.

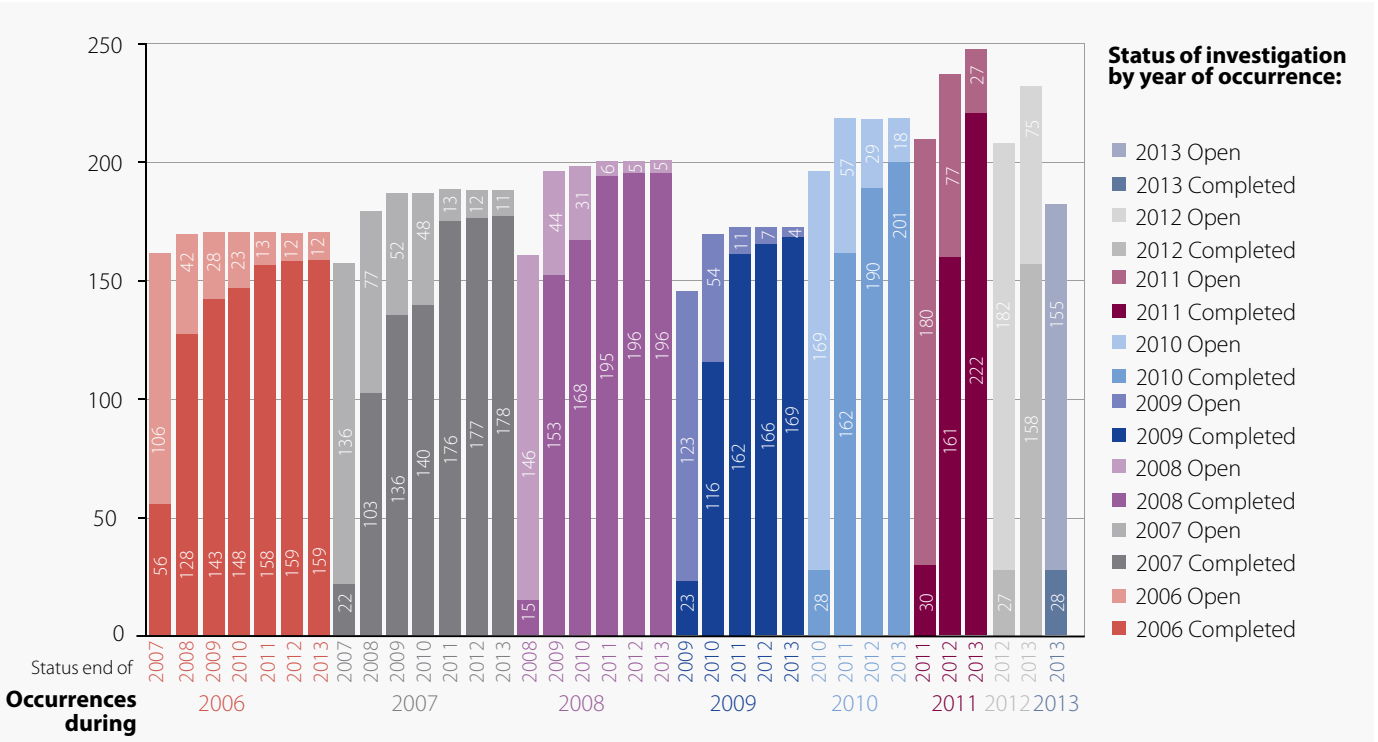

Figure 37: NIB investigations carried out since 2006 with the status of the investigation (ERAIL database)

The Agency receives notifications for a majority of the serious accidents investigated, although this notification is not always sent within the one week deadline. The compliance of Member States with the requirements for notification and submission of final reports has been improving over time. In 2013, around one third of notifications to investigate were in fact submitted within one week after the occurrence of the accident. As the Agency does not yet systematically receive information on the starting date of the investigations, the date of the accident occurrence is used as a reference. It should be noted that the time between the occurrence and the decision to investigate can, in certain cases, be longer than a week.

The overview of the number of investigations carried out by NIBs in Europe is showed in Figure 37. There was a drop in the number of investigated occurrences that occurred in 2009; since then the number of occurrences investigated by NIBs across Europe has risen. The figure also shows that over the past four years the percentage share of investigations that were closed during the calendar year following the occurrence has been rather stable, at about 70 %.

The average number of days between the accident occurrence and the notification to investigate to the Agency has decreased over time: from 91 days in 2008 to 27 days in 2013. Despite an improvement recorded over time, one third of started investigations are not notified to the Agency within 10 days after the decision was taken to start the investigation.

[27] 'Within one week after the decision to open an investigation the investigation body shall inform the Agency thereof. The investigation body shall send the Agency a copy of the final investigation report.' (Art. 24(1,2) RSD (49/2004/EC)).

Year of occurrence / average number of days between occurrence and:	2008	2009	2010	2011	2012	2013
- notification	91	60	49	50	35	27
- final investigation report	460	402	377	313	347	-

Table 6: Average time span between occurrence and accident notification and between occurrence and the submission of the final investigation report to the Agency (in days) ([28])

The final investigation reports on the investigations carried out by NIBs should be made public as soon as possible, and normally not later than one year after the date of the occurrence. The average number of months before the final report is submitted to the Agency has also decreased over time: from more than 15 months for accidents occurring in 2008 to around 11 months for accidents occurring in 2012.

Every year, more than 200 accidents and incidents are investigated by Member State NIBs. This number has been slightly increasing over recent years, since more and more NIBs have decided to open an investigation into accidents not categorised as serious according to the RSD. The number of serious railway accidents investigated by NIBs has been stable since 2007 at around 40 (Figure 38).

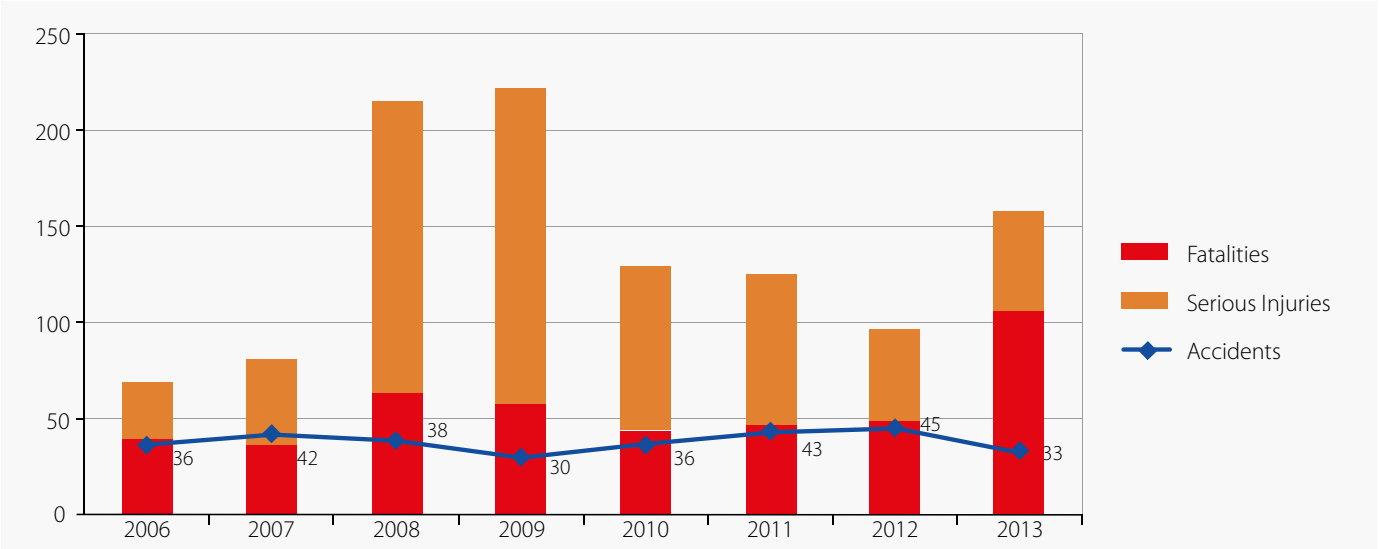

Figure 38: Serious railway accidents investigated by NIBs together with the resulting casualties (EU-27)

A detailed look into the type of serious accidents investigated by NIBs shows that train derailment is the most commonly investigated type of serious accidents, followed by train collision (Figure 39). However, the largest number of accidents classified as serious by the NIBs and investigated by them are level-crossing accidents.

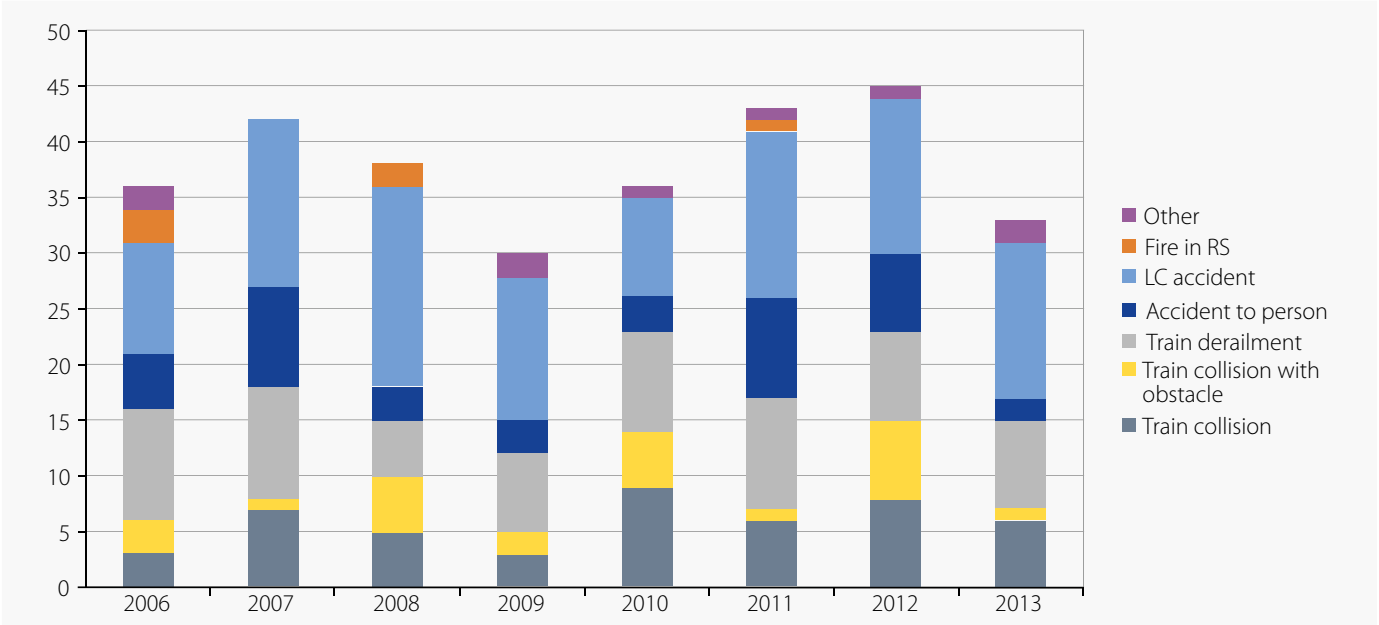

Figure 39: Serious accidents investigated by NIBs per type of accident (EU-27 countries in 2006–2013)

[28] Occurrences for which the investigation started in the following calendar year have been excluded from the analysis.

