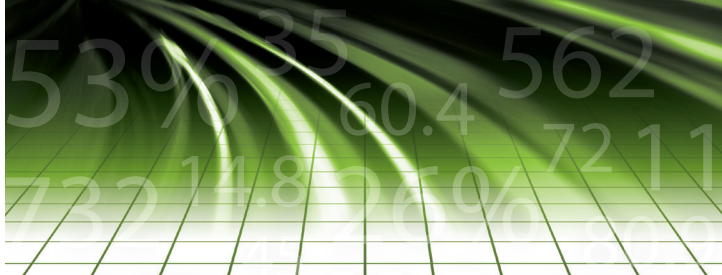
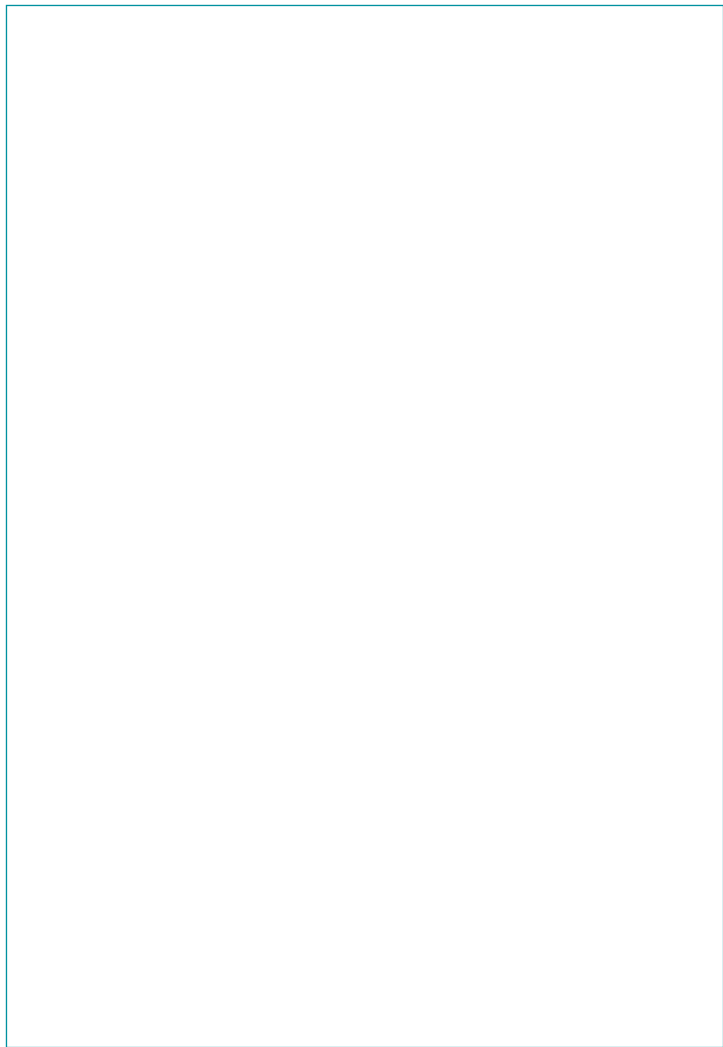




# Annual Safety Performance Report 2010/11

Key facts and figures





# Contents

<b>Introduction</b> .....	<b>2</b>
<b>2010/11 Headline statistics</b> .....	<b>3</b>
<b>Background</b> .....	<b>4</b>
Recent safety trends.....	4
Risk profile for the railway – fatalities .....	5
Risk profile for the railway – all injuries .....	6
Long-term safety trends.....	7
Rail safety in context: inter-modal comparisons .....	8
Rail safety in context: European comparisons .....	9
<b>Risk from train accidents</b> .....	<b>10</b>
Long-term trends .....	10
Potentially higher-risk train accidents.....	11
Train accident precursors.....	12
Signals passed at danger (SPADs).....	13
<b>Risk to passengers</b> .....	<b>14</b>
Passenger fatalities.....	14
Major injuries to passengers.....	15
Platform-train interface.....	16
Passenger and public assaults.....	17
Passenger accident rate by time of day.....	18
<b>Risk to the workforce</b> .....	<b>19</b>
Workforce fatalities.....	19
Rail safety in context: occupational risk.....	20
Workforce major injuries.....	21
Workforce assaults.....	22
<b>Risk to members of the public</b> .....	<b>23</b>
Public fatalities.....	23
Trespass fatalities by age and gender.....	24
<b>Risk at the road-rail interface</b> .....	<b>25</b>
Fatalities at level crossings.....	25
Collisions between trains and road vehicles.....	26
<b>The Strategic Safety Plan</b> .....	<b>27</b>
Trajectories of the 2009 - 2014 SSP.....	27
<b>Progress against other industry requirements</b> .....	<b>28</b>
High Level Output Specification.....	28
<b>Key safety facts</b> .....	<b>29</b>
<b>Definitions and scope</b> .....	<b>35</b>
<b>Fatalities and weighted injuries</b> .....	<b>36</b>
<b>Further information</b> .....	<b>37</b>

## Introduction

**RSSB was established in April 2003 to support the railway industry in its management of cross-industry issues, including safety. Through its services, it assists the industry in the challenge of maintaining and, where reasonably practicable, reducing the risk to passengers, railway employees and members of the public. The analysis and presentation of safety performance information is a key part of this function.**

The 2010/11 Annual Safety Performance Report (ASPR) reviews the performance levels achieved during the year across a number of topic areas.

RSSB reports on a financial year basis for consistency with Control Period 4 (CP4), its associated High Level Output Specification (HLOS), and the Railway Strategic Safety Plan (SSP), all of which cover the period April 2009 to March 2014.

The ASPR's main purpose is to inform those in the industry who manage risk. However, it is also intended to inform other rail industry employees, passengers, the Government (and its agencies) and the public at large.

Here, we present a 'pocket-sized' version of some key points from the main report. The full report may be downloaded from our website at [www.rssb.co.uk](http://www.rssb.co.uk).

## 2010/11 Headline statistics

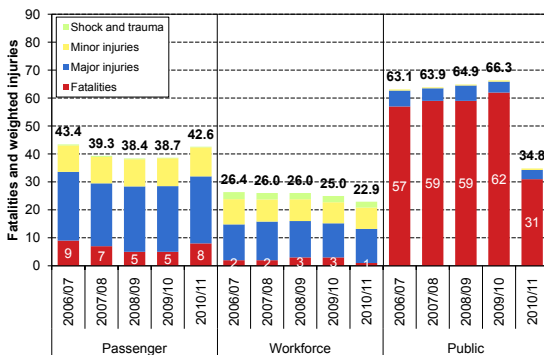
- **1.4** billion passenger journeys, an 8% increase on 2009/10
  - **0** passenger, workforce or public fatalities in train accidents
  - **8** passenger fatalities in individual incidents, all at stations:
    - **2** fell from the platform and were struck by trains
    - **2** fell from the platform and were electrocuted
    - **1** was struck by a train at the platform edge
    - **1** died from a fall on an escalator
    - **1** died after a fall on a platform
    - **1** died following an assault
  - **1** workforce fatality:
    - An infrastructure worker died after a fall from height
  - **239** public fatalities:
    - **208** were suicides or suspected suicides
- Of those classed as being accidental:
- **27** were trespassing
  - **4** were pedestrians at level crossings
- **240** major injuries to passengers
  - **122** major injuries to members of the workforce

## Background

### Recent safety trends

Over the past decade, and against a background of generally increasing rail usage, industry initiatives have brought about improvements in the safety of passengers and workforce from both train accidents and personal accidents.

