

Rail Safety

Quality and methodology report

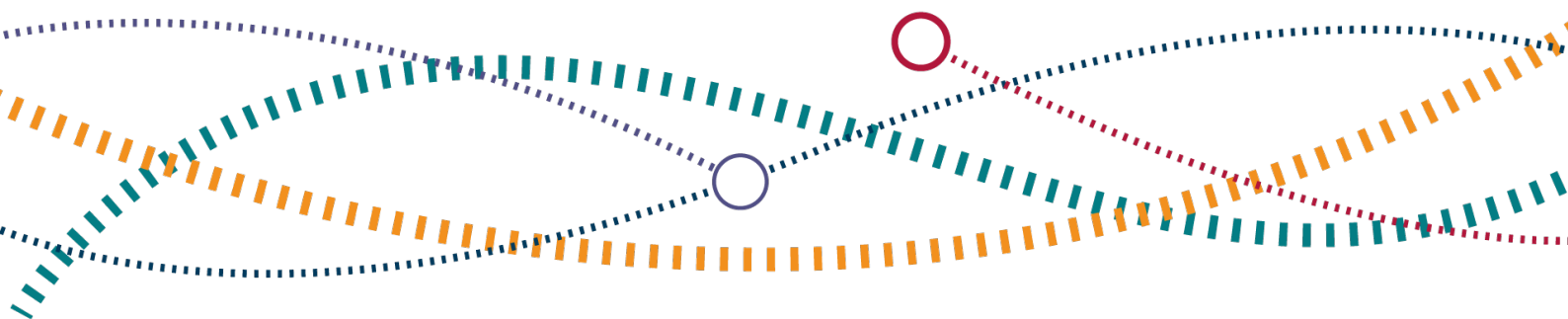
26 September 2024

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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:

- Data sources, methodology and definitions – detail on the various data sources, methodology used to compile the statistics, definitions and changes to data previously published following an external review in 2022;
- 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 rail, London Underground, and other non-mainline networks (trams, metros, other light rail, minor and heritage railways). This provides a comprehensive overview of safety on rail networks across Great Britain.

Data sources, 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. High Speed 1 Limited (HS1 Ltd) and Core Valley Lines infrastructure safety incidents are also included.
- London Underground's safety, health and environment reporting system – 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:

- **Overall harm** – the number of fatalities and injuries for workforce and non-workforce (passenger or public) on all rail networks. It also includes the number of fatalities and injuries at level crossings.
- **Other non-workforce fatalities** – the number of suicides, trespassing and level crossing fatalities.
- **Non-workforce injuries** – the number of injuries and, shock and trauma incidents for non-workforce (passenger or public) by location of incident and cause of harm on all rail networks. It also includes the number of fatalities at **level crossings**. In addition, it has **passenger and public assaults** (number and type of assaults) on mainline and London Underground.
- **Workforce injuries** – the number of workforce injuries by severity and worker type.
- **Train accidents** – the number of train accidents by type and severity.
- **Signals passed at danger (SPADs)** – the number of SPADs on the mainline.

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 30,000 km of track and over 5,000 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 272 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 using public spaces in and around the station and 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** is defined as people who are not part of the rail workforce. Passenger and public incidents that took place on mainline trains or in stations are combined together into non-workforce incidents.
- **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 **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** include incidents of a person falling, slipping or tripping over an object no matter what the cause or consequence. It includes falls from height, fall from a platform on to track, and falling down the stairs or escalators among others.
- **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 from manual handling e.g. lifting or moving 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**.

Safety statistics review

ORR commissioned a review of the rail safety statistics to improve the quality and comparability of the data in 2022. External consultants engaged with all the data suppliers and proposed a new methodology to improve the comparability and consistency of the statistics across the three data sources by aligning the various categories.

This led to new data being supplied for the April 2021 to March 2022 statistical release, based on the new methodology. RSSB provided most of the back series from April 2002 and LUL from April 2008 onwards except for the financial year April 2016 to March 2017. Data for non-mainline networks is available from April 2016 onwards.

The reporting systems for Transport for London changed during the financial year April 2016 to March 2017. The data in the previous system was incomplete, ceasing part-way through the year and the data in the new system was unreliable during its first year of use while migration was still underway. The April 2016 to March 2017 LUL figures could not be supplied as combining numbers from two different systems would be inappropriate due to the variation in methodology used to calculate the figures. LUL data before April 2016 to March 2017 should not be compared with data after April 2016 to March 2017 due to the change in reporting systems. In some data tables, only the totals are published as there were concerns about the quality of disaggregation.

Revisions

There have been revisions to previously published data. Details of previous revisions can be found in the [Revisions log](#).