In addition to serious accidents, the NIBs investigate accidents and incidents which under slightly different conditions might have led to serious accidents and notify the Agency thereof. These occurrences represent about 85 % of all investigated occurrences. Table 7 demonstrates that the investigated occurrences represent a fraction of the total number of significant accidents and accident precursors. The railway undertakings (RUs) and infrastructure managers (IMs) should normally also investigate occurrences other than significant accidents as part of their safety management systems (SMSs), however the extent of RU/IM investigation into significant accidents and into accident precursors at the EU level is not known.

Year of reporting	National safety authorities (NSAs of EU-27)		National investigation bodies (NIBs)
	Significant accidents	Precursors	Notifications of opened investigations
2009	2 739	9 304	173
2010	2 249	10 339	219
2011	2 187	9 618	249
2012	2 026	11 541	233
2013	NA	NA	183

Table 7: Number of occurrences reported to the ERA in the period 2009–2013 (EU-27)

While the majority of serious accidents in the EU are investigated by the NIBs, the share of other similar accidents and other accidents and incidents investigated vary greatly among countries. NIBs carried out nine investigations per year on average in the period between 2010-2012 that were notified to the Agency.

The variation in investigation effort by individual NIBs is demonstrated in Figure 40, which shows the number of notified investigations per country standardised by the number of significant accidents and by train-km in the period between 2010-2012. All occurrences for which a NIB investigation was started were considered, regardless of whether the investigation has been carried out and closed in practice.

For three Member States (Croatia, Lithuania and Luxembourg), no single NIB accident investigation was notified to the ERA; for six Member States (Austria, Czech Republic, Spain, Hungary, Romania and UK), the number of investigations exceeded 60 over three years (20 per year on average). The number of notified investigations standardised by significant accidents and train-km gives an indication about the relative extent of independent investigation in individual Member States. A relatively small number of NIB investigations are carried out in the Baltic countries, Poland, Portugal and France. The number of occurrences investigated by NIBs is relatively significant in Spain, Hungary, Ireland and in the UK.

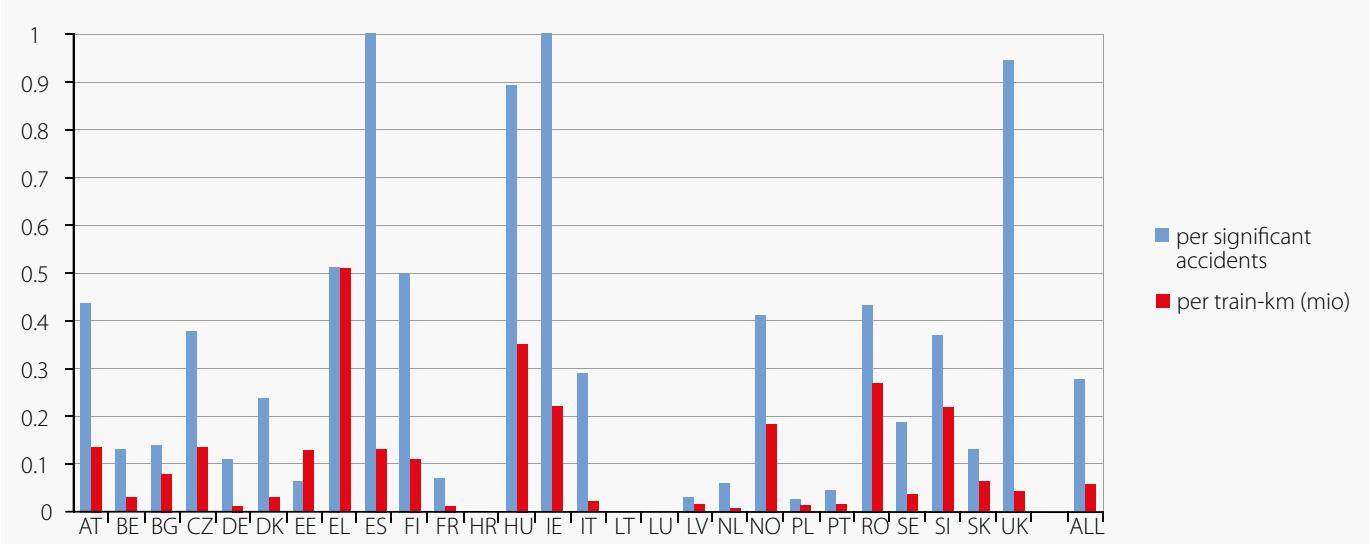

Figure 40: Investigated occurrences as notified to the ERA per significant accidents and per million train kilometres (2010–2012)

Conclusion

Independent accident investigation of railway accidents and incidents carried out by the NIBs of Member States has been maturing over the past few years. The number of occurrences investigated per year fell slightly to about 200 per year, while the quality of the investigations has gradually improved through an extended investigation into the underlying causes of accidents and into the role of the safety management systems as well as better targeted safety recommendations. In 2013 we also saw an increased number of investigations in which the NIBs of different Member States actively cooperated.

Reporting on opened and closed investigations continued to improve in 2013, with the majority of notifications meeting the legal requirements. However, one continuing concern is the proportion of investigations for which the final investigation report is available within one year. This concerns notably the serious accidents, as visible from the overview of serious accidents that occurred in 2012 in Annex I. For three out of eight serious accidents, the investigation has not yet been closed.

There are prevailing major differences between NIBs in terms of resources, organisational structure, level of independence and the impact of their work. For example, half of the NIBs in the EU are part of a multimodal organisation also investigating other types of transport accidents; some are part of the Ministry of Transport and others carry out no investigations in practice. The Agency has been actively seeking to enhance the role and impact of NIB independent investigations to achieve the objectives of the Railway Safety Directive, by facilitating the network of NIBs and providing specific technical support on request. The Agency also recently started the voluntary NIB assessment programme that should shed some more light on the quality and effectiveness of NIB accident investigations and indirectly on their impact on railway safety in the EU.


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Background information

The report Railway safety performance in the European Union summarises information on the development of railway safety in Europe. It is produced by the Agency in accordance with the EU legislation ([31]). It builds on the information provided by the National Bodies under the EU legislation ([32]).

The primary purpose is to provide safety intelligence and information on risks to EU policy-making bodies, NSAs, NIBs and to the general public. The report reviews the performance levels achieved during 2012 across a number of topic areas. It includes basic statistical analyses on a wide range of safety performance indicators and highlights significant findings.

The report is based on the common safety indicators (CSIs) data reported to the ERA by 31 January 2014. Any changes after that date have not been taken into account. Information presented on serious accidents and their investigations is based on reports available to the ERA on 1 February 2014. Any event occurring after that day is not covered by this report. This report covers the railways in 26 of the 28 EU countries; Cyprus and Malta do not have railway systems that are covered by EU legislation. These 26 Member States are referred to as 'Member States', 'EU', or 'EU countries' in the report. The Channel Tunnel (CT) is a separate reporting entity, so that relevant data are given separately to the French and UK data. The data are also reported by Norway. Therefore, there were a total of 28 reporting entities in 2013; the term 'Europe' was sometimes used for this complete group in the report.

European legislation requires Member States to report to the ERA on significant accidents and serious accidents occurring in their territory. The NSAs must report all significant accidents. The NIBs must investigate all serious accidents, notify the ERA of these investigations and, when closed, send the investigation report to the ERA. The term significant accident covers a wider range of events than serious accidents. The legislation provides the following definitions for these two groups of accident:

Significant accident	Serious accident
Directive 2004/49/EC, Commission Directive 2009/149/EC and Regulation (EC) No 91/2003	Directive 2004/49/EC
'significant accident' means **any accident** involving at least one rail vehicle in motion, resulting in at least one killed or seriously injured person, or in **significant damage** to stock, track, other installations or environment, or extensive disruptions to traffic. Accidents in workshops, warehouses and depots are excluded ([29]). Significant damage is damage that is equivalent to EUR 150 000 or more.	'serious accident' means any **train collision** or **derailment of trains**, resulting in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock, the infrastructure or the environment, **and any other similar accident** with an **obvious impact** on railway safety regulation or the management of safety; 'extensive damage' means damage that can immediately be assessed by the investigating body to cost at least EUR 2 million in total ([31]).
Reporting of CSIs by NSAs	Accident investigation by NIBs
Each year the safety authority shall publish an annual report concerning its activities in the preceding year and send it to the Agency by 30 September at the latest. The report shall contain information on: the development of railway safety, including an aggregation at Member State level of the CSIs laid down in Annex I ([30])	Within one week after the decision to open an investigation the investigating body shall inform the Agency thereof. The investigating body shall send the Agency a copy of the final report normally not later than 12 months after the date of the occurrence ([32]).

Table 8: Accidents reported to the ERA according to the EU legislation

([29]) Appendix to Annex I to the RSD, Article 1.1.
([30]) Article 3(l) of the RSD.
([31]) Article 18 of the RSD.
([32]) Article 24 of the RSD.

The current legislative framework does not require Member States to collect information on all railway accidents. The reporting is often limited to significant accidents and a selection of other events. Data on incidents are not necessarily collected by RUs/IMs and the NSAs do usually rely on accident data when planning their supervision activities. Moreover, information about less serious accidents and incidents are not systematically collected at the EU level. This absence may represent an obstacle to efficient learning and early identification of recurring safety issues in the EU railway system.

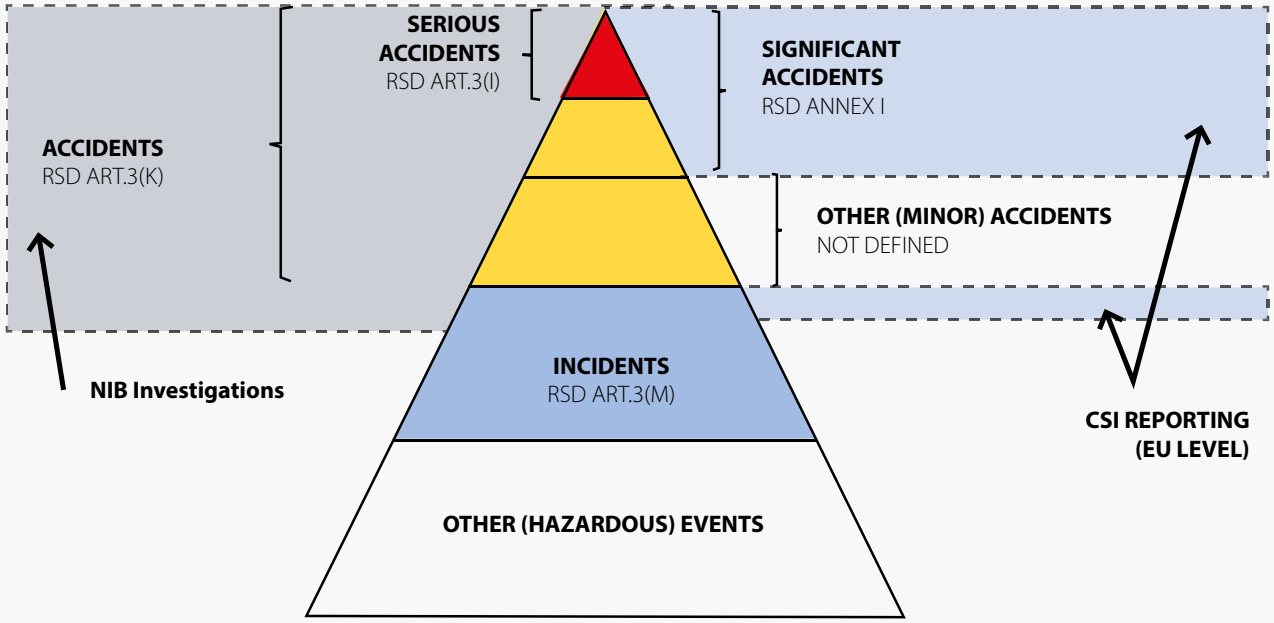

Figure 41: Overview of the current common accident reporting in the EU

ANNEXES

Annex I — Serious accidents

Serious accidents in 2013

In this section we provide an overview of serious accidents that occurred during 2013. The information available in ERAIL database on 31 January 2014 was used to produce the overview. In some cases, additional information provided by NIBs was included.