#### Fatalities and weighted injuries (excluding suicide)



Source: SMIS

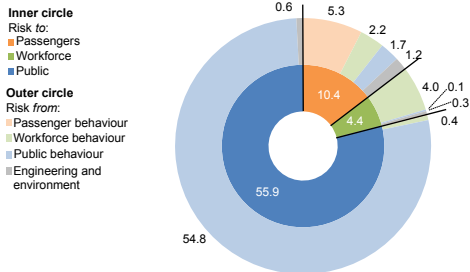
- The overall harm to passengers has risen compared with recent years. This is due mainly to the higher number of fatalities in 2010/11 resulting from individual accidents at stations.
- The harm to members of the workforce is at its lowest recorded level.
- The overall harm to members of the public is at an historic low, due mainly to a reduction in trespass-related fatalities.

## Background

### Risk profile for the railway – fatalities

The industry uses the Safety Risk Model (SRM) to assess the underlying level of risk to passengers, staff and the public from the operation and maintenance of Network Rail Managed Infrastructure (NRM). It is used to look at who is affected by the risk (risk to), along with the source from which it arises (risk from). The SRM has been updated to version 7, using data to September 2010.

#### Fatality risk profile excluding suicide (70.7 fatalities/year)



Source: SRMv7

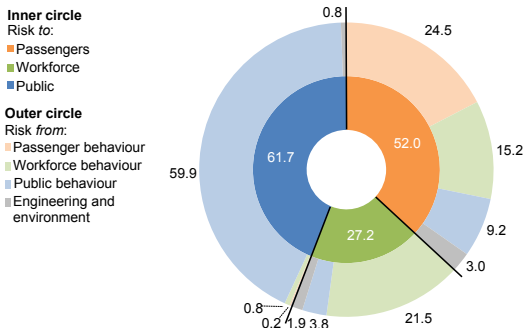
- Most of the fatality risk is to members of the public, with the dominant source being public behaviour (for example, people at level crossings or trespassing on or near the track).
- Passenger fatality risk arises from a number of sources, including individual accidents in stations as well as train accidents. Train accidents can be caused by engineering problems, workforce errors, the environment, or public behaviour.
- Workforce fatality risk arises largely from areas that are under the direct control of the industry.

## Background

### Risk profile for the railway – all injuries

The railway measures overall harm in terms of fatalities and weighted injuries (FWI) – defined on page 36.

#### FWI risk profile excluding suicide (140.9 FWI/year)



Source: SRMv7

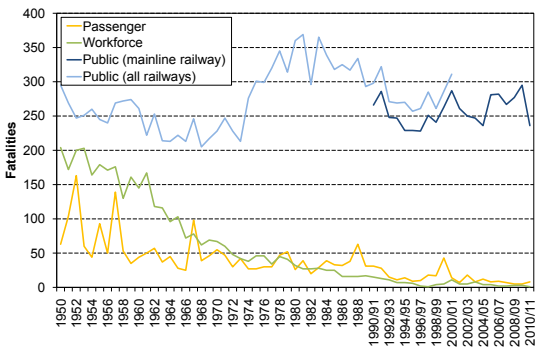
- When weighted injuries are added to the fatality risk, the large number of lower consequence injuries such as slips, trips and falls to passengers and staff results in the risk profile being split more evenly between passengers, the workforce and members of the public.
- Relatively few non-fatal public injuries are recorded. This is partly because the hazards that account for most of the risk (in particular, being struck by trains) are more likely to result in fatalities than injuries.
- Most of the risk to passengers and workforce arising from public behaviour is due to assaults.

## Background

### Long-term safety trends

Railway safety has improved significantly over the last 60 years. In the period following World War II, around 200 workers were killed in accidents on the railway each year, while the number of passenger fatalities regularly exceeded 50.

#### Number of fatalities since 1950



Source: ORR data for mainline railway up to 1993/94, RSSB data from 1994/95 onwards. Public (all railways) – ORR data, includes London Underground and other rail systems.

- The greatest improvement over the past 60 years has been in workforce fatalities. The annual average number of workforce fatalities has fallen by around 98% since 1950.
- There has also been a marked downward trend in the number of passenger fatalities.
- There has been no sustained reduction in public fatalities (which mainly comprise trespassers and suicides).

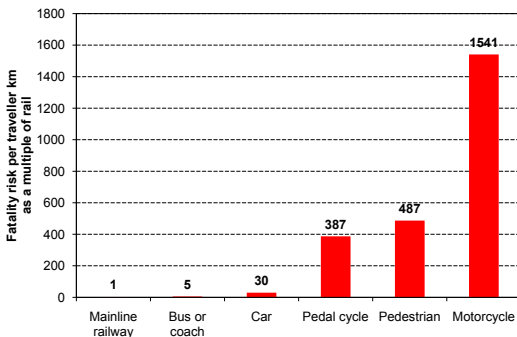
## Background

### Rail safety in context: inter-modal comparisons

#### Rail remains one of the safest modes of transport

*There have been substantial improvements in the safety of both road and rail transport over the past four decades, with a marked improvement in road safety in recent years. Car travel, however, has a similar level of safety today as rail travel had forty years ago on a per traveller kilometre basis.*

#### Traveller fatality risk for different transport modes (relative to rail)



Source: SRMv7 for rail, Department for Transport (DfT) for other modes.

- On the basis of fatality risk per traveller kilometre, rail travel is:
  - More than 1,500 times safer than travelling by motorcycle.
  - More than 300 times safer than cycling or walking.
  - Around 30 times safer than using a car.
  - Similar to – but somewhat safer than – bus and coach travel.
- Public transport is generally safer than private transport.
- Most existing estimates put air safety on a similar level to rail safety on a per traveller kilometre basis.

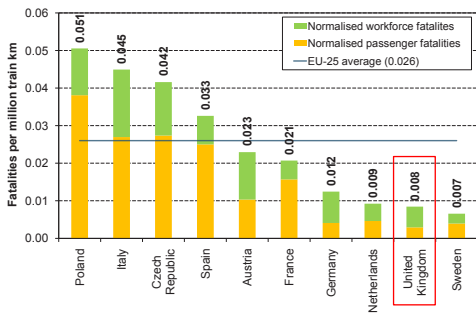
## Background

### Rail safety in context: European comparisons

#### UK railways compare favourably with other EU countries

The European Railway Safety Directive requires member states to ensure current levels of safety are maintained and, where reasonably practicable, improved, with a view to gradually harmonising safety performance. In 2011, the European Commission will publish the second set of Common Safety Targets and National Reference Values for the 25 member states with railways.

#### Passenger and workforce fatality rates on the largest EU railways



Source: Eurostat data 2004-2009. The chart shows the ten largest EU railways in terms of train km

- Passenger and workforce fatality rates in the United Kingdom were well below the EU-25 average over the six-year period 2004-2009.
- The countries with similar rates to the UK include Germany, the Netherlands and Scandinavian countries.
- In general, countries in northern and western parts of Europe have safer railways than those further south and east.

