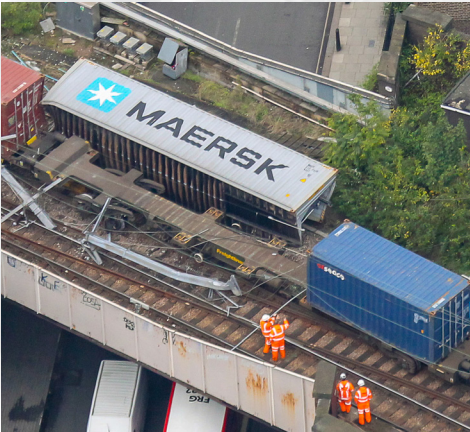




Rail Accident Investigation Branch



Annual Report 2014 Section 1

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This report is published in accordance with:

- the Railway Safety Directive 2004/49/EC;
- the Railways and Transport Safety Act 2003; and
- the Railways (Accident Investigation and Reporting) Regulations 2005.

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This report is published by the Rail Accident Investigation Branch, Department for Transport.

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Preface

Preface

This is the Rail Accident Investigation Branch's (RAIB) Annual Report for the calendar year 2014. It is produced in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005 (SI1992) and also meets the requirement of the European Railway Safety Directive (2004/49/EC).

This legislation can be referred to on the RAIB's website at www.gov.uk/raib.

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RAIB Annual Report 2014



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Any term explained in appendix C is shown in *italics* the first time it appears in the report.

Chief Inspector's Foreword

Chief Inspector's Foreword

This is the Rail Accident Investigation Branch's tenth Annual Report. We, together with the rail industry, and other organisations (which interface with the railways), have learnt much about the safety of the UK's railways since the Branch became operational in 2005; and many important improvements have been driven by the RAIB's recommendations. The extent of implementation of our recommendations in 2014 continues to be high. For those where the Office of Rail and Road (ORR), the safety authority for most rail operations, has informed us of the status¹, all either have been, or are being, implemented. There have been far reaching changes following our recommendations, in addition to the actions that parties often take in response to emerging findings whilst our investigations are still ongoing. Four examples are listed below:

- The Primrose Hill/Camden Road West Junction investigation (Report 21/2014) recommended that the railway industry should work together to assess the risk of freight train derailment due to uneven loading, and adopt control measures to reduce the risk. This and other recommendations, following a number of previous RAIB investigations, has led to an important new industry initiative, to review the risk of derailments from a system perspective taking account of contribution of track, vehicle and the loads that are conveyed. This will lead to a review of the adequacy of the collective controls exercised by existing standards, and the identification of improvements that may include new or revised standards covering design, inspection and maintenance, or measures to detect uneven wheel loading.
- The James Street station investigation (Report 22/2012) recommended that ORR should work with industry to take the findings of RAIB's report into account in published guidance on the management of the risk at the interface between platforms and trains (PTI). As a consequence, the RSSB² was commissioned to develop a national risk management strategy for the PTI. This strategy has now been published on behalf of the railway industry and includes a commitment to research and assess a range of engineering options to reduce PTI risk areas, such as technology for improving train dispatch and ways of reducing the gap between trains and platforms.
- The Sewage Works Lane investigation (Report 14/2011) recommended that Network Rail should review its level crossing management processes. (ORR had also expressed concerns about the quality of level crossing risk management.) Network Rail have subsequently appointed more than 100 new dedicated Level Crossing Managers trained in data gathering, risk assessments and inspection of level crossings, which it is hoped will improve the risk management at all types of level crossings.
- The Grayrigg investigation (Report 20/2008) recommended that Network Rail modify the design of the non-adjustable stretcher bar assembly to withstand normal operational loads (and credible faults) with a safety margin and reducing the reliance on staff patrolling the track to spot and rectify loose fixtures. Network Rail developed, tested, and is now installing a new design of stretcher bar throughout the UK.

¹ The European Railway Safety Directive requires the safety regulator or public bodies to ensure our recommendations are duly considered and acted upon appropriately.

² A not-for-profit company owned and funded by major stakeholders in the railway industry, and which provides support and facilitation for a wide range of cross-industry activities. The company is registered as 'Rail Safety and Standards Board', but is known as 'RSSB'.

Chief Inspector's Foreword

The high level of uptake of our recommendations is a reflection of the general positive engagement between the industry, the ORR and the RAIB; and shows the commitment of the industry and the ORR to drive through the changes that we have identified as being needed.

The RAIB does not and cannot mandate the actions we believe that should be taken arising from our investigation findings; we make recommendations. Those in receipt of our recommendations must consider them and take appropriate action based on considerations which include risk and whether the costs of mitigating the risks are proportionate. All parties, with the exception of the Safety Authorities and other Government bodies, are overseen in this by the appropriate Safety Authority which, for most of the railways investigated by the RAIB, is the ORR.

Although the uptake of our recommendations is high, I still have concerns over the speed and/or quality of the responses to some of our recommendations:

- According to the reports that we have received from the ORR³, at the end of 2014 the number of recommendations still open after three and two years has fallen to 20 for both time periods, from 25 and 39 respectively in 2013. Whilst the amount of time needed for implementation will depend on the recommendation's scope and complexity, most recommendations can be, and are, implemented within two years; some significantly earlier. Nevertheless, all the while recommendations are 'open', it is likely that the related risks to safety are still present on the railways, so I am concerned about outlying recommendations that have yet to be concluded after two years. The ORR has again indicated that it will be particularly focusing on working with the industry to conclude these, and other long outstanding recommendations, this year.
- There have been three investigations started or concluded in 2014 where, we believe, earlier RAIB recommendations, had they been implemented more fully or in a more timely fashion, would have probably prevented a second accident or near miss. This continues to concern me as these are serious incidents that could have been avoided. Details of these are to be found in Section 1 under 'Recommendations'.
- Section 2 of this report contains information received during 2014 from ORR or other public bodies concerning actions taken in response to our recommendations. We have highlighted particular concerns relating to seven of these responses where we do not think the actions have, or will, mitigate those risks to safety identified by our investigations (see also table 7 in Section 1). We have had earlier contact with the ORR to make them aware of our concerns so they are able to consider this in their oversight of the industry actions.

In general, the UK's railway industry has a very positive approach to improving safety, resulting in it being amongst the safest in Europe⁴. However, I have concerns about the number of very serious near miss events that we have had cause to investigate. Between 2012 and 2014, there have been eight events where we consider that accidents that could have resulted in more than one death and serious injuries were only narrowly avoided.

³ Note: The industry may have a different perception of extent of implementation but this will be because the ORR has not yet validated the implementation.

⁴ As indicated by the European Railway Agency: Railway Safety performance in the European Union 2014.

Chief Inspector's Foreword

In 2013 we investigated two such incidents and another five in 2014. Some examples from 2014, which are subject to ongoing investigations, include Hest Bank on 22 September (when with less than two seconds to spare, nine workers leapt out of the way of a train travelling at 98 mph) and Newbury on 17 November (when a passenger train hit a fallen signal post at 110 mph without derailing). Further details are included in this report in Section 1 under 'Operational activity 2014'.

The most recent near miss events that we are investigating occurred very recently when a steam-hauled charter train passed a signal at danger and came to a stand across the junction at Wootton Bassett on 7 March 2015, (the signal was being maintained at danger to protect the movement of a previous train, which had passed through the junction a short time before), and when a high speed passenger train collided with fallen masonry at Froxfield on 22 February 2015 (a reversing articulated lorry had struck the bridge parapet causing it to collapse across the tracks, the train hit the debris but fortunately did not derail).

By October this year the RAIB will have been operational for ten years. By the end of this month I will have been Chief Inspector for 12 years; I was appointed in 2003 to set up and then lead the Branch. To serve in this role has been an immense privilege and I am proud of what the Branch has achieved. I feel I have accomplished what I set out to do. As a result, earlier this year I decided to leave this post; a decision made all the more difficult because this role has been so absorbing and rewarding.

I will wait until I have closed the door on this role before I start my search for my next challenge. This is to avoid any potential conflicts of interest as my search will include, but not necessarily be limited to, the rail industry, which I will continue to investigate until I leave this post at the end of this month.

I wish to extend my thanks to all those I have worked with over the last 12 years, those inside and outside the rail industry, my team and the families and colleagues of those involved in the accidents we have investigated who have joined forces with us to make the railways in the UK ever safer.

Carolyn Griffiths



Chief Inspector of Rail Accidents

29 May 2015

1. The role of the Rail Accident Investigation Branch

Further information about the role of the RAIB can be found on our website: www.gov.uk/raib:

[1. Background to the Branch](#)

The RAIB became operational in October 2005 as the UK's independent organisation for investigating accidents and incidents occurring on the UK's railways. The roles and duties of the RAIB are set out in the Railways and Transport Safety Act 2003 (the Act) and its associated implementing regulations, the Railways (Accident Investigation and Reporting) Regulations 2005 (the Regulations). Together, the Act and the Regulations also implement the requirements of the European Railway Directive (2004/49/EC) ([the Directive](#)), which came into force in 2004. The Directive creates a common regulatory framework for safety across Europe and requires each member state to establish national safety authorities (eg ORR), and an independent body to investigate all rail accidents (RAIB).

[2. Aims of the Branch](#)

The RAIB's aims are to improve the safety of the railways by carrying out timely investigations into railway accidents and incidents to determine the causes and circumstances, and to make safety recommendations to reduce the likelihood of accidents in the future.

[3. Objectives of the Branch](#)

- To respond promptly and effectively to notifications of railway accidents and incidents.
- To conduct thorough investigations in a way that is proportionate to the seriousness of the event and the lessons to be learned from it.
- To use the resources of the RAIB appropriately to achieve the maximum effect in the improvement of safety on railways and tramways.

[4. Scope of accidents and incidents investigated](#)

The scope of the RAIB's investigation work is set out in the Regulations and the Act and covers the mainline railways, metros, light rail⁵ and heritage railways of Great Britain and Northern Ireland and the Channel Tunnel. Under the Act, the RAIB is mandated to investigate any serious railway accident, as defined in the Regulations, and also has the freedom to investigate other types of accident or incident where it believes that an investigation could significantly improve railway safety.

[5. Accident and incident notification](#)

The Regulations place a duty on railway industry bodies whose staff or property is involved in an accident or incident to notify the RAIB.

[6. The RAIB's response to notifications](#)

The RAIB will decide on the basis of the initial notification whether it should immediately mobilise personnel to the accident site. Usually this is to conduct a preliminary examination. The RAIB's Chief Inspector or her Deputy, a Duty Co-ordinator and a team of inspectors are on call 24 hours a day, 365 days per year to respond to incidents.



⁵ Tramways in Scotland came into RAIB's scope on 26 May 2015, following amendment to Act to remove restriction.

1 The role of the Rail Accident Investigation Branch

[7. Preliminary Examination](#)

The purpose of the preliminary examination is to gather sufficient details and evidence to enable the RAIB to make an informed decision whether or not to conduct a full investigation.

[8. Investigation](#)

The RAIB's investigations are conducted completely independently of all other organisations and investigations by other parties. However, it can share factual evidence with industry stakeholders and will share such evidence with other statutory investigatory bodies. It will not share the identities of witnesses or their statements, nor medical records relating to persons involved in the accident or incident, or other information given in confidence. The RAIB will keep involved parties informed of emerging findings throughout the investigation and may inform the broader industry of progress and findings during the investigation by way of an interim report.

If the RAIB decides that a full investigation is disproportionate to the potential safety lessons that may be learned then it might publish a bulletin, which consists of a summary of the findings and identification of safety lessons.

[9. The investigation report](#)

On completion, the Chief Inspector sends the report to the Secretary of State for Transport and publishes it on the RAIB's website.

[10. The recommendation process](#)

Where appropriate, the RAIB's investigation reports will include recommendations to improve safety and to prevent the reoccurrence of similar accidents.

[11. Organisation and Funding](#)

The RAIB consists of full time investigators and support staff. They are based in two operational centres, at Derby and Farnborough.

The RAIB's budget for 2014 was £4.8 million.

[12. Board of Transport Accident Investigators](#)

The Board of Transport Accident Investigators was established in 2003 by the Secretary of State, consisting of the three Chief Inspectors of accident investigation (Rail, Marine and Air), and is currently chaired by the RAIB's Chief Inspector. Its purpose is, where appropriate, to ensure consistency of approach and identify and develop any common strategic aims and objectives and best practices. These include the development of a new and common electronic evidence management system, upkeep of the Branches' web content, and dealing with common risks in a collaborative manner. The Board normally meets quarterly.



2. Operational activity 2014

During the period from 1 January to 31 December 2014, the RAIB received 299 notifications of railway accidents and incidents from the industry. These resulted in 37 (immediate and delayed) deployments of RAIB inspectors to the accident or incident site to carry out a preliminary examination. There were three additional preliminary examinations which did not require deployment to site.

As a result of the analysis of the information gathered, the RAIB started 19 full investigations, and issued one Bulletin report and four Urgent safety advice notices. (See page 17 for more information on Bulletins and Urgent safety advice.)

Investigation reports published in 2014

The RAIB completed and published 29 full investigation reports (including two class investigations) in 2014. While the RAIB's aim is to publish reports and bulletins within 12 months, the length of individual investigations can sometimes extend beyond this because of the complexity and scale of the investigation, late notification by the industry or the need to address complex issues raised during formal consultation. In 2014 the mean average time taken to publish the RAIB's reports was 12 months⁶ after the date of occurrence (as compared to 11.9 months in 2013). The shortest time taken was seven months and the longest 23 months⁷.