Serious accidents are train collisions and derailments with a fatality or at least five serious injuries, or extensive damage (above EUR 2 million) and any other similar accidents with an obvious impact on railway safety regulations or the safety management. These accidents are subject to mandatory investigation by National Investigation Bodies, according to Article 21 of the RSD. The investigation reports of these accidents should be available during 2014 at the latest. The accidents are listed in order of occurrence.

Event:	Passager trains collision
Date, time and location:	21 January 2013, 08:45, **Wien — Penzing**, Austria
Outcomes:	5 seriously injured (rail passengers)
Notification (ERAIL):	AT-0795
Short description:	Two passenger trains travelling between Wien Penzing and Wien Hütteldorf station during rush hour collided head-on whilst travelling along the same track. Due to a signalling failure, the traffic was operating in restricted mode at the time of the collision.

Event:	Passenger train collision with obstacle
Date, time and location:	6 February 2013, **Reinbek**, Germany
Outcomes:	1 fatality (railway worker)
Notification (ERAIL):	N/A
Short description:	Intercity train travelling on a two-track line hit a light rail maintenance vehicle. The debris of the vehicle hit a track worker standing next to the noise protection wall. The worker died from the injuries incurred.

Event:	Passenger train collision with obstacle
Date, time and location:	18 February 2013, 06:55, **Chiuro**, Italy
Outcomes:	2 fatalities (road vehicle occupants)
Notification (ERAIL):	IT-2066
Short description:	Regional Train travelling from Sondrio to Tirano collided with a truck that was pushed onto the railway track after a multiple road accident involving five passenger cars that occurred on an adjacent road.

Event:	Service train and locomotive collision
Date, time and location:	27 March 2013, 23:45, **Obereggendorf**, Austria
Outcomes:	2 fatalities, 1 serious injury (employees)
Notification (ERAIL):	AT-2173
Short description:	The locomotive of a freight train collided with a standing service train in the extended train station area of Obereggendorf at 23:45. The service train was probably on the line carrying out maintenance work when hit by the locomotive which was travelling at a speed of 100 km/h.

Event:	Freight train derailment
Date, time and location:	4 May 2013, 01:58, **Schellebelle — Wetteren**, Belgium
Outcomes:	One fatality (other)
Notification (ERAIL):	BE-2269
Short description:	A freight train carrying the toxic chemical compound acrylonitrile and travelling from the Netherlands to the port of Gent derailed on a switch when approaching the town of Wetteren at around 2 a.m. Seven of the train's 13 cars derailed and three were thrown on to their side by the force of the derailment. Fire broke out and several explosions occurred following the derailment. Furthermore, some chemicals leaked into drains, releasing dangerous gas and forcing inhabitants of several hundred households to evacuate. As a result of the accident, traffic on the line was interrupted for two months and an extensive cleaning effort had to be carried out on the environment.

Event:	Passenger train derailment
Date, time and location:	12 July 2013, 17:14, **Bretigny-sur-Orge**, France
Outcomes:	6 fatalities and 2 serious injuries (train passengers)
Notification (ERAIL):	FR-2506
Short description:	Intercity passenger train travelling from Paris to Limoges derailed on the switch situated at the entry to the Bretigny-sur-Orge station. The train was travelling at a full speed as it was not scheduled to stop there. Four carriages of the train derailed, of which three overturned. One carriage smashed across a platform and came to rest on a parallel track; another lay half-way across the platform. There were 385 passengers on the train. A loose fish plate was found on the accident site indicating a possible infrastructure failure.

Event:	Passenger train derailment
Date, time and location:	24 July 2013, 20:41, **Santiago de Compostela**, Spain
Outcomes:	79 fatalities, 33 serious injuries (train passengers)
Notification (ERAIL):	ES-2566
Short description:	The express passenger service was nearing the end of a six-hour trip from Madrid to the town of Ferrol in northwest Spain, when it derailed at the curve in the approach to the Santiago de Compostela station. Two traction units and 11 coaches left the track, most of them hitting a concrete wall. One of the coaches caught fire as another car was snapped in half. As the train was not under the control of a train control system, the train approached the curve at excessive speed. Due to high accident impact speed, most of some 218 passengers sustained injuries, 79 of them fatal.

Investigations of serious accidents that occurred in 2012

In this section we provide an overview of accidents that occurred in 2012, both serious and some other similar accidents, for which the investigation report should normally have been published within one year. The information available in the ERAIL database on 31 January 2014 was used to produce this overview.

Serious accidents are train collisions or train derailments, with at least one fatality or five serious injuries, or extensive damage. These accidents are subject to mandatory investigation by national investigation bodies, according to provisions of Article 19 of the RSD. The investigation reports of these accidents should be available in year 2013 at latest. The accidents are listed in order of occurrence.

Event:	Collision with obstacle
Date, time and location:	13 January 2012, **Langenhorn,** Germany
Outcomes:	1 fatality, 2 serious injuries
Report published:	22 August 2013
ERAIL ID:	DE-1329
Main causes: — Direct:	Presence of cattle on the track.
Underlying/root:	Not identified.

Event:	Train derailment
Date, time and location:	15 February 2012, **Nykirke,** Norway
Outcomes:	5 serious injuries (2 passengers, 3 employees), EUR 10 million material damage
Report published:	12 February 2013
ERAIL ID:	NO-1359
Main causes: — Direct:	Overspeeding, failure to respect the speed restriction side-track post
Underlying/root:	Train protection system with limited ability to control the speed.

Event:	Train collision
Date, time and location:	3 March 2012, **Sczekoczyny,** Poland
Outcomes:	16 fatalities (11 passengers, 5 employees), 2 serious injuries
Report published:	15 February 2013
ERAIL ID:	PL-1378
Main causes: — Direct:	Wrong route setting (signal)
Underlying/root:	Failure to apply internal procedures by railway employees Inadequate monitoring by IM and RU management Inadequate systems for employee training and examination Ineffective operational regulations on signal settings

Event:	Collision with obstacle
Date, time and location:	6 April 2012, **Kryoneri,** Greece
Outcomes:	3 fatalities (1 car occupant, 2 by-passers)
Report published:	Not yet
ERAIL ID:	EL-1434
Main causes: — Direct:	N/A
Underlying/root:	N/A

Event:	Collision with obstacle
Date, time and location:	13 April 2012, **Mühlheim,** Germany
Outcomes:	3 fatalities (employees), 6 serious injuries
Report published:	Not yet
ERAIL ID:	DE-1395
Main causes: — Direct:	N/A
Underlying/root:	N/A

Event:	Train collision
Date, time and location:	21 April 2012, **Amsterdam — Sloterdijk station,** Netherlands
Outcomes:	1 fatality (passenger), 22 seriously injured (passengers)
Report published:	26 July 2013
Final report (ERAIL ID):	NL-1413
Main causes: — Direct:	Passenger train passed a red signal that was not seen by the train driver. Improper traffic management: tight timetable and delay of goods train.
Underlying/ root:	Absence of any warning system to driver when approaching a red signal and of mitigating measures once signal passed. RU adjusted timetable to accommodate engineering work, but it conflicted with IM planning standards. Lack of regular review and assessment of the timetable by the IM. Limited supervision of risk management by the RU/IM. Crashworthiness requirement not part of the train authorisation process and the failure of the Environmental and Transport Inspectorate to enforce RU statutory duty of care for train crashworthiness.

Event:	Collision with obstacle
Date, time and location:	14 June 2012, **Duffel,** Belgium
Outcomes:	1 fatality (employee) and 1 serious injury
Report published:	22 September 2013
ERAIL ID:	BE-1436
Main causes: — Direct:	Fork arm of an excavator entered the gauge during operation in the vicinity of the mainline.
Underlying/ root:	Use of different technique to lift up and move pallets from the platform which extended the operational range of the excavator. Absence of specific instructions on the performance of the work by the contracting company. Poor risk management of the contractor.

Event:	Collision with obstacle
Date, time and location:	26 July 2012, **Hosena,** Germany
Outcomes:	1 fatality, 1 serious injury
Report published:	Not yet
ERAIL ID:	DE-0131
Main causes: — Direct:	N/A
Underlying/root:	N/A


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Annex II — CSI data tables

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TABLES 1 — 13 with CSI data

Legend

- Natural variation
- Natural variation due to a single accident
- Change of definition or reporting procedure
- Unknown reason for variation
- Further detailed explanation available

Table 1	Fatalities by category of persons																														
Victim types - fatalities	Year	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK	All	EU-28
Passengers	2010	0	18	0	0	2	0	0	0	1	15	0	2	1	3	0	7	0	0	0	0	0	7	1	4	2	0	0	0	63	63
	2011	0	0	1	0	5	9	0	0	0	2	0	7	0	3	0	0	0	0	0	0	0	10	0	0	0	0	1	0	38	38
	2012	0	0	1	0	2	3	1	0	0	4	0	2	0	3	0	2	0	0	0	1	0	15	0	1	0	0	1	0	36	36
Employees	2010	0	1	2	0	5	8	0	1	0	3	1	1	0	2	0	5	0	0	0	0	0	6	1	4	2	0	2	0	44	44
	2011	2	2	1	0	3	10	0	0	0	0	1	2	1	1	0	1	0	0	0	0	0	2	0	2	2	0	0	0	30	30
	2012	1	1	2	1	3	9	0	0	0	0	0	4	0	1	0	1	1	0	0	0	0	15	0	3	1	1	1	1	46	46
Level crossing users	2010	13	8	8	0	34	44	4	2	12	9	8	29	7	30	2	11	5	0	5	8	3	54	11	35	7	6	9	4	368	365
	2011	21	8	2	0	17	28	0	3	5	8	2	29	15	27	0	15	6	0	2	10	1	60	4	22	7	1	11	6	310	309
	2012	14	13	7	0	19	45	2	4	8	5	6	33	8	27	0	12	3	0	5	13	1	61	8	41	7	4	21	7	374	373
Unauthorised persons	2010	17	5	6	0	6	80	5	9	16	10	4	37	19	47	1	48	26	0	13	0	3	216	9	96	31	7	44	16	771	768
	2011	12	15	33	0	4	82	4	6	8	15	2	50	10	53	1	49	20	0	8	3	4	244	10	76	15	3	37	45	809	805
	2012	17	3	11	0	2	74	4	3	10	16	0	32	0	41	0	54	15	0	10	1	0	180	16	81	5	0	45	33	653	653
Other persons	2010	0	2	0	0	1	14	0	0	0	0	0	0	0	0	0	0	0	0	4	2	3	0	0	0	0	1	3	5	35	32
	2011	0	2	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	4	0	0	0	0	0	4	25	25
	2012	1	1	0	0	0	7	1	0	0	2	0	0	6	0	0	0	0	0	3	1	0	0	0	0	2	0	0	1	25	25
Total persons	2010	30	34	16	0	48	146	9	12	29	37	13	69	27	82	3	71	31	0	22	10	9	283	22	139	42	14	58	25	1 281	1 272
	2011	35	27	37	0	29	140	4	9	13	25	5	88	26	84	1	65	26	0	13	14	5	320	14	100	24	4	49	55	1 212	1 207
	2012	33	18	21	1	26	138	8	7	18	27	6	71	14	72	0	69	19	0	18	16	1	271	24	126	15	5	68	42	1 134	1 133

