


RAIB

Rail Accident Investigation Branch

# Annual Report 2009 - Section 1

Department for Transport

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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## Preface

This is the Rail Accident Investigation Branch's (RAIB) Annual Report for the calendar year 2009. 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 website at http://www.raib.gov.uk.

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# RAIB Annual Report 2009









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# Chief Inspector's Foreword

In the 12 months covered by this report the Rail Accident Investigation Branch has completed and published 33 reports, 9 bulletins and started a further 21 investigations; 20 concerning specific accidents or incidents and one concerning a series of accidents.

The main purpose of this report is to highlight the safety issues in the industry today as we see them through our investigations and the actions that are being taken to address these issues. Section 1 of the report gives our overview whilst Section 2 itemises each recommendation we have made in 2009 along with previous recommendations that were seen as open at the end of 2008 and the status of those recommendations as reported to us.

The consequences of an accident are not a reliable indication of the size of the risk to safety nor the potential for more serious consequences. Therefore the RAIB must take that into account in deciding what it will investigate, based on early information regarding the incident and the RAIB's judgement as to whether an investigation has the potential for significant learning and improvement of safety. This is why we investigate incidents or near misses. By the time a serious accident occurs, for some of those involved, our investigation is too late.

Regarding the number of investigations we undertake, a simple comparison with our European equivalents is unlikely to be meaningful as it will fail to take into account some key differences. The National Rail Accident Investigation Bodies (NIBs) vary enormously between the European member states. Some are very well established whilst others are still in the process of establishing their operations; some only investigate those rail systems which are subject to European law whilst others, like us, investigate other railways such as the metros (eg London Underground) and tramways (eg Croydon and Manchester's Light Rail Systems). Some use in-house capability to do most of the investigation work whilst others, to a large extent, use investigation work carried out by others including the police and industry.

I decided we would publish all of our investigation reports not only on our own website but also on that of the European Rail Agency, as this provides broader access to safety information regarding light rail, metros and other railways that may benefit others outside of the UK.

Last year we conducted 49 preliminary examinations and, based on early information about these accidents or incidents, we started 20 investigations. Of the 20 investigations we started last year 15 were on rail systems which are the subject of European legislation. Of those 15; three were fatal accidents (five people were killed; four people in crossing accidents and one person whilst working on the tracks); one was a total collapse of a bridge whilst a train was travelling over it; two were very near miss fatal accidents (one involved a worker being struck by a train; the other where a wheelchair user had to pull himself clear of his chair on a crossing to avoid being was struck by a train); three were accidents which under slightly different circumstances would have been serious; and the remaining six indicated significant risks to safety which warranted independent investigation.

While the way we investigate is very different from the former Industry Formal Inquiries[1], the number of Formal Inquiries was not so very different from the current number of RAIB investigations. A review of Rail Safety and Standard Board's (RSSB's) website[2] indicates in the three years from January 2002 to December 2004 before the RAIB became operational, 39 such Inquiries concerning the UK's national rail system were commenced; an annual average of 13. Last year RAIB commenced 15 such investigations. The average number of recommendations per formal inquiry was 10 - which is higher than the RAIB's average of six recommendations per report in the last two years.

The UK's railways in general continue to deliver high levels of safety but it is impossible to measure how many accidents are avoided through the work of the RAIB. However, since RAIB went live in October 2005 and up to December 2009 the industry had reported it had implemented 445 of RAIB's recommendations (239 had been validated as such by the ORR). These statistics do not reflect the additional actions that the industry take during the course of RAIB's investigations thereby negating the need for a RAIB recommendation[3]. Each implemented recommendation is a change to the railway or the way in which railway people do their work; each reflects an improvement made by the industry to further the safety of passengers, workers and the public.

In 97% of the cases where RAIB is aware of the response to its recommendations, measures to implement the recommendations are either in progress or are complete. I believe this is an indication of a very positive engagement between industry and the work we do.

I said in last year's annual report that we had found recurring issues relating to:

a) worksite management;
b) management of fatigue;
c) planning possessions and weaknesses in conveying related information to staff;
d) inspection standards for track and related guidance to staff;
e) location and signage of decision points at crossings;
f) examination and assessment of risks associated with crossings and design for good sighting; and
g) management and operation of Road Rail Vehicles.

Many of these issues have continued to be evident during 2009. This year our report makes reference to further reccurring issues relating to:

a) maintenance standards for track and guidance to staff;
b) management of earthworks;
c) freight train preparation; and
d) Red Zone working.

ORR and industry parties have indicated that steps have been taken in many of these areas or work is underway.

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[1] Formal Inquiries were managed by Railway Safety and more recently by Rail Safety and Standards Board (RSSB)

[2] www.rssb.co.uk.

[3] RAIB reports include details of such industry activity.

## Chief Inspector's foreword

We believe there are cases where, had our recommendations been implemented sooner, or more completely, it is very likely that a second incident would have been avoided. We have continued to discuss such cases with both specific industry parties and ORR throughout the year. We hope this might inform the ORR's new recommendation handling process and also help inform industry both in their decisions when prioritising their work on safety and their own monitoring of repeat causality amongst the broader base of industry investigations.

The RAIB has in the past expressed concerns about the length of time it has taken for the ORR to report the progress of implementation of RAIB recommendations and the ambiguity of the status of a recommendation when it is reported as 'closed'. However, in early 2010 the ORR introduced a new system of recommendation handling that is aimed to give more timely and structured reports. The reports received by us since April this year, in general, have provided better information on the measures taken and also a timeframe for implementation agreed between the ORR and the duty holder. More recently the ORR has confirmed that it will no longer use the term 'closed' in its reports but instead indicate when a recommendation has been fully implemented thus providing a far better understanding to those individuals affected by rail accidents, the industry, the public and the RAIB.

I mentioned in last year's Annual Report that at the time of publication the RAIB had not received confirmation from ORR that any of the Grayrigg recommendations had been satisfactorily completed. The accident at Grayrigg occurred in February 2007 and the RAIB published its final report in October 2008. The ORR has since provided details of the timeframes agreed between them and Network Rail for implementation of the related recommendations. These range from mid 2010 to early 2012. A number are declared by Network Rail as complete, three have been validated by ORR as such, and two as partially complete.

In relation to RAIB's Grayrigg recommendation 29 which concerned establishing thresholds of working hours for safety critical staff, we have since investigated another accident (East Somerset Junction – published in November 2009) and made further more detailed recommendations concerning the same issue. ORR have reported that Network Rail are now reviewing their controls and standards concerning working hours and are considering revised working hour limits with a view to implementing a new standard in the first quarter of next year.