More typically, our reports (excluding broader 'class' investigations) are published in 11.4 months (based on the median time taken to publish). If Liverpool Street, the longest report, is not included in the statistics the mean average length of time taken to publish was 11.1 months.

In addition to these reports, there was one bulletin published in 2014. The time from the incident to publication of the bulletin was just over nine months (5.3 months in 2013⁸). Overall the average time for full investigation and bulletin reports to be published was 11.9 months.

Table 1 provides a summary of the outputs achieved by the RAIB in 2014. Details on the status of recommendations issued in reports published in 2014 and recommendations subject to a report by the safety authority can be found in [Section 2 of the Annual Report](#).

⁶ Excluding class investigations.

⁷ The longest investigation, Liverpool Street (RAIB report 27/2014), was delayed whilst access was sought to key evidence, without causing disproportionate disruption to the railway.

⁸ Average time for bulletins has increased due to the complexity of the RAIB Bulletin 01/2014 Engineering train collision at Kitchen Hill, near Penrith, which took nine months from incident date to publication.

2 Operational Activity 2014

Table 1 – RAIB outputs in 2014

| | |
|--------------------------------------|----|
| Preliminary examinations completed | 40 |
| Full investigation reports published | 29 |
| Bulletins published | 1 |
| Urgent safety advice issued | 4 |
| Investigations commenced | 19 |

Table 2 provides details of the investigations completed in 2014 and the legal basis for the investigation. The references 19(1), 19(2) and 21(6) refer to the relevant articles in the Directive (see table 3 for more detail).

Table 3 provides details of full investigations commenced in 2014 and the basis for the investigation.

Table 4 provides details of two investigations opened in 2012 & 2013 but not completed by 31 December 2014.

Table 2 – Investigations completed in 2014

| Report Number | Event date | Publication date | Title of investigation (location) | Occurrence type | Basis for investigation | | |
|---------------|------------|------------------|---|--|-------------------------|-------|-------|
| | | | | | 19(1) | 19(2) | 21(6) |
| 01/2014 | 24/01/2013 | 14/01/2014 | Fatal accident at Motts Lane level crossing, Witham, Essex | Level crossing fatality | X | | |
| 02/2014 | 21/01/2013 | 16/01/2014 | Derailment at Castle Donington, Leicestershire | Freight train derailment | | a | |
| 03/2014 | 08/03/2013 | 13/02/2014 | Penetration and obstruction of a tunnel between Old Street and Essex Road stations, London | Infrastructure failure | | a | |
| 04/2014 | 21/03/2013 | 24/02/2014 | Fatal accident at Athelney level crossing, near Taunton, Somerset | Level crossing fatality | X | | |
| 05/2014 | 13/04/2013 | 06/03/2014 | Tram running with doors open on London Tramlink, Croydon | Train movement accident involving passengers | | a | |
| 06/2014 | 16/07/2013 | 27/03/2014 | Collision at Buttington Hall <i>user worked crossing</i> , Welshpool | Level crossing injury | | a | |
| 07/2014 | 23/01/2013 | 31/03/2014 | Locomotive derailment at Ordsall Lane Junction, Salford | Passenger train derailment | | a | |
| 08/2014 | | 02/04/2014 | Class investigation into landslips affecting Network Rail infrastructure between June 2012 and February 2013 | Class investigation | | | |
| 09/2014 | 21/07/2013 | 01/05/2014 | Passenger train collision at Norwich | Collision with other train | X | | |
| 10/2014 | 31/05/2013 | 12/05/2014 | Accident at Balnamore level crossing, Ballymoney, Northern Ireland | Level crossing near miss | | a | |
| 11/2014 | 06/06/2013 | 15/05/2014 | Near miss at Llandovery level crossing, Carmarthenshire | Level crossing near miss | | a | |
| 12/2014 | 25/06/2013 | 16/06/2014 | Near miss at Butterswood level crossing, North Lincolnshire | Level crossing near miss | | b | |
| 13/2014 | 23/11/2013 | 16/06/2014 | Locomotive failure near Winchfield | Train defect | | a | |
| 14/2014 | 26/10/2013 | 26/06/2014 | Road vehicle incursion onto the railway at Aspatria, Cumbria | Near miss (non level crossing) | | b | |
| 15/2014 | 21/04/2013 | 17/07/2014 | Runaway of a <i>road rail vehicle</i> and the resulting collision in Queen Street High Level Tunnel, Glasgow | Runaway incident | | a | |
| 16/2014 | 23/08/2013 | 28/07/2014 | Uncontrolled evacuation of a London Underground train at Holland Park station | Train defect | | a | |
| 17/2014 | 28/08/2013 | 14/08/2014 | Accidents involving a wheelchair rolling onto the track at Southend Central; and a pushchair rolling onto the track at Whyteleafe | Near miss (non level crossing) | | a | |
| 18/2014 | 26/10/2013 | 21/08/2014 | Fatal accident at Barratt's Lane No.2 <i>footpath crossing</i> , Attenborough, Nottingham | Level crossing fatality | X | | |
| 19/2014 | 05/06/2013 | 18/09/2014 | Passenger trapped in a train door and dragged a short distance at Newcastle Central station | Train movement accidents involving a passenger | | a | |
| 20/2014 | 15/10/2013 | 09/10/2014 | Freight train derailment near Gloucester | Freight train derailment | | a | |
| 21/2014 | 15/10/2013 | 14/10/2014 | Derailment at Primrose Hill / Camden Road West Junction | Freight train derailment | X | | |
| 22/2014 | 03/02/2014 | 23/10/2014 | Passenger dragged a short distance by a train at Holborn station | Train movement accidents involving a passenger | | b | |
| 23/2014 | 01/08/2013 | 23/10/2014 | Dangerous occurrence at Denmark Hill station | Infrastructure failure | | b | |
| 24/2014 | | 13/11/2014 | Class investigation into rail breaks on the East Coast Main Line | Class investigation | | | |
| 25/2014 | 16/01/2014 | 20/11/2014 | Passenger train collision with trolley at Bridgeway <i>user worked crossing</i> , near Shrewsbury | Collision with an obstacle | | a | |
| 26/2014 | 20/11/2013 | 24/11/2014 | Buffer stop collision at Chester station | Collision with an obstacle | | a | |
| 27/2014 | 23/01/2013 | 11/12/2014 | Derailment at Liverpool Street station, London | Passenger train derailment | | a | |
| 28/2014 | 14/07/2013 | 15/12/2014 | Collision between a train and a car at Jetty Avenue level crossing, Woodbridge, Suffolk | Level crossing minor damage | | b | |
| 29/2014 | 20/03/2014 | 22/12/14 | Unauthorised entry of a train onto a single line at Greenford | SPAD | | a | |

2 Operational Activity 2014

Table 3 – Full investigations commenced in 2014

| Event date | Title of the investigation (location) | Occurrence type | Basis for investigation | | |
|------------|---|--|-------------------------|-------|-------|
| | | | 19(1) | 19(2) | 21(6) |
| 16/01/2014 | Passenger train collision with trolley at Bridgeway user worked crossing, near Shrewsbury | Collision with an obstacle | | a | |
| 22/01/2014 | Fatal accident involving a track worker, near Newark North Gate station | Staff hit by train (fatality) | x | | |
| 03/02/2014 | Passenger dragged a short distance by a train at Holborn station | Train movement accidents involving a passenger | | b | |
| 20/03/2014 | Unauthorised entry of a train onto a single line at Greenford | SPAD | | a | |
| 02/04/2014 | Derailment of a freight train at Angerstein Junction | Freight train derailment | | a | |
| 11/05/2014 | Fatal accident at Frampton level crossing | Level crossing fatality | x | | |
| 12/05/2014 | Collision at Loughborough Central on the Great Central Railway | Collision with other train | | a | |
| 25/05/2014 | Derailment at London Paddington station | Passenger train derailment | | a | |
| 24/06/2014 | Accident involving a track worker near Redhill | Staff hit by train (injury) | | a | |
| 11/08/2014 | Electrical arcing and fire on a Metro train and parting of the overhead line at Walkergate station, Newcastle upon Tyne | Fire on rolling stock | | a | |
| 22/09/2014 | Near miss involving track workers near Hest Bank, Lancashire | Staff hit by train (near miss) | | a | |
| 23/09/2014 | Severe electric shock to a train driver near Sutton Weaver, Cheshire | Electric shock | | a | |
| 02/10/2014 | Derailment of a freight train near Porthkerry, Vale of Glamorgan, South Wales | Freight train derailment | | a | |
| 23/10/2014 | Derailment of freight train near Heworth, Tyne and Wear | Freight train derailment | | a | |
| 26/10/2014 | Train struck lineside equipment in Watford Tunnel | Collision with an obstacle | | a | |
| 01/11/2014 | Runaway of trolleys and subsequent near miss at Raven level crossing, Garnant, Carmarthenshire | Runaway incident | | a | |
| 17/11/2014 | Collision between a train and a collapsed signal post at Newbury, Berkshire | Collision with an obstacle | | a | |
| 27/11/2014 | Runaway of an on-track machine at Bryn, near Wigan | Runaway incident | | a | |
| 28/12/2014 | Near miss involving construction workers at Heathrow Tunnel Junction, West London | Staff hit by train (near miss) | | a | |

Article 19(1) - a serious accident where the investigation is mandatory.

Article 19(2) - an accident or incident, which under slightly different conditions might have led to a serious accident, ie a near miss of a serious accident – see key below a, b, c, or d:

- a. the seriousness of the accident or incident;
- b. it forms part of a series of accidents or incidents relevant to the system as a whole;
- c. its impact on railway safety on a community level;
- d. requests from *infrastructure managers*, the safety authority or the Member State.

Article 21(6) - a non-serious accident or incident where there is significant potential for learning safety lessons.

Table 4 – List of investigations opened in 2012 & 2013 but not completed by 31 December 2014

| Event date | Title of investigation (location) | Occurrence type | Basis for investigation | | |
|------------|---|--------------------------|-------------------------|-------|-------|
| | | | 19(1) | 19(2) | 21(6) |
| 27/08/13 | Derailment of freight train at Stoke Lane level crossing, near Nottingham | Freight train derailment | | a | |
| | Class investigation - Engineering protection irregularities ⁹ | Class investigation | | | |

Summary details of open investigations can be found at www.gov.uk/raib under the link called 'Current investigations'.

⁹ Class investigation triggered by a possession irregularity at Settle Junction in December 2012.

Bulletins

Normally, when the RAIB deploys inspectors to the site of an accident or incident, it is to conduct a preliminary examination of the circumstances and key evidence. In some instances, on the basis of a review of this information, the RAIB concludes that further investigation by the RAIB would be unlikely to result in formal recommendations for the improvement of safety. However, sometimes, more general safety lessons are identified where the RAIB believes that it would be beneficial to make these widely known across the industry, and Bulletins are used for this.

During 2014, the RAIB published one Bulletin on its website.

The Bulletin covered:

- Collision with other train – two freight trains, operated in connection with engineering work, were involved in a collision at Kitchen Hill, near Penrith (RAIB bulletin 01/2014).

Urgent safety advice (USA)

In addition, the RAIB can issue Urgent safety advice at any stage during an investigation when it believes that there is a need to provide immediate information to the relevant industry bodies about the wider safety issues that have been identified. If the issue affects other European member states the safety advice is reported to the European Rail Agency (ERA) via their safety information system (SIS); this action alerts all member states of the advice. During 2014 the RAIB issued Urgent safety advice on four occasions, as follows:

Table 5 – Urgent safety advice issued by the RAIB in 2014

| Incident date | Incident | Urgent safety advice | Date of USA | Date sent to ERA SIS |
|---------------|--|--|-------------|--------------------------------|
| 15/10/2013 | Freight train derailment near Gloucester | USA issued to provide preliminary advice about the risk of derailment of IDA freight wagons on <i>cyclic top track geometry</i> defects. For the track, USA issued to highlight that emergency speed restrictions for cyclic top track geometry defects are being removed when the steps taken to correct the defect have not been effective. | 11/04/2014 | UK specific - not sent to ERA. |
| 23/11/2013 | Locomotive failure near Winchfield | USA issued to alert owners and operators of steam locomotives to risks arising from the methods of manufacture and inspection of cotters used to secure small end nuts and other assemblies, and the need to assess the risks associated with design changes that may be introduced during restoration or overhaul. | 17/03/2014 | UK specific - not sent to ERA. |
| 02/04/2014 | <i>Flange climb</i> derailment leading to blockage of two running lines at Angerstein Junction | USA issued to alert operators and owners of hopper wagons to the circumstances of the derailment and its likely cause. | 28/07/2014 | UK specific - not sent to ERA. |
| 25/05/2014 | Derailment of empty passenger train at Paddington Station, London | USA issued to raise awareness of initial <i>bogie</i> -related findings among owners, operators and maintainers of Siemens Desiro trains, and owners, operators and maintainers of trains with similar bogie design. | 18/06/2014 | UK specific - not sent to ERA. |

2 Operational Activity 2014

What does the RAIB investigate?