Table 2	Serious injuries by category of persons																														
Victim types - Serious injuries	Year	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK	All	EU-28
Passengers	2010	4	171	0	0	14	8	1	0	3	14	0	12	3	29	0	6	0	0	0	5	0	35	3	14	10	1	17	7	357	357
	2011	5	3	14	0	13	33	3	0	0	5	3	14	3	32	1	4	0	0	0	0	1	58	2	15	2	5	4	1	221	220
	2012	5	1	8	0	7	9	1	0	0	4	0	6	5	41	0	6	0	0	0	28	0	79	3	11	1	0	12	1	228	228
Employees	2010	14	3	1	0	3	18	0	0	3	2	0	4	5	1	0	5	0	0	0	0	0	9	2	12	5	0	3	6	96	96
	2011	6	1	2	0	4	28	3	0	0	0	0	5	3	1	0	0	0	0	1	2	3	11	0	5	2	1	1	1	80	77
	2012	18	3	3	2	2	10	1	1	2	2	0	6	5	1	0	7	1	0	1	8	3	5	0	1	0	0	2	1	85	82
Level crossing users	2010	23	4	9	0	45	32	4	10	8	3	3	17	10	22	0	3	2	0	5	1	1	52	3	65	5	7	2	2	338	337
	2011	25	9	8	0	21	25	3	7	6	3	3	9	8	21	0	1	2	0	5	3	1	46	3	50	3	5	14	1	282	281
	2012	24	5	15	0	34	36	4	3	2	3	6	10	17	23	0	5	2	0	3	8	0	36	5	60	10	6	15	4	336	336
Unauthorised persons	2010	8	1	12	0	45	29	0	0	6	8	5	11	5	18	0	18	13	0	7	3	0	91	8	91	5	4	17	6	411	411
	2011	7	4	18	0	36	41	2	0	8	2	2	23	6	22	0	29	9	1	13	3	0	93	5	81	8	1	20	4	438	438
	2012	11	5	6	0	23	35	2	0	1	7	3	11	0	23	0	21	5	0	3	2	0	63	7	59	6	0	12	9	314	314
Other persons	2010	0	2	0	0	0	29	0	4	0	0	0	2	0	0	0	0	0	0	3	1	4	0	0	0	0	0	6	2	53	49
	2011	2	5	0	0	0	20	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	2	34	34
	2012	1	0	0	0	0	25	3	3	0	1	0	4	9	0	0	0	0	0	1	2	0	1	1	0	1	0	0	4	56	56
Total persons	2010	49	181	22	0	107	116	5	14	20	27	8	46	23	70	0	32	15	0	15	10	5	187	16	182	25	12	45	23	1 255	1 250
	2011	45	22	42	0	74	147	11	7	14	10	8	53	20	76	1	34	11	1	21	8	5	209	10	151	15	12	39	9	1 055	1 050
	2012	59	14	32	2	66	115	11	7	5	17	9	37	36	88	0	39	8	0	8	48	3	184	16	131	18	6	41	19	1 019	1 016

Table 3 A	2010	Fatalities by type of accident and victim categoriiiiy																													
Accident types	Year	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK	All	EU-28
Collisions of trains	Total	0	19	0	0	1	0	0	1	1	2	0	0	0	1	1	0	0	0	0	0	3	0	0	3	1	0	3	0	36	33
	Passengers	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	19	19
	Employees	0	1	0	0	0	0	0	1	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	6	6
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Unauthorised persons	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	4	4
	Other persons	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	2	0	6	3
Derailments of trains	Total	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Passengers	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Employees	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Level-crossing accidents	Total	13	8	9	0	34	45	4	2	12	10	8	27	7	30	0	11	5	0	5	8	3	55	11	35	7	10	9	4	372	369
	Passengers	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Employees	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	3
	Level crossing users	13	8	8	0	34	44	4	2	12	9	8	27	7	30	0	11	5	0	5	8	3	54	11	35	7	6	9	4	364	361
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	4
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accidents to persons caused by rolling stock in motion	Total	15	7	7	0	12	101	5	9	15	25	5	37	20	49	2	60	26	0	17	2	3	228	11	97	34	3	46	21	857	854
	Passengers	0	0	0	0	2	0	0	0	0	14	0	2	1	3	0	7	0	0	0	0	0	7	1	4	1	0	0	0	42	42
	Employees	0	0	1	0	4	7	0	0	0	1	1	0	0	0	0	5	0	0	0	0	0	5	1	1	2	0	1	0	29	29
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Unauthorised persons	15	5	6	0	6	80	5	9	15	10	4	34	19	46	1	48	26	0	13	0	3	216	9	92	31	3	44	16	756	753
	Other persons	0	2	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	0	0	0	1	5	28	28
Fires in rolling stock	Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	2
	Passengers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Employees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other accidents	Total	2	0	0	0	0	0	0	0	0	0	0	4	0	2	0	0	0	0	0	0	0	0	0	3	0	1	0	0	12	12
	Passengers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Employees	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	4	4
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	2	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	7	7
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1

Table 3 B	2011	Fatalities by type of accident and victim category																													
Accident types	Year	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK	All	EU-28
Collisions of trains	Total	0	0	0	0	1	10	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	12
	Passengers	0	0	0	0	1	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9
	Employees	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Derailments of trains	Total	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	5	5
	Passengers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	2
	Employees	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Level-crossing accidents	Total	21	8	2	0	17	28	0	3	5	8	2	32	15	27	0	15	6	0	2	11	1	62	4	22	7	1	11	6	316	315
	Passengers	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	5	5
	Employees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Level crossing users	21	8	2	0	17	28	0	3	5	8	2	29	15	27	0	15	6	0	2	10	1	60	4	22	7	1	11	6	310	309
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accidents to persons caused by rolling stock in motion	Total	14	19	35	0	10	102	4	6	8	17	2	54	10	56	1	50	20	0	11	2	4	251	10	78	17	3	38	49	871	867
	Passengers	0	0	1	0	4	1	0	0	0	2	0	4	0	3	0	0	0	0	0	0	0	6	0	0	0	0	1	0	22	22
	Employees	2	2	1	0	2	8	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2	0	2	2	0	0	0	23	23
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	12	15	33	0	4	82	4	6	8	15	2	49	10	53	1	49	20	0	8	2	4	243	10	76	15	3	37	45	806	802
	Other persons	0	2	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	4	20	20
Fires in rolling stock	Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Passengers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Employees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other accidents	Total	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	5	0	0	0	0	0	0	8	8
	Passengers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Employees	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	2
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1

Table 3 C	2012	Fatalities by type of accident and victim category																												
Accident types	Year	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK	All	EU-28
Collisions of trains	Total	0	1	1	0	0	8	0	0	4	2	0	0	0	0	0	0	0	0	0	1	0	16	0	0	0	0	0	1	34	34
	Passengers	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	11	0	0	0	0	0	0	13	13
	Employees	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	10	10
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	1	0	0	1	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7	7
	Other persons	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
Derailments of trains	Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Passengers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Employees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Level-crossing accidents	Total	14	13	7	0	19	45	2	2	8	5	6	33	8	27	0	13	3	0	5	13	1	61	8	41	7	4	21	7	373	372
	Passengers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Employees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Level crossing users	14	13	7	0	19	45	2	2	8	5	6	33	8	27	0	12	3	0	5	13	1	61	8	41	7	4	21	7	372	371
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accidents to persons caused by rolling stock in motion	Total	19	4	13	0	7	84	6	5	6	20	0	36	6	43	0	56	16	0	13	0	0	194	16	84	7	1	47	34	717	717
	Passengers	0	0	1	0	2	2	1	0	0	4	0	2	0	3	0	2	0	0	0	0	0	4	0	1	0	0	1	0	23	23
	Employees	1	0	2	0	3	5	0	0	0	0	0	4	0	1	0	0	1	0	0	0	0	10	0	3	0	1	1	1	33	33
	Level crossing users	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Unauthorised persons	17	3	10	0	2	72	4	3	6	16	0	30	0	39	0	54	15	0	10	0	0	180	16	80	5	0	45	32	639	639
	Other persons	1	1	0	0	0	5	1	0	0	0	0	0	6	0	0	0	0	0	3	0	0	0	0	0	2	0	0	1	20	20
Fires in rolling stock	Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Passengers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Employees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other accidents	Total	0	0	0	1	0	1	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	0	0	1	1	0	0	0	10	10
	Passengers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Employees	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	2
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	1	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	0	0	1	0	0	0	0	7	7
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1