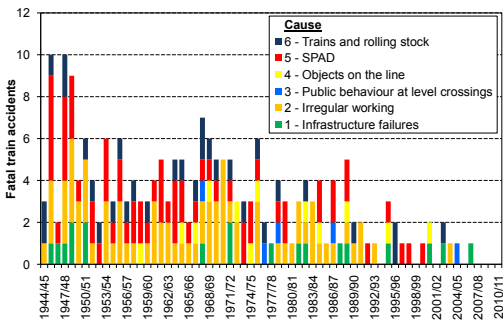
# Risk from train accidents

## Long-term trends

### Fatal train accident rate remains below one per year

Train accidents currently account for around 6% of the overall FWI risk. The frequency of train accidents with passenger or workforce fatalities has dropped steadily over the past 60 years and is now at its lowest ever level.

#### Train accidents leading to passenger and workforce fatalities



Source: ORR for historical data; SMIS for recent statistics.

- Six years in the last decade (including the last four years) saw no train accidents with on-board fatalities.
- The rate of train accidents that result in passenger or workforce fatalities has fallen by around 90% since the early 1950s and is currently around one every two years based on a 10-year moving average.
- There has been a substantial reduction in the frequency of fatal train accidents caused by factors that are largely within the industry's control, namely infrastructure failures, irregular working, SPADs, and train and rolling stock failures.

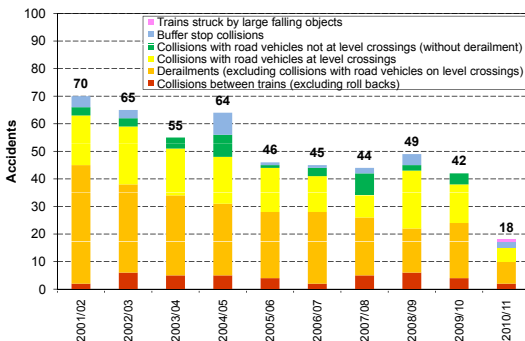
## Risk from train accidents

### Potentially higher-risk train accidents

#### PHRTA rate lowest on record

The types of train accident most likely to result in harm, such as collisions and derailments, are known as potentially higher-risk train accidents (PHRTAs).

#### Potentially higher-risk train accidents (PHRTAs)



Source: SMIS

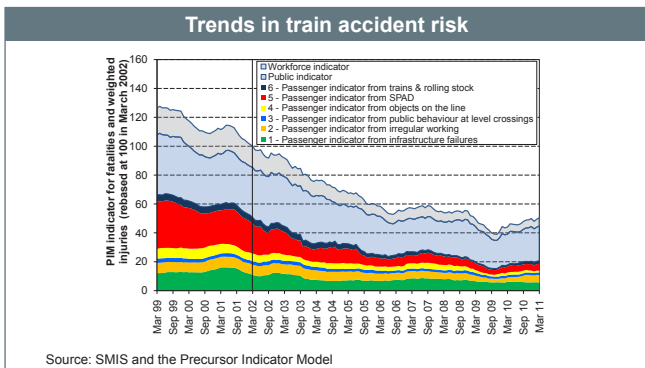
- The incidence of PHRTAs in 2010/11 was by far the lowest on record. The numbers of derailments, collisions at level crossings, collisions with road vehicles at other locations, and collisions between trains were all at historic lows.
- There has been a significant reduction in the number of PHRTAs since the late 1990s. Much of this was due to a reduction in the number of freight train derailments.

# Risk from train accidents

## Train accident precursors

### PIM trends show a rise

As serious train accidents are rare, the industry monitors trends in train accident precursors using the Precursor Indicator Model (PIM).



- In contrast to the reduction in PHRTAs (page 11), the PIM, which is based on the occurrence of potential train accident precursors, suggests that train accident risk has risen, although it remains low by historical standards. This is due to increases in the estimated risk from four of the six causes modelled by the PIM.
- The chart shows that the largest reduction in passenger risk over the past decade has occurred in the SPAD group. This is largely due to the introduction of TPWS. Other sources of risk, such as infrastructure failures and irregular working, have also reduced over the past 10 years.
- There has been relatively little change in the risk from public behaviour at level crossings, which – being outside the direct control of the railway – has proved difficult to reduce.

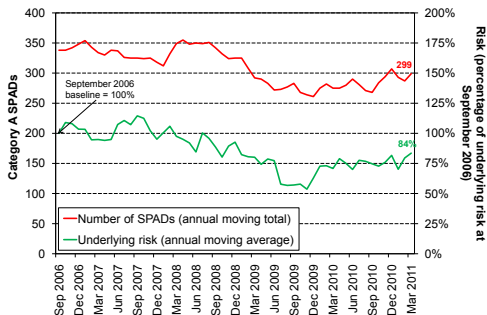
## Risk from train accidents

### Signals passed at danger (SPADs)

#### SPAD risk remains below the 2006 baseline level

The accident at Ladbroke Grove (1999), in which 31 people died, occurred following a SPAD. Since then, the industry has focussed on reducing the risk from this hazard through initiatives such as the introduction of TPWS (completed at the end of 2003), which can automatically stop a train that passes a signal at danger.

#### Trend in SPAD risk



Source: SMIS & the rail industry's SPAD risk ranking tool

- At the end of the year, the estimated level of SPAD risk was 16% lower than it was in September 2006.
- There were 299 category A SPADs in 2010/11 compared with 275 in 2009/10.

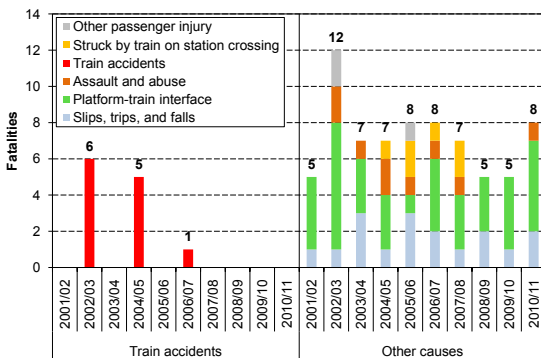
## Risk to passengers

### Passenger fatalities

#### Eight passengers were fatally injured in 2010/11 – the highest number since 2006/07

The main sources of fatality risk are accidents at the platform-train interface, and slips, trips and falls around the station. The SRM estimates that train accidents account for around one-fifth of passenger fatality risk.

#### Passenger fatalities by accident type



Source: SMIS

- There were eight passenger fatalities in 2010/11. This equates to a rate of around one fatality per 170 million passenger journeys.
- The fatalities all occurred in separate incidents in stations (see page 3). Five of the accidents were reported as involving intoxication.
- The increase in fatalities contributed to an overall rise in FWI of around 10%. Another factor is the recent growth in rail usage; the FWI per passenger journey increased by 2%.

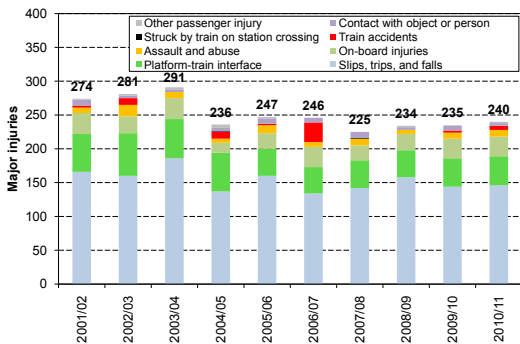
## Risk to passengers

### Major injuries to passengers

#### No significant change in the level of passenger major injuries

Most passenger major injuries continue to be the result of slips, trips and falls in stations.