Of the eight Grayrigg recommendations that were made to parties other than Network Rail, five have been reported as complete and we await confirmation of the outcome of the remaining three.

Accident investigation has produced valuable evidence about the effectiveness of current standards and whether they convey to the staff who use them the understanding intended. RAIB investigations have also identified apparent knowledge gaps that could be filled by specialist studies or research.

The RAIB has to date directed a total of 44 recommendations to RSSB regarding proposals for changes to standards and for research. We are working with RSSB to better understand RSSB's recommendation handling process, how decisions made concerning our recommendations align with the principles of As Low As Reasonably Practicable (ALARP) and how to better engage with the industry committees as and when appropriate.

# Chief Inspector's foreword

At the time of writing this report, of the 44 recommendations made to RSSB, ORR have reported 30 are implemented, no changes will be made to standards in response to three recommendations and 11 recommendations are under consideration by ORR; but RSSB has indicated to ORR that in seven of those 11 cases no measures are proposed to be taken.

The RAIB continues to foster contact with overseas organisations and works with the European Rail Agency and the NIB Network to share its experience and best practice and to learn. The RAIB is engaged in a number of specific initiatives with investigation bodies both in Europe and further afield internationally.

Last year we asked readers of our Annual Report to give us feedback on whether they found its content and style useful. Although we received limited feedback, we have tried, where possible, to take those comments on board. I would again like to ask for your views to help us shape next year's report (please refer to the feedback questionnaire at Annex C or the electronic version on our website: www.raib.gov.uk/publications/annual_report/annual_report_feedback_2010.cfm). Subject to your views, we intend to make next year's report much shorter and capitalise on links to information within our website. This way we hope to enable readers to access only those sections they wish to read and help us produce the report more efficiently.

Finally, and importantly, I wish to thank those railway organisations and individuals, and particularly the injured and bereaved, who have constructively contributed to our investigations, thus helping us in our work to improve safety.

Carolyn Griffiths

Chief Inspector of Rail Accidents

28 September 2010

# 1. The role of the Rail Accident Investigation Branch

## Background

The RAIB became operational in October 2005 as the UK's independent body for investigating accidents and incidents occurring on the railways of Great Britain and Northern Ireland and tramways in England and Wales. It is part of the Department for Transport, but is functionally and operationally independent; the Chief Inspector reports directly to the Secretary of State on matters concerning accident investigation.

The role 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 these also implement the requirements of the European Railway Safety Directive (2004/49/EC). The Regulations also include details of the scope of the regulations and the categories of accidents that the industry must notify to the RAIB. Full details can be found at www.raib.gov.uk.

Through its investigations, the RAIB's aim is to improve the safety of the railways and prevent railway accidents and incidents by determining the causes and circumstances of accidents and incidents, along with any other factors that contributed to the event or made the outcome worse. It then publishes investigation reports containing evidence based safety recommendations, to reduce the likelihood and mitigate the consequences of similar accidents and incidents occurring in the future. Publication of our investigations reports provides all parts of the railway industry, both nationally and internationally, and the public, with the opportunity to consider the findings and learn lessons from our investigations.

The RAIB is not a prosecuting body and it does not apportion blame or liability. Its investigations are focused solely on improving safety and breaches of legislation are dealt with by other organisations; primarily the police and safety authorities, none of their statutory duties have been changed by the creation of the RAIB.

## Scope of accidents and incidents investigated

The scope of RAIB's work is set out in the Act and it is mandated to investigate any serious railway accident, as defined in the Regulations (Regulation 2(3)), which occurs on a railway, as defined by the Transport and Works Act 1992. This covers all mainline railways, metros, tramways, most heritage railways, and cable hauled systems.

In this context, a serious accident means an accident involving a derailment or collision of rolling stock which has an obvious impact on railway safety regulation or management of safety and includes such an accident that results in:

- the death of at least one person;
- serious injuries to five or more persons; or
- extensive damage to rolling stock, the infrastructure or the environment.

However, it is not required to investigate these accidents if they fall outside of the RAIB's general aim to improve the safety of railways and to prevent railway accidents and incidents.

Importantly, the Act provides for the RAIB to investigate other accidents and incidents occurring on railway property that are or may be relevant to the operation of the railway, and where the Branch believes that there may be significant safety lessons to be learnt which could improve the safety of railways.

The RAIB does not investigate:

- worker accidents/incidents that are not associated with train movements and which are not relevant to the operation of the railway;
- accidents/incidents involving trespassers or suicides; or
- generally accidents/incidents that occur within an industrial curtilage, unless it involves a train carrying passengers.

## Accident and incident notification

The Regulations place a duty on railway industry bodies (railway infrastructure managers, railway operators, or maintainers), whose staff or property is involved in an accident or incident, to notify the RAIB of accidents and incidents. These range from those resulting in serious injury and damage, through to incidents of "near miss".

## RAIB's response to notifications

The RAIB has a Duty Co-ordinator and a team of inspectors on call 24 hours a day, 365 days per year. On being notified of an accident or incident, the RAIB's normal approach is to obtain sufficient further detail. For accidents or incidents that are in scope and where there is perishable evidence or evidence that needs to be recorded or secured before releasing the site back to the industry, inspectors are deployed to the site to conduct a preliminary examination.

The RAIB employs 26 inspectors and principal inspectors with either a professional railway or investigation background, and who have been given extensive and bespoke training concerning railway operations, railway engineering and investigation skills.

Since the RAIB covers the whole of the UK, there can be occasions when it requires assistance to ensure a rapid initial presence at the more remote locations. The purpose is to provide the RAIB with early information from the site and to ensure that important perishable evidence is recorded and other evidence that needs to be protected is identified. For this purpose, the RAIB can ask the railway industry to assign specific industry personnel from its own staff, known as 'Accredited Agents', to carry out these limited activities on behalf of the RAIB until its inspectors arrive on site. These Accredited Agents have all been pre-selected, trained, assessed and approved by the RAIB. During 2009, Accredited Agents were used by the RAIB Duty Co-ordinator on 16 occasions. This included accidents involving derailments, collisions between trains, collisions between trains and road vehicles, and cases of staff being struck by trains.

## Preliminary examination

The purpose is to gather sufficient details and evidence to enable RAIB to make an informed decision about the accident or incident and whether or not to conduct a full investigation. In forming this decision, the RAIB takes into account the actual or potential seriousness of the accident or incident, the potential for recurrence, and whether an investigation by the RAIB would likely meet the aim of improving the safety of railways. If the accident or incident does not warrant a full investigation but the RAIB feels there may still be some learning points for the industry it will publish a short bulletin describing the occurrence and the associated learning points.