Table 4 A	2010	Serious injuries by type of accident and victim category																													
Accident types	Year	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK	All	EU-28
Collisions of trains	Total	3	171	0	0	1	4	0	0	2	1	0	1	0	1	0	1	0	0	0	0	4	13	0	14	9	0	15	0	240	236
	Passengers	2	169	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	8	0	11	0	203	203
	Employees	1	2	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0	0	4	0	8	1	0	3	0	23	23
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	8	8
	Other persons	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	1	0	6	2
Derailments of trains	Total	2	0	0	0	9	1	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	18
	Passengers	0	0	0	0	8	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11
	Employees	2	0	0	0	1	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Level-crossing accidents	Total	23	4	10	0	45	37	4	10	8	6	3	19	10	22	0	4	2	0	5	1	1	59	3	65	6	11	6	6	370	369
	Passengers	0	0	0	0	0	1	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	8	8
	Employees	0	0	1	0	0	4	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	4	0	0	1	0	0	1	13	13
	Level crossing users	23	4	9	0	45	32	4	10	8	3	3	17	10	22	0	3	2	0	5	1	1	52	3	65	5	7	2	2	338	337
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	4	0	0	7	7
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	4
Accidents to persons caused by rolling stock in motion	Total	14	6	12	0	52	68	1	4	4	20	5	25	11	47	0	25	13	0	10	6	0	114	13	93	9	1	24	14	591	591
	Passengers	2	2	0	0	5	4	1	0	0	12	0	10	2	29	0	6	0	0	0	2	0	26	3	12	2	1	6	4	129	129
	Employees	5	1	0	0	2	7	0	0	0	0	0	2	4	0	0	1	0	0	0	0	0	0	2	2	2	0	0	2	30	30
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	7	1	12	0	45	29	0	0	4	8	5	11	5	18	0	18	13	0	7	3	0	88	8	79	5	0	17	6	389	389
	Other persons	0	2	0	0	0	28	0	4	0	0	0	2	0	0	0	0	0	0	3	1	0	0	0	0	0	0	1	2	43	43
Fires in rolling stock	Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2
	Passengers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2
	Employees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other accidents	Total	7	0	0	0	0	6	0	0	0	0	0	1	2	0	0	2	0	0	0	3	0	1	0	8	1	0	0	3	34	34
	Passengers	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	4	4
	Employees	6	0	0	0	0	6	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	1	0	2	1	0	0	3	23	23
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	7	7
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 4 B	2011	Serious injuries by type of accident and victim category																													
Accident types	Year	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK	All	EU-28
Collisions of trains	Total	0	0	0	0	4	26	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	6	0	1	1	6	0	0	45	45
	Passengers	0	0	0	0	4	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	0	0	33	33
	Employees	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	1	0	0	8	8
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	2
	Other persons	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	2
Derailments of trains	Total	0	0	0	0	5	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	2	34	0	0	0	0	1	0	44	42
	Passengers	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	0	0	0	0	1	0	38	38
	Employees	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	6	4
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Level-crossing accidents	Total	25	9	9	0	22	34	3	5	6	3	3	14	8	23	0	3	2	0	6	3	1	51	3	57	3	5	14	1	313	312
	Passengers	0	0	0	0	0	6	0	0	0	0	0	5	0	1	0	2	0	0	0	0	0	2	0	5	0	0	0	0	21	21
	Employees	0	0	1	0	1	3	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	3	0	2	0	0	0	0	12	12
	Level crossing users	25	9	8	0	21	25	3	5	6	3	3	9	8	21	0	1	2	0	5	3	1	46	3	50	3	5	14	1	280	279
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	4	0	0	7	7
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accidents to persons caused by rolling stock in motion	Total	15	13	33	0	42	78	6	2	8	7	5	23	8	49	1	31	9	1	15	3	0	116	7	88	11	1	24	8	604	604
	Passengers	3	3	14	0	5	4	3	0	0	5	3	7	0	30	1	2	0	0	0	0	0	22	2	10	1	0	3	1	119	119
	Employees	4	1	1	0	1	15	1	0	0	0	0	1	2	0	0	0	0	0	0	0	0	1	0	3	2	0	1	1	34	34
	Level crossing users	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Unauthorised persons	6	4	18	0	36	41	2	0	8	2	2	13	6	19	0	29	9	1	13	3	0	93	5	75	8	1	20	4	418	418
	Other persons	2	5	0	0	0	18	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	31	31
Fires in rolling stock	Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Passengers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2
	Employees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other accidents	Total	5	0	0	0	1	9	1	0	0	0	0	15	3	4	0	0	0	0	0	2	2	2	0	5	0	0	0	0	49	47
	Passengers	2	0	0	0	0	0	0	0	0	0	0	2	3	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	10	9
	Employees	2	0	0	0	1	8	1	0	0	0	0	4	0	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	20	19
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	1	0	0	0	0	0	0	0	0	0	0	9	0	3	0	0	0	0	0	0	0	0	0	5	0	0	0	0	18	18
	Other persons	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1

Table 4 C	2012	Serious injuries by type of accident and victim category																													
Accident types	Year	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK	All	EU-28
Collisions of trains	Total	0	1	3	0	0	6	0	0	1	3	0	4	3	0	0	0	0	0	0	29	0	61	2	0	0	0	7	0	120	120
	Passengers	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	28	0	59	2	0	0	0	5	0	97	97
	Employees	0	1	3	0	0	1	0	0	1	1	0	3	2	0	0	0	0	0	0	1	0	2	0	0	0	0	2	0	17	17
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other persons	0	0	0	0	0	5	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6
Derailments of trains	Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	1	0	0	0	4	2
	Passengers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	2	2
	Employees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Level-crossing accidents	Total	26	5	15	0	36	36	4	3	2	3	6	10	17	24	0	9	2	0	3	2	0	36	5	60	10	6	15	4	339	339
	Passengers	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	5	5
	Employees	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	5	5
	Level crossing users	24	5	15	0	34	36	4	3	2	3	6	10	17	23	0	5	2	0	3	0	0	36	5	60	10	6	15	4	328	328
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	4	0	0	7	7
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accidents to persons caused by rolling stock in motion	Total	24	8	14	0	30	69	6	4	2	11	3	17	14	64	0	28	6	0	5	9	0	85	9	67	7	0	19	15	516	516
	Passengers	5	1	8	0	6	9	1	0	0	3	0	3	4	40	0	2	0	0	0	0	0	20	1	11	0	0	7	1	122	122
	Employees	7	2	0	0	1	8	1	1	1	1	0	2	1	1	0	5	1	0	1	1	0	1	0	0	0	0	0	1	36	36
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	8	8
	Unauthorised persons	11	5	6	0	23	34	1	0	1	7	3	8	0	23	0	21	5	0	3	0	0	63	7	56	6	0	12	9	304	304
	Other persons	1	0	0	0	0	18	3	3	0	0	0	4	9	0	0	0	0	0	1	0	0	1	1	0	1	0	0	4	46	46
Fires in rolling stock	Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Passengers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2
	Employees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other persons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other accidents	Total	9	0	0	2	0	4	1	0	0	0	0	6	2	0	0	1	0	0	0	8	1	2	0	4	0	0	0	0	40	39
	Passengers	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Employees	9	0	0	2	0	1	0	0	0	0	0	1	2	0	0	1	0	0	0	5	1	2	0	1	0	0	0	0	25	24
	Level crossing users	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unauthorised persons	0	0	0	0	0	1	1	0	0	0	0	3	0	0	0	0	0	0	0	2	0	0	0	3	0	0	0	0	10	10
	Other persons	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	3

Table 5	Total and relative nr of suicides																														
Category	Year	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK	All	EU-28
Suicide events	2006	78	97	32		174		21		1	189	42	351		128	7	126	0	4	6	190	11	25	40	16	69	6	49	227	1 889	1 878
	2007	113	94	39	0	150	706	24	0	4	188	54	344		111	5	138	0	7	10	193	8	28	52	24	78	14	48	197	2 629	2 621
	2008	93		27	0	160	714	15	1	1	174	52	289		111	7	137	0	5	9	164	7	29	50	29	71	20	58	202	2 425	2 418
	2009	101	69	19	0	185	875	23	0	3	163	62	337		139	2	111	2	4	10	197	8	23	69	25	67	10	56	210	2 770	2 762
	2010	90	84	18	0	198	899	20	0	2	124	44	328	19	121	6	109	4	3	13	201	7	44	51	23	68	15	48	224	2 763	2 756
	2011	87	98	27	0	235	853	20	0	4	128	64	332	28	155	6	140	5	7	10	215	11	28	42	76	62	25	40	203	2 901	2 890
	2012	80	102	33	0	224	872	32	5	1	138	47	356	24	148	5	124	13	5	7	202	8	80	58	57	82	16	38	248	3 005	2 997

Table 6	Number of accidents by type of accidents																														
Accident types	Year	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK	All	EU-28
Collisions of trains	2010	3	5	2	0	3	13	0	1	4	2	0	15	0	1	0	2	0	1	1	5	9	4	2	10	3	0	2	8	96	87
	2011	2	0	0	0	6	18	1	0	1	4	2	12	0	0	0	6	0	0	0	4	15	8	1	1	2	1	1	3	88	73
	2012	1	3	3	0	6	23	1	3	2	3	0	17	1	1	0	7	0	0	0	3	10	6	1	0	4	1	1	10	107	97
Derailments of trains	2010	2	2	1	0	3	19	1	0	2	7	1	14	0	1	0	3	1	0	0	3	4	17	3	0	7	0	1	6	98	94
	2011	2	3	1	0	5	14	1	0	0	7	0	11	1	1	0	4	0	0	1	1	4	23	2	1	7	0	1	6	96	92
	2012	2	2	3	0	6	11	1	1	2	10	3	13	1	3	0	5	0	0	1	0	4	17	0	0	10	1	2	3	101	97
Level-crossing accidents	2010	33	17	10	0	57	73	9	17	16	11	9	36	12	42	2	15	6	2	10	9	3	86	14	58	14	16	11	7	595	592
	2011	43	16	7	0	34	56	2	15	8	8	5	40	18	38	0	18	6	0	8	14	2	86	7	43	7	6	21	11	519	517
	2012	36	18	15	0	47	79	5	10	6	8	11	38	18	37	0	13	4	0	6	19	2	77	11	59	11	8	27	10	575	573
Accidents to persons caused by rolling stock in motion	2010	29	15	20	0	61	166	5	13	17	24	10	64	28	96	1	80	37	0	27	5	3	335	22	190	38	4	70	34	1 394	1 391
	2011	30	32	65	2	51	175	10	13	15	23	7	76	17	104	2	78	27	1	26	3	6	366	17	166	28	3	61	54	1 458	1 452
	2012	43	12	26	0	37	150	11	6	8	29	3	51	20	107	0	80	22	0	18	5	0	275	23	151	14	1	65	49	1 206	1 206
Fires in rolling stock	2010	0	0	0	1	0	2	0	0	0	0	0	6	0	0	0	0	0	0	0	1	1	0	0	2	0	0	0	2	15	14
	2011	0	0	1	0	1	4	1	0	0	0	0	2	0	0	0	0	0	0	0	1	1	0	0	1	2	1	0	2	17	16
	2012	0	1	1	2	1	2	1	0	0	0	0	2	0	0	0	1	0	0	0	0	1	0	0	0	3	0	0	0	15	14
Other accidents	2010	12	1	6	0	1	24	1	0	0	1	3	20	5	2	0	3	0	0	3	1	0	7	1	11	7	1	1	5	116	116
	2011	7	0	0	0	2	18	1	0	0	0	0	13	3	4	0	2	0	0	0	6	7	5	0	5	8	0	0	2	83	76
	2012	5	0	0	0	0	24	2	0	0	1	2	15	2	4	0	1	0	0	0	3	2	4	1	5	5	3	1	3	83	81
Total nr accidents	2010	79	40	39	1	125	297	16	31	39	45	23	155	45	142	3	103	44	3	41	24	20	449	42	271	69	21	85	62	2 314	2 294
	2011	84	51	74	2	99	285	16	28	24	42	14	154	39	147	2	108	33	1	35	29	35	488	27	217	54	11	84	78	2 261	2 226
	2012	87	36	48	2	97	289	21	20	18	51	19	136	42	152	0	107	26	0	25	30	19	379	36	215	47	14	96	75	2 087	2 068