#### Passenger major injuries by accident type



Source: SMIS

- The total number of major injuries in 2010/11 has increased slightly for the third year running and is at its highest level since 2006/07.
- The major injury rate for 2010/11 was lower than one per five million passenger journeys, a 5% decrease on the rate in 2009/10.
- Six passengers received major injuries in two train accidents in 2010/11. Both accidents were caused by road user behaviour.

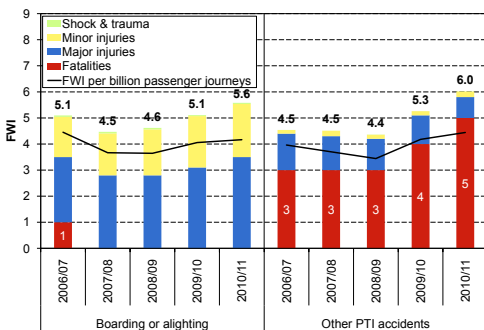
## Risk to passengers

### Platform-train interface

#### Passenger harm from accidents at the platform-train interface increasing

Accidents at the platform-train interface (PTI) contribute 20% (10.4 FWI) of passenger risk. Around half of this (5.1 FWI) is from accidents while boarding or alighting the train. Other accidents at the PTI contribute 5.3 FWI and include injuries such as those resulting from falls onto the track.

#### Passenger harm from accidents at the PTI



Source: SMIS

- The level of harm at the platform-train interface has increased over recent years, both for accidents occurring during boarding/alighting and for those not. The rate of harm normalised by passenger journeys has also shown an increase for both types of PTI accidents.
- Accidents at the PTI not due to boarding or alighting occur less frequently, but have a greater tendency for serious outcome. More than half of the fatalities shown in this category have intoxication recorded as a factor.

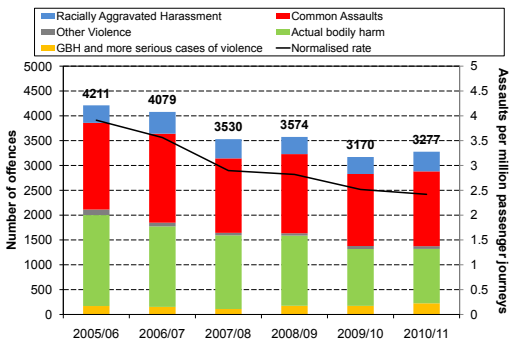
## Risk to passengers

### Passenger and public assaults

#### BTP records a slight increase in assaults

The number of assaults recorded by British Transport Police (BTP) increased in 2010/11. BTP data also includes assaults involving non-travelling members of the public on railway premises.

#### Assaults on passengers and the public



Source: BTP

- The current year shows an increase of 3% in the total number of passenger and public assaults, compared with 2009/10. However, the number is the second lowest recorded over the period shown.
- The most serious crimes, such as grievous bodily harm (GBH), are relatively rare, although these offences increased the most (around 30%) in 2010/11.
- Year on year, the normalised assault rate has decreased and is currently less than one per 400,000 journeys.

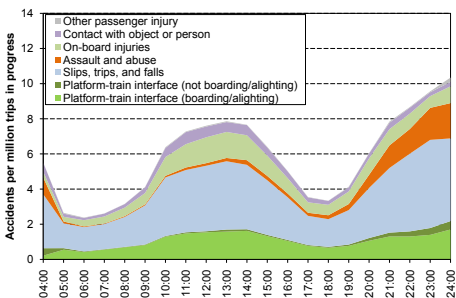
## Risk to passengers

### Passenger accident rate by time of day

#### Passenger accident rate is higher at off-peak travel times

Reported passenger accident rates and profiles vary according to the time of day, day of week, and month of year.

#### Passenger accident profiles by time of day



Source: SMIS and National Travel Survey (DFT)

- The rate of accidents, normalised by trips in progress, appears to be at its highest at off-peak times, between 1000 hrs and 1600 hrs, and again between 1900 hrs and midnight.
- Those travelling at off-peak times are often less frequent users who face higher risk because they are unfamiliar with rail travel. They may also be under less time pressure than commuters and more likely to report a minor accident to a member of staff.
- The extent to which this trend is evident varies between accident types. The rates of assaults and platform-train interface accidents (not boarding/alighting) are highest in the evening, coinciding with a rise in accidents related to intoxication.

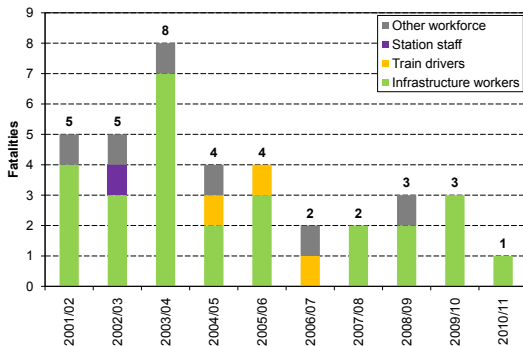
## Risk to the workforce

### Workforce fatalities

#### One staff member fatally injured

On 13 April 2010, an employee of a contractor to Network Rail was fatally injured after the cherry picker, which he was using while engaged on bridge strengthening work, toppled over, causing him to fall around 70ft.

#### Workforce fatalities by type of worker



Source: SMIS. The term 'infrastructure worker' replaces 'track worker', retaining the same scope, as this more accurately reflects the wide range of activities performed by those within the grouping.

- Most workforce fatalities occur to infrastructure workers. Since 2001/02, there have been 37 workforce fatalities, 27 of which have occurred to this group of workers.
- More than one-half of workforce fatalities (25) since 2001/02 occurred on the running line. Of the remaining fatalities, three members of staff died in train accidents, four in depots, yards or sidings and five at other locations.

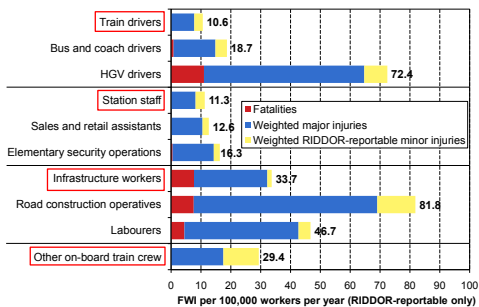
## Risk to the workforce

### Rail safety in context: occupational risk

#### Railway workforce risk varies by occupation

*Different activities expose workers to different levels of risk.*

#### Industry risk comparison



Source: RSSB for railway occupations, HSE for other industries.  
The data covers the period 2007/08-2009/10.

- Train drivers are subject to a lower level of risk than drivers of large road vehicles. Infrastructure workers appear to be exposed to a level of risk lower than road construction operatives and labourers, although they are exposed to the highest risk of the rail occupations shown.
- Other on-board crew also appear to have a high level of risk compared with the other rail personnel groups shown. The risk mostly arises from high-frequency, but typically low-consequence, accidents. Physical assault and verbal abuse have accounted for nearly one-fifth of the harm over the last ten years.
- There is an element of uncertainty in these estimates, as industries may vary in terms of their reporting consistency.