The 2003 Act requires that the RAIB investigate all serious accidents where potential safety lessons can be learned that will improve railway safety and will prevent railway accidents and incidents. The RAIB also has the legal power to enable it to investigate non-serious accidents or incidents for the same purpose. Part of the decision process on deciding whether or not to investigate is based upon the RAIB's evaluation of the potential for safety lessons to be learned. In particular, it takes account of the main difference between an accident and an incident, which is the severity of the consequences; and this is often related to chance.

The detailed investigation of such incidents, in the same manner as investigation of serious accidents, provides many of the learning points to improve safety at minimal cost in terms of adverse consequence to passengers, staff, the industry, and the railway infrastructure. It also means that opportunities for improving safety and preventing future accidents or mitigating the economic and human consequences are not passed over due to a failure to learn from previous incidents.

A particular category of the investigations relates to those incidents which under slightly different circumstances could have led to a serious accident with multiple fatalities but where it was fortunate that no one was killed or seriously injured (ie the near miss events).

Narrowly avoided multiple fatality accidents

Between 2012 and 2014, there have been eight such events where RAIB consider that a multiple fatality accident was narrowly avoided. In 2012 we investigated one such incident, another two in 2013, and a further five in 2014. The relevant investigation reports are:

- Roydon 16/07/2012 (RAIB report 07/2013): Two track workers got clear of line two seconds before train passed at 62 mph.
- Old Street 08/03/2013 (RAIB report 03/2014): Drills, from construction work above, came through tunnel roof, narrowly missed by train.
- Gloucester 15/10/2013 (RAIB report 20/2014): Freight train derailed on cyclic top, fouled opposite line, nothing in immediate vicinity.
- Winchfield 23/11/2014 (RAIB report 13/2014): Motion of locomotive fell apart at speed, landed on 3rd rail, no derailment.

The following investigations of incidents that occurred in 2014 are still in progress:

- Hest Bank 22/09/2014: Group of nine workers, with less than two seconds to spare, leaped out of way of train travelling at 98 mph.
- Raven crossing 01/11/2014: Runaway trolleys narrowly missed group of four working at level crossing.
- Newbury 17/11/2014: A passenger train hit a fallen signal post at 110 mph without derailing.
- Heathrow Tunnel Junction 28/12/2014: Near miss involving a group of staff, and collision with trolley in which staff jumped clear.

In addition, investigations are in progress for the following near miss incidents that have occurred in 2015 to date:

- Froxfield 22/02/2015: Train struck fallen masonry at 90 mph, no derailment.
- Scout Green 07/03/2015: Container blew off freight train, passed over opposite line on which sleeper train had just passed.
- Wootton Bassett 07/03/2015: SPAD and near miss at a high-speed junction, involving two passenger trains.
- Deeping St Nicholas 31/03/2015: Container blew off freight train, fouled opposite line, nothing in immediate vicinity.

3 Operational experience

3. Operational experience - Summary of incidents and accidents investigated by the RAIB (2009 – 2014)

Classification of accidents and incidents that have to be notified to the ERA

The RAIB has a duty to investigate and to report to the ERA all serious railway accidents, as defined by the Directive, and where necessary, any other similar accident with an obvious impact on railway safety regulation or the management of safety occurring on the railways in the United Kingdom.



The ERA has published guidance to promote consistent categorisation of investigations in accordance with the Directive. The RAIB uses this to classify its investigations according to Articles 19(1), 19(2) and 21(6) (see table 3 for more detail).

The following table (table 6) shows the breakdown of accidents and incidents that the RAIB has investigated between 2010 and 2014. The figures have been collated according to the date of occurrence and not publication of the report.

Table 6 – Investigations by category sorted by Article 19(1), 19(2), and 21(6)¹⁰

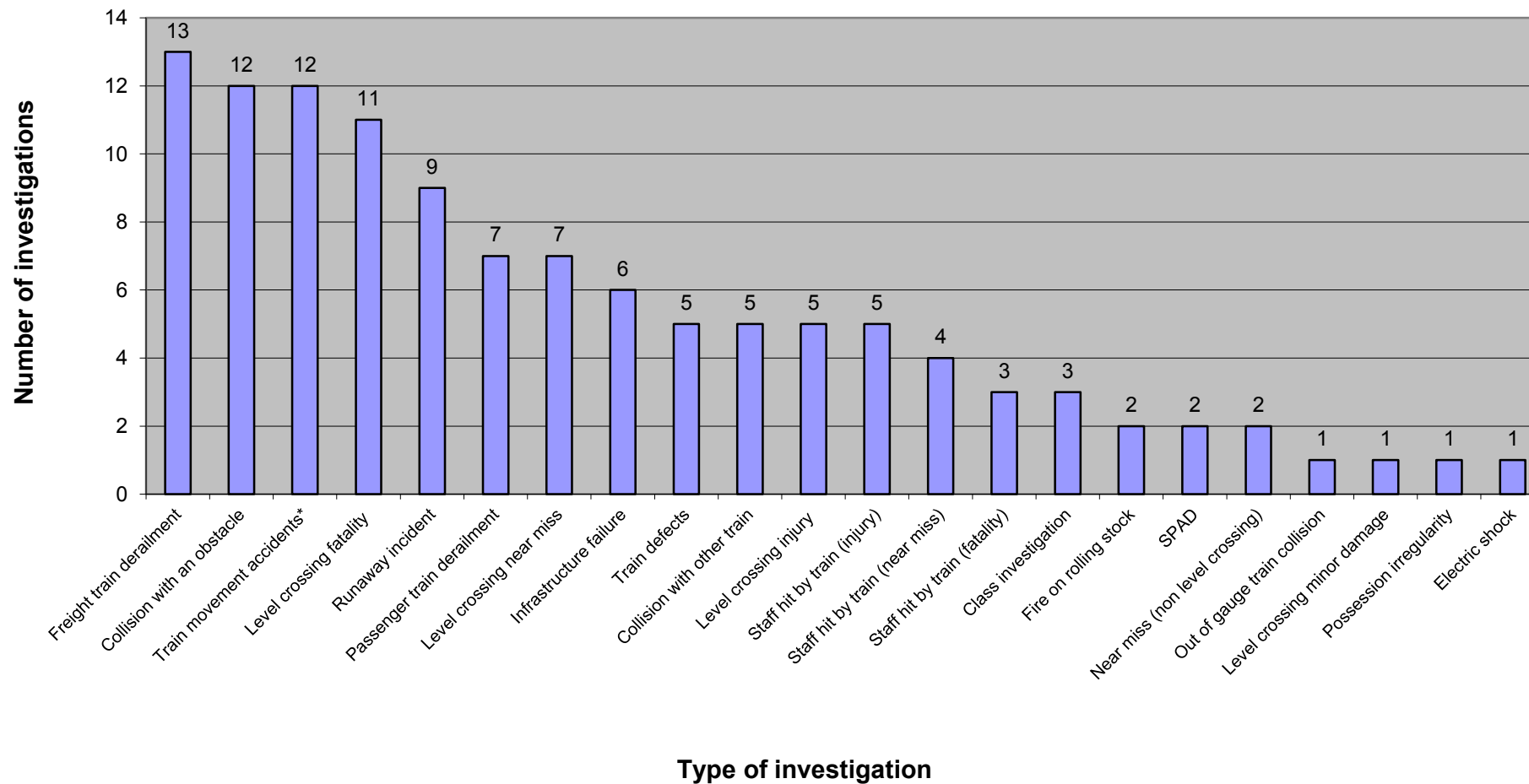
| Basis for Investigations by the European Railway Safety Directive category | 2010 | 2011 | 2012 | 2013 | 2014 | TOTAL |
|--|-----------|-----------------|-----------|-----------|-----------|------------|
| Article 19(1) | 1 | 4 | 3 | 5 | 5 | 15 |
| Article 19(2) | 16 | 23 | 21 | 21 | 17 | 98 |
| Article 21(6) | 1 | 0 ¹¹ | 0 | 0 | 0 | 1 |
| Total | 18 | 27 | 24 | 26 | 19 | 114 |

¹⁰ Figures do not include three class investigations (which address more general safety issues).

¹¹ In 2008 the ERA widened the scope of the Directive to include tramways and heritage. Since then, the RAIB has categorised all accidents and incidents according to Article 19(1) or 19(2).

Bar Chart 1 shows the total number of investigations carried out by the RAIB; the total broken down by the type of accident for the 5 year period 2010 to 2014¹².

Chart 1 - Types of incidents/accidents investigated 2010 - 2014



Note: "Train movement accidents" include passengers and members of public (not staff).

¹² Figures include 3 class investigations; two involving infrastructure failures and one involving engineering protection irregularities.

4 Recommendations

4. Recommendations

Recommendations are one of the prime outputs of the RAIB's investigations in improving safety. The recommendations are addressed to the appropriate safety authority¹³, and to other public bodies where they are the end implementer.

The purpose of addressing the recommendation in this way is so that the safety authority can ensure that the organisations to which the recommendations are made, properly consider the recommendations, and where appropriate act on them; as the Directive and Regulations require. The Regulations give the safety authority the power to require end implementers to provide full details of the measures they intend to take, or have taken, to implement the recommendation. The ORR must satisfy itself that the end implementer, either has implemented the recommendation or otherwise, has taken sufficient actions to mitigate the related risks to an appropriate level. The safety authority is also required to inform the RAIB, within a period not exceeding 12 months¹⁴, of the measures taken, or the reasons why no implementation measures are being taken.

The RAIB has no role or statutory powers to follow up on the implementation of recommendations, unless it is necessary to do so as part of a subsequent investigation. In Section 2 of the Annual Report the RAIB provides an overview of the status of recommendations made by the RAIB. It is compiled from information provided to the RAIB by the ORR, other safety authorities, or other public bodies, and the categories used are based on the following ORR descriptors:

- Implemented – meaning that all associated actions to deliver the recommendation have been completed.
- Implemented by alternative means – meaning that the intent of the recommendation has been satisfied in a way that was not identified by the RAIB during the investigation.
- Implementation ongoing – meaning that work to deliver the intent of the recommendation has been agreed and is in the process of being delivered.
- In-progress – meaning that ORR has yet to be satisfied that an appropriate plan, with timescales, is in place to implement the recommendation; and work is in progress to provide this.
- Non-implementation – meaning that no measures will be taken to implement the recommendation.
- Awaiting Response – meaning awaiting initial response from ORR (or other safety authority or public body) on the status of the recommendation.

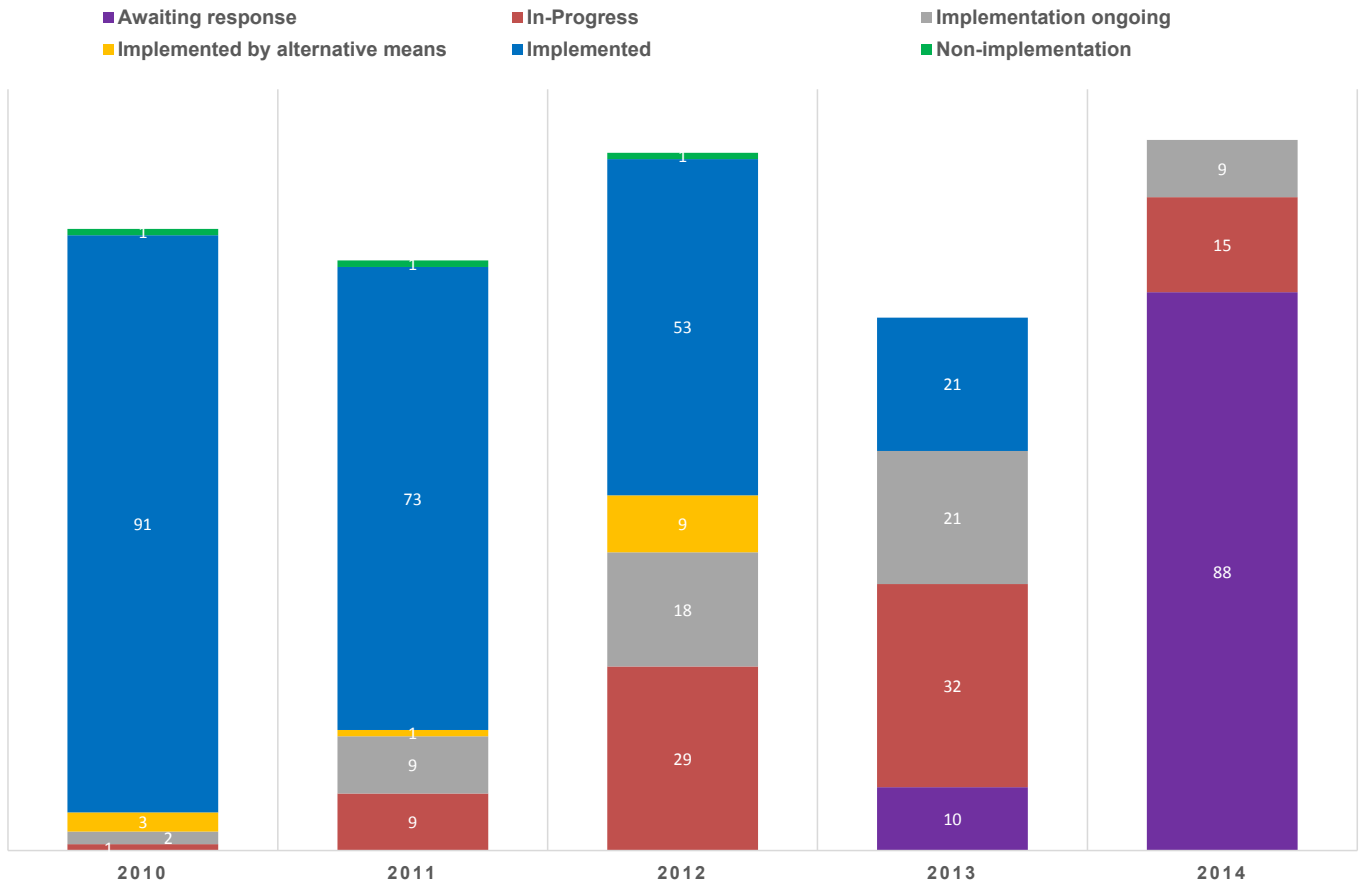
¹³ The safety authority is the safety regulator; for Great Britain this is primarily the Office of Rail and Road (ORR) although there are some recommendations made by the RAIB where the Health and Safety Executive (HSE) has been the safety authority (for accidents occurring that were not attributed to the railway and are investigated under the Health and Safety at Work etc Act 1974); for the Channel Tunnel it is the Inter Governmental Commission and for Northern Ireland it is the Department for Regional Affairs.