# 1 The role of the Rail Accident Investigation Branch

## Investigation

While all of RAIB's investigations are conducted completely independently of any investigations by other parties, it can share with industry stakeholders and will share with other statutory investigatory bodies technical evidence and factual data arising from tests and examinations that it carries out. It will not share witness statements or identification, nor medical records relating to persons involved in the accident or incident.

During investigations the RAIB will maintain contact with the industry stakeholders involved with the accident or incident. However, if at any time during the investigation the RAIB becomes aware of any safety matter that it believes requires urgent consideration it will formally alert the industry and safety authority by issuing an Urgent Safety Advice.

## The investigation report

On completion of the investigation the RAIB produces a draft report for consultation, as required by the Regulations, with the industry stakeholders, safety authority, individuals and anyone involved in the RAIB investigation, and those to whom a recommendation may be directed. The RAIB considers representations and will revise the report if it considers that the changes are appropriate.

On completion the report is sent to the Secretary of State for Transport and published on the RAIB's website.

## The recommendation process

Where appropriate RAIB investigation reports will include recommendations to improve safety. The RAIB can direct recommendations to any organisation or person it thinks is best placed to implement the changes required (the 'end implementer'). This includes railway and non-railway, private and public sector organisations. Those persons or organisations will be informed of the recommendations through involvement in the investigation and/or the RAIB's consultation and being formally sent a copy of the final report by the RAIB.

The recommendations are also addressed to the relevant safety authorities[4], or to other public bodies where appropriate, who are required to ensure that recommendations are duly considered and where appropriate acted upon. They are also required to report back to RAIB details of any implementation measures, 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, other than if it becomes relevant as part of a subsequent investigation, so this feedback is important in providing information and transparency on the safety improvements and changing environment resulting from RAIB's investigations.

Full details of the recommendations made in 2009 and details of recommendations made in previous years which have not been closed by the relevant safety authority or public body is given in 'Annual Report 2009 Section 2: Reported status of RAIB's Recommendations 2009', which can be found at www.raib.gov.uk.

[4] The safety authority is the safety regulator; for mainland UK this is primarily the Office of Railway Regulation (ORR) although there are some recommendations made by the RAIB where the 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.

# 2. Operational Activity 2009

During the period from 1 January to 31 December 2009, the RAIB received 364 notifications of railway accidents and incidents from the industry as required by law, in accordance with the Schedules[5] of the Regulations. In addition there were three events which should have been notified to RAIB. These resulted in 49 deployments of RAIB inspectors to the accident or incident site to carry out a preliminary examination. As a result of the analysis of the information gathered the RAIB started 20 full investigations, one class investigation and issued nine Bulletin reports.

Table 1 – Accidents and Incidents notified to RAIB during 2009

| Schedule | 1 | 2 | 4 | 5 |
|---|---|---|---|---|
| Notifications | 236 | 95 | 4 | 29 |

Table 2 – RAIB outputs in 2009

| | |
|---|---|
| Preliminary examinations completed | 49 |
| Full investigation reports published | 33 |
| Class investigations published | 2 |
| Investigations commenced | 20 |
| Class investigations commenced | 1 |
| Bulletins published | 9 |
| Urgent safety advice issued | 5 |

## Investigation reports published in 2009

The RAIB completed and published 33 investigation reports in 2009, an increase of six compared with 2008. Table 3 provides details of the investigations and the basis for the investigation taking account of the requirements of the European Railway Safety Directive and national regulations.

For investigations started in 2007 and 2008, and published in 2009, the average time from the date of the incident to publication was 12 months. For the two investigations started and published in 2009, the time from the incident date to publication was five and eight months respectively.

While the RAIB's aim is to publish reports within 12 months, the length of individual investigations can sometimes extend beyond this because of the complexity and scale of the investigation, and the Branch's overall workload of other investigations. However, by the end of 2009 only one RAIB investigation had been open for more than 12 months, and that was published during January 2010.

[5] Schedules:

Schedule 1 - Types of accidents and incidents other than any occurring within the Channel Tunnel System which must be notified to the RAIB immediately and by the quickest means available.

Schedule 2 - Types of accidents and incidents other than any occurring within the Channel Tunnel System which must be notified to the RAIB as soon as reasonably practicable and in any event within three working days of occurrence.

Schedule 4 - Types of accidents and incidents occurring within the Channel Tunnel System that must be notified to the RAIB immediately and by the quickest means available.

Schedule 5 - Types of accidents and incidents occurring within the Channel Tunnel System that must be notified to the RAIB as soon as practicable and in any event within three working days of occurrence.

# 2 Investigations 2009

In addition, the RAIB is continuing to assist its French counterpart, the Bureau d'Enquêtes sur les Accidents de Transport Terrestre (BEA-TT), who have the lead role in the investigation of an accident in the Channel Tunnel that occurred on 11 September 2008.

A summary of the details of each full investigation where a report has been published and the associated recommendations can be found in a separate report titled 'Annual Report 2009 Section 2: Reported status of RAIB's Recommendations 2009'.