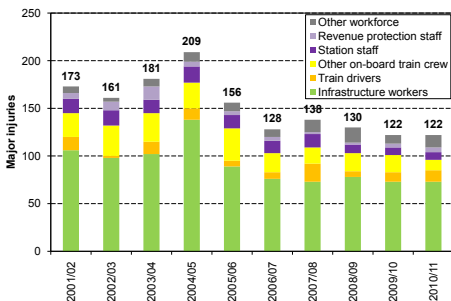
## Risk to the workforce

### Workforce major injuries

#### Workforce major injuries remain stable

The most common causes of infrastructure worker major injury are slips, trips and falls and accidents associated with construction-type hazards. For train drivers, the most common cause is boarding/alighting, for train crew it is on-board injuries and for station staff it is slips, trips and falls.

#### Workforce major injuries by type of worker



Source: SMIS

- There were 122 workforce major injuries in 2010/11: the same as the previous year. The number has been fairly constant for the last five years.
- Infrastructure workers have experienced more than half of all major injuries during each year of the period shown.
- Injuries in depots, yards and sidings are not included in the chart, but the scope of SMIS reporting was extended (on a non-mandatory basis) to cover depots, yards and sidings in April 2010. RSSB plans to extend its reporting scope accordingly once sufficient data is available.

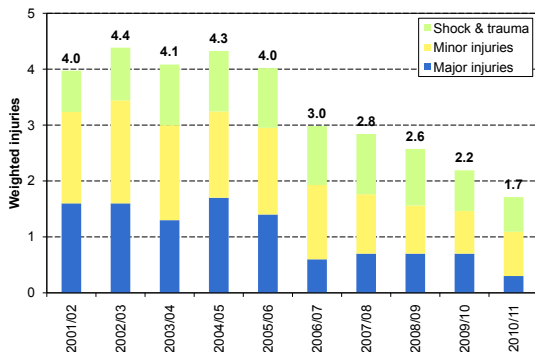
## Risk to the workforce

### Workforce assaults

#### Harm from assaults at historically low level

More workforce assaults occur in stations than on trains. The risk profile has historically been fairly evenly split between major injuries, minor injuries and shock/trauma.

#### Harm from workforce assaults



Source: SMIS

- The overall harm from assaults suffered by members of the workforce fell for the sixth successive year in 2010/11. The decrease is largely due to a lower number of major injuries.
- Conversely, the number of reported cases of assault or abuse reached a new high. This is thought to be a consequence of the industry's work to encourage staff members to report such incidents.
- Ticket disputes are identified as the primary cause in around 40% of reported assaults on staff, with alcohol/drugs the primary factor in 16%.

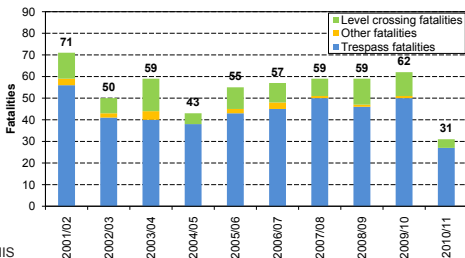
## Risk to members of the public

### Public fatalities

#### Substantial reductions in public fatalities

Most of the accidental risk to members of the public results from their own actions, such as trespass or level crossing misuse. It is an area of risk where the railway has limited control.

#### Trends in accidental public fatalities



Source: SMIS

- Most members of the public killed accidentally on the railway are trespassers. There were 27 trespass fatalities in 2010/11, which is unusually low.
- Where available, coroners' verdicts are used to distinguish between suicides and accidental deaths. When a verdict is not yet available, or an open verdict is returned, RSSB applies the Ovenstone criteria to determine the likely intent.
- More than three-quarters of all public fatalities on the railway are the result of suicide. On average, there are around four suicides per week.

#### Fatalities due to suicide or suspected suicide

2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
192	200	189	193	226	225	208	218	233	208

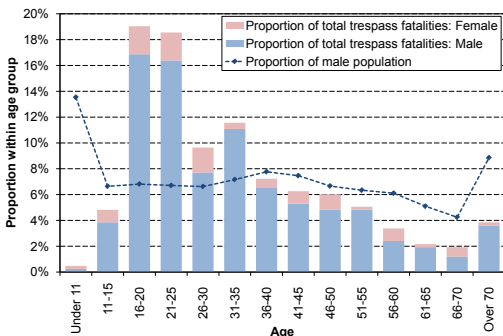
## Risk to members of the public

### Trespass fatalities by age and gender

#### High proportion of trespass fatalities are young men

*The direct cause of most trespass fatalities is being struck by a train. Accidents and near misses with people on the line often result in shock or trauma for train drivers and other train crew.*

#### Trespass fatalities by age and gender



Source: SMIS for trespass fatality data; Office for National Statistics for population data (estimates cover years 2001 to 2009).

- The peak ages for trespass fatalities are the late teens and the early twenties.
- The percentage of male trespass fatalities is disproportionately high compared to their level in the overall population. Although males make up just less than 50% of the total population, they have accounted for 88% of trespass fatalities over the past 10 years.

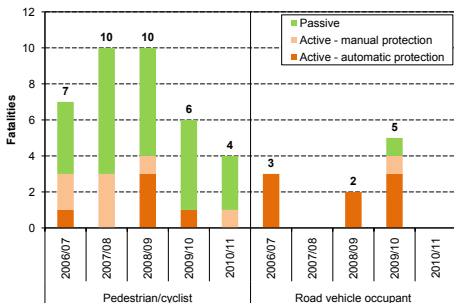
## Risk at the road-rail interface

### Fatalities at level crossings

#### Reduction in fatalities to level crossing users

There are around 6,500 level crossings in active use on the mainline railway, comprising many different types.

#### Fatalities at level crossings by crossing type



Source: SMIS. The chart excludes suicides and suspected suicides.

- There were four pedestrian fatalities at level crossings in 2010/11 (fewer than any other year in the past decade).
- Fatality rates at UK level crossings are low compared with other EU countries.
- Most level crossing fatalities occur on passive crossings where the user is responsible for ensuring that it is safe to cross.
- Since 2001/02, more than half of pedestrian fatalities have occurred on footpath crossings.

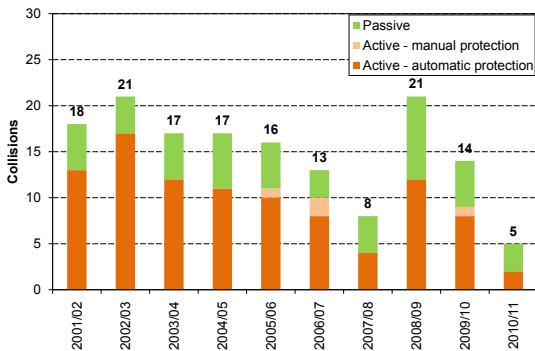
## Risk at the road-rail interface

### Collisions between trains and road vehicles

#### Level crossing collisions at lowest in 10 years

Most of the risk associated with crossings is borne by the crossing user. Network Rail's 'Don't Run the Risk' campaign has continued to promote level crossing safety as part of a long-term effort to change the attitude and behaviour of level crossing users.