¹⁴ In accordance with Regulation 12(2)(b) of the Railways (Accident Investigation and Reporting) Regulations 2005.

The following chart provides the status of recommendations made between 1 January 2010 and 31 December 2014.

Chart 2 – Recommendation implementation status per year (includes recommendations made not only to safety authorities but also public bodies).

RECOMMENDATION IMPLEMENTATION STATUS



Where the RAIB has concerns, based on the risk, over the way that an organisation has responded to the recommendation, the RAIB raises these concerns with the relevant safety authority and reflects any outstanding concerns in our Annual Report.

Recommendations where the RAIB has concerns are marked with a coloured triangle in Section 2 of the Annual Report. The triangles used are as follows:

- ▲ The RAIB has particular concerns that no actions have been taken in response to a recommendation.
- ▲ The RAIB has concerns that the actions taken are inappropriate or insufficient to address the risk identified during the investigation.
- △ The RAIB notes that substantive actions have been reported but the RAIB still has concerns.

4 Recommendations

The table below shows recommendations marked with a coloured triangle in Section 2.

Table 7 – Summary of recommendations of RAIB concern

| Investigation Name | Rec No | Concern | Triangle Colour |
|---|--------|--|-----------------|
| Runaway and derailment of wagons at Ashburys. | 1 | RAIB considers that more can be done to assess the effectiveness of handbrakes on wagons that are to be stabled. RAIB is seeking further information. | Red ▲ |
| Derailment at Santon near Foreign Ore Branch Junction, Scunthorpe. | 7 | Ineffective management of recurrent track twist faults. | White △ |
| Partial failure of a structure inside Balcombe Tunnel, West Sussex. | 4 | The RAIB is concerned about the delay in implementing remedial actions in response to reported structure defects. These were further identified in the collapse of a structure at Denmark Hill in 2013. | White △ |
| Autumn <i>Adhesion</i> incidents at Esher and Lewes Part 3. | 19 | ERTMS program is still developing requirements. | Blue ▲ |
| Pedestrian struck by a tram at Sandilands tram stop, Croydon. | 3 | ORR has carried out a review and concluded that no further action is needed. The RAIB continues to believe that the presence of a recess at this, and higher level platforms on other systems, can deliver significant safety benefit. | Blue ▲ |
| Dangerous occurrence at Lindridge Farm UWC near Bagworth, Leicestershire. | 3 | Network Rail considers actions taken to implement recommendation 5 overcome the need to implement this recommendation. The RAIB has written to the ORR to express its concern. | Blue ▲ |
| Fatal accident at Bayles and Wylies FPC, Bestwood, Nottingham. | 3 | ORR reports that it has reviewed existing guidance on 'Pedestrian Safety' and concluded that it provides adequate guidance. ORR has informed RAIB that it expects the guidance to be further reviewed by UK Tram (who will be taking on the responsibility for tramway guidance). The RAIB is urging the ORR to reconsider the need for revised guidance in light of the recently published RSSB research. | Blue ▲ |

Accidents that could have been avoided

The RAIB has identified three accidents during 2014 that could well have been avoided had previous RAIB recommendations been implemented more fully or in a more timely fashion. These are:

- Gloucester (RAIB report 20/2014) could have been avoided had an earlier recommendation made following a derailment at Santon in 2008 (RAIB report 10/2009) been fully implemented (this related to the management of repetitive track geometry faults).
- Primrose Hill/Camden Road (RAIB report 21/2014) could have been avoided had an earlier recommendation made following a derailment at Duddleston in 2007 (RAIB report 16/2008) been fully implemented (this identified the need to evaluate the performance of FEA-B type container wagons when carrying longitudinal and lateral load off-sets).
- Liverpool Street (RAIB report 27/2014) could have been avoided had an earlier recommendation made following a derailment at Windsor & Eton Riverside in 2009 (RAIB report 11/2010) been fully implemented (this related to the need to measure dynamic gauge at locations not covered by geometry recording trains).

Recommendations and Reports Published in 2014

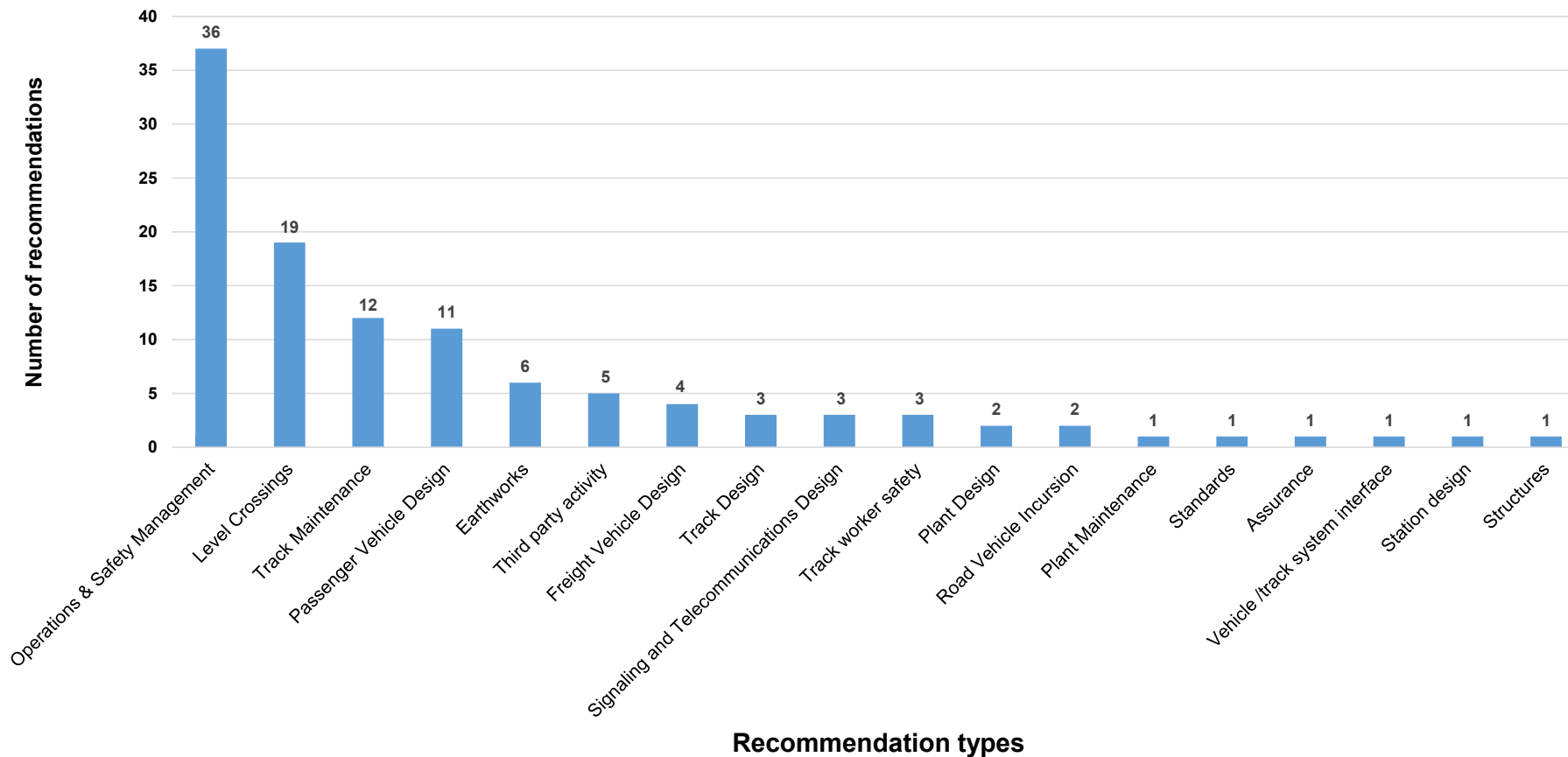
In the 29 reports published in 2014, the RAIB made a total of 112 recommendations; the average number of recommendations per report is approximately four. The majority of the recommendations made in 2014 were targeted at the following organisations (in some cases they were made to more than one implementer):

- Network Rail (56).
- Mainline Infrastructure Owners (3).
- Manufacturers (3).
- Main line freight train operators (2).
- Light Rail Tram (LRT) Operating Company and Infrastructure (7).
- Northern Ireland Railways (3).
- Other Public Bodies (4).
- Rail Safety and Standards Board (13).
- ORR (3).
- Department for Transport (2).
- Heritage Railway Association (3).
- London Underground Ltd and Infrastructure Companies (10).
- Passenger, Train Operating Company (TOC) (17).
- Metro, Train Operating Company (TOC) (1).

The number of accidents investigated and the number of recommendations made should not be taken as an indicator for assessing the safety of the UK railways. There is no way to assess how many incidents/accidents have been avoided as a result of the actions taken following our recommendations. The statistical data on UK's railway safety is published by the ORR on its website. These statistics can be found at: <http://dataportal.orr.gov.uk>.

Chart 3 – Types of recommendations made in 2014¹⁵

26



¹⁵ Operations and Safety Management refers to Railway operations / Safety Management System.

4 Recommendations

5. Identification of important recurrent issues

This part of the report and Appendix A, relate to investigations started and reports published between 17 October 2005 (the date that the RAIB became operational) and 31 December 2014.

Any areas of recommendations highlighted in this part have featured in the RAIB investigation reports that were published during 2014.

Details of the actions taken by the railway industry are primarily based on reports provided by the ORR during 2014.

Throughout this part 5, the RAIB reports are referred to as follows:

Location of event; two digit report number/year of publication

A full listing of RAIB reports, giving dates of occurrence and the full title can be found at: www.gov.uk/raib.

Recurrent issues

Table A1 in Appendix A shows some key recurrent issues identified in the RAIB investigation reports, and details where there have been further instances during 2014. The table shows for each issue:

- the number of investigations published before 2014;
- the number of investigations published during 2014 and their titles; and
- the number of investigations ongoing at 31 December 2014 and their titles.

From the above recurrent issues, the RAIB has selected a number of topics of particular concern. These are:

- level crossings;
- track worker safety;
- freight train derailments; and
- risk to passengers at the platform train interface.

All of the above were also topics in the RAIB's Annual Report for 2013.

For each topic the RAIB has identified:

- any recurrences during 2014;
- the associated safety issues;
- relevant areas of recommendation; and
- any safety improvement initiatives (as reported to the RAIB).

In addition, four **fact sheets** have been prepared which summarise key information.

5 Identification of important recurrent issues

Topics of particular concern to the RAIB

Level crossings

The UK's mainline railway has one of the best level crossing safety records relative to the other European Union Member States¹⁶. However, by 31 December 2014 the RAIB had had cause to investigate 55 level crossing accidents or incidents, and had published 54 related reports (including four bulletins and two class investigations). These level crossing accidents resulted in a total of 30 fatalities. During 2014 the RAIB published eight reports concerning accidents/incidents at level crossings; three of these involved a fatality.

In more than half of the investigations published during 2014 the RAIB found that the actions of level crossing users were a factor (five out of eight). However, the RAIB will not normally investigate level crossing accidents when a preliminary examination of the circumstances suggests that:

- the accident resulted from a deliberate violation or the reckless actions of a level crossing user (provided there are no particular features of the design or location of the crossing that may have prompted such behaviour);
- the direct cause of the accident was inattention, or distraction, that appears not to be related to the design or operation of the crossing; or
- the potential for additional safety learning affecting the design or operation of level crossings is limited.

Of particular interest to the RAIB are the types of investigation that can bring important safety learning in one or more of the following areas:

- Factors influencing user behaviour and their propensity to make errors or that may cause users to misuse a crossing (eg potentially misleading signs and excessive waiting times for users of level crossings)¹⁷. These were identified in three reports published during 2014.

- Fatal accident at Motts Lane level crossing, Witham, Essex (RAIB report 01/2014).
- Fatal accident at Barratt's Lane No. 2 footpath crossing, Attenborough, Nottingham (RAIB report 18/2014).
- Collision between a train and a car at Jetty Avenue level crossing, Woodbridge, Suffolk (RAIB report 28/2014).