Table 3 - Investigations completed in 2009

| Report Number | Event date | Publication date | Title of investigation (location) | Occurrence type | Basis for investigation | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Article: | | | Nat Regs |
| | | | | | 19(1) | 19(2) | 21(6) | |
| 01/2009 | 22/1/08 | 20/1/09 | Fatal accident at West Lodge crossing, Haltwhistle | Level Crossing Fatality | | a | | |
| 02/2009 | 22/6/07 | 22/1/09 | Derailment at Ely Dock Junction | Freight train derailment | x | | | |
| 03/2009 | 9/3/08 | 11/2/09 | Derailment of road rail vehicle at Terryhoogan, near Scarva, Northern Ireland | Freight train derailment | | b | | |
| 04/2009 | 3/9/07 | 12/2/09 | Derailment near Exhibition Centre station, Glasgow | Passenger train derailment | | a | | |
| 05/2009 | 5/12/07 | 25/2/09 | Runaway of road rail vehicle at Glen Garry | Collision with other train | | b | | |
| 06/2009 | 13/9/08 | 12/3/09 | Fatal accident at Morden Hall Park footpath crossing | Level Crossing Fatality | | | | a |
| 07/2009 | 25/3/08 | 18/3/09 | Derailment of a freight train near Moor Street station, Birmingham | Freight train derailment | | | x | |
| 08/2009 | 4/4/08 | 19/3/09 | Uncontrolled movement of a road vehicle in Channel Tunnel passenger shuttle train in transit from the UK to France | Unsafe loads | | | x | |
| 09/2009 | 31/3/08 | 30/3/09 | Fatal accident at Tackley station level crossing | Level Crossing Fatality | | | x | |
| 10/2009 | 25/1/08 | 30/4/09 | Derailment at Santon near Foreign Ore Branch Junction | Freight train derailment | | b | | |
| 11/2009 | 31/10/07 4/11/07 | 27/5/09 | Road rail vehicle runaway incidents at Brentwood, Essex, and at Birmingham Snow Hill | Runaway incident | | a | | |
| 12/2009 | 1/3/08 | 27/5/09 | Detachment of containers from freight wagons near Cheddington and Hardendale | Unsafe loads | | | x | |
| 13/2009 | 19/6/08 | 3/6/09 | Investigation into safety at user worked crossings - Class Investigation [6] | | | | | |
| 14/2009 | 1/7/08 | 11/6/09 | Near miss at Poplar Farm level crossing, Attleborough | Level Crossing near miss | | | x | |
| 15/2009 | 24/6/08 | 18/6/09 | Collision between a passenger train and two rail-mounted grinding machines at Acton West | Collision with other obstacle | | b | | |
| 16/2009 | 4/4/08 | 22/6/09 | Derailment of a Docklands Light Railway train, Deptford Bridge | Collision with other obstacle | | | | a |
| 17/2009 | 27/7/08 | 24/6/09 | Collision near New Southgate | Collision with other train - out of gauge | | | x | |
| 18/2009 | 3/5/08 | 2/7/09 | Derailment of a passenger train at Gysgfa, Ffestiniog Railway | Passenger train derailment | | | | b |
| 19/2009 | 13/11/07 | 16/7/09 | Track worker struck by a train on Grosvenor Bridge, London Victoria | Staff hit by train (Injury) | | b | | |
| 20/2009 | 21/10/08 | 28/7/09 | Near miss at Llanbadarn Automatic Barrier Crossing (Locally Monitored), near Aberystwyth | Level Crossing Near miss | | b | | |
| 21/2009 | 19/12/08 | 12/8/09 | Incident involving a container train at Basingstoke station | Collision with other object | | | x | |
| 22/2009 | 28/5/08 | 20/8/09 | Collision with debris from Bridge GE19 near London Liverpool Street | Collision with other obstacle | | | x | |
| 23/2009 | 7/12/08 | 27/8/09 | Track worker struck by train, Stevenage | Staff hit by train (Injury) | | a | | |
| 24/2009 | 26/4/08 | 14/9/09 | Freight train collision at Leigh-on-Sea | Collision with other train | | b | | |

[6] A Class Investigation is a number of related incidents / accidents within one report.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 25/2009 | 29/6/08 | 17/9/09 | Derailment at St Peter's Square, Manchester | Passenger train derailment | | | | a |
| 26/2009 | 3/11/08 | 6/10/09 | Fatal accident at Wraysholme crossing, Flookburgh, Cumbria | Level Crossing fatality | | | x | |
| 27/2009 | 23/5/08 | 29/10/09 | Investigation into runaways of Road Rail Vehicles and their trailers on Network Rail - Class Investigation | | | | | |
| 28/2009 | 10/11/08 | 10/11/09 | Derailment of two locomotives at East Somerset Junction | Freight train derailment | | | x | |
| 29/2009 | 23/5/08 | 12/11/09 | Serious injury sustained by a signal technician at Kennington Junction | Staff hit by train (Injury) | | b | | |
| 30/2009 | 30/3/09 | 19/11/09 | Accident at Dalston Junction | Staff hit by train (Injury) | | a | | |
| 31/2009 | 4/7/09 | 19/11/09 | Container doors hit passenger trains, Penrith station and Eden Valley loop, Cumbria | Collision with other train - out of gauge | | | x | |
| 32/2009 | 22/11/08 | 19/11/09 | Double fatality at Bayles & Wylies footpath crossing,Bestwood, Nottingham | Level Crossing fatality | | | x | |
| 33/2009 | 18/12/08 | 14/12/09 | Collision and derailment of a passenger train at North Rode | Collision with other obstacle | | a | | |

Note: Rows highlighted in blue in tables 3 and 4 refer to Class Investigations.

## Basis for investigation:

**Article 19(1)** - (a serious accident or incident on mainland Network Rail (NR), Eurotunnel, High Speed 1, or Northern Ireland Railways (NIR)).

**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 on mainland NR, Eurotunnel, High Speed 1, or NIR) - 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)** - **UK Regs** - (a non-serious accident or incident where there is potential for learning safety lessons on mainland NR, Eurotunnel, High Speed 1, or NIR).

**Other national rules / regulations (Article 2(2))** - (this is used when the incident falls outside the scope of the Safety Directive 2004/49/EC) - UK Regs - (a serious accident, a near miss of a serious accident or incident, or a non-serious accident or incident, that has potential for learning safety lessons on metros, trams, light rail, or networks that exist separate from rest of railway system) - see key below - a, b, or c:

a. metros, trams and other light rail systems;
b. networks that are functionally separate from the rest of the railway system;
c. privately owned railway infrastructure that exist solely for use by the infrastructure owner for its own freight operations.

# 2 Operational Activity 2009

## Table 4 – Full investigations commenced in 2009

| Event date | Title of investigation (location) | Occurrence type | Basis for investigation | | | |
|---|---|---|---|---|---|---|
| | | | Article: | | | |
| | | | 19(1) | 19(2) | 21(6) | Nat Regs |
| 27/1/09 | Derailment of a freight train at Stewarton, Ayrshire | Freight train derailment | x | | | |
| 10/3/09 | Derailment of a Docklands Light Railway train, near West India Quay station | Passenger train derailment | | | | a |
| 22/3/09 | Incident at Greenhill Upper Junction, near Falkirk | Failure of Signalling System | | a | | |
| 27/3/09 | Near-miss at Hanger Lane junction | Signal passed at danger | | | | a |
| 30/3/09 | Accident at Dalston Junction | Staff hit by train (Injury) | | a | | |
| 6/5/09 | Fatal accident at Fairfield level crossing, Little Bedwyn, Wiltshire | Level crossing fatality | | | x | |
| 1/6/09 | Derailment of a passenger train near Cummersdale, Cumbria | Passenger train derailment | | | x | |
| 4/7/09 | Container doors hit passenger trains, Penrith station and Eden Valley loop, Cumbria | Collision with other train - out of gauge | | | x | |
| 5/8/09 | Fatal accident at Norbreck, Blackpool [7] | Level crossing Injuries | | | | a |
| 7/8/09 | Class Investigation - AOCLs | | | | | |
| 25/8/09 | Derailment at Wigan North Western | Freight train derailment | | | x | |
| 15/9/09 | Collision on Great Orme Tramway | Collision with other train | | | | a |
| 23/9/09 | Overhead line failure, St Pancras International station | Electric shock / near miss | | | x | |
| 28/9/09 | Derailment at Hampton Loade, Severn Valley Railway | Passenger train derailment | | | | b |
| 29/9/09 | Fatal accident at Halkirk level crossing | Level crossing fatality | | | x | |
| 11/10/09 | Derailment at Windsor & Eton Riverside station | Passenger train derailment | | | x | |
| 15/11/09 | Failure of bridge RDG1 48 (River Crane) between Whitton and Feltham | Infrastructure failure | | a | | |
| 28/11/09 | Investigation into the derailment of a train on the approach to Gillingham Tunnel, in Dorset | Collision with other obstacle | | a | | |
| 2/12/09 | Fatal accident at Whitehall West Junction | Staff hit by train (fatality) | | a | | |
| 19/12/09 | Investigation into a near-miss at Victory level crossing near Taunton | Level crossing near miss | | | x | |
| 22/12/09 | Investigation into a near-miss involving a freight train and two passenger trains at Carstairs, South Lanarkshire | Runaway incident | | | x | |