#### Collisions between trains and road vehicles by crossing type



Source: SMIS

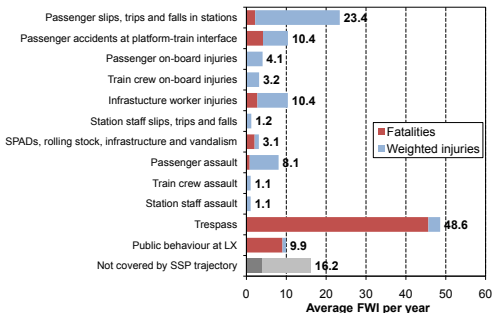
- The number of collisions between trains and road vehicles was well below the 10-year average level of 15 per year.
- There were no fatal collisions between trains and road vehicles in 2010/11.
- A collision between a train and a lorry near Sudbury derailed the train and five people on board received major injuries, while the remaining 16 passengers suffered minor injuries.

# The Strategic Safety Plan

## Trajectories of the 2009–2014 SSP

The 2009–2014 Strategic Safety Plan (SSP) defines a number of trajectories, each related to a particular aspect of system risk. Trajectories are a way of illustrating expected changes in the level of risk as a result of the initiatives being undertaken or planned by the industry.

### Risk profile by SSP trajectories



Source: SRMv7. Fifteen trajectories have been defined in the SSP, they cover 89% of the total FWI risk, and 94% of the fatality risk. Those related to train accident risk (SPADs, rolling stock, infrastructure and vandalism) have been grouped in a single bar in this chart

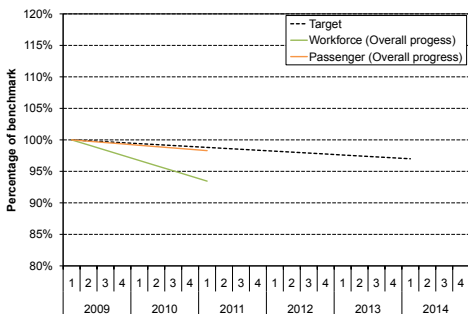
- The SSP trajectories cover 94% of risk to passengers, 67% of risk to the workforce and 93% of risk to members of the public.
- For 11 of the 15 trajectories set out in the 2009-2014 SSP, current performance satisfies the trajectory, with varying levels of stability.
- For four of the 15 SSP trajectories, current performance is not yet within the trajectory. These trajectories relate to train accident risk from rolling stock failure, passenger risk at the platform-train interface, passenger injuries on board trains, and trespass.

## Progress against other industry requirements

### High Level Output Specification

*In the High Level Output Specification (HLOS), the Department for Transport established safety metrics for both passenger risk and workforce risk, and specified a requirement for a 3% reduction in both categories over Control Period 4 (1 April 2009 to 31 March 2014).*

#### Progress against HLOS target for passenger and workforce risk



Source: SRMv6.5 for baseline and SRMv7.

- Based on the SRM, the trend in passenger risk to the end of March 2011 seems consistent with the requirement of the HLOS target. For workforce risk, the initial indication suggests a rate of risk reduction better than that required by the HLOS target.
- These results provide reassurance that safety performance is in line with the HLOS requirements. Trends will be monitored throughout the period.
- In summer 2011, the European Commission will publish its second assessment of member states safety performance against their National Reference Values. The UK had acceptable performance in all risk measures.

# Key safety facts

## Train accidents

Train accidents	2006/07	2007/08	2008/09	2009/10	2010/11
<b>Fatalities (excluding suicides)</b>	<b>5</b>	<b>0</b>	<b>2</b>	<b>7</b>	<b>0</b>
Passengers	1	0	0	0	0
Workforce	0	0	0	0	0
Members of the public	4	0	2	7	0
<b>Weighted injuries (excluding suicides)</b>	<b>4.21</b>	<b>0.97</b>	<b>0.57</b>	<b>1.18</b>	<b>1.32</b>
Passengers	3.28	0.12	0.03	0.39	0.72
Workforce	0.82	0.63	0.33	0.57	0.50
Members of the public	0.10	0.21	0.21	0.21	0.10
<b>Total train accidents</b>	<b>825</b>	<b>783</b>	<b>697</b>	<b>581</b>	<b>523</b>
<b>PHRTAs</b>	<b>45</b>	<b>44</b>	<b>49</b>	<b>42</b>	<b>18</b>
Involving passenger trains	24	20	31	26	14
Collisions between trains	1	4	6	4	1
Derailments	11	3	3	8	5
Collisions with road vehicles (not at LC)	2	5	0	2	0
Collisions with road vehicles (at LC)	9	7	18	12	5
Striking buffer stops	1	1	4	0	2
Struck by large falling object	0	0	0	0	1
Not involving passenger trains	21	24	18	16	4
Collisions between trains	1	1	0	0	1
Derailments	15	18	13	12	3
Collisions with road vehicles (not at LC)	1	3	2	2	0
Collisions with road vehicles (at LC)	4	1	3	2	0
Striking buffer stops	0	1	0	0	0
Struck by large falling object	0	0	0	0	0
<b>Non-PHRTA train accidents</b>	<b>780</b>	<b>739</b>	<b>648</b>	<b>539</b>	<b>505</b>
Involving passenger trains	665	621	552	471	443
Open door collisions	2	3	3	1	0
Roll back collisions	4	3	2	4	4
Striking animals	126	112	116	144	169
Struck by missiles	221	225	198	141	90
Train fires	136	87	73	69	57
Striking level crossing gates/barriers	3	4	6	2	7
Striking other objects	173	187	154	110	116
Not involving passenger trains	115	118	96	68	62
Open door collisions	0	0	0	1	0
Roll back collisions	0	0	0	0	2
Striking animals	13	14	12	16	21
Struck by missiles	63	60	46	22	8
Train fires	11	9	11	6	9
Striking level crossing gates/barriers	1	4	2	5	1
Striking other objects	27	31	25	18	21
<b>PIM index (at year end)</b>	<b>57.2</b>	<b>54.0</b>	<b>49.5</b>	<b>44.0</b>	<b>50.4</b>
Infrastructure failures	11.5	10.6	8.5	7.8	7.1
Irregular working	8.7	7.8	7.0	6.4	9.5
Public behaviour at level crossings	21.0	20.1	23.4	19.9	22.2
Objects on the line	5.0	5.2	2.6	2.5	2.3
Signals passed at danger	7.9	8.1	6.5	5.6	6.5
Trains and rolling stock	3.1	2.2	1.5	1.8	2.8

Derailments following collisions with road vehicles at level crossings are counted under the category *Striking road vehicle at level crossing*. Derailments following collisions with road vehicles at other locations are counted under the category *Derailments*.