¹⁶ As indicated by the European Railway Agency: Railway Safety performance in the European Union 2014.

¹⁷ The RAIB does not condone the actions of those who choose to violate safety rules or disregard safety signals. However, it is important to recognise that the design of a crossing can strongly influence the way that users interact with the crossing. In some cases factors such as extended waiting times can increase the likelihood of non-compliant behaviour at level crossings.

- Factors linked to the railway industry's understanding of its level crossing assets and the management of risk (eg inaccurate data on crossing usage and insufficient allowance for high seasonal road traffic). These were identified in four reports published during 2014.

- Fatal accident at Motts Lane level crossing, Witham, Essex (RAIB report 01/2014).
- Collision at Buttington Hall user-worked crossing, Welshpool (RAIB report 06/2014).
- Fatal accident at Barratt's Lane No. 2 footpath crossing, Attenborough, Nottingham (RAIB report 18/2014).
- Collision between a train and a car at Jetty Avenue level crossing, Woodbridge, Suffolk (RAIB report 28/2014).

- Errors by railway staff (eg crossing keepers and train drivers). These were identified in three reports published during 2014.

- Accident at Balnamore level crossing, Ballymoney (RAIB report 10/2014).
- Near miss at Landoverly level crossing, Carmarthenshire (RAIB report 11/2014).
- Near miss at Butterswood level crossing, North Lincolnshire (RAIB report 12/2014).

- Factors linked to deficiencies, or potential for improvement, in the design of level crossings and associated standards (eg sub-optimum signalling controls and inadequate sighting). These were identified in six reports published during 2014.

- Fatal accident at Motts Lane level crossing, Witham, Essex (RAIB report 01/2014).
- Fatal accident at Athelney level crossing, near Taunton, Somerset (RAIB report 04/2014).
- Near miss at Landoverly level crossing, Carmarthenshire (RAIB report 11/2014).
- Near miss at Butterswood level crossing, North Lincolnshire (RAIB report 12/2014).
- Fatal accident at Barratt's Lane No. 2 footpath crossing, Attenborough, Nottingham (RAIB report 18/2014).
- Collision between a train and a car at Jetty Avenue level crossing, Woodbridge, Suffolk (RAIB report 28/2014).

5 Identification of important recurrent issues

The year 2014 was of particular interest with regard to the number of level crossing design issues and a number of important recommendations were made to address these. These are summarised in **fact sheet one**.

A common theme linking many of the factors identified in the fact sheet is the need for the adequacy of level crossing equipment to be kept under constant review (to allow for factors such as change of use and the reliability of equipment), and for engineers to look for opportunities to upgrade crossings to modern standards. The RAIB notes that Network Rail is working to promote consideration of opportunities for safety improvements when specifying and designing new, or upgraded infrastructure (eg the 'safe by design' campaign led by Infrastructure Projects).

Areas of particular concern to the RAIB

Time taken to address known risk factors at level crossings

In the last seven years the RAIB has investigated at least seven accidents that have occurred at level crossings where the need for improvements, or closure, had already been identified by Network Rail. The factors underlying these delays are likely to have included:

- organisational factors and poor tracking of progress;
- inadequate risk assessment;
- complex and difficult legal processes for closure of level crossings and delayed planning permission for bridges; and
- insufficient funding and/or management resource.

In the light of the number of such instances, the RAIB, has examined Network Rail's past and current processes for the planning and implementation of improvement works at level crossings. This examination has revealed a number of relevant railway industry initiatives:

1. The appointment of more than 100 new level crossing managers (LCMs) means that the risk at every crossing is now monitored by a named individual. LCMs have been trained to identify local factors that may affect safety and it is hoped this will lead to improved risk assessment; which should in turn facilitate the implementation of necessary improvements. Where necessary, LCMs have also been empowered to impose interim risk control measures, such as temporary speed restrictions, prior to the implementation of longer term improvement plans.
2. The headquarters level crossing team provides direction and leadership to the LCMs in the Routes by, for example, issuing guidance and holding workshops. It also manages the national delivery of the more significant schemes such as crossing closures and the implementation of new initiatives such as new technology at user worked crossings.
3. Many of Network Rail's Routes have introduced level crossing steering groups that meet every four weeks and are attended by senior managers. The purpose of these meetings is to provide a forum for Route LCMs to discuss the implementation of mitigation measures that are proving to be problematic.

4. The denial of approvals by planning authorities is a significant cause to the delay (and in some cases non-implementation) of level crossing closure schemes; as the authorities are required to consider the impact of any proposed changes on the local community. Such matters are mostly outside railway industry's control, although closer working between Network Rail's legal specialists (such as liabilities advisors) and LCMs, is intended to help. Despite such delays, Network Rail bridged 38 footpath crossings in CP4¹⁸ and plans to carry out 70 in CP5.
5. Ring-fenced funding of £99 million has been assigned in CP5 to improving safety at level crossings (this is over and above the normal budget for operations and maintenance).
6. Network Rail is proposing to allocate dedicated funding for level crossing improvements at the delivery unit level. This currently exists within the Wales Route.

The RAIB also notes that the Law Commission has studied the closure of level crossings in their recent review of level crossing law. In their report, they made recommendations 26 – 68 (inclusive) for a more streamlined process on closures, when in the public interest. The most significant recommendation, (number 26), proposed closing public and private crossings by means of a new statutory system, with or without replacement, by means of level crossing orders. The closure proposals were broadly supported by the Transport Select Committee in its recent review of level crossing safety (February 2014).

The DfT responded to the closure recommendations by accepting most of them, but rejecting four and only partially accepting number 26. The DfT believe the recommended proposal is extremely close to the existing system under the Transport and Works Act 1992 and the scope for simplification was limited. It stated that it would only consider a new system if the Department concluded that the existing process causes specific problems which need to be addressed. The RAIB is aware that the DfT has undertaken to give this further consideration during spring 2015 by producing a paper comparing the current closure methods with the Law Commission's proposals and holding a stakeholder seminar to discuss the issues and options.

Given the railway industry's recent initiatives that are designed to improve the implementation of identified safety improvements, and potential changes to legislation associated with closures of level crossings, the RAIB does not propose to investigate these issues any further at this stage. However, in the event of any future investigations into accidents or incidents at level crossings the RAIB will review any evidence it finds of delays to safety improvement works, and will make any necessary recommendations to address remaining areas of concern.

Railway industry initiatives for the improvement of safety at level crossings

During 2014 the ORR provided updated information concerning the measures taken by the railway industry to implement RAIB recommendations. These are described in Section 2 of this Annual Report.

Network Rail has closed more than 10% of all its level crossings since 2009 and the ORR has stated that Network Rail has met its own target of a 25% reduction in level crossing risk over CP4. The RAIB also notes that the plan for CP5 includes a ring-fenced fund of £99 million for expenditure at crossings.

¹⁸ CP (Control Periods) are the five year timespans that Network Rail uses for financial and other planning purposes. Each Control Period begins on 1 April and ends, five years later, on 31 March to coincide with the financial year. CP4 ran from 2009 to 2014 and CP5 is due to finish in 2019.

5 Identification of important recurrent issues

A number of Network Rail initiatives promise to address previous RAIB recommendations. These include:

- the introduction of new technology to inform signallers of train location in long sections and/or provide warnings to the users of user worked crossings when trains are approaching (including at high risk crossings, currently reliant on users hearing the horn of approaching trains);
- the ongoing installation of barriers at automatic open crossings (*locally monitored*);
- the use of systems to provide a local audible warning to pedestrians when trains are approaching (as an alternative to reliance on hearing the train's horn); and
- the installation of more enforcement cameras to enable the prosecution of motorists who drive through flashing red lights at level crossings.

During 2014 the RSSB published some important research (project T984) into the way that pedestrians use level crossings and the ways in which the design of a crossing can influence their behaviour. This research aimed to establish the underlying and generic causes of pedestrian fatalities; understand the reasons why they occur; and examine both existing and novel solutions. Amongst the most promising potential solutions identified were the demarcation of a 'danger zone' at passive crossings with a single block of yellow colour and the improvement of auditory alarms at active crossings. These, and other potential safety enhancements, are currently being considered by Network Rail. The RAIB awaits the outcome of these considerations with interest.

Other RSSB reports published during the year included a review of signage at level crossings on public roads (T756). Research into signage at private road level crossings is ongoing (project T983). Both these areas of research address recommendations made by the RAIB.



FACT SHEET ONE

DESIGN ISSUES AT LEVEL CROSSINGS IDENTIFIED IN RAIB INVESTIGATIONS DURING 2014

| Investigation | Design issue(s) | Area of recommendation (or general safety learning) |
|---|---|--|
| Fatal accident at Motts Lane level crossing, Witham, Essex, RAIB report 01/2014. | <ul style="list-style-type: none"> Excessive length of time that the <i>miniature stop lights</i> were showing red: <ul style="list-style-type: none"> High railway traffic levels. Incorrect configuration of automatic route setting (ARS). | <ul style="list-style-type: none"> Identification of similar locations where lights remain at red for excessive period of time and to take appropriate actions at each (Network Rail). Research to examine maximum acceptability closure times and acceptable levels of variability (Network Rail). Review of ARS design process (Network Rail). |
| Fatal accident at Athelney level crossing, near Taunton, Somerset, RAIB report 04/2014. | <ul style="list-style-type: none"> Barriers closed for extended period due to wrong direction train movements during engineering activities. Poor presentation of public emergency telephones. | <ul style="list-style-type: none"> Introduction of suitable operational and engineering measures to mitigate the risk of extended closure times at similar locations (Network Rail). Research into ways of improving the presentation of public emergency telephones (RSSB). |
| Near miss at Landoverly level crossing, Carmarthenshire, RAIB report 11/2014. | <ul style="list-style-type: none"> Poor positioning of platform equipment and signage. Missed opportunity to integrate railway signalling with the level crossing controls. No positive warning to train crew that the crossing had not operated. | <ul style="list-style-type: none"> Review of the positioning of platform equipment and signage used by train crew at unmanned stations (Arriva Trains Wales). Signalling design processes to include a requirement to give consideration to any reasonable opportunities for safety improvements (Network Rail). Review of the design of current arrangements for providing an indication to the drivers of the status of train crew operated crossings (Network Rail). |
| Near miss at Butterswood level crossing, North Lincolnshire, RAIB report 12/2014. | <ul style="list-style-type: none"> Poor reliability of the power supplies. Need to consider whether a positive indication can be given to drivers that locally monitored crossings have failed. | <ul style="list-style-type: none"> Human factors and technical review of indications provided to drivers at locally monitored crossings (Network Rail). Review of the reliability of automatic locally monitored crossings and the practicality of remote condition monitoring (Network Rail). |
| Fatal accident at Barratt's Lane No. 2 footpath crossing, Attenborough, Nottingham, RAIB report 18/2014. | <ul style="list-style-type: none"> Design of pedestrian gate did not encourage users to look towards approaching trains on the nearest track. | <ul style="list-style-type: none"> <i>The need to provide guidance on the design of kissing gates at pedestrian crossings (learning point - action is already being addressed by RSSB).</i> |
| Collision between a train and a car at Jetty Avenue level crossing, Woodbridge, Suffolk, RAIB report 28/2014. | <ul style="list-style-type: none"> The sighting of approaching trains from road vehicles at user worked crossings. Potentially misleading signage. | <ul style="list-style-type: none"> Assessment of crossings to ensure that drivers of road vehicles have sufficient sighting when stopped clear of the line (Network Rail). Research into user behaviour when driving vehicles across user worked crossings – this is to inform a review of standards relating to the design and management of user worked crossings (Network Rail). |
| Fatal accident at Frampton level crossing, RAIB report 05/2015. | <ul style="list-style-type: none"> Signage did not identify that use by vehicles was prohibited. Location of signs was not compliant with current standards. | <ul style="list-style-type: none"> Review of signage at user worked crossings. |

5 Identification of important recurrent issues

The safety of track workers

The RAIB published one report concerning the safety of track workers. This related to a near miss with track workers and a subsequent train collision with a trolley that had been placed on the line near Shrewsbury (RAIB report 25/2014).

Sadly, another track worker was struck and killed by a train at Newark North Gate in January 2014. The RAIB's report into this accident, published in February 2015, identified that the key factor that led to this accident was a breakdown in safety discipline and vigilance at the work site that resulted in shortcuts to pre-work site checks and briefing; including the absence of the controller of site safety from the site during the work activities. This reinforces the importance of the industry continuing to address the attitudes and behaviours of front-line staff and their managers.

At the end of the year, a Heathrow Express train emerging from the tunnel, near Heathrow Tunnel Junction, narrowly avoided striking two construction workers who had placed a trolley on a line that was still open to traffic. This is now under investigation, and is of particular interest, given the continuing growth in the number of railway construction sites on and around the railway network.

Fact sheet two summarises the current status of investigations into events involving track workers that were completed, or ongoing, during 2014. For each such investigation it shows the primary cause, where this has already been identified, key safety issues and areas of recommendation.

Areas of particular concern to the RAIB

Underlying behaviours and attitudes

A recurrent issue identified by RAIB investigations has been the need to address the underlying factors which influence the behaviours that cause staff to violate rules, and implement (or fail to challenge) unsafe systems of work.