Table 7	Dangerous goods accidents																													
Category	Year	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK	All	EU-28
Number of accidents involving at least one railway vehicle transporting dangerous goods in which dangerous goods are NOT released	2010	0	0	0	0	0	2	1	0	0	1	0		0	0	0	0	3	0	0	0	0	8	1	1	0	0	0	0	17	17
	2011	0	0	0	0	0	1	2	0	0	4	0	0	0	0	0	0	2	0	1	2	0	5	0	1	0	0	0	1	19	19
	2012	0	2	0	0	0	4	1	0	0	2	1	1	0	0	0	9	3	0	1	2	0	0	0	0	0	0	0	0	26	26
Number of accidents involving at least one railway vehicle transporting dangerous goods in which dangerous goods ARE released	2010	0	2	0	0	0	2	1	0	0	0	0		0	0	0	5	0	0	2	0	0	24	0	1	0	0	0	0	37	37
	2011	0	0	0	1	0	2	0	0	0	0	0	2	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	9	9
	2012	0	0	0	0	0	4	0	0	0	0	0	2	0	0	0	1	1	0	1	0	0	1	0	0	0	0	0	0	10	10
Total number of accidents involving at least one railway vehicle transporting dangerous goods	2010	0	2	0	0	0	4	2	0	0	1	0		0	0	0	5	3	0	2	0	0	32	1	2	0	0	0	0	54	54
	2011	0	0	0	1	0	3	2	0	0	4	0	2	0	0	0	0	3	0	2	3	0	6	0	1	0	0	0	1	28	28
	2012	0	2	0	0	0	8	1	0	0	2	1	3	0	0	0	10	4	0	2	2	0	1	0	0	0	0	0	0	36	36

Table 8	Number of precursors to accidents																														
Precursors to accidents	Year	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK	All	EU-27
Broken rails	2010	211	67	69	15	5	599	5	9	143	97	50	379		734	5	368	4	1	7	111	101	1 461	50	591	62	114	165	197	5 620	5 519
	2011	93	45	71	8	25	452	28	11	91	78	51	274		369	2	313	3	2	9	0	47	1 564	21	580	55	81	133	127	4 533	4 486
	2012	144	52	82	9	30	644	51	16	13	100	62	335	50	576	2	337	2	3	9	0	56	1 800	45	643	34	94	145	164	5 498	5 392
Trackbuckles	2010	172	5	1	0	0	71	4	0	44	506	14	160		8	1	573	1	1	0	14	11	23	56	0	68	16	9	29	1 787	1 776
	2011	162	21	1	0	2	30	1	0	78	310	11	171		3	0	1 276	1	1	2	0	19	20	24	0	70	10	8	11	2 232	2 213
	2012	168	26	0	0	0	29	2	0	5	267	35	217	11	4	4	1 981	0	1	5	0	8	53	76	0	590	16	5	10	3 513	3 494
Wrong-side signalling failures	2010	4	2	0	0	0	0	38	23	0	6	0	321		0	0	1	0	3	1	17	2	16	1	1	1	0	57	10	504	502
	2011	4	2	0	0	0	0	46	20		5	0	315		0	0	0	1	1	0	0	9	0	0	0	2	0	28	7	440	431
	2012	2	12	0	0	0	0	47	12	0	2	5	366		0	0	0	1	0	0	0	12	5	0	0	1	0	15	4	484	472
Signals passed at danger	2010	11	104	0	3	78	352	182	0	1	87	35	112		10	14	10	2	4	6	169	116	13	6	571	341	10	22	304	2 563	2 447
	2011	5	91	4	6	85	464	173	1	3	78	20	128		18	6	12	0	11	2	155	58	29	22	518	297	5	25	269	2 485	2 427
	2012	10	75	4	6	80	400	139	2	1	77	20	122		21	8	20	4	5	3	1	51	16	25	447	328	6	39	220	2 130	2 079
Broken wheels	2010	0	0	1	0	2	4	9	0	1	0	0	2		1	0	5	0	0	0	0	5	23	0	0	4	0	0	0	57	52
	2011	1	0	2	0	3	3	14	0	2	0	0	0		0	0	1	0	0	0	0	1	3	0	0	4	0	0	0	34	33
	2012	1	0	27	0	0	0	7	0	0	0	1	0		1	0	20	0	0	0	0	2	3	0	0	1	0	1	0	64	62
Broken Axles	2010	0	0	1	0	2	4	9	0	1	0	0	2		1	0	5	0	0	0	0	5	23	0	0	4	0	0	0	57	52
	2011	1	0	2	0	3	3	14	0	2	0	0	0		0	0	1	0	0	0	0	1	3	0	0	4	0	0	0	34	33
	2012	1	0	27	0	0	0	7	0	0	0	1	0		1	0	20	0	0	0	0	2	3	0	0	1	0	1	0	64	62
All precursors	2010	398	178	100	18	86	1 030	238	32	189	696	99	975	0	754	20	958	7	9	14	311	235	1 539	114	1 163	477	140	253	541	10 574	10 339
	2011	265	159	94	15	115	952	263	32	174	471	82	889	0	391	8	1 603	5	15	13	155	134	1 618	68	1 098	429	96	194	414	9 752	9 618
	2012	326	165	127	16	110	1 076	248	31	21	447	123	1 040	61	602	14	2 367	7	9	17	2	129	1 881	146	1 091	956	116	205	398	1 1731	1 1541

Table 9	Economic impact of accidents																														
Category	Year	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK	All	EU-28
Economic impact of fatalities (MEUR)	2010	66.05	63.32	13.06	0	93.21	285.41	23.56	8.00	34.59	53.48	25.59	132.47	19.61	244.98	7.59	101.55	16.46	0	11.52	22.03	5.38	384.26	21.20	673.46	98.26	10.45	28.81	47.32		
	2011	76.76	51.49	0	0	86.35	285.16	10.54	15.71	19.38	33.09	9.85	39.23	18.89	258.64	1.49	20.38	130.91	0	53.50	30.73	0	434.50	6.24	484.5	56.91	1.74	0	123.62		
	2012	74.39	59.00	9.06	1.98	17.33	291.82	21.41	4.35	15.70	35.88	11.73	133.78	7.63	42.58	0	108.11	10.22	0	8.84	35.2	4.57	156.82	22.56	61.36	36.69	4.69	36.23	85.77		
Economic impact of serious injuries (MEUR)	2010	14.73	51.21	2.43	0	28.17	31.32	1.62	1.23	3.12	4.83	2.20	12.33	2.24	26.47	0	5.88	1.10	0	1.05	2.92	0.42	33.96	2.06	128.87	10.90	1.17	3.06	5.11		
	2011	13.48	6.37	0	0	30.43	41.35	3.59	1.60	2.58	1.64	2.04	3.19	1.95	29.62	0.19	1.47	8.64	0.06	11.48	2.36	0.33	37.96	0.60	106.92	5.20	0.71	0	2.04		
	2012	18.16	3.49	1.87	0.53	5.96	33.59	3.64	0.57	0.57	2.80	2.27	9.74	2.65	6.98	0	7.85	0.59	0	0.52	14.4	1.92	14.52	2.01	8.62	6.43	0.73	2.99	5.12		
Cost of material damages to rolling stock or infrastructure (significant accidents) (MEUR)	2010	21.60	0	0.73	0	6.67	57.76	0	0.76	0.30	0	0.86	0	0	0.93	0	6.38	0.04	1.08	0.03	0	0	14.54	2.24	0.45	0	0	2.50	12.77		
	2011	28.88	0	0.55	0	5.09	45.12	0	0	0.39	4.48	0.28	0	0	0.54	0	4.14	0.00	0	0.03	24.38	20	26.48	0.69	0.73	4.76	1.58	1.88	5.02		
	2012	27.77	1.27	0.20	0	5.89	31.86	0	0	0.40	3.43	2.75	0	0	3.25	0	13.41	0.52	0	0.80	12.92	3	6.05	0.24	0.08	0	0	0	12.81		
Cost of damage to the environment (significant accidents) (MEUR)	2010	0	0	0	0.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.59	0	0	0	0	0	0.79	0.79		
	2011	0	0	0	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.91	0	0	0	0	0	0	0		
	2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0.12	0	0	0	0	0	0	0		
Cost of delays as a consequence of significant accidents (MEUR)	2010	0.34	0	0	0	0.26	35.01	0	9.72	0.08	0	0	0	0	0	0	9.25	0.10	0.14	0.74	0	0	1.56	0.81	0	0	0	0	0.47		
	2011	3.45	0	0	0	0.25	25.94	0	0	0.04	0.91	0.03	0	0	0.16	0	0	0.03	0	0.69	1.04	0	8.57	0.38	0.31	0	0.02	0	0.76		
	2012	3.19	0	0.00	0	0.14	31.50	0	0	0.29	1.13	0.20	0	0	0.27	0	0	0.52	0	0.78	0.66	0	1.80	0.47	0.21	0	0	0.97	1.30		
Economic impact of significant accidents (MEUR)	2010	103.34	114.52	16.21	0	128.45	409.50	25.18	19.72	38.09	58.31	28.65	144.80	21.85	272.38	7.59	123.05	17.70	1.22	13.35	24.95	5.80	435.90	26.32	802.78	109.15	11.62	34.37	66.46		
	2011	122.68	57.86	0.55	0	122.48	397.57	14.13	17.31	22.39	40.11	12.20	42.42	20.83	288.96	1.69	25.99	139.58	0.06	65.70	58.50	20.33	508.42	7.91	592.47	66.86	4.06	1.88	131.44		
	2012	123.62	63.76	11.13	2.51	29.33	388.76	25.06	4.92	16.96	43.24	16.96	143.51	10.29	53.08	0	129.37	11.86	0	10.95	63.19	9.49	179.31	25.28	70.27	43.12	5.43	40.18	105.00		

Table 10	Technical safety of infrastructure and its implementation																														
Category	Year	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK	All	EU-28
Perc. of track with ATP in operation	2010	72	11	11	100	0	93	53	23	0	88	82	52			5	100	37	100	47	98	70	0	52	97	65	67	21	4		
	2011	82	11	11	100		94	53	23	0	86	82	52	40	54	5	100	37	100	66	96	74	0	58	97	81	67	21	4		
	2012	82	9	11	100	0	94	37	23	0	86	82	73	31	54	0	100	38	100	66	100	74	0	64	97	81	67	21	4		
Perc of trainkm using operational ATP	2010	86	4	21	100	0			69	0	97	99				11	92	86	99	47	99	90	0	90	100	96		0	3		
	2011	86	4	21	100		97.6	53	63	0	97	98		62	61	10	99	75	100	95	99	90	0	90	100	96		0	3		
	2012	86		22	100	1	99		63	0	97	98	99	62	56	0	99	76	100	95	100	93	0	88	100	96			3		
Total nr of level crossings	2010	5 142	1 902	815	0	8 491	17 393	1 467	335	1 305	2 522	3 833	18 364	1 440	5 964	1 050	5 683	538	138	613	2 628	3 611	14 126	1 107	5 169	11 370	888	0	6 647	122 541	118 930
	2011	5 026	1 879	788	0	8 315	15 520	1 390	328	1 250	2 439	3 745	18 138	1 518	6 043	1 018	5 670	538	138	600	2 556	3 615	14 518	1 049	5 270	8 730	840	2 180	6 647	119 748	116 133
	2012	4 680	1 857	783	0	8 315	14 275	1 362	328	1 587	2 400	3 581	18 055	1 518	6 041	1 015	5 600	539	137	634	2 597	3 618	14 356	877	5 262	8 616	838	2 254	6 617	117 742	114 124
Tot nr of level cross-sings per track km	2010	0.639	0.300	0.158	0	0.735	0.272	0.454	0.155	0.425	0.133	0.433	0.437	0.484	0.564	0.485	0.233	0.250	0.225	0.181	0.385	0.832	0.491	0.314	0.256	0.741	0.406	0	0.210		
	2011	0.698	0.296	0.153	0	0.720	0.246	0.432	0.152	0.411	0.126	0.421	0.431	0.510	0.571	0.470	0.233	0.246	0.225	0.150	0.365	0.833	0.505	0.301	0.262	0.560	0.386	0.470	0.214		
	2012	0.636	0.288	0.152	0	0.720	0.232	0.424	0.152	0.522	0.124	0.403	0.393	0.510	0.571	0.469	0.230	0.246	0.221	0.162	0.369	0.930	0.501	0.271	0.262	0.585	0.385	0.485	0.208		