## Key safety facts

### Train accident precursors

<b>Train accident precursors</b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>	<b>2009/10</b>	<b>2010/11</b>
<b>Infrastructure failures</b>					
Environment: adhesion	93	80	137	104	184
Environment: flooding	62	138	108	105	39
Environment: landslips	27	37	31	34	11
Level crossing failures	2636	2376	2238	2017	1579
Other structural failures	80	74	66	51	92
Track: broken rails	192	182	164	154	171
Track: buckled rails	85	4	17	27	29
Track: level 2 exceedences per mile	0.80	0.81	0.68	0.72	0.71
Wrightsiding signalling failures	589	595	827	772	786
<b>Irregular working</b>					
Runaway trains	13	7	4	9	6
Train speeding	73	113	73	213	145
Objects foul of the line	-	-	184	152	198
Track management/maintenance issues	-	-	156	112	103
Irregular working affecting level crossings	-	-	92	81	90
Misrouting	-	-	2345	2207	2087
Other signaller errors	-	-	86	62	91
<b>Level crossing incidents</b>					
Near misses with road vehicles	191	170	197	159	149
<b>Objects on the line</b>					
Trains striking objects blown onto the line	278	237	207	215	122
Trains striking objects due to vandalism	71	46	36	26	31
Animals on the line (including train strikes)	2390	1923	1857	1300	1527
Road vehicle incursions	77	87	66	50	60
<b>Category A SPADs</b>					
Total number of cat A SPADs	334	349	292	275	299
Risk ranked 20+	18	21	17	19	17
Risk ranked 16+	106	93	89	81	87
<b>Trains and rolling stock</b>					
Brakes	49	13	8	5	23
Hot axle boxes	888	636	730	664	396
Fires due to rolling stock failures	74	58	49	47	52
Fires due to vandalism	65	35	29	21	8
Other rolling stock failures	88	67	30	34	56
Other train fires	9	3	8	7	5
<b>Dangerous goods incidents</b>					
All incidents involving dangerous goods trains	128	163	164	169	97
Confirmed dangerous goods incidents	96	142	125	150	79

# Key safety facts

## Passengers

<b>Passengers</b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>	<b>2009/10</b>	<b>2010/11</b>
<b>Fatalities</b>	<b>9</b>	<b>7</b>	<b>5</b>	<b>5</b>	<b>8</b>
Train accidents	1	0	0	0	0
Slips, trips, and falls	2	1	2	1	2
Platform-train interface	4	3	3	4	5
Assault and abuse	1	1	0	0	1
On-board injuries	0	0	0	0	0
Contact with object or person	0	0	0	0	0
Struck by train on station crossing	1	2	0	0	0
Other type of passenger injury	0	0	0	0	0
<b>Major injuries</b>	<b>246</b>	<b>225</b>	<b>234</b>	<b>235</b>	<b>240</b>
Train accidents	29	0	0	3	6
Slips, trips, and falls	134	142	158	144	146
Platform-train interface	39	41	40	42	43
Assault and abuse	7	10	6	9	10
On-board injuries	30	22	24	29	29
Contact with object or person	7	9	4	7	4
Struck by train on station crossing	0	1	0	0	0
Other type of passenger injury	0	0	2	1	2
<b>Minor injuries</b>	<b>4888</b>	<b>5028</b>	<b>5237</b>	<b>5280</b>	<b>5555</b>
RIDDOR reportable	1140	1103	1118	1168	1201
Non-RIDDOR reportable	3748	3925	4119	4112	4354
<b>Incidents of shock</b>	<b>322</b>	<b>330</b>	<b>260</b>	<b>205</b>	<b>227</b>
Class 1	10	13	5	3	7
Class 2	312	317	255	202	220
<b>Fatalities and weighted injuries</b>	<b>43.41</b>	<b>39.32</b>	<b>38.39</b>	<b>38.67</b>	<b>42.61</b>
Train accidents	4.28	0.12	0.03	0.39	0.72
Slips, trips, and falls	20.77	20.90	23.55	21.11	22.47
Platform-train interface	9.64	8.98	8.98	10.37	11.60
Assault and abuse	2.08	2.29	0.84	1.19	2.29
On-board injuries	4.38	3.37	3.68	4.13	4.12
Contact with object or person	1.22	1.51	1.05	1.35	1.14
Struck by train on station crossing	1.00	2.10	0.00	0.00	0.01
Other type of passenger injury	0.04	0.05	0.26	0.13	0.27
<b>Passenger kms (billions)</b>	<b>46.2</b>	<b>48.9</b>	<b>50.8</b>	<b>51.4</b>	<b>54.5</b>
<b>Passenger journeys (millions)</b>	<b>1145</b>	<b>1218</b>	<b>1267</b>	<b>1259</b>	<b>1355</b>

Incidents of passenger trespass, suspected and attempted suicide are analysed under public risk and counted in the key safety fact sheet for members of the public.

## Key safety facts

### Workforce

<b>Workforce</b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>	<b>2009/10</b>	<b>2010/11</b>
<b>Fatalities</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>1</b>
Infrastructure worker	0	2	2	3	1
Train driver	1	0	0	0	0
Other on-board train crew	0	0	0	0	0
Station staff	0	0	0	0	0
Revenue protection	0	0	0	0	0
Other workforce	1	0	1	0	0
<b>Major injuries</b>	<b>128</b>	<b>138</b>	<b>130</b>	<b>122</b>	<b>122</b>
Infrastructure worker	76	73	78	73	73
Train driver	7	19	6	10	12
Other on-board train crew	20	17	19	18	11
Station staff	13	14	9	8	8
Revenue protection	4	2	2	4	5
Other workforce	8	13	16	9	13
<b>Minor injuries</b>	<b>6202</b>	<b>5663</b>	<b>5455</b>	<b>5305</b>	<b>5335</b>
RIDDOR-reportable	711	566	589	555	571
Non RIDDOR-reportable	5491	5097	4866	4750	4764
<b>Incidents of shock</b>	<b>1450</b>	<b>1422</b>	<b>1335</b>	<b>1140</b>	<b>1101</b>
Class 1	264	219	223	273	255
Class 2	1186	1203	1112	867	846
<b>Total FWI</b>	<b>26.35</b>	<b>26.03</b>	<b>26.04</b>	<b>24.96</b>	<b>22.94</b>
Infrastructure worker	9.65	11.02	11.44	11.95	10.14
Train driver	3.79	3.94	2.62	2.99	3.19
Other on-board train crew	6.38	5.33	5.52	5.39	4.64
Station staff	3.00	3.02	2.42	2.18	2.12
Revenue protection	1.12	0.96	0.94	1.06	1.12
Other workforce	2.42	1.77	3.10	1.39	1.72

## Key safety facts

### Public

Public	2006/07	2007/08	2008/09	2009/10	2010/11
<b>Trespass</b>					
Fatalities	45	50	46	50	27
Major injuries	38	30	33	20	16
Minor injuries	33	25	20	34	29
Shock/trauma	1	0	1	0	0
<b>Total trespass FWI</b>	<b>48.91</b>	<b>53.09</b>	<b>49.38</b>	<b>52.13</b>	<b>28.71</b>
<b>Level crossings</b>					
Fatalities	9	8	12	11	4
Major injuries	8	4	9	7	5
Minor injuries	34	18	19	24	19
Shock/trauma	0	1	3	2	1
<b>Total level crossings FWI</b>	<b>9.89</b>	<b>8.44</b>	<b>12.97</b>	<b>11.75</b>	<b>4.56</b>
<b>Non-trespass non-LX</b>					
Fatalities	3	1	1	1	0
Major injuries	11	11	13	13	12
Minor injuries	92	97	87	128	137
Shock/trauma	2	6	3	1	2
<b>Total non-trespass non-LX FWI</b>	<b>4.29</b>	<b>2.33</b>	<b>2.51</b>	<b>2.55</b>	<b>1.54</b>
<b>Total public accidental FWI</b>					
Fatalities	57	59	59	62	31
Major injuries	5.70	4.50	5.50	3.90	3.30
Minor injuries	0.39	0.34	0.34	0.41	0.49
Shock/trauma	0.00	0.01	0.02	0.01	0.01
<b>Total accidental FWI</b>	<b>63.09</b>	<b>63.86</b>	<b>64.86</b>	<b>66.33</b>	<b>34.80</b>
<b>Suicide</b>					
Fatalities	225	208	218	233	208
Major injuries	33	27	34	25	36
Minor injuries	9	9	18	13	15
Shock/trauma	1	0	0	1	0
<b>Total suicide FWI</b>	<b>228.34</b>	<b>210.74</b>	<b>220.48</b>	<b>235.57</b>	<b>210.67</b>

