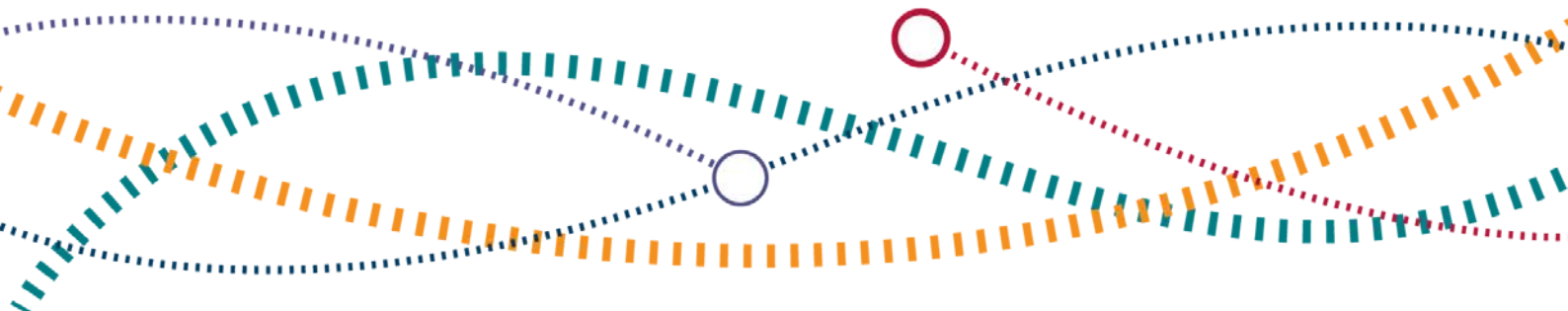




# Rail Safety: Quality and Methodology Report

September 2020



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# Introduction

This is a report on the quality of the annual rail safety statistical release and associated data tables. It helps users to understand the quality of our statistics, and also ensures ORR is compliant with the three quality principles in [the Code of Practice for Official Statistics](#) - Q1: Suitable data sources, Q2: Sound methods, and Q3: Assured quality. This report also provides information on the methodology and data sources used to produce the statistics.

This report covers the following areas:

- Methodology and definitions – detail on the various data sources, methodology used to compile the statistics, definitions and changes to data previously published;
- Historic background – a background to rail safety statistics and details of any changes throughout the time series;
- Relevance to users – the users of the statistics, and our engagement;
- Accuracy and reliability – the accuracy, data coverage and quality assurance of the statistics;
- Timeliness and punctuality – our timescales for the production, quality assurance and publication of the statistics;
- Accessibility and clarity – the format of our statistics and where they can be found;
- Coherence and comparability – similar statistics published elsewhere and the degree in which the statistics can be compared over time.

Rail safety statistics is an annual release, covering safety data on the mainline, London Underground, and trams, metros and other non-Network Rail networks. This provides a comprehensive overview of safety on rail networks across Great Britain.

# Methodology and definitions

The data contained within the release and the data tables are sourced from:

- RSSB's Safety Management Information System (SMIS) – the industry's national database for recording safety related events that occur on Great Britain's mainline rail network
- London Underground's Safety and Environmental Analysis (LUSEA) – records information on all safety related incidents on the London Underground network.
- Office of Rail and Road (ORR) Webform – records safety incidents which occur on non-mainline railways including trams, metros, other light rail, and minor and heritage railways in Great Britain.
- British Transport Police (BTP) – they collect statistics on assaults to passengers and members of the public.

The rail safety release covers the following areas:

- **Fatalities and injuries** – the number of incidents for non-workforce in stations or on trains on the mainline. It also covers fatalities and injuries to passengers and members of the public on London Underground or trams, metros and other non-Network Rail networks. Shock and trauma incidents are included in this data.
- **Workforce safety** – the number of fatalities and injuries by severity and worker type.
- **Public safety** – the number of public fatalities (including suicides and suspected suicides) and injuries by severity and person category type.
- **Level crossings** – the number of fatalities at level crossings, and near miss incidents by user (pedestrian or road vehicle).
- **Passenger and public assaults** – the number and type of assaults to passengers and members of the public on mainline and London Underground.
- **Train accidents** – the number of train accidents by type and severity

## Definitions

More information on definitions is available in Appendix 2 of RSSB's [Data transparency document](#).