[7] The pedestrian was seriously injured as a result of the accident and died five weeks later.

## 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, 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 more widely known across the industry and Bulletins are used for this.

During 2009, the RAIB published nine Bulletins on its website. These covered:

- four derailments;
- four collisions; and
- one runaway trolley.

## Urgent safety advice

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. During 2009 the RAIB issued urgent safety advice on five occasions, as follows:

- **29 May 2009** Advice about software changes on the train control system of the Docklands Light Railway.
- **6 May 2009** Advice about braking of road-rail vehicles on wet and contaminated rails following a runaway road-rail vehicle in the Severn Tunnel.
- **21 August 2009** Advice about speed of trams on level crossings on the Blackpool Tram system.
- **1 October 2009** Advice about maintaining up to date emergency phone numbers on road side emergency signs on the Network Rail system.
- **16 October 2009** Advice about safety management systems and standards on minor railways, following derailments on the Severn Valley Railway and the Great Orme Tramway.

# 2 Operational Activity 2009

Table 5 - List of investigations in progress during 2009 and published prior to issue of annual report

| Report Number | Event date | Publication date | Title of investigation (location) | Occurrence type | Basis for investigation | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Article: | | | Nat Regs |
| | | | | | 19(1) | 19(2) | 21(6) | |
| 01/2010 | 12/6/08 | 14/1/10 | Derailment of a freight train at Marks Tey, Essex | Freight train derailment | | | x | |
| 02/2010 | 27/1/09 | 3/2/10 | Derailment of a freight train at Stewarton, Ayrshire | Freight train derailment | x | | | |
| 03/2010 | 10/3/09 | 4/3/10 | Derailment of a Docklands Light Railway train, near West India Quay station | Passenger train derailment | | | | a |
| 04/2010 | 22/3/09 | 18/3/10 | Incident at Greenhill Upper Junction, near Falkirk | Failure of signalling system | | a | | |
| 05/2010 | 27/3/09 | 22/3/10 | Near-miss at Hanger Lane junction | Signal passed at danger | | | | a |
| 06/2010 | 1/6/09 | 25/3/10 | Derailment of a passenger train near Cummersdale, Cumbria | Passenger train derailment | | | x | |
| 07/2010 | 28/9/09 | 08/4/10 | Derailment at Hampton Loade, Severn Valley Railway | Passenger train derailment | | | | b |
| 08/2010 | 6/5/09 | 12/5/10 | Fatal accident at Fairfield level crossing, Little Bedwyn, Wiltshire | Level crossing fatality | | | x | |
| 09/2010 | 5/8/09 | 3/6/10 | Fatal accident at Norbreck, Blackpool | Level crossing injury | | | | a |
| 11/2010 | 11/10/09 | 5/8/10 | Derailment at Windsor & Eton Riverside station | Passenger train derailment | | | x | |
| 12/2010 | 23/9/09 | 5/8/10 | Overhead line failure, St Pancras International station | Electric shock / near miss | | | x | |
| 13/2010 | 15/9/09 | 16/8/10 | Collision on Great Orme Tramway | Collision with other train | | | | a |
| 14/2010 | 25/8/09 | 18/8/10 | Derailment at Wigan North Western | Freight train derailment | | | x | |
| 15/2010 | 2/12/09 | 2/9/10 | Fatal accident at Whitehall West Junction | Staff hit by train (Fatality) | | | x | |
| 16/2010 | 29/9/09 | 23/9/10 | Fatal accident at Halkirk level crossing | Level crossing fatality | | | x | |
| 17/2010 | 14/11/09 | 23/9/10 | Failure of bridge RDG1 48 (River Crane) between Whitton and Feltham | Near miss (non-Level crossing) | | a | | |

Full details of these investigations can be can be found at www.raib.gov.uk in the section titled investigation reports under the publications area.

Table 6 - List of investigations opened in 2009 but not completed by 23/09/2010

| Event date | Title of investigation (location) | Occurrence type | Basis for investigation | | | |
|---|---|---|---|---|---|---|
| | | | Article: | | | Nat Regs |
| | | | 19(1) | 19(2) | 21(6) | |
| 28/11/09 | Investigation into the derailment of a train on the approach to Gillingham Tunnel, in Dorset | Collision with other obstacle | | a | | |
| 19/12/09 | Investigation into a near-miss at Victory level crossing near Taunton | Level Crossing near miss | | | x | |
| 22/12/09 | Investigation into a near-miss involving a freight train and two passenger trains at Carstairs, South Lanarkshire | Runaway incident | | | x | |

Summary details of these investigations can be can be found at www.raib.gov.uk in the section titled current investigations register under the publications area.

# 3. Operational experience - Summary of incidents and accidents occurring on UK railways

The following section gives a brief overview of the incidents and accidents that have been investigated and published by the RAIB, they are initially categorised by the type of railway followed by the incident / accident type. The tables include historic data from when the RAIB became operational in October 2005 to 31 December 2009.

## Incidents and accidents on the National Railway Network

The national railway network (those lines operated by Network Rail, including High Speed 1) represents the largest railway system in the UK, and operates the fastest and heaviest trains.

In 2009 the RAIB published a total of 33 investigation reports on all networks; of these, 27 reports concerned accidents and incidents on the national railway network. Five of these investigations were started in 2007, 20 in 2008 and two in 2009.