# Key safety facts

## Road-rail interface

Road-rail interface	2006/07	2007/08	2008/09	2009/10	2010/11
<b>Fatalities at LC (level crossings)</b>	<b>10</b>	<b>10</b>	<b>12</b>	<b>11</b>	<b>4</b>
<b>Pedestrians</b>	<b>7</b>	<b>10</b>	<b>10</b>	<b>6</b>	<b>4</b>
Passenger on station crossing	1	2	0	0	0
Member of public	6	8	10	6	4
<b>Road vehicle occupants</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>5</b>	<b>0</b>
<b>Train occupants</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Passenger on train	0	0	0	0	0
Workforce on train	0	0	0	0	0
<b>Weighted injuries at LC</b>	<b>0.99</b>	<b>0.82</b>	<b>1.18</b>	<b>0.99</b>	<b>1.18</b>
<b>Pedestrians</b>	<b>0.85</b>	<b>0.50</b>	<b>0.92</b>	<b>0.72</b>	<b>0.50</b>
<b>Road vehicle occupants</b>	<b>0.10</b>	<b>0.21</b>	<b>0.21</b>	<b>0.21</b>	<b>0.10</b>
<b>Train occupants</b>	<b>0.05</b>	<b>0.12</b>	<b>0.05</b>	<b>0.06</b>	<b>0.59</b>
<b>Suicide and attempted suicide</b>					
<b>Suicide</b>	<b>22</b>	<b>20</b>	<b>23</b>	<b>35</b>	<b>28</b>
<b>Attempted suicide</b>	<b>0.00</b>	<b>0.10</b>	<b>0.11</b>	<b>0.13</b>	<b>0.21</b>
<b>Collisions with road vehicles at LC</b>	<b>13</b>	<b>8</b>	<b>21</b>	<b>14</b>	<b>5</b>
Resulting in derailment	0	0	0	0	1
<b>Collisions with gates or barriers at LC</b>	<b>4</b>	<b>8</b>	<b>8</b>	<b>7</b>	<b>8</b>
Gates	3	6	6	7	6
Barriers	1	2	2	0	2
<b>Reported near misses</b>	<b>361</b>	<b>382</b>	<b>437</b>	<b>403</b>	<b>460</b>
With pedestrians	174	212	242	247	312
With road vehicles	187	170	195	156	148
<b>Reported incidents of crossing misuse</b>	<b>2545</b>	<b>2290</b>	<b>3023</b>	<b>2549</b>	<b>2967</b>
With pedestrians	1008	860	866	921	1393
With road vehicles	1537	1430	2157	1628	1574
<b>Vehicle incursions</b>	<b>77</b>	<b>87</b>	<b>66</b>	<b>50</b>	<b>60</b>
Via fences	48	40	31	27	30
Via bridges	2	3	3	1	2
Via level crossings	15	21	20	17	24
Via access points	12	23	12	5	4
Number foul of the track	36	59	34	31	33
Number struck by trains	4	8	3	5	0
Train struck by falling vehicle	0	0	0	0	1
<b>Bridge strikes</b>	<b>2200</b>	<b>2351</b>	<b>1908</b>	<b>1631</b>	<b>1782</b>
Underline (rail over road)	2042	2176	1736	1456	1609
Serious	4	7	11	2	3
Overline (road over rail)	132	149	119	117	105
Serious	9	5	1	7	4
Other	26	26	53	58	68
Serious	0	0	0	0	1

## Definitions and scope

**Scope.** The report relates to the mainline railway in Great Britain. The analysis covers events that take place on trains, in mainline stations and on Network Rail managed infrastructure (such as the track and the area around it). Workforce fatalities in depots, yards and sidings are included, but other incidents in these locations are not. Suicides, suspected suicides and attempted suicides are generally excluded from the statistics presented in the charts in this booklet.

**Person type.** A person working for a company in the rail industry, either as a contractor or a direct employee, is classed as a **member of the workforce** while they are on duty. Someone on a train or in a station in connection with a journey they have just made, or are about to undertake, is a **passenger**. Anyone else is a **member of the public**.

**Injury degree.** Injuries that involve serious harm, such as a loss of consciousness or a broken limb, are classed as **major injuries**, as is any injury that requires attendance at hospital for over 24 hours. Other physical injuries are classed as **minor injuries**. The railway measures overall harm in terms of **fatalities and weighted injuries (FWI)**. See page 36 for more information.

**Data sources.** Most of the statistics presented in this report are derived from the rail industry's Safety Management Information System (SMIS), and usually cover the ten-year period from 2001/02 to 2010/11. The charts showing the risk profile are based on the industry's Safety Risk Model (SRM). Data sources are referenced in the relevant charts.

## Fatalities and weighted injuries

The table shows the number of each injury type that is deemed to be 'statistically equivalent' to one fatality. The weightings direct safety expenditure towards those incidents and accidents that lead to the highest levels of risk without ignoring the types of incident that typically have less severe outcomes.

### Injury degrees and weightings

Injury degree	Definition	Ratio
Fatality	Death occurs within one year of the accident.	1
Major injury	Injuries to passengers, staff or members of the public as defined in schedule 1 to RIDDOR 1995. This includes losing consciousness, most fractures, major dislocations and loss of sight (temporary or permanent) and other injuries that resulted in hospital attendance for more than 24 hours.	10
RIDDOR-reportable minor injury	A physical injury to a passenger, staff or member of the public that is neither a fatality nor a major injury. Minor injuries to the workforce are RIDDOR-reportable if the injured person is incapacitated for work for more than three consecutive days. Minor injuries to the passengers and public are RIDDOR-reportable if the injured person was taken from the accident site to hospital.	200
Non RIDDOR-reportable minor injury	All other physical injuries.	1000
Class 1 shock / trauma	Shock or trauma resulting from being involved in or witnessing events that have serious potential for a fatal outcome eg train accidents such as collisions and derailments, or personal accidents involving being struck by train.	200
Class 2 shock / trauma	Shock or trauma resulting from other causes, such as verbal abuse and near misses, or personal accidents with a typically non-fatal outcome.	1000

RIDDOR refers to the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995: a set of health and safety regulations that mandates the reporting of, inter alia, work-related accidents.

## Further information

For further information on safety performance, readers are referred to the full version of the ASPR, which is available from the RSSB website. RSSB also produces a range of topic-specific safety performance reports, which are also available from its website:

[www.rssb.co.uk](http://www.rssb.co.uk)

To discuss any of the information in this Key Facts and Figures booklet, the full version of the ASPR, or other RSSB safety performance analyses, contact:

**Liz Davies**

Safety Intelligence Strategy Manager

020 3142 5475

[liz.davies@rssb.co.uk](mailto:liz.davies@rssb.co.uk)

For information or queries about RSSB in general, contact:

**RSSB enquiry desk**

020 3142 5400

[enquirydesk@rssb.co.uk](mailto:enquirydesk@rssb.co.uk)

RSSB Block 2 Angel Square 1 Torrens Street London EC1V 1NY  
[www.rssb.co.uk](http://www.rssb.co.uk)