During track engineering activities it is vital that those with responsibility for the safety of the workers have the skills needed to exercise leadership and to promote the safe performance of the team. RAIB investigations have revealed that these skills include:

- the ability of the leader to exercise authority and influence;
- the need for the leader to understand the task;
- the need for planning and effective communications between all parties;
- the need for good leadership and effective team working; and
- the need for clear instruction and procedures.

One or more of these factors have been identified in 29 investigations (27 on the national railway network, one class investigation and one on a light rail system).

Control of work activities

During 2013 Network Rail started a major review of the way work activities on the track are controlled, known as the 'Planning and delivering safe work programme'. As a consequence a new role of Safe Work Leader is being introduced throughout 2015. This is intended to provide improved safety leadership on site and is being introduced in conjunction with a new process for the planning and implementation of work activities on track. This will include the use of an electronic work permit system, linked to electronic maps. If successfully implemented, this new role and process have the potential to address some of the recurrent issues relating to track worker safety identified by the RAIB.

The RAIB is concerned regarding the number of irregularities associated with the protection of engineering activities on the operating railway. For this reason, the RAIB is currently concluding a class investigation¹⁹ to examine the factors that have led to the break-down of safe systems of work, and the extent to which these factors will be addressed by the new planning and work delivery arrangements.

Network Rail initiatives for the improvement of track worker safety

The RAIB is aware that Network Rail is carrying out a range of initiatives designed to promote safe behaviours and attitudes amongst its staff and managers. In particular during 2014 and 2015, it is providing 'Managing Site Safety' training for thousands of team leaders, with the following aims:

- to raise awareness and understanding amongst team leaders about their roles as leaders of site safety;
- to develop new ways of thinking and behaving in the role; and
- to plan for, deliver and review safe and effective working environments and work practices by applying safety leadership behaviours and competencies.

A number of RAIB investigations have identified the need to address the behaviours, attitudes and interpersonal skills of those with safety leadership roles. The RAIB is therefore supportive of such initiatives and will be assessing their effectiveness in any future investigations. A particular concern expressed by the RAIB after the fatal accident at Saxilby in December 2012 (RAIB report 21/2013), is that the industry needs to ensure that suitable safety management arrangements are put in place for track workers, who are either self-employed or contracted to work on an 'as needed' basis. Network Rail has informed RAIB that it is in the process of letting labour supply contracts that require safety critical staff to be employed directly by a licensed Principal contractor or Network Rail.



¹⁹ Class investigation: Engineering protection irregularities.

5 Identification of important recurrent issues

FACT SHEET TWO

RAIB INVESTIGATIONS INVOLVING TRACK WORKERS DURING 2014 (excludes events involving road rail vehicles)

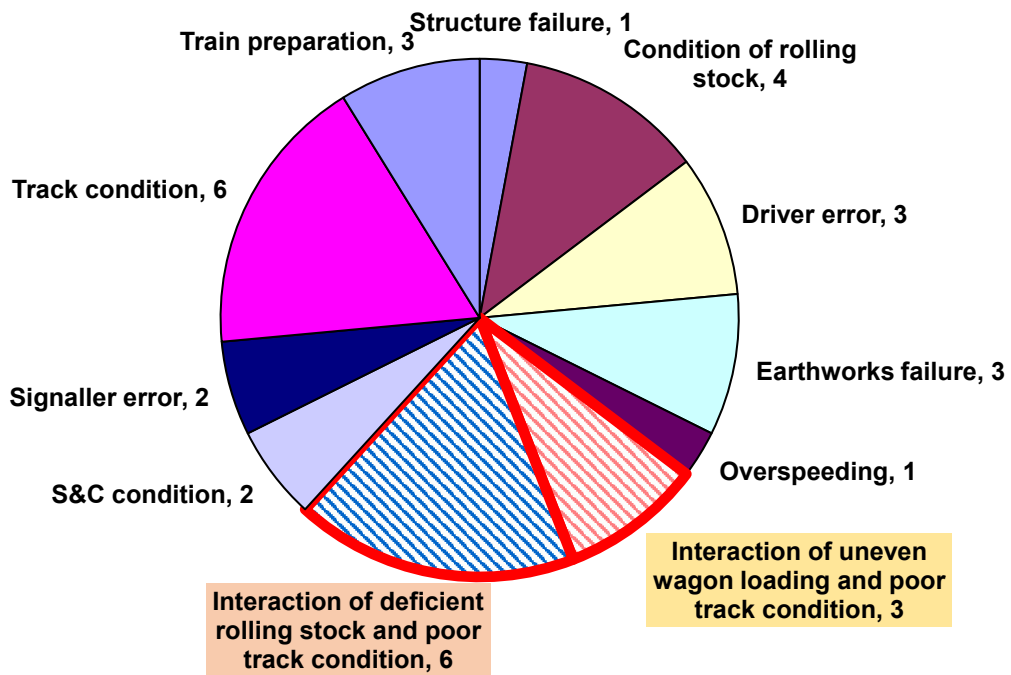
| Investigation | Primary cause | Key safety issue and areas of recommendation |
|---|--|--|
| Passenger train collision with trolley at Bridgeway user worked crossing, RAIB report 25/2014. | Lack of effective control of the system of work and poor decision making. | <ul style="list-style-type: none"> • The need for better clarity of planning documentation. • The need for a review of planning practices and processes at Shrewsbury depot. • The need for strengthening of the systems that were in place for the management of staff competence. |
| Fatal accident involving a track worker near Newark North Gate station, RAIB report 01/2015. | There was a breakdown in safety discipline and vigilance at the work site. | <ul style="list-style-type: none"> • The need to improve work site safety discipline and vigilance, especially for teams doing routine work with which they are familiar; by undertaking re-briefing and training of staff, actively monitoring safety discipline on site and investigating ways of improving vigilance on repetitive tasks. • Improving the implementation of Network Rail's procedures for planning safe systems of work so that the method of working that is chosen minimises the risk to track workers so far as is reasonably practicable, as intended by the procedure. |
| Accident involving a track worker near Redhill on 24/06/2014 (ongoing). | The section supervisor did not remain in a position of safety until the train had passed. In addition, the cess was narrow and treacherous at this location. | <ul style="list-style-type: none"> • The need to assess the availability and suitability of the locations that are required to be used as a position of safety when working on lines that are still open to traffic. • The need for employers to emphasise the importance, for everyone's safety, of not working in dangerous locations, and the responsibility of individuals to identify when the working environment is, or becomes, unsafe. |
| Near miss involving track workers near Hest Bank, Lancashire on 22/09/2014 [potential multiple fatality accident] (ongoing). | Human error. | <ul style="list-style-type: none"> • The need to mitigate risk associated with extended warning times. • Research into railway activities that require constant levels of vigilance. • Mitigating the risk of high reliance on a single lookout. |
| Runaway of two <i>iron men</i> trolleys and subsequent near-miss at Raven level crossing, Garnant, Carmarthenshire on 01/11/2014 (ongoing). | Design and maintenance testing of iron men trolleys and suitability for long distance movements on steep gradients. | Improved design, procedures and training for the use of such equipment. |

Derailments of freight (and other non-passenger) trains on the national network

By 31 December 2014 the RAIB had published a total of 34 reports concerning the derailment of a non-passenger train. Chart 4 (below) shows the primary causes of these derailments.

Chart 4 – Primary causes of non-passenger train derailments identified in RAIB reports 2005-2014

Total = 34



The above figure shows that 26% of such derailments investigated by the RAIB were caused by a combination of poor track condition and one of the following:

- defective rolling stock;
- an undesirable design feature of rolling stock; or
- an unevenly distributed payload.

Fact sheet three summarises the investigations and bulletins into freight train derailments that were either published during 2014 or were still ongoing. Key safety issues and areas of recommendation are summarised for each investigation.

5 Identification of important recurrent issues

Areas of particular concern to the RAIB

Understanding the risk associated with freight wagon derailments

Shown below are nine RAIB investigations in which it was found that a derailment occurred due to a track fault combined with the effect of either a deficient wagon or an uneven payload:

Track fault + a deficient wagon

- Container train derailment at Washwood Heath, Birmingham (RAIB report 39/2007).
- Derailment of coal wagons at King Edward Bridge, Newcastle (RAIB report 02/2008).
- Container train derailment at Wigan North Western station (RAIB report 14/2010).
- Derailment of a hopper wagon at Bordesley Junction, Birmingham (RAIB report 19/2012).
- Locomotive at rear of empty stock train derailed at Ordsall Lane (RAIB report 07/2014).
- Container train derailment at Gloucester (RAIB report 20/2014).

Excessive track twist + an unevenly distributed load

- Container train derailment at Duddeston Junction, Birmingham (RAIB report 16/2008).
- Container train derailment at Reading West Junction (RAIB report 02/2013).
- Container train derailment at Primrose Hill/Camden Road West Junction (RAIB report 21/2014).

It is significant that six out of nine of these derailments involved wagons that are designed to carry containers. There was only one case (Gloucester) where the severity of the track fault required the imposition of an immediate speed restriction. This suggests that the railway industry needs to better understand how container wagons and their payloads are interacting with the type of track faults that might sometimes be encountered.

A range of factors can be involved in a derailment. These include the geometry of the track, the interaction of wheels and rail, and differing levels of friction. Assessing the interactions between these factors can be complex. Consequently, computer simulations are often used by the RAIB to assess the way in which the various factors have combined to cause a derailment.

Both track and wagons are subject to design and maintenance processes, and operating rules, which aim to control the factors that can contribute to derailment. In Great Britain the design and maintenance of track and wagons are almost always the responsibility of different organisations. The definition of the allowable condition of track and wagons has evolved during many years of service experience. Many in the railway industry argue that as long as track condition, and wagon design and operation remain close to that in the past (sometimes referred to as the ‘historical norm’), the risk associated with wagon derailments will not vary a great deal from its current level. However, a number of RAIB derailment investigations indicate that reliance on this ‘historical norm’ is no longer sufficient since wagon design and payloads are changing over time. When such changes are occurring, their effect on derailment risk is not being systematically evaluated. Part of the reason for this is that the ‘historical norm’ is not clearly defined.

It is the view of the RAIB that the industry need to better understand:

- the interrelationship between allowable conditions of track, wagons and their payloads;
- the basis of its ‘historical norm’ and what constitutes a significant change from it; and
- how to approach quantifying risk when such changes are made, given that more than one industry party may be involved.

In relation to track quality, the RAIB is concerned about the number of investigations in which freight trains derail on track that has a history of recurring faults (this was found to be a factor in no less than three investigations published by 31 December 2014). In some instances this has occurred because local staff have not appreciated the significance of the recurrent (and/or multiple) track faults. In many others, staff have identified an underlying deterioration in track quality but have not taken actions to address it due to factors, such as, a lack of resource, poor competence or the absence of management oversight. Network Rail has recognised the issue and is introducing new management systems that are intended to aid the identification, tracking, management and rectification of recurrent track faults.

[Railway industry initiatives to address vehicle/track system interface risk](#)

The RAIB findings, and a recent ORR initiative, have prompted and informed an important railway industry initiative to better understand the control of risk associated with the derailment of container wagons.

The RAIB is happy to endorse this ORR initiative and will be offering to help the industry make full use of RAIB’s learning when addressing this issue.



5 Identification of important recurrent issues

FACT SHEET THREE

RAIB INVESTIGATIONS INTO FREIGHT TRAIN DERAILMENTS DURING 2014

NOTE: those investigations which raise substantive issues for both track and rolling stock are shaded

| Investigation | Primary cause | Key safety issue and areas of recommendation |
|---|--|---|
| Derailment at Castle Donington, Leicestershire, RAIB report 02/2014. | Track condition (cyclic top). | <ul style="list-style-type: none"> The need for effective management of cyclic top (including assessing the implications of incomplete maintenance activities). |
| Locomotive derailment at Ordsall Lane Junction, Salford, RAIB report 07/2014. | Track design (absence of <i>check rail</i> and high friction on curve). | <ul style="list-style-type: none"> The need to identify all curves that are non-compliant with the requirement for a check rail, and at each such location, to implement measures to manage the derailment risk. The need to identify locations where recent changes (eg to rail lubrication) may have increased friction levels, and at each such location to implement suitable risk control measures. The need to define criteria for when existing track assets should be brought into line with current standards. |
| Derailment of a freight train at Gloucester, RAIB report 20/2014. | Poor track condition (cyclic top) combined with abnormal dynamic performance of rolling stock. | <ul style="list-style-type: none"> The need for more effective management of track drainage. The need for a comprehensive review of the way in which cyclic top is detected and managed. The need for a review of the ways in which the susceptibility of new rolling stock to cyclic top is assessed as part of design verification and approvals. The need for new guidance on designing rolling stock such that it is not vulnerable to the effect of cyclic top. |
| Derailment at Primrose Hill/Camden Road West Junction, RAIB report 21/2014. | Poor track condition combined with longitudinal and lateral asymmetric loading of a container wagon. | <ul style="list-style-type: none"> The need for improved guidance on how staff should manage track geometry in the absence of data from track recording vehicles. The need for key stakeholders in the railway industry to work together to assess the risk of asymmetric loading, and to adopt reasonably practicable control measures. The need for railway standards on the resistance to derailment to make suitable allowance for the effects of asymmetric loading. |
| Derailment of a freight train at Stoke Lane, RAIB report 02/2015. | <i>Voiding</i> of ground under track following tunnelling activities. | <ul style="list-style-type: none"> The need for improved arrangements for managing the risk of third party construction activities under the track. |
| Derailment of a freight train at Angerstein Junction on 02/04/2014 (ongoing). | Poor track condition and the effect of an uneven residual load. | <ul style="list-style-type: none"> The need for an assessment of the base distance over which track twist is measured. The need for improved guidance on how staff should manage track geometry on lines that are not currently monitored by track recording vehicles. The control of risk due to residual and uneven loads in aggregate wagons. The need to assess acceptable limits for twist in bogies. The potential for better information to wagon operators by using data from the new build of wheel impact detectors. |
| Derailment of a freight train near Porthkerry on 02/10/2014 (ongoing). | Poor rail condition. | <ul style="list-style-type: none"> The need for improved measures to control the risk of rail failure (particularly when rail is re-used). |
| Derailment of a freight train near Heworth on 23/10/2014 (ongoing). | Poor track condition combined with defective wagon suspension. | <ul style="list-style-type: none"> Improved management of recurrent track faults. Mitigating the risk of defective pedestal suspension. |
| Derailment of a freight train at Ashburys, Manchester, RAIB bulletin B02/2015). | Cracked wheel due to dragging brakes. | <ul style="list-style-type: none"> Measures to control the risk of wheels overheating due to defective brakes. |

Accidents to passengers at station platforms (platform train interface)

By 31 December 2014, the RAIB had published a total of 12 reports and one bulletin into accidents to passengers associated with the movement of trains or trams at station platforms. Of these, nine involved trains on the national network, two involved London Underground, one involved a tram and one a train on Newcastle's metro system. Of the total:

- four accidents involved people falling between the train and platform;
- six involved people who were trapped in train doors and dragged for a distance as the train departed;
- one involved a person who was trapped and dragged and then fell between the train and the platform; and
- two involved mismanagement of train doors.