### Interaction with road vehicles and pedestrians at level crossings

After trespass and suicide, trains hitting road vehicles and pedestrians represent the greatest cause of loss of life on the railways of the UK. In the case of accidents on level crossings where there is no evidence of intent of suicide, or of deliberate misuse by a road vehicle driver, cyclist or pedestrian, the RAIB will carry out a preliminary examination. If the conditions of the crossing, or other railway controlled features, have the potential to be either causal or contributory to the accident then the RAIB will normally carry out an investigation.

Two such investigations, which involved a total of four fatalities, were started in 2009. The history of such events investigated by the RAIB since 2005 is shown in the table below.

Table 7: Trains hitting road vehicles or pedestrians at crossings

| | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| Investigations | 4 | 1 | 0 | 5 | 2 |
| Reports published | 0 | 5 | 0 | 1 | 4 |

Table 8: Numbers of persons hit by trains whilst in vehicles or as pedestrians at crossings

| | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| Fatalities | 5 | 0 | 0 | 6 | 4 |
| Serious injury | 0 | 1 | 0 | 0 | 0 |
| Minor injury | 0 | 0 | 0 | 0 | 0 |

During 2009 the RAIB published six reports involving the interaction between trains, operating on the national railway system, and road vehicles. Four reports related to the deaths of five people on level crossings and a further two concerned near misses at level crossings involving a mobility scooter and a tanker lorry carrying liquefied petroleum gas.

After investigating a number of collisions on User Worked Crossings the RAIB carried out a ‘class’ investigation into the safety of this type of crossing, which was published in June 2009 with eight recommendations.

# 3 Operational experience

## Derailments

During 2009 the RAIB published five reports on derailments of trains on the national rail system, one involved a passenger train, and four involved freight trains. Of the five derailments, four were associated with the condition of the track, and one was caused by individual error during degraded working.

No-one was injured in any of these derailments. The history of such events investigated by the RAIB since 2005 is shown in the tables 9 and 10.

Table 9: Derailments – Passenger trains

| | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| Commenced | 4 | 4 | 4 | 2 | 2 |
| Published | 0 | 4 | 3 | 6 | 1 |

Table 10: Derailments – Freight trains

| | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| Commenced | 1 | 6 | 3 | 4 | 2 |
| Published | 0 | 2 | 6 | 2 | 4 |

During the last five years the RAIB has investigated 32 accidents where trains derailed; the most common occurrence was when the train was crossing points (6 passenger + 9 freight = 15), the second most common cause was derailments caused by landslides (4 passenger + 2 freight = 6). The remainder of the derailments occurred because of a mixture of track faults eg broken or worn rails.

## Collisions

The RAIB has not yet formally investigated any collisions between passenger trains on the national network. However, it did carry out a preliminary examination of a slow speed collision at Darlington during 2009, and published a bulletin about the lessons that could be learned.

One investigation report and one bulletin were also published about accidents where parts of freight trains hit and damaged passing passenger trains.

## Doors

During 2009, the RAIB commenced one investigation into an incident concerning train doors. To date, the RAIB has published four investigation reports into different door systems. There were no common features found between them.

## Possession management and road rail vehicles

In 2009 five reports were published on incidents and accidents associated with the maintenance and renewal of the national network.

Two concerned individual cases of road rail vehicles (RRVs) (vehicles converted to run on road or rail wheels) making uncontrolled moves over long distances (several miles in the case of the Brentwood road rail vehicle runaway investigation (report number 11/2009)), fortunately without casualties. A third, in the light of the ongoing large number of incidents that were occurring (18 since 2001), was a class investigation concerning runaways and collisions involving RRVs and trailers that couple to them.

The other two reports concerned collisions, in one case between two engineering trains within a possession, and in the other, a passenger train striking equipment that had been wrongly placed on an open line.

The history of such events investigated by the RAIB since 2005 is shown in table 11.

| Table 11: Possession management | | | | | |
|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 |
| Commenced | 1 | 2 | 3 | 3 | 0 |
| Published | 0 | 2 | 0 | 2 | 5 |

## Staff accidents

The RAIB started one investigation in 2009 concerning a lookout who was struck by a train and fatally injured, near Leeds, and published four reports concerning accidents to other staff.

Two accidents resulted in serious, life-changing, injuries, and in the other two cases the track workers who were struck were not seriously hurt. Two of these reports involved staff working in the vicinity of points.

| Table 12: Staff incidents | | | | | |
|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 |
| Commenced | 1 | 4 | 5 | 2 | 1 |
| Published | 0 | 1 | 3 | 4 | 5 |

## Signals Passed at Danger (SPADs)

At the turn of the millennium, SPADs represented the highest risk of a catastrophic accident on the UK national network. The introduction of the Train Protection and Warning System (TPWS) is estimated by the Rail Safety & Standards Board (RSSB) to have reduced this risk by approximately 90%. The RAIB only investigates the highest risk SPADs, which have significant potential to cause an accident. There were no such instances in 2009.

| Table 13: Signals Passed at Danger (SPADs) | | | | | |
|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 |
| Commenced | 1 | 1 | 1 | 0 | 0 |
| Published | 0 | 1 | 1 | 1 | 0 |

## Other

There are investigations which do not fall into the normal everyday classification of events, these are classified by the RAIB as ‘other’ investigations. There were three such investigations started by the RAIB on the national network in 2009.

| Table 14: Other | | | | | |
|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 |
| Commenced | 2 | 10 | 1 | 3 | 3 |
| Published | 0 | 2 | 10 | 1 | 3 |

The RAIB also published three ‘other’ investigations in 2009. These concerned two occasions of containers blowing off wagons on the same night, a container striking a platform canopy, and the sudden movement of Bridge GE 19, carrying the new East London line over the Great Eastern main line at Liverpool Street, London.

# 3 Operational experience

## Northern Ireland Railways

The Branch published one report in 2009, dealing with a derailment of a Road Rail Machine in 2008.

| Table 15: Northern Ireland Railways | | | | | |
|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 |
| Commenced | 0 | 1 | 2 | 1 | 0 |
| Published | 0 | 0 | 2 | 1 | 1 |

## Channel Tunnel

Investigations about incidents in the Channel Tunnel and its immediate approaches are governed by a Protocol of Co-operation between BEA-TT and RAIB. An investigation, commenced in 2008, into a road coach that moved within a Eurotunnel shuttle, injuring its driver and causing damage to the train and to road vehicles, the report was published in 2009.

In addition the RAIB continues to assist BEA-TT in its investigation into the fire that occurred in the French part of the tunnel on 11 September 2008.

| Table 16: Channel Tunnel | | | | | |
|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 |
| Commenced | 0 | 1 | 0 | 1 | 1[8] |
| Published | 0 | 0 | 1 | 0 | 1 |

## Light railways (Tramways)

Six towns or cities in the UK currently operate light railway systems; in addition there are a number of preserved tramways. In 2009 the RAIB commenced two investigations on light rail systems.