Table 11	Level crossings by type																														
Level crossing types	Year	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK	All	EU-28
Active LC with automatic user-side warning	2010	797	218	0	0	2 324	999	800	135	2	472	90	13 110	91	988	3	60	306	3	346	70	1	1 249	35	871	918	24		288	24 200	24 199
	2011	757	209	0	0	2 209	895	904	136	2	464	90		149	1 015	3	46	308	3	367	89	1	1 282	35	908	843	21	351	288	11 375	11 374
	2012	766	210	0	0	2 209	726	910	136	2	458	90	46	149	1 015	3	39	310	3	413	10	1	1 295	38	936	836	22	459	296	11 378	11 377
Active LC with automatic user-side protection	2010	0	0	131	0	0	1 051		0	0	0	0		0	0	0	4	9	0	0	116	119	0	0	0	31	0		0	1 461	1 342
	2011	0	0	161	0	0	743		0	0		0		0	0	0	4	7	0	0	114	119	0	0	0	9	0	0	0	1 157	1 038
	2012	0	0	172	0	0	693		0	0	0	0	0	0	0	0	4	7	0	0	114	98	0	0	0	11	0	0	0	1 099	1 001
Active LC with automatic user-side protection and warning	2010	878	1 297	0	0	1 072	6 269		29	0	0	727		155	463	12	4 218	10	82	86	1 501		362	340	218	2 280	282		494	20 775	20 775
	2011	938	1 289	0	0	1 104	7 260		29	0		716		312	468	4	4 140	10	82	65	1 486	0	389	347	190	2 196	281	429	494	22 229	22 229
	2012	921	1 285	0	0	1 104	6 547		29	0	0	704	10 018	312	466	18	4 039	13	82	62	1 501	0	411	349	233	2 215	281	512	492	31 594	31 594
Active LC with automatic user-side protection and warning, and rail-side protection	2010	29	0	354	0	0	1 100		0	767	480	0		193	1 126	191	294	15	0	0	3	349	395	0	0	19	0		55	5 370	5 021
	2011	21	0	315	0	0	395		0	678	464	0	10 968	47	1 155	195	294	15	0	0	3	349	416	0	0	78	0	126	55	15 574	15 225
	2012	21	0	303	0	0	544		0	762	453	0	788	47	1155	181	277	15	0	0	3	373	444	2	0	77	0	149	56	5 650	5 277
Active LC with manual user-side warning	2010	223	71	0	0	0	325		0	0	0	0		0	5	0	0	33	18	20	297	3 142	56	2	0	62	0		0	4 254	1 112
	2011	175	72	0	0	0	107		0	0		0		0	5	0	0	32	18	16	210	3 146	52	2	1	87	0	33	0	3 956	810
	2012	169	70	0	0	0	97		0	0	0	0	0	0	5	0	0	28	18	16	297	3 146	38	4	2	87	0	0	0	3 977	831
Active LC with manual user-side protection	2010	8	0	184	0	422	436		0	0	2	0		72	69	6	3	6	2	3			1 806	70	533	5	8		419	4 054	4 054
	2011	9	0	178	0	422	415		0	0	1	0		69	73	5	2	7	2	2	0	0	1 718	60	695	2	8	143	419	4 230	4 230
	2012	9	0	171	0	422	324		0	23	0	0	840	69	73	5	1	3	2	0	0	0	1 658	32	591	16	8	58	392	4 697	4 697
Active LC with manual user-side protection and warning	2010	0	25	0	0	0	133		0	48	17	0		17	169	0	4	5	1	3	19		1 520	17	10	19	25		404	2 436	2 436
	2011	0	25	0	0	0	110		0	43	17	0	1 725	17	176	0	2	5	1	0	26	0	1 552	13	1	29	25	18	404	4 189	4 189
	2012	0	25	0	0	0	134		0	19	17	0	151	17	176	0	1	5	1	0	19	0	1 562	10	25	40	24	4	433	2 663	2 663
Total number of active level crossings	2010	1 935	1 611	669	0	3 818	10 313	800	164	817	971	817	13 110	528	2 820	212	4 583	384	106	458	2 006	3 611	5 388	464	1 632	3 334	339	0	1 660	62 550	58 939
	2011	1 900	1 595	654	0	3 735	9 925	904	165	723	946	806	12 693	594	2 892	207	4 488	384	106	450	1 928	3 615	5 409	457	1 795	3 244	335	1 100	1 660	62 710	59 095
	2012	1 886	1 590	646	0	3 735	9 065	910	165	806	928	794	11 843	594	2 890	207	4 361	381	106	491	1 944	3 618	5 408	435	1 787	3 282	335	1 182	1 669	61 058	57 440
Total number of passive level crossings	2010	3 207	291	146	0	4 673	7 080	667	171	488	1 551	3 016	5 254	912	3 144	838	1 100	154	32	155	622	0	8 738	643	3 537	8 036	549		4 987	59 991	59 991
	2011	3 126	284	134	0	4 580	5 595	486	163	527	1 493	2 939	5 445	924	3 151	811	1 182	154	32	150	628	0	9 109	592	3 475	5 486	505	1 080	4 987	57 038	57 038
	2012	2 794	267	137	0	4 580	5 210	452	163	781	1 472	2 787	6 212	924	3 151	808	1 239	158	31	143	653	0	8 948	442	3 475	5 334	503	1 072	4 948	56 684	56 684

Table 12	Management of safety – number of audits planned and conducted																														
Category	Year	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL	NO	PL	PT	RO	SE	SI	SK	UK	AII	EU-28
Total number of accomplished audits	2006		0	0		159		33			731	44	1			21	1 278	21		131		55	0	2		319		6	720		
	2007		0	0	25	290		36	249		755	43	44		21	13	2 157	27		1 853	20	66	0	6		188		0	189		
	2008	109	0	0	24	263		32	83	0	777	33	50			21	2 158	29		265	20	72	0	1		156	4	1	47		
	2009	220		2941	19	410			84	0	1 365	26			41	18	2 431	27	317	5	5	86	0	10		164		1			
	2010	381		0	35	628			81	0	1 127	18			29	20	2 223	30	409	6	35	60	1	7	285	187	1	1	912		
	2011	524	4	0	45	692		34	20	0	1 217	52			40	18	2 455	28	469	6	100	79	351	9	262	179	3	1	899		
	2012	392	45	4	22	742		1 909	78	0	1 216	82	211		31	22	3 110	29	401	7	235	62	466	15	351	204	2	1	869		
Percentage of audits accomplished/ required and/or planned	2006		0	0		100		100			100	91	100			100	98	81		100		70	100	100		98			93		
	2007			0	85	100		100	100		100	67	100		77	100	56	100		97	100	74	0	100		96		0	97		
	2008	96	0		59	100		100	94	0	100	97	100			100	83	100		100	100	95	0	100		88	100	100	100		
	2009	92		0	76	100			95	0	100	92	100		100	90	84	96		100	100	77	0	100	0	74		100			
	2010	89		0	92	97			97	0	90	90			71	100	80	100	77	100	97	75	100	100	97	87	100	100	88		
	2011	97	66	0	100	97		77	100	0	100	80.8			93	94	87	100	83	100	98	96	100	100	98	88	100	100	90		
	2012	93	83	100	81	97		1	98	0	100	95	89		79	88	88	100	99	100	100	89	87	100	89	88	100	100	89		

Table 13	Traffic and infrastructure data																				
Reference data	Year	AT	BE	BG	CT	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	NL
Total number of Train km	2006	152		36		159	1 013	80		19	185	50	508		106	18	377	13		17	133
	2007	155	103.59	36	6	152	1 048	78	7	19	185	52	529		114	16	370	14		18	140
	2008	158	92.9	35	5	174	1 043	82	7	21	192	53	541		109	19	366	15		19	139
	2009	152	91.87	31	5	163	1 002	82	6	19	188	50	504		106	18	350	14	8	18	132
	2010	156	98	30	5	160	1 032	63	8	16	186	51	484	24	102	17	323	14	8	16	146
	2011	152	100.57	31	5	160	1 053	64	7	12	191	51	501	25	110	18	317	15	8	18	160
	2012	149	99.26	27	5	161	1 038	63	7	11	188	50	511	25	115	18	316	14	8	18	149
Number of Passenger km	2006	8 830	9 607	2 420		6 908	77 803	6 274		1 811	20 477	3 540	76 470		9586	1872	58 679	430		992	15 600
	2007	9 149	9 932	2 423	1	6 906	79 100	5 080	274	1 930	20 584	3 778	78 740		10 080	2007	49 090	409		983	16 400
	2008	10 600	10 403	2 334		6 659	82 500	5 196	274	1 657	22 073	4 052	87 000		8 288	1975	49 407	397		951	16 500
	2009	10 500	10 493	2 144		6 472	81 612	5 055	231	1 414	21 729	3 876	83 260		7 945	1681	46 425	357	332	747	16 800
	2010	10 700		2 099	496	6 553	83 702	5 230	456	1 143	20 977	3 959	81 750	1 742	7 665	1677	43 473	373	349	740	16 620
	2011	10 900	94 93	2 067	506	6 750	85 034	5 405	393	957	21 399	3 882	82 750	1 486	7 795	1639	41 325	389	353	732	16 892
	2012	11 160	9 493	1 876	518	6 750	85 034	5 468	249	832	20 789	4 035	85 230	1 103	8 070	1583	41 609	403	377	717	17 247
Number of passenger train km	2010	104		23	1	12 3	777	45	4	15	158	35	410	16	85	16	280	5	7	6	134
	2011	100	85	22	0.96	123	780	46	3	11	161	35	425	18	83	17	273	5	7	6	147
	2012	102	85	20	0.96	125	783	45	3	10	161	36	423	18	88	17	274	5	7	6	138
Number of Freight train km	2010	44		6	0.14	36	255	3	4	0.98	25	15	74	5	17	0.34	43	8	0.9	10	12
	2011	43	14	7	0.12	37	272	4	4	0.87	26	15	75	5	26	0.36	43	9	0.90	12	12
	2012	40	13	6	0.27	36	254	3	3	0.77	23	14	88	5	27	0.36	40	9	0.71	12	11
Number of Other train km	2010	6	98	1	4	0	0	14	0	0	2	0		1		0.77	0	0.23		0	0.18
	2011	8	0.01	1	4		0	14	0		3			2	0.14	0.70	0.57	0	0.08	0	0.25
	2012	7	0	1	4	0	0	14	0		3	0		1.6	0.12	0.70	1	0	0.08	0	0.46
Number of Freight tonne km	2010	22 438		7	61	34 024	107 300	2 240	13 694	393		9 750	32 706	2 618	8 798	92	19 563	13 451	717	17 178	6 385
	2011	22 143	15	8	71	33 900	113 317	2 614	12 464	351	8 653	9 395		2 438	9 010	105	21 308	15 088	626	21 410	6 378
	2012	21 523		7	49	29 046	110 065	2 278	10 302	282	7 149	9 275		2 332	9 093	90	20 945	14 172	759	21 866	3 725
Number of line kilometres (double track lines are to be counted ONCE)	2010	5 807		3 973	108	9 628	33 803	2 477	899.8	2 552	13 852	5 919	42 039	2 722	8 657	1683	16 794	1 767	275	1 897	3 016
	2011	5 188	3 587	3 946	159	9 614	33 736	2 460	918	2 523	13 965	5 944	29 297	2 722	7 690	1683	16 789	1 767	275	1 865	3 035
	2012	5 257	3 587	3 946	159	9 487	33 479	2 459	918	2 523	13 996	5 944	29 675	2 722	7 690	1683	16 722	1 767	275	1 859	3 063
Number of track kilometres (double track lines are to be counted TWICE)	2010	8 049	6 344	5 154	159	11 554	63 839	3 233	2 167	3 070	18 966	8 862	42 039	2 976	10 577	2165	24 370	2 148	614	3 395	6 830
	2011	7 201	6 344	5 154	200	11 554	63 067	3 216	2 164	3 041	19 372	8 885	42 088	2 976	10 577	2165	24 377	2 184	614	3 998	7 000
	2012	7 360	6 446	5 154	200	11 554	61 431	3 210	2 164	3 041	19 326	8 883	45 937	2 976	10 577	2165	24 334	2 189	621	3 908	7 033