- The **mainline rail network** is owned and operated by Network Rail. This includes over 20,000 miles of track and over 6,000 level crossings. There are more than 2,500 mainline stations in Great Britain.
- **London Underground** (also known as the Tube) is operated by London Underground Limited, which is owned by Transport for London. It has 11 lines covering over 400 km and serves 270 stations.
- **Light rail** is an urban transportation system that generally uses electrically powered rail guided vehicles along exclusive rights-of-way at ground level, on raised structures, in tunnels, and in streets. **Tramways** are a specific type of light rail system that have a significant element of the system operating in a highway environment or other public space.  
The light rail and tramways operating in Great Britain are:
  - Blackpool Tramway
  - Docklands Light Railway
  - Edinburgh Trams
  - London Tramlink
  - Manchester Metrolink
  - Nottingham Express Transit
  - Sheffield Supertram
  - Tyne and Wear Metro
  - West Midland Metro
- **Minor and heritage railways** are railways which are 'lines of local interest', museum railways or tourist railways that preserve, re-create or simulate railways of the past. This includes any that demonstrate or operate historic or special types of motion power or rolling stock. There are over 200 such railways operating in Great Britain.
- **A passenger** is defined as a person on railway infrastructure who either: intends to travel, is in the process of travelling, or has travelled. This is regardless of whether they have a valid ticket.
- **Members of the public** are defined as neither passengers nor workforce. It includes people who trespass, or who commit (or attempt to commit) suicide. It also includes people using public spaces such as roads, where trams may operate.

- **Workforce** is defined as a person working for the industry on railway activities, either as a direct employee or under contract.
- **Non-workforce** are defined as people who are not part of the rail workforce. Data for the mainline comes from RSSB, who were not able to reliably differentiate between passengers and members of the public for some incidents. Passenger and public incidents that took place on mainline trains or in stations are combined together into non-workforce incidents. This category only applies to mainline, as incidents are divided into passenger and public for London Underground, and trams, metro and non-Network Rail networks.
- **A trespasser** is defined as someone who accesses prohibited areas of the railway, and their actions are due to deliberate or risk-taking behaviour. Examples include deliberately alighting a train in service, going down to the track from the platform to retrieve a dropped item, or taking a short cut across a railway through a gap in a railway boundary fence. People who make errors or violations at level crossings are not included in this category.
- **A level crossing** is where a railway line is crossed by a road or right of way on the level, this means without the use of a tunnel or a bridge. **Active crossings** warn road vehicles or pedestrians of approaching trains through closure of gates or barriers, and/or warning lights or alarms. **Passive crossings** do not give warnings of approaching trains, or the only warning is the use of the train's horn. The responsibility is with the road vehicle user or pedestrian to determine whether it is safe or not to cross.
- A **near miss at a level crossing** can be either a near miss between a train and a person or road vehicle at a level crossing, or any emergency brake application of a train or rail vehicle to avoid striking a person or road vehicle.
- A **platform-train interface** incident can be classed as two types: **boarding/alighting**, where an incident occurs whilst getting on or off a train or **not boarding/alighting**, where an incident involves falling from the platform (with or without a train present) or contact with train or traction supply at the platform edge.
- **Slips, trips, and falls** are generally defined as a fall of less than 2 metres anywhere (except on trains), and falls of any height down stairs or escalators.
- **Assault and abuse** includes all types of assault, verbal abuse and threat. It also includes unlawful killing, murder or manslaughter or lawful killing in self-defence. For further detail on assault offences please see [Sentencing Council website](#)
- **Contact with object** covers any injury that involved contact with objects, not covered by another category. **Contact with person** covers injuries due to bumping into, or being bumped into, by other people. This excludes assaults.

- **Awkward body movement** are strains and sprains due to lifting or moving objects, or awkward movement. This excludes injuries to dropping items being carried (classed as contact with object).
- **A PHRTA** is a Potentially Higher Risk Train Accident. These are RIDDOR reportable accidents and are those that have the greatest risk of resulting in physical injuries. Train accidents which have a lower potential for serious consequences are known as **non-PHRTAs**.

## Revisions to data previously published

The rail safety release for 2019-20 and the accompanying data tables include revisions to data previously published. Reasons for changes to data could include late reporting, late reporting, changes as a result of further investigations into incidents, or the development of injuries sustained in previously reported incidents.