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 to users

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.

ORR's last [user survey](#) took place from mid-January to mid-April 2020. The aim of the survey was to gather feedback on ORR's new data portal; this includes statistical releases, data tables and other supplementary material. There were 42 responses to the survey. ORR created an [implementation plan](#) following the 2020 user survey.

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

How these statistics can be used



- Monitoring the number of annual fatalities and injuries on all three rail networks – mainline rail, London Underground and other non-mainline networks in Great Britain
- Comparing the number of suicide or suspected suicide attempts and fatalities over time on mainline rail and London Underground
- Monitoring level crossing incidents over time on mainline and non-mainline networks
- Monitoring the number of train accidents across all three rail networks

How these statistics cannot be used



- Using workforce harm as an indication of occupational health across the rail network (refer to occupational health)
- Assessing performance against safety targets in the rail industry (refer to Common Safety Indicators)
- Estimating the number of suicides or suspected suicides on non-mainline networks
- Comparing safety performance across networks (due to the varying sizes of each network)

Accuracy and reliability

The proximity between an estimate and the unknown true value.

Quality assurance

RIDDOR 2013 provides clear classifications and definitions of the categories of incidents. Incidents reported through the LUL's reporting system 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. RSSB recently completed its sixth formal assessment of SMIS data quality since the introduction of the new system in 2017. The assessment considered core accuracy, timeliness and completeness of the data. The results for the 2023 assessment showed that the industry average for core accuracy has increased to 99.11% and the average timeliness is 8.3 days.

For more information on the data quality programme and associated activities, as well as the ongoing SMIS improvement work, please see the [RSSB SMIS Data Quality webpage](#).

Changes to terms used and definitions

On 21 January 2021, changes were introduced to the way injuries are categorised and weighted. These changes bring injury categories into line with current RIDDOR requirements. They also help to enable objective categorisation of injury severity, to improve the quality of the information on which safety management decisions are informed.

The new injury categories reported are as follows:

- **Fatality** - death occurs within one year of the incident. Fatalities due to natural causes (e.g. heart attack, stroke) when travelling or at the stations are not included in the mainline or non-mainline fatalities data, but they are included in the London Underground fatalities.
- **Specified injury** – the most serious RIDDOR reportable injuries to members of the workforce (previously called workforce major injury).
- **Severe injury** (additional RIDDOR workforce and non-workforce reportable injuries):
 - **Severe over 7-day**: Greater than 7-days lost time due to injury. Injuries to workforce, which are neither fatalities nor specified injuries, and result in the injured person being incapacitated due to that injury from their normal duties for more than seven consecutive calendar days, not including the day of the injury.
 - **Severe Hospital**: An injury to any non-workforce (or workforce off-duty) which occurs on or in connection with the transport system, resulting in that person being taken from the site of the accident to a hospital for treatment, in respect of that injury.
- **Non-severe injury** - All other workforce and non-workforce injuries which are neither fatalities, specified, nor severe injuries.
- **Shock and trauma**: shock or traumatic stress affecting any person who has been involved in, or has been a witness to, an event, and not suffered any physical injury.
 - Shock and trauma 7: greater than 7-day lost time shock or trauma. Any shock and trauma that results in workforce being incapacitated due to shock for their normal duties for more than seven consecutive calendar days, not including the day of the incident.
 - Shock and trauma: Any other workforce shock and trauma and all non-workforce shock and trauma.

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.

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 usually published at the end of September.

The [publication schedule](#) available on the data portal outlines the publication dates for ORR's '[accredited official 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.

Statistics need to be presented in a clear and understandable form. All our rail statistics data tables can be accessed free of charge on our [data portal](#). Commentary about the statistics and trends are provided in the statistical releases. Interactive dashboards (PowerBI) are also available.

Our data portal and its content meet the accessibility standards of the [Public Sector Bodies Website Accessibility Regulations](#). We support our users by providing the information they need in a way that is clear and accessible. Our statistical releases use plain language, and any technical terms, acronyms and definitions are clearly defined and explained when this is appropriate, to ensure that the statistics can be used effectively. Our data tables are available at the highest level of detail that is practical and in accessible formats. All data tables are available in OpenDocument Spreadsheet (.ods) format. We can also provide data in csv format on request.

Please see our [accessibility statement](#) for further details, including any non-accessible content.

Data tables

All tables associated with this release can be found under the Data tables heading at the bottom of the [Rail safety page](#).