### Interaction with road vehicles and pedestrians

One investigation was started in 2009 after a pedestrian was struck by a tram at a roadway crossing. The pedestrian suffered serious injuries and died in hospital around five weeks later.

| Table 17: Light Railways (Tramways) Interaction with road vehicles and pedestrians | | | | | |
|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 |
| Commenced | 1 | 0 | 0 | 1 | 1 |
| Published | 0 | 1 | 0 | 0 | 1 |

[8] Assisting BEA-TT with the fire investigation dated 11 September 2008.

### Collisions

One investigation was carried out in 2009 concerning a set of points moving between the front and trailing bogie of a tram, redirecting the rear into the path of another tram. The accident occurred on the Great Orme Tramway, at Llandudno. There were no casualties.

### Derailments

The RAIB published one report on a light rail system in 2009, concerning a derailment at St Peter's Square on the Manchester system. This was the fourth derailment in the city centre of Manchester since 2004. Two of these derailments have now been investigated by the RAIB, which has commented on the control of renewals in the city centre. The Greater Manchester Passenger Transport Executive has now funded the renewal of the entire city centre track on the Manchester system, and this work has been completed.

## Metros

There are four metro systems in the UK. London Underground is the largest of these by a considerable margin, and is the second largest railway system in the UK.

The RAIB commenced two investigations in 2009. One concerned a Signal Passed at Danger, with a possibility of a collision, on the London Underground system, and the second a derailment on points on the Docklands Light Railway. In addition one report on a metro was published in 2009, concerning the derailment of a Docklands Light Railway train that struck engineering equipment that had been left on the track after engineering work.

Table 18: Metros

| | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| LUL Commenced | 0 | 3 | 4 | 0 | 1 |
| LUL Published | 0 | 1 | 2 | 4 | 0 |
| DLR Commenced | 0 | 0 | 0 | 1 | 1 |
| DLR Published | 0 | 0 | 0 | 0 | 1 |

## Heritage railways

The heritage sector is a relatively small part of the UK's railway operations but there are in excess of 100 heritage systems that operate in the UK that are covered by the scope of the Railways (Accident Investigation and Reporting) Regulations 2005.

The RAIB commenced one investigation in 2009. This concerned a derailment of a steam locomotive tender on the Severn Valley Railway which was caused by deficient management and maintenance arrangements. There were no casualties.

A report was published in 2009 relating to a derailment on the Ffestiniog Railway in 2008. This is a narrow gauge line, and the derailment was caused by a shortcoming of maintenance arrangements. The guard of the train received minor injuries.

Table 19: Heritage railways

| | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| Commenced | 0 | 5 | 6 | 2 | 1 |
| Published | 0 | 1 | 10 | 2 | 1 |

# 3 Operational experience

## Accidents and incidents investigated during last five years (2005–2009)

The following tables show the breakdown of accidents and incidents, by type, that the RAIB has investigated. They have been collated according to the date of occurrence and not publication of the report.

| Table 20: Investigations completed | | 2005 | 2006 | 2007 | 2008 | 2009 | TOTAL |
|---|---|---|---|---|---|---|---|
| Investigations on national railway networks (Network Rail, Eurotunnel, High Speed 1 and Northern Ireland Railways infrastructure) Basis for investigation: Art 19(1) & 19(2) | Train collision | | 1 | 2 | 1 | | **4** |
| | Train collision with an obstacle | 1 | 2 | 1 | 3 | 1 | **8** |
| | Train derailment | 1 | 5 | 6 | 2 | 1 | **15** |
| | Level crossing accident / incident | 1 | 2 | | 2 | | **5** |
| | Accident to person caused by RS in motion | | 1 | 4 | 2 | 2 | **9** |
| | Fire in rolling stock | | 1 | | | | **1** |
| | Involving dangerous goods | | | | | | **0** |
| | Signal Passed at Danger (SPAD) | 1 | 2 | 1 | | | **4** |
| | Electric shock | | 1 | | | | **1** |
| | Runaway | 1 | 1 | 2 | | | **4** |
| | Unauthorised movement | | | 2 | | | **2** |
| | Failure of signalling system | | | | | 1 | **1** |
| | Unsafe load | | | | | | **0** |
| | Possession irregularities | | 1 | | | | **1** |
| | Near miss | | 2 | 1 | 1 | 1 | **5** |
| Investigations on national railway networks (Network Rail, Eurotunnel, High Speed 1 and Northern Ireland Railways infrastructure) Basis for investigation: Art 21(6) | Train collision | | | 1 | 1 | 1 | **3** |
| | Train collision with an obstacle | 1 | 1 | 2 | 2 | | **6** |
| | Train derailment | 2 | 4 | | 3 | 3 | **12** |
| | Level crossing accident | 3 | 1 | 1 | 5 | 3 | **13** |
| | Accident to person caused by RS in motion | 1 | 1 | | | | **2** |
| | Fire in rolling stock | | | | | | **0** |
| | Involving dangerous goods | | | | | | **0** |
| | Signal Passed at Danger (SPAD) | | 1 | | | | **1** |
| | Electric shock | | | | | 1 | **1** |
| | Runaway | | | | | 1 | **1** |
| | Unsafe load | | 1 | | 2 | | **3** |
| | Possession irregularities | | | | | | **0** |
| | Near miss | | 1 | | | | **1** |
| **TOTAL** | | **12** | **28** | **23** | **24** | **15** | **103** |

| Table 21: Investigations completed | | 2005 | 2006 | 2007 | 2008 | 2009 | TOTAL |
|---|---|---|---|---|---|---|---|
| Investigations on metros, trams, heritage railways Basis for investigation: Other Nat Regs | Train collision | 1 | 3 | 1 | | | **5** |
| | Train collision with an obstacle | | | 1 | 1 | | **2** |
| | Train derailment | 1 | 8 | 4 | 2 | 3 | **18** |
| | Level crossing accident | 1 | 1 | 3 | 1 | 1 | **7** |
| | Accident to person caused by RS in motion | | 2 | | 1 | | **3** |
| | Fire in rolling stock | | 1 | 1 | | | **2** |
| | Involving dangerous goods | | | | | | **0** |
| | Signal Passed at Danger (SPAD) | | | | | 1 | **1** |
| | Electric shock | | | | | | **0** |
| | Unauthorised movement | | 1 | 1 | | | **2** |
| | Runaway | 1 | 1 | 1 | | | **3** |
| | Unsafe load | | | | | | **0** |
| | Possession irregularities | | | | | | **0** |
| | Near miss | 1 | | 2 | | | **3** |
| **TOTAL** | | **5** | **17** | **14** | **5** | **5** | **46** |

***Note:*** *Figures do not include Class Investigations or the discontinued report under "Other Nat Regs".*

The bar charts 1 to 5 show the total number of investigations carried out by the RAIB broken down by the type of accident and railway for the 5 year period 2005 to 2009.