The following data in the 2019-20 release and data tables has been revised:

- Data on All fatalities and injuries (Table 5200) on the mainline has been revised from 2015-16 to 2018-19.
- Data on Road rail interface fatalities (Table 5204) on the mainline has been revised for suicide figures from 2017-18 to 2018-19.
- Data on Passenger and public assault (Table 5206) on the mainline has been revised for all categories from 2015-16 to 2018-19.
- Data on Workforce fatalities and injuries (Table 5206) on the mainline has been revised from 2015-16 to 2018-19.
- Data on Public fatalities and injuries (Table 5220) on the mainline has been revised from 2016-17 to 2018-19.
- Data on Passenger fatalities and injuries (Table 5230) on the mainline has been revised from 2016-17 to 2018-19.
- Data on Road rail interface bridge strikes (Table 5240) on the mainline has been revised for bridge strikes from 2015-16 to 2018-19.
- Data on road rail interface near miss and misuse incidents (Table 5244) has been revised for misuse categories from 2016-17 to 2018-19.
- Data on Broken rails and buckled rails (Table 5250) has been revised for broken rails on the mainline for 2018-19.
- Data on Train accidents by severity (Table 5260) on the mainline has been revised from 2016-17 to 2018-19.

Details of the revisions to each table are available in the [revisions log](#). Further information on revisions and data series breaks can also be found in the data tables.

# Historical background

**1840** – Railway Inspectorate established with responsibility of overseeing the safety of British Railways and Tramways

**1900** – Railway Inspectorate given powers to investigate accidents to staff

**1990** – Railway Inspectorate becomes part of Health & Safety Executive (HSE)

**2006** – Railway Inspectorate becomes part of Office of Rail Regulation (ORR) and re-named Her Majesty's Railway Inspectorate (HMRI)

**2009** – Renamed the Railway Safety Directorate (RSD)

**2015** – Office of Rail Regulation renamed Office of Rail and Road

Railway operators have a statutory requirement to report accidents to ORR, and since 1946 the Railway Inspectorate has published statistical data and key events on an annual basis. Between 1946 and 1991 this was published by calendar year, but since 1991 data has been published by financial year.

In addition to the reporting of accidents, those in the railway industry are subject to the Reporting of Injuries, Disease and Dangerous Occurrences Regulations (RIDDOR). The latest version of this legislation was laid before parliament in June 2013 coming into force on 1 October 2013. RIDDOR, which replaced the Notification of Accidents and Dangerous Occurrences Regulations (1980) in 1985, is the instrument which regulates the statutory obligation to report deaths, injuries, diseases and dangerous occurrences that take place at work or in connection with work.

For details of the types of accidents and incidents that are required to be reported, and how they can be reported please see the [ORR webpage Reporting RIDDOR incidents](#).

For more detail on the types of injuries, disease and dangerous occurrences covered by RIDDOR please see the [HSE website](#).



# Relevance

The degree to which the statistical product meets the user needs in both coverage and content.

Rail safety statistics are key measures of safety on the mainline, London Underground and non-mainline rail networks in Great Britain. This helps provide a comprehensive set of safety statistics. The safety of all users and those working in the rail industry is a top priority for the industry, and these statistics help provide one measure of the success of achieving a safe railway.

More detailed information on users of ORR statistics and meeting the needs of users is available on our [user engagement webpage](#).

# Accuracy and reliability

The proximity between an estimate and the unknown true value.

## Mainline safety data under-reporting

RSSB provide mainline data from their Safety Management Information System (SMIS). For 2019-20 RSSB are working with Govia Thameslink Railway (GTR) to enhance data capture for lower risk events that are not reportable under RIDDOR.

An adjustment factor has been applied to the national injury and weighted injury figures for 2019-20 to include the estimated numbers of such events that GTR had not yet recorded in SMIS. Some discrepancies will exist whilst RSSB and GTR work together to ensure the data is fully captured.

## Changes to terms used and definitions

In previous publications of these statistics, the numbers of mainline incidents involving passengers (people using the rail network with intent to travel) and other members of the public were presented in two separate categories. For 2019-20 data, for some incidents it was not possible for RSSB to differentiate reliably between these two groups.

Due to this, the number of mainline public and passenger (non-workforce) incidents occurring on trains or in stations have now been combined. Public incidents that occurred elsewhere on the network, for example involving trespassers, continue to be categorised separately.

There were changes to the definition of RIDDOR reportable minor injuries which came into operation from April 6th 2012 which has resulted in a reduction in comparability between minor injuries data recorded before and after this date. Before 6th April 2012 RIDDOR reportable minor injuries were reportable if the injured person was incapacitated for work for more than three consecutive days, after which it changed to seven consecutive days.