Fatalities and injuries

- All fatalities and injuries – Table 5200
- Passenger and public assault –Table 5206
- Workforce harm – Table 5210
- Non-workforce harm by location of incident – Table 5220
- Non-workforce harm by cause – Table 5230
- Fatalities and injuries for trespassers – Table 5270
- Harm caused by suicides or suspected suicides – Table 5275

Level crossings

- Road rail interface fatalities –Table 5204

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

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, LUL's reporting system and ORR Webform), as part of the quality assurance process, data received from London Underground 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 April 2023 to March 2024](#).
- Office of Rail and Road – [Annual Health and Safety Report on Britain's railways, 2023 to 2024](#)
- Transport for London – [Safety, Health and Environment Report April 2023 to March 2024](#)
- Health and Safety Executive (HSE) – [Health & Safety Statistics data](#)

The rail safety data are comparable to the two related publications by RSSB and ORR mentioned above. Occasional differences may occur due to subsequent updates or revisions. Reasons for changes to data could include late reporting, changes as a result of further investigations into incidents, or the development of injuries sustained in previously reported incidents.

European Safety Benchmarking

ORR is required to assess annual safety performance of Great Britain's mainline railways and the achievement of safety targets. This assessment uses a common set of railway safety data, the Common Safety Indicators (CSIs). CSIs can be used to benchmark the performance of GB railways and other European countries. The [latest CSI report for GB for was published](#) by ORR in February 2024.

Length of comparable time series

Fatalities and injuries

Measures	Network	Start of time series	Any break in series
All fatalities and injuries	Mainline	1 April 2002	<i>None</i>
All fatalities and injuries	London Underground	1 April 2008	Between 31 March 2016 and 1 April 2017
All fatalities and injuries	Trams, metros and non-mainline	1 April 2016	<i>None</i>
Passenger and public assault	Mainline	1 April 2004	<i>None</i>
Passenger and public assault	London Underground	1 April 2004	Between 31 March 2009 and 1 April 2009
Passenger and public assault	Trams, metros and non-mainline	<i>N/A</i>	<i>N/A</i>
Workforce harm	Mainline	1 April 2002	<i>None</i>
Workforce harm	London Underground	1 April 2017	<i>None</i>
Workforce harm	Trams, metros and non-mainline	1 April 2016	<i>None</i>
Non-workforce harm by location of incident	Mainline	1 April 2002	<i>None</i>
Non-workforce harm by location of incident	London Underground	1 April 2008	Between 31 March 2016 and 1 April 2017
Non-workforce harm by location of incident	Trams, metros and non-mainline	1 April 2016	<i>None</i>
Non-workforce harm by cause	Mainline	1 April 2002	<i>None</i>
Non-workforce harm by cause	London Underground	1 April 2008	Between 31 March 2016 and 1 April 2017
Non-workforce harm by cause	Trams, metros and non-mainline	1 April 2016	<i>None</i>
Trespassing fatalities and injuries	Mainline	1 April 2002	<i>None</i>
Trespassing fatalities and injuries	London Underground	1 April 2008	Between 31 March 2016 and 1 April 2017
Trespassing fatalities and injuries	Trams, metros and non-mainline	1 April 2016	<i>None</i>
Harm caused by suicides or suspected suicides	Mainline	1 April 2002	<i>None</i>
Harm caused by suicides or suspected suicides	London Underground	1 April 2008	Between 31 March 2016 and 1 April 2017
Harm caused by suicides or suspected suicides	Trams, metros and non-mainline	<i>N/A</i>	<i>N/A</i>

Level crossings - Road rail interface

Measures	Network	Start of time series	Any break in series
Fatalities	Mainline	1 April 2002	<i>None</i>
Fatalities	London Underground	<i>N/A</i>	<i>N/A</i>
Fatalities	Trams, metros and non-mainline	1 April 2016	<i>None</i>

Train accidents

Measures	Network	Start of time series	Any break in series
By severity	Mainline	1 April 2002	<i>None</i>
By severity	London Underground	1 April 2017	<i>None</i>
By severity	Trams, metros and non-mainline	1 April 2016	<i>None</i>
With passenger or workforce fatalities	Mainline	1 April 1945	<i>None</i>
With passenger or workforce fatalities	London Underground	1 April 1950	<i>None</i>
With passenger or workforce fatalities	Trams, metros and non-mainline	<i>N/A</i>	<i>N/A</i>

Other

Measures	Network	Start of time series	Any break in series
Broken rails and buckled rails	Mainline	1 April 2002	<i>None</i>
Broken rails and buckled rails	London Underground	1 April 2008	Between 31 March 2016 and 1 April 2017; Between 31 March 2022 and 1 April 2022
Broken rails and buckled rails	Trams, metros and non-mainline	1 April 2016	<i>None</i>



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