Three investigations involving the platform train interface were published during 2014:

- Passenger trapped in a train door and dragged a short distance at Newcastle Central station (RAIB report 19/2014).
- Passenger dragged a short distance by a train at Holborn station (RAIB report 22/2014).
- Accidents involving a wheelchair rolling onto the track at Southend Central and a children's push-chair rolling onto the track at Whyteleafe (RAIB report 17/2014).

Areas of particular concern to the RAIB

While the rail industry's overall safety record has improved in recent years, industry data shows that accidents at the platform/train interface have increased since 2005/2006, even allowing for an increased number of passenger journeys. The increase indicates that the industry's focus on operational matters has not delivered improved safety at the platform/train interface, which suggests that there is a need to consider technical solutions to reduce the risk.

Although contributing passenger behavioural issues cannot be eradicated, there are technical measures that can be taken to reduce the likelihood of serious accidents. These include:

- allowing the person dispatching the train to observe the platform and train, fully and without interruption, for as long as possible, ideally until the train has left the platform;
- allowing the train to be stopped directly and quickly by the person dispatching it in the event of an emergency;
- measures to prevent people from falling through the platform edge gap; and
- reducing the possibility that passengers can become trapped in train doors undetected, whilst on the outside of the train.

5 Identification of important recurrent issues

Some rail industry bodies may judge that technical solutions are not reasonably practicable to carry out when they compare safety benefits with the cost of implementation. However, technical solutions can bring operational benefits because they speed up train dispatch and give the people responsible for dispatch more confidence in the judgement calls they must sometimes make. Technical solutions that prevent accidents, or mitigate their consequences, may also reduce train delays and service disruptions. For these reasons, the operational benefits of technical solutions should be fully considered in any cost benefit analysis.

Railway industry initiatives to address PTI risk

The RAIB is pleased to note that the ORR has worked with RSSB to establish a cross-industry group to develop a strategy for the management of the platform train interface (the 'Platform Train Interface Strategy Group' (PTISG)). This major initiative is intended to address a recommendation made by the RAIB in its report into a fatal accident at James Street station in Liverpool (RAIB report 22/2012).

The work of the PTISG is captured in a RSSB document entitled '[Platform Train Interface Strategy](#)' that was published in January 2015. Its analysis of the current PTI risk identifies three types of hazardous event that are of particular concern to the RAIB due to their proven potential to cause very serious harm to those involved. These are:

Incidents involving passengers falling between the train and the platform

- Huntingdon train door incident (RAIB report 11/2007).
- Passenger accident at Brentwood station (RAIB report 19/2011).
- Fatal accident at James Street station, Liverpool (RAIB report 22/2012).
- Accident at Charing Cross station (RAIB report 10/2013).

Incidents involving passengers falling from the platform

- Accidents involving a wheelchair rolling onto the track at Southend Central and a pushchair rolling onto the track at Whyteleafe (RAIB report 17/2014).

Incidents involving passengers being struck and/or trapped and dragged by train doors

- Huntingdon train door incident, RAIB report 11/2007).
- Person trapped in doors and pulled along platform at King's Cross station, London (RAIB report 09/2012).
- Person trapped in a train door and dragged at Jarrow station, Tyne and Wear Metro (RAIB report 26/2012).
- Passenger trapped in a train door and dragged a short distance at Newcastle Central station (RAIB report 19/2014).
- Passenger dragged a short distance by a train at Holborn station (RAIB report 22/2014).

The Platform Train Interface Strategy document both identifies areas of current railway industry activity relevant to the management of PTI risk, and areas of potential safety improvement.

As shown in **fact sheet four**, a significant number of the areas for action identified by the PTISG correspond to areas of recommendations made by the RAIB in its investigations. Consequently, the RAIB is hopeful that the work of the new PTI Strategy Implementation Group that has been established in the wake of the published strategy, will lead to real improvements in passenger safety on the growing network.



5 Identification of important recurrent issues

FACT SHEET FOUR

KEY PTI SAFETY ISSUES IDENTIFIED IN RAIB INVESTIGATIONS AND ACTIONS PROPOSED IN THE RAIL INDUSTRY'S 'PLATFORM TRAIN INTERFACE STRATEGY'

| Safety issue | RAIB recommendation | | Action identified by PTISG |
|--|--|---|--|
| | Rec No. | Report | |
| Enabling dispatchers to observe the platform train interface for as long as possible, ideally until the train has left the platform. | 3 | Fatal accident at James Street station, Liverpool, RAIB report 22/2012. | Likely areas of research that have been identified include the feasibility and effectiveness of increased use of cameras to monitor the PTI during dispatch, and as the train is departing. |
| Enabling dispatchers to stop trains quickly in an emergency (including after the signal to start has been given). | 3 | Fatal accident at James Street station, Liverpool, RAIB report 22/2012. | Consideration is to be given to the technologies that can be utilised to stop trains when there is a PTI incident. |
| | <i>Learning point</i> 1 | Accident at Charing Cross station, RAIB report 10/2013. Passenger dragged a short distance by a train at Holborn station, RAIB report 22/2014. | |
| Adapting trains and/or platforms to reduce the platform edge gap. | 3 | Fatal accident at James Street station, Liverpool, RAIB report 22/2012. | A stated objective of the PTISG is the provision of clear processes for optimising the platform train gap at individual locations, taking into account the different traffic types, operations, and geographical constraints. Areas to be addressed will include: <ul style="list-style-type: none"> Evaluation of the effectiveness of platform edge gap fillers (trials are ongoing at Heathrow). Investigation of platform height, and train gauge, in order to optimise the platform edge gaps and stepping distances. |
| The need for systematic assessment of dispatch risk at each platform. | 3 | Passenger accident at Brentwood station, RAIB report 19/2011. | <ul style="list-style-type: none"> Ongoing development of a PTI risk management tool. |
| | <i>Reported to be an action already taken.</i> | Passenger trapped in a train door and dragged a short distance at Newcastle Central station, RAIB report 19/2014. | |
| Design and testing of train door obstruction detection systems. | 5 | Passenger trapped in a train door and dragged a short distance at Newcastle Central station, RAIB report 19/2014. | Research is also planned into how train door design can be enhanced to help reduce the occurrence of door trapping incidents (including methods of testing). |
| Improved information on door trapping incidents. | 6 | Passenger trapped in a train door and dragged a short distance at Newcastle Central station, RAIB report 19/2014. | <ul style="list-style-type: none"> Improved PTI data capture form trialed. SMIS improvements planned to aid good quality data capture for PTI incidents. Trial of new system for reporting 'close calls' (including at the PTI). |
| Management of the risk at platforms that slope towards the track. | 2 | Wheeled transport rolling off platforms at Southend and Whyteleafe, RAIB report 17/2014. | Research is planned into <i>crossfall</i> requirements for platforms. |
| Passenger awareness of PTI risk. | 3 | Wheeled transport rolling off platforms at Southend and Whyteleafe, RAIB report 17/2014. | A series of initiatives are planned to increase public awareness of PTI risk, and to enable staff to help manage it. |
| | 1 | Person trapped in a train door and dragged at Jarrow station, RAIB report 26/2012. | |

Appendix A - Summary of key recurrent safety issues in RAIB investigations between October 2005 and the end of 2014

All of the named investigations have taken place on Great Britain's national network unless indicated thus:

- (U) London Underground.
- (L) Light rail/tramway.
- (H) Heritage sector (and other minor railways).
- (NI) Northern Ireland.
- (M) Metro.

Issues that are highlighted in colour in table A1 are of particular interest to the RAIB and have been discussed in more detail in the text in part 5. These issues have been selected for one or more of the following reasons:

- there are major risk implications (eg level crossings, track worker safety, platform train interface);
- there have been a number of potentially dangerous events (eg derailment of freight trains); and
- factors that have been identified previously have recurred and are still of concern to the RAIB (eg level crossings, track worker safety, freight trains, track).

Table A1 – Recurrent issues tracking table

| RECURRENT ISSUES | No. of reports published before 2014 N = GB National network L = Light rail H = Heritage U = Underground NI = Northern Ireland M = Metro | No. of reports published during 2014 | Report reference <i>(bulletins shown in italics)</i> Investigations & bulletins involve GB national network (N) unless otherwise indicated | No. of investigations ongoing at 31 December 2014 | Details of investigations ongoing at 31 December 2014 <i>(bulletins shown in italics)</i> Investigations & bulletins involve GB national network (N) unless otherwise indicated |
|------------------|--|--------------------------------------|--|---|---|
| Level crossings | N = 30 (+ 2 class investigations + 3 bulletins) L = 6 H = 3 (+ 1 bulletin) NI = 1 Total = 46 | 8 | <p>Fatal accident at Motts Lane level crossing, Witham, Essex, RAIB report 01/2014.</p> <p>Fatal accident at Athelney level crossing, near Taunton, Somerset, RAIB report 04/2014.</p> <p>Collision at Buttington Hall user-worked crossing, Welshpool, RAIB report 06/2014.</p> <p>Accident at Balnamore level crossing, Ballymoney, RAIB report 10/2014 (NI).</p> <p>Near miss at Landoverly level crossing, Carmarthenshire, RAIB report 11/2014.</p> <p>Near miss at Butterswood level crossing, North Lincolnshire, RAIB report 12/2014.</p> <p>Fatal accident at Barratt's Lane No. 2 footpath crossing, Attenborough, Nottingham, RAIB report 18/2014.</p> <p>Collision between a train and a car at Jetty Avenue level crossing, Woodbridge, Suffolk, RAIB report 28/2014.</p> | 1 | Fatal accident at Frampton level crossing (since published, RAIB report 05/2015). |

| RECURRENT ISSUES | No. of reports published before 2014 N = GB National network L = Light rail H = Heritage U = Underground NI = Northern Ireland M = Metro | No. of reports published during 2014 | Report reference <i>(bulletins shown in italics)</i> Investigations & bulletins involve GB national network (N) unless otherwise indicated | No. of investigations ongoing at 31 December 2014 | Details of investigations ongoing at 31 December 2014 <i>(bulletins shown in italics)</i> Investigations & bulletins involve GB national network (N) unless otherwise indicated |
|---|--|--------------------------------------|--|---|---|
| Risk management and inspection at level crossings | N = 21 (+ 1 class investigation + 1 bulletin) L = 2 H = (1 bulletin) Total = 26 | 4 | Fatal accident at Motts Lane level crossing, Witham, Essex, RAIB report 01/2014. Collision at Buttington Hall user-worked crossing, Welshpool, RAIB report 06/2014. Fatal accident at Barratt's Lane No. 2 footpath crossing, Attenborough, Nottingham, published, RAIB report 18/2014. Collision between a train and a car at Jetty Avenue level crossing, Woodbridge, Suffolk, RAIB report 28/2014. | 0 | |
| Error or unsafe act by railway staff (eg crossing keeper or train driver] | N = 8 (+ 2 bulletins) H = 1 Total = 11 | 3 | Accident at Balnamore level crossing, Ballymoney, RAIB report 10/2014 (NI). Near miss at Landoverly level crossing, Carmarthenshire, RAIB report 11/2014. Near miss at Butterswood level crossing, North Lincolnshire, RAIB report 12/2014. | 0 | |
| Error or unsafe acts by level crossing users | N = 17 (+ 2 class investigations) L = 4 NI = 1 Total = 24 | 5 | Fatal accident at Motts Lane level crossing, Witham, Essex, RAIB report 01/2014. Fatal accident at Athelney level crossing, near Taunton, Somerset, RAIB report 04/2014. Collision at Buttington Hall user-worked crossing, Welshpool, RAIB report 06/2014. Fatal accident at Barratt's Lane No. 2 footpath crossing, Attenborough, Nottingham, RAIB report 18/2014. Collision between a train and a car at Jetty Avenue level crossing, Woodbridge, Suffolk, RAIB report 28/2014. | 1 | Fatal accident at Frampton level crossing (since published, RAIB report 05/2015). |