## Data coverage

It is mandatory for all infrastructure managers and railway undertakings operating on Network Rail managed infrastructure, London Underground and non-mainline networks to report all health and safety incidents to ORR who have the responsibility of overseeing the safety of Britain's railways and tramways.

## Quality assurance

RIDDOR 2013 provides clear classifications and definitions of the categories of incidents. Incidents reported through the LUSEA and ORR webform are therefore adjusted to ensure that they comply with the categories defined by RIDDOR and there is consistency between the three data sources. The data received from the three sources is subject to a quality assurance process carried out by ORR.

Variance between an estimate and the unknown true value could occur where reportable incidents have not been reported or reported within the incorrect RIDDOR classification. Reasons for such incorrect reporting could include a lack of adequate training by those responsible for reporting incidents or staff involved in incidents not reporting them to those responsible for RIDDOR submissions.

All data received from London Underground, RSSB and BTP are subject to a series of quality assurance checks before publication. We check the data are provided in the correct format, there are no inconsistencies and that trends over time are similar, to ensure accurate data are published.

RSSB also undertake exercises to improve data quality in SMIS. The current system was launched in March 2017, and users now have over three years experiences of using the new system. RSSB has worked on improving user guidance, and have a data quality programme to continuously monitor and enhance the quality of the information recorded. RSSB also manually validate high-risk events, which covers fatalities, major injuries, SPADs and potentially high risk train accidents.

In January 2011 RSSB published an independent review of RIDDOR reporting by Network Rail, its contractors and London Underground which concluded that there had been a significant level of under-reporting of RIDDOR minor injuries by Network Rail staff and its contractor companies between 2005/06 and 2009/10. RSSB estimated that 500 to 600 RIDDOR minor injuries may not have been reported by Network Rail Infrastructure Projects and Maintenance teams over the five year period between 2005/06 and 2009/10. This estimate represents a range of 37% to 42% under reporting for RIDDOR minor injuries. The report also concluded that there had been some under reporting of major injuries to ORR. Improvement schemes implemented since the publication of the report should have helped to decrease the level of under reporting identified by the review.

# Timeliness and punctuality

Timeliness refers to the time gap between publication and the reference period.  
Punctuality refers to the gap between planned and actual publication dates.

Rail safety data is typically available on the ORR data portal within six months of the financial year ending, and annual data is published in September.

The [publication schedule](#) available on the data portal outlines the publication dates for National Statistics quarterly and annual statistical releases and other official statistics up to 12 months in advance.

ORR is committed to releasing its statistics in an open and transparent manner that promotes confidence.

# Accessibility and clarity

Accessibility is the ease with which users are able to access the data, also reflecting the format in which the data are available and the availability of supporting information. Clarity refers to the quality and sufficiency of the metadata, illustrations and accompanying advice.

All rail statistics data tables can be accessed free of charge on the [ORR Data Portal](#). Commentary about the statistics and trends are provided in the statistical releases. An interactive chart (PowerBI) is available on the [Rail safety theme page](#).

The rail safety data tables currently published on the data portal are:

## Fatalities and injuries

- All fatalities and injuries – Table 5200
- Passenger and public assault –Table 5206
- Workforce fatalities and injuries –Table 5210
- Public fatalities and injuries – Table 5220
- Passenger fatalities and injuries – Table 5230

## Level crossings

- Road rail interface fatalities –Table 5204
- Road rail interface bridge strikes – Table 5240
- Road rail interface near miss and misuse incidents – Table 5244
- Road rail interface collisions – Table 5245

## Train accidents

- Train accidents by severity –Table 5260
- Train accidents with passenger or workforce fatalities – Table 5265

## Other tables

- Broken rails and buckled rails –Table 5250
- Signals passed at Danger (SPADs) quarterly – Table 5255

For further information about these statistics please contact the Information & Analysis team at [rail.stats@orr.gov.uk](mailto:rail.stats@orr.gov.uk)

# Coherence and comparability

Coherence is the degree to which data that are derived from different sources or methods, but refer to the same topic, are similar. Comparability is the degree to which data can be compared over time and domain.

Rail safety statistics for the mainline network and London Underground are comparable to data published on the RSSB website and by Transport for London (TfL). Occasionally differences may occur as there may have been updates to incident records between publication dates. Reasons for such changes could include late reporting, changes as a result of further investigations into incidents or the development of injuries sustained in previously reported incidents.

One example where data can be revised is when the coroner has reported a verdict relating to a railway fatality. A previous record may need to be updated to reflect the fatality classification as either accidental, suicide or suspected suicide. For more information on the criteria and how railway fatalities are classified, please see RSSB's [Data transparency document](#).