The two published reports on the Channel Tunnel (a fire and an unsafe load), four Northern Ireland Railway investigations (three derailments involving maintenance vehicles and a level crossing fatality), and two investigations in sidings/depots (one fatality and one derailment) have not been included in the charts below.

**Chart 1 - Types of incidents/accidents investigated on National Networks, Light Rail, Metro and Heritage Railways 2005-2009**

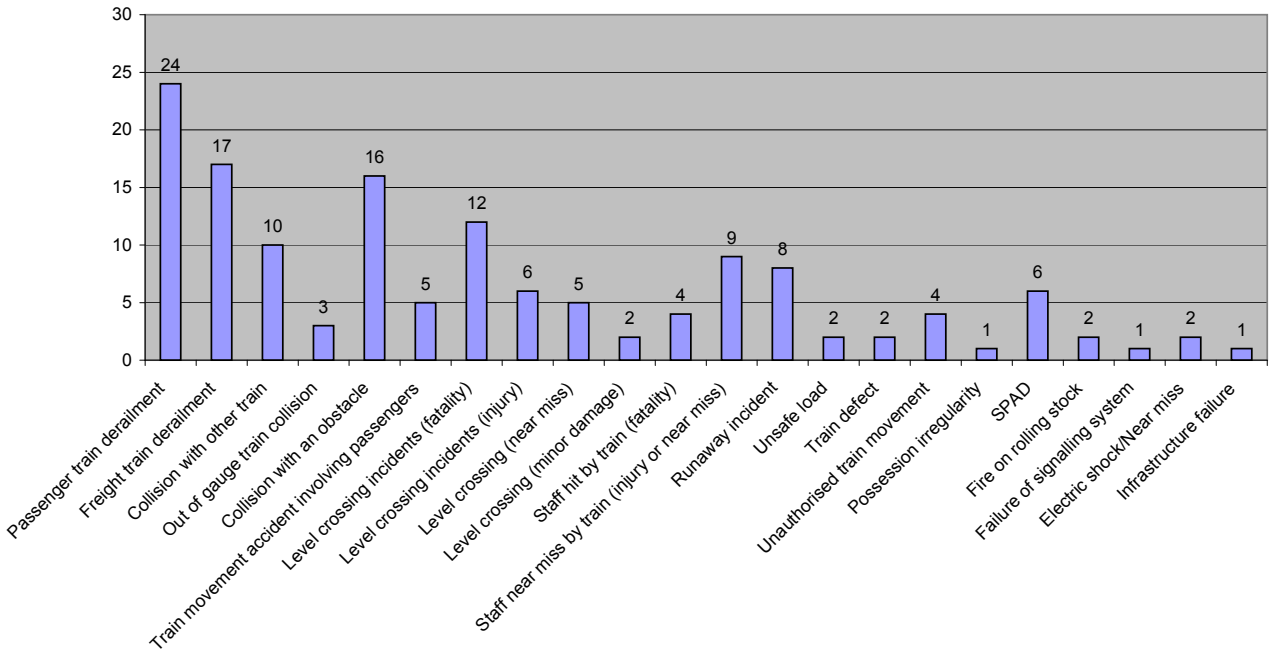
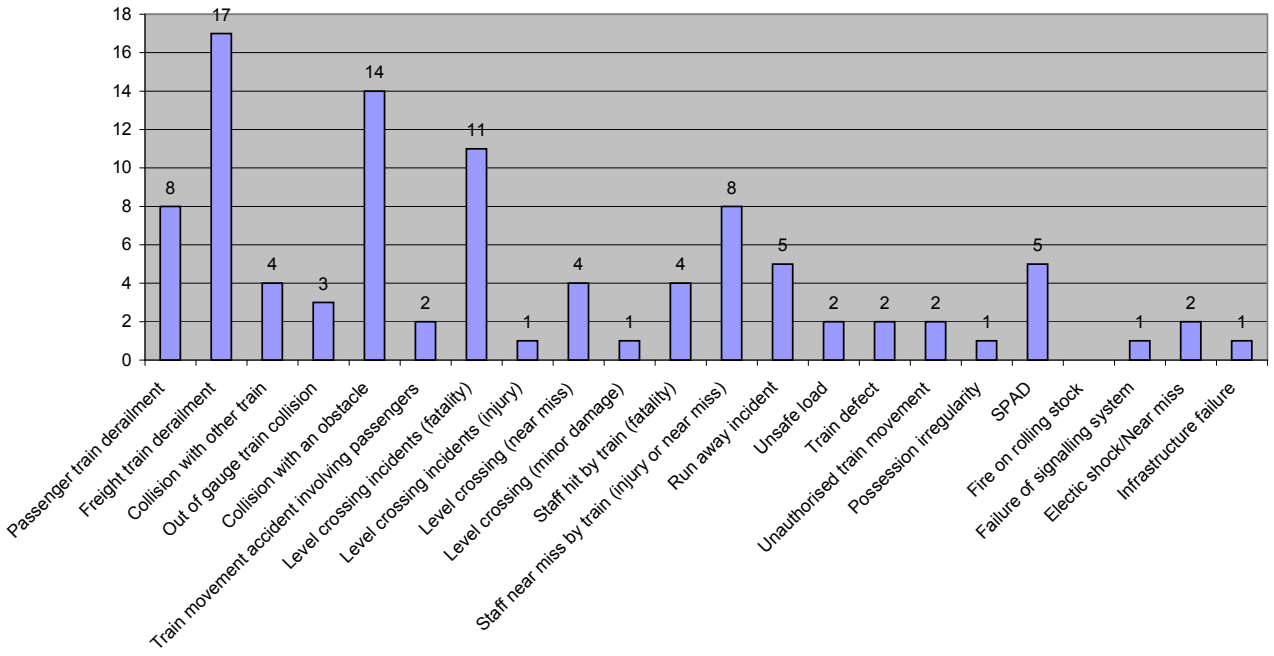



**Chart 2 - Types of Accident/Incident investigations 2005-2009 on the National Networks**



# 3 Operational experience

**Chart 3 - Types of incident/accident investigations 2005-2009 on Light Rail**