| RECURRENT ISSUES | No. of reports published before 2014 N = GB National network L = Light rail H = Heritage U = Underground NI = Northern Ireland M = Metro | No. of reports published during 2014 | Report reference <i>(bulletins shown in italics)</i> Investigations & bulletins involve GB national network (N) unless otherwise indicated | No. of investigations ongoing at 31 December 2014 | Details of investigations ongoing at 31 December 2014 <i>(bulletins shown in italics)</i> Investigations & bulletins involve GB national network (N) unless otherwise indicated |
|---|--|--------------------------------------|--|---|---|
| Level crossing design Issues | N = 25 (+ 2 class investigations + 3 bulletins) L = 2 H = 3 (+ 1 bulletin) NI = 1 Total = 37 | 6 | Fatal accident at Motts Lane level crossing, Witham, Essex, RAIB report 01/2014. Fatal accident at Athelney level crossing, near Taunton, Somerset, RAIB report 04/2014. Near miss at Landoverly level crossing, Carmarthenshire, RAIB report 11/2014. Near miss at Butterswood level crossing, North Lincolnshire, RAIB report 12/2014. Fatal accident at Barratt's Lane No. 2 footpath crossing, Attenborough, Nottingham, RAIB report 18/2014. Collision between a train and a car at Jetty Avenue level crossing, Woodbridge, Suffolk, RAIB report 28/2014. | 1 | Fatal accident at Frampton level crossing (since published RAIB report 05/2015). |
| Road vehicle incursions | N = 5 (+ 1 bulletin) Total = 6 | 1 | Road vehicle incursion onto the railway at Aspatria, Cumbria, RAIB report 14/2014. | 0 | |
| Staff working on lines that are still open to traffic (<i>Red Zone working</i>) | N = 11 (+ 3 bulletins) L = 1 Total = 15 | 0 | | 3 | Fatal accident involving a track worker, near Newark North Gate station (since published, RAIB report 01/2015). Accident involving a track worker near Redhill on 24/06/2014. Near miss involving track workers near Hest Bank, Lancashire on 22/09/2014. |

| RECURRENT ISSUES | No. of reports published before 2014 N = GB National network L = Light rail H = Heritage U = Underground NI = Northern Ireland M = Metro | No. of reports published during 2014 | Report reference <i>(bulletins shown in italics)</i> Investigations & bulletins involve GB national network (N) unless otherwise indicated | No. of investigations ongoing at 31 December 2014 | Details of investigations ongoing at 31 December 2014 <i>(bulletins shown in italics)</i> Investigations & bulletins involve GB national network (N) unless otherwise indicated |
|--|--|--------------------------------------|---|---|--|
| Work activities in and around an engineering possession (including train movements) | N = 12 (+ 1 bulletin) Total = 13 | 0 | | 4 | Runaway of trolleys and subsequent near miss at Raven level crossing, Garnant, Carmarthenshire on 01/11/2014. Runaway of an on-track machine at Bryn, near Wigan on 27/11/2014. Near miss involving construction workers at Heathrow Tunnel Junction, West London on 28/12/2014. Class investigation into possession irregularities. |
| Safety of track workers, safety leadership and the supervision of track workers | N = 21 (+ 4 bulletins) L = 1 Total = 26 | 0 | | 3 | Fatal accident involving a track worker, near Newark North Gate station (since published, RAIB report 01/2015). Near miss involving construction workers at Heathrow Tunnel Junction, West London on 28/12/2014. Class investigation into possession irregularities. |
| Track quality, maintenance & inspection | N = 15 L = 4 H = 3 U = 1 NI = 1 Total = 24 | 5 | Derailment at Castle Donington, Leicestershire, RAIB report 02/2014. Locomotive derailment at Ordsall Lane Junction, Salford, RAIB report 07/2014. Freight train derailment near Gloucester, RAIB report 20/2014. Class investigation into rail breaks on the East Coast Main Line, RAIB report 24/2014. Derailment at Liverpool Street station, London, RAIB report 27/2014. | 5 | Derailment of freight train at Stoke Lane level crossing, near Nottingham (since published, RAIB report 02/2015). Derailment of a freight train at Angerstein Junction on 02/04/2014. Derailment at London Paddington station (since published, RAIB report 03/2015). Derailment of a freight train near Porthkerry, Vale of Glamorgan, South Wales on 02/10/2014. Derailment of freight train near Heworth, Tyne and Wear, on 23/10/2014. |

| RECURRENT ISSUES | No. of reports published before 2014 N = GB National network L = Light rail H = Heritage U = Underground NI = Northern Ireland M = Metro | No. of reports published during 2014 | Report reference <i>(bulletins shown in italics)</i> Investigations & bulletins involve GB national network (N) unless otherwise indicated | No. of investigations ongoing at 31 December 2014 | Details of investigations ongoing at 31 December 2014 <i>(bulletins shown in italics)</i> Investigations & bulletins involve GB national network (N) unless otherwise indicated |
|---|---|---|---|--|---|
| Switches and crossings (S&C) | N = 6 (+ 2 bulletins) L = 4 H = 2 U = 1 Total = 15 | 0 | | 1 | Tram derailment near Mitcham Junction, London on 29/12/2014 (L). |
| Road rail vehicles | N = 4 NI = 1 Total = 5 | 1 | Runaway of a road rail vehicle and the resulting collision in Queen Street High Level Tunnel, Glasgow, RAIB report 15/2014. | 1 | Runaway of an on-track machine at Bryn, near Wigan on 27/11/2014. |
| Passenger train design and maintenance | N = 12 (+2 bulletins) L = 1 H = 2 (+1 bulletin) U = 1 M = 2 Total = 21 | 5 | Tram running with doors open on London Tramlink, Croydon, RAIB report 05/2014 (L). Passenger trapped in train doors and dragged a short distance at Newcastle Central Station, RAIB report 19/2014. Uncontrolled evacuation of a London Underground train at Holland Park station, RAIB report 16/2014 (U). Locomotive failure near Winchfield, RAIB report 13/2014 (H). Buffer stop collision at Chester station, RAIB report 26/2014. | 2 | Electrical arcing and fire on a Metro train and parting of the overhead line at Walkergate Station, Newcastle upon Tyne on 11/08/2014 (M). Derailment at London Paddington station (since published, RAIB report 03/2015). |
| Defective freight rolling stock – including load and train preparation | N = 19 (+ 4 bulletins) H = 1 Total = 24 | 2 | Freight train derailment near Gloucester, RAIB report 20/2014. Derailment at Primrose Hill/Camden Road West Junction, RAIB report 21/2014. | 2 (+1) | Derailment of a freight train at Angerstein Junction on 02/04/2014. Derailment of freight train near Heworth, Tyne and Wear on 23/10/2014. <i>Derailment of a freight train at Ashburys, Manchester (since published RAIB bulletin B02/2015).</i> |

| RECURRENT ISSUES | No. of reports published before 2014 N = GB National network L = Light rail H = Heritage U = Underground NI = Northern Ireland M = Metro | No. of reports published during 2014 | Report reference <i>(bulletins shown in italics)</i> Investigations & bulletins involve GB national network (N) unless otherwise indicated | No. of investigations ongoing at 31 December 2014 | Details of investigations ongoing at 31 December 2014 <i>(bulletins shown in italics)</i> Investigations & bulletins involve GB national network (N) unless otherwise indicated |
|--|---|---|---|--|--|
| Fatigue | N = 10 Total = 10 | 2 | Collision between a passenger train and a stationary train at Norwich station, RAIB report 09/2014. Near miss at Llandoverly level crossing, Carmarthenshire, RAIB report 11/2014. | 1 | Special report on Fatigue. |
| Low adhesion | N = 3 (+ 1 bulletin) H = 1 Total = 5 | 1 | Buffer stop collision at Chester station, RAIB report 26/2014. | 0 | |
| Safety management, compliance with rules and asset management on heritage and other minor operators | H = 10 (+ 4 bulletins) Total = 14 | 0 | | 1 | Collision at Loughborough Central on the Great Central Railway (since published, RAIB report 04/2015) (H). |
| Accidents involving passengers and moving trains at stations (Platform Train interface) | N = 5 (+ 1 bulletin) L = 1 U = 2 M = 1 Total = 10 | 3 | Passenger trapped in train doors and dragged a short distance at Newcastle Central Station, RAIB report 19/2014. Wheeled transport rolling off platforms at Southend and Whyteleafe stations, RAIB report 17/2014. Passenger dragged a short distance by a train at Holborn station, RAIB report 22/2014 (U). | 0 | |

| RECURRENT ISSUES | No. of reports published before 2014 N = GB National network L = Light rail H = Heritage U = Underground NI = Northern Ireland M = Metro | No. of reports published during 2014 | Report reference <i>(bulletins shown in italics)</i> Investigations & bulletins involve GB national network (N) unless otherwise indicated | No. of investigations ongoing at 31 December 2014 | Details of investigations ongoing at 31 December 2014 <i>(bulletins shown in italics)</i> Investigations & bulletins involve GB national network (N) unless otherwise indicated |
|---|--|--------------------------------------|--|---|---|
| Failures of structures or deficient inspection/assessments | N = 8 Total = 8 | 1 | Dangerous occurrence at Denmark Hill station, RAIB report 23/2014. | 0 | |
| Earthworks | N = 8 (+ 1 class investigation + 1 bulletin) NI = 1 Total = 11 | 3 | Derailment at Castle Donington, Leicestershire, RAIB report 02/2014. Class investigation into landslips affecting Network Rail infrastructure between June 2012 and February 2013, RAIB report 08/2014. Freight train derailment near Gloucester, RAIB report 20/2014. | 0 | |

Appendix B - Glossary of abbreviations and acronyms

| | |
|---------|---|
| ARS | Automatic Route Setting |
| CP | Control Period |
| LCM | Level Crossing Manager |
| ERA | European Railway Agency |
| ERA SIS | European Railway Agency Safety Information System |
| ERTMS | European Rail Traffic Management System |
| FPC | Footpath Crossing |
| LRT | Light Rail Tram |
| ORR | Office of Rail and Road |
| PTI | Platform Train Interface |
| PTISG | Platform Train Interface Strategy Group |
| SMIS | Safety Management Information System |
| SPAD | Signal Passed At Danger |
| TOC | Train Operating Company |
| USA | Urgent safety advice |
| UWC | User Worked Crossing |

Appendix C - Glossary of terms

All definitions marked with an asterisk, thus (*), have been taken from Ellis' British Railway Engineering Encyclopaedia © Iain Ellis. www.iainellis.com.

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|----------------------------|--|
| Adhesion | Describing the friction produced between a rail and a rail wheel. Therefore, loss of adhesion is the absence of this friction and the inability to make any forward progress.* |
| Bogie | A metal frame equipped with two or three wheelsets and able to rotate freely in plan, used in pairs under rail vehicles to improve ride quality and better distribute forces to the track.* |
| Cess | Space alongside the line, it can provide space for a Cess path but it is not always a position of safety.* |
| Check rail | A rail or other special section provided alongside a running rail to give guidance to flanged wheels by restricting lateral movement of the wheels.* |
| Crossfall | The transverse (relative to the track) slope applied to the formation to ensure effective drainage.* |
| Cyclic top | Regular vertical, medium wavelength variations from design level.* |
| Flange climb | A fault condition in which the lateral force exerted on a rail wheel is sufficient to force the rotating wheel up the gauge face of the rail.* |
| Footpath crossing | A level crossing provided solely for use by pedestrians.* |
| Infrastructure Manager | Any person who is responsible for establishing and maintaining infrastructure or a part thereof, which may also include the management of infrastructure control and safety systems, but does not include a maintainer.* |
| Iron Men | (Trade name) Pairs of small gantries fitted with chain hoists and rail wheels, used to transport rails, crossings and switch half sets to and from sites without using powered plant. * |
| Locally Monitored Crossing | A level crossing operated by a signaller or crossing keeper from a signal box or crossing box adjacent to the level crossing.* |
| Miniature Stop Lights | Miniature lights more often red and green used as the warning at certain types of automatic level crossing.* |
| Points | An assembly of Switches and Crossings designed to divert trains from one line to another.* |
| Possession | A period of time during which one or more tracks are blocked to trains to permit work to be safely carried out on or near the line.* |
| Road Rail Vehicle | Any vehicle adapted to operate equally well on road and rail. |
| Red Zone | An area that is on or near a line where trains are running normally.* |

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|----------------------|--|
| Switches & Crossings | See definition of Points (above). |
| Track Geometry | The horizontal and vertical Alignment of the track.* |
| User worked crossing | A level crossing where the barriers or gates are operated by the user. There is generally no indication of the approach of trains, but a telephone will be provided to contact the signaller.* |
| Voiding | A track fault consisting of spaces under sleepers or bearers in the packing area, often caused by inadequate packing or differential settlement between sleepers.* |

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Department for Transport.

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