To ensure the highest achievable levels of coherence and comparability between the three data sources (SMIS, LUSEA and ORR Webform), as part of the quality assurance process, data received from London Underground (LUSEA) and the ORR Webform is adjusted to ensure that it is compliant with RIDDOR classifications.

The standardisation of incident reporting through RIDDOR classification provides comparability between the statistics published in this statistical release and those published by other industries based on RIDDOR. These statistics can be found on the Health and Safety Executive website. Other related reports and data are:

- RSSB – [Annual Health and Safety Report 2019/20](#). RSSB have also published 14 topic-specific reports, which look at priority risk areas
- Office of Rail and Road – [Annual Health and Safety Report](#)
- Transport for London – [Safety, Health and Environment Report 2019/20](#)
- Transport for London – [Crime and Incident bulletins](#)
- British Transport Police – [Annual statistical bulletins](#)
- Health and Safety Executive (HSE) – [Health & Safety Statistics data](#)

## Length of comparable time series

Measures	Network	Start of time series	Any break in series
<b>Fatalities and injuries</b>			
All fatalities and injuries	Mainline	2002-03	Between 2006-07 and 2007-08
	London Underground	2001-02	Between 2007-08 and 2008-09
	Trams, metros and other non-Network Rail networks	2005-06	<i>None</i>
Passenger and public assault	Mainline	2004-05	<i>None</i>
	London Underground	2004-05	Between 2008-09 and 2009-10
	Trams, metros and other non-Network Rail networks	<i>N/A</i>	<i>N/A</i>
Workforce fatalities and injuries	Mainline	2002-03	Between 2006-07 and 2007-08
	London Underground	2001-02	Between 2007-08 and 2008-09
	Trams, metros and other non-Network Rail networks	2005-06	<i>None</i>
Public fatalities and injuries	Mainline	2002-03	Between 2006-07 and 2007-08
	London Underground	2001-02	<i>None</i>
	Trams, metros and other non-Network Rail networks	2005-06	<i>None</i>
Passenger fatalities and injuries	Mainline	2002-03	Between 2006-07 and 2007-08
	London Underground	2001-02	<i>None</i>
	Trams, metros and other non-Network Rail networks	2005-06	<i>None</i>
<b>Level crossings - Road rail interface</b>			
Fatalities	Mainline	2002-03	<i>None</i>
	London Underground	2001-02	<i>None</i>
	Trams, metros and other non-Network Rail networks	2005-06	<i>None</i>
Bridge strikes	Mainline	2002-03	<i>None</i>
	London Underground	2001-02	<i>None</i>
	Trams, metros and other non-Network Rail networks	<i>N/A</i>	<i>N/A</i>
Near miss and misuse incidents	Mainline	2002-03	Between 2013-14 and 2014-15
	London Underground	<i>N/A</i>	<i>N/A</i>
	Trams, metros and other non-Network Rail networks	<i>N/A</i>	<i>N/A</i>
Collisions	Mainline	2002-03	<i>None</i>
	London Underground	<i>N/A</i>	<i>N/A</i>
	Trams, metros and other non-Network Rail networks	2005-06	<i>None</i>

Measures	Network	Start of time series	Any break in series
<b>Train accidents</b>			
By severity	Mainline	2002-03	Between 2006-07 and 2007-08
	London Underground	2001-02	<i>None</i>
	Trams, metros and other non-Network Rail networks	2005-06	<i>None</i>
With passenger or workforce fatalities	Mainline	1949-50	<i>None</i>
	London Underground	1950-51	<i>None</i>
	Trams, metros and other non-Network Rail networks	<i>N/A</i>	<i>N/A</i>
<b>Other</b>			
Broken rails and buckled rails	Mainline	2002-03	<i>None</i>
	London Underground	2001-02	<i>None</i>
	Trams, metros and other non-Network Rail networks	<i>N/A</i>	<i>N/A</i>

## European Safety Benchmarking

The UK is required to submit Common Safety Indicators (CSIs) data to the European Union Agency for Railways on an annual basis. The CSIs can be used to assess and benchmark the performance of the UK railway against EU member states. The latest CSIs can be found on the [ERAIL website](#) including the latest [report on rail safety](#) in the EU (2018 calendar year data).

The results of analysis of CSIs submitted for 2010 to 2013 can be found on the ORR website: [Railway safety benchmarking - Safety on the UK's mainline railway network](#) (October 2015).





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