Table 13	Traffic and infrastructure data										
Reference data	Year	NO	PL	PT	RO	SE	SI	SK	UK	All	EU-28
Total number of Train km (million)	2006	47	221	39	94	132	18	50	535	4 011	3 964
	2007	47	223	40	96	134	19	51	521	4 184	4 137
	2008	46	224	41	96	138	20	49	549	4 243	4 196
	2009	43	208	40	88	143	18	44	568	4 101	4 058
	2010	46	219	40	93	141	18	47	520	4 074	4 028
	2011	45	227	37	104	140	20	45	528	4 155	4 109
	2012	46	223	37	108	140	19	46	535	4 142	4 095
Number of Passenger km (million)	2006	2 859	18 173	3 876		9 716	11.37	2 194	49 750	387 880	385 020
	2007	2 859	19 374	3 990	6 724	10 295	812	2 147	50 473	393 544	390 684
	2008	2 859	20 144	4 154	6 955	10 838	834	2 278	53 002	411 334	408 475
	2009	2 996	18 576	4 151	6 176	11 216	840	2 246	52 764	400 045	397 049
	2010	3 153	17 799	4 111	5 499	11 036	813	2 291	55 831	390 247	387 094
	2011	3 036	18 049	4 143	5 141	11 434	773	2 427	56 059	401 216	398 180
	2012	3 207	17 737	3 802	4 896	11 530	741	2 461	58 882	405 806	402 599
Number of passenger train km (million)	2010	34	145	32	70	94	10	33	485	3 157	3 122
	2011	35	143	30	79	96	11	31	490	3 275	3 240
	2012	35	142	29	80	100	11	31	498	3 284	3 248
Number of Freight train km (million)	2010	8	73	7	22	40	8	14	34	777	769
	2011	8	79	6	25	43	9	14	37	838	829
	2012	7	76	8	27	39	8	13	37	813	806
Number of Other train km (million)	2010	2		0		6	0	0	0	139	136
	2011	2	4	0		0	0	0	0	41	39
	2012	3	5	0	0		0	1	0	44	41
Number of Freight tonne km (million)	2010	3 893	48 952	2 842	11 412	23 463	3 283	18 230	18 531	422 027	418 133
	2011	4036	53 103	2 321	17 524	22 705	3 751	18 014	22 817	423 571	419 535
	2012	3 813	49 079	2 421	16 972	22 000	3 815	17 322	23 192	401 578	397 765
Number of line kilometres (double track lines are to be counted ONCE)	2010	4 114	20 045	2 842	17 263	11 066	1 228	3 622	15 777	233 828	229 714
	2011	4 114	20 066	2 794	17 220	11 206	1 209	3 624	16 187	223 584	219 470
	2012	3 646	19 960	2 541	17 168	9 944	1 209	3 631	16 219	221 531	217 885
Number of track kilometres (double track lines are to be counted TWICE)	2010	4 341	28 743	3 530	20 171	15 347	2 187	4 638	31 630	337 100	332 759
	2011	4 341	28 730	3 483	20 129	15 601	2 177	4 641	31 108	336 387	332 046
	2012	3 891	28 664	3 239	20 077	14 739	2 177	4 648	31 752	337 698	333 807

Annex III — National Safety Authorities and National Investigation Bodies of EU Member States

Country	National Safety Authority	National Investigation Body
Austria	Bundesministerium für Verkehr, Innovation und Technologie Oberste Eisenbahnbehörde www.bmvit.gv.at	Sicherheitsuntersuchungsstelle des Bundes, Schiene Bundesanstalt für Verkehr (VERSA) http://versa.bmvit.gv.at
Belgium	Dienst veiligheid en interoperabiliteit der spoorwegen — Service de Sécurité et d'Interopérabilité des Chemins de Fer et d'Interopérabilité des Chemins de Fer www.mobilit.belgium.be/fr/traficferroviaire/autorites/ssicf/	Federale Overheidsdienst Mobiliteit en Vervoer Onderzoeksorgaan voor Ongevallen en Incidenten op het Spoor Service Public fédéral Mobilité et Transports Organisme d'enquête sur les Accidents et les Incidents ferroviaires www.mobilit.fgov.be
Bulgaria	Изпълнителната агенция 'Железопътна администрация' (Ministry of Transport — Railway Administration Executive Agency) www.iaja.government.bg	Ministry of Transport — Railway Accident Investigation Unit (RAIU) http://www.mtitc.government.bg/
Czech Republic	Drážní Úřad (DU) (Rail Authority) www.ducr.cz	Drážní inspekce (DI) www.dicr.cz
Germany	Eisenbahn — Bundesamt (EBA) www.eba.bund.de	Bundesministerium für Verkehr, Bau und Stadtentwicklung Eisenbahn-Unfalluntersuchungsstelle www.bmvbs.de
Denmark	Trafikstyrelsen www.trafikstyrelsen.dk	Havarikommissonen for Civil Luftfart og Jernbane (HCLJ) www.havarikommissionen.dk
Estonia	Tehnilise Järelevalve Amet www.tja.ee	Ohutus-juurdluse Keskus (OJK) www.ojk.ee
Greece	Ρυθμιστική Αρχή Σιδηροδρόμων (Regulatory Authority for Railways) www.ras-el.gr	Hellenic Ministry of Infrastructure, Transport and Networks Committee for Accident Investigation www.yme.gr
Spain	Ministerio de Fomento Dirección General de Infraestructuras Ferroviarias www.fomento.es	Ministerio de Fomento Comision de Investigación de Accidentes ferroviarios www.fomento.es
Finland	Liikenteen turvallisuusvirasto (TraFi) www.trafi.fi	Onnettomuustutkintakeskus (Accident Investigation Board) www.onnettomuustutkinta.fi
France	Établissement Public de Sécurité Ferroviaire (EPSF) www.securite-ferroviaire.fr	Bureau d'Enquêtes sur les Accidents de Transport Terrestre www.bea-tt.equipement.gouv.fr
Croatia	Agencija za sigurnost željezničkog prometa www.asz.hr	Agencije za istraživanje nesreća u zračnom, pomorskom i željezničkom prometu (AIN) http://azi.hr/
Hungary	Nemzeti Közlekedési Hatóság — National Transport Authority www.nkh.hu	Közlekedésbiztonsági Szervezet (Transportation Safety Bureau) www.kbsz.hu
Ireland	Railway Safety Commission www.rsc.ie	Railway Accident Investigation Unit www.raiu.ie
Italy	Agenzia Nazionale per la Sicurezza delle Ferrovie www.ansf.it	Direzioine generale per le investigazioni ferroviarie – Ministero delle Infrastrutture e dei Trasporti www.mit.gov.it
Lithuania	Valstybinė geležinkelio inspekcija www.vgi.lt	Katastrofų tyrimų vadovas www.transp.lt
Luxembourg	Ministère du Développement durable et des Infrastructures Administration des Chemins de Fer (ACF) www.railinfra.lu	Administration des Enquêtes Techniques http://www.mt.public.lu/transports/AET/

Latvia	Valsts dzelzceļa tehniskās inspekcijas www.vdzti.gov.lv	Transporta nelaimes gadījumu un incidentu izmeklēšanas birojs — Transport Accident and Incident Investigation Bureau (TAIIB) www.taiib.gov.lv
Netherlands	Inspectie Leefomgeving en Transport (ILT) www.ilent.nl	Onderzoeksraad voor Veiligheid http://www.onderzoeksraad.nl/
Norway	Statens Jernbanetilsyn (SJT) www.sjt.no	Statens Havarikommisjon for Transport — Accident Investigation Board Norway (AIBN) www.aibn.no
Poland	Urząd Transportu Kolejowego www.utk.gov.pl	Państwowa Komisja Badania Wypadków Kolejowych (NIB) www.mi.gov.pl
Portugal	Instituto da Mobilidade e dos Transportes Terrestres www.imtt.pt	Gabinete de Investigação de Segurança e de Acidentes Ferroviários (GISAF) www.iot.gov.pt
Romania	Autoritatea Feroviară Română (AFER) www.afer.ro	Autoritatea Feroviară Română (AFER) Romanian Railway Investigating Body www.afer.ro
Sweden	Transportstyrelsen www.transportstyrelsen.se	Statens haverikommission www.havkom.se
Slovenia	Javna agencija za železniški promet Republike Slovenije (AŽP) www.azp.si	Ministry of Transport Railway Accident and Incident Investigation Division www.mzp.gov.si
Slovakia	Úrad pre reguláciu železničnej dopravy (URZD) www.urzd.sk	Ministry of Transport Posts and Telecommunication www.telecom.gov.sk
United Kingdom	Office of Rail Regulation (ORR) www.rail-reg.gov.uk	Rail Accident Investigation Branch www.raib.gov.uk
Channel Tunnel	Channel Tunnel Intergovernmental Commission (IGC) Commission intergouvernementale Tunnel sous la Manche http://www.channeltunneligc.co.uk Assisted by: Channel Tunnel Safety Authority ctsa@orr.gsi.gov.uk Secrétariat général au Tunnel sous la Manche (SGTM) www.cigtunnelmanche.fr	See the relevant authority or body in France or United Kingdom for the respective part of the Channel Tunnel

Photographs : ERA staff, NIB Hungary, NIB Norway

Railway safety performance in the European Union 2014
85 pages
21 x 29.7 cm

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TR-AB-14-001-EN-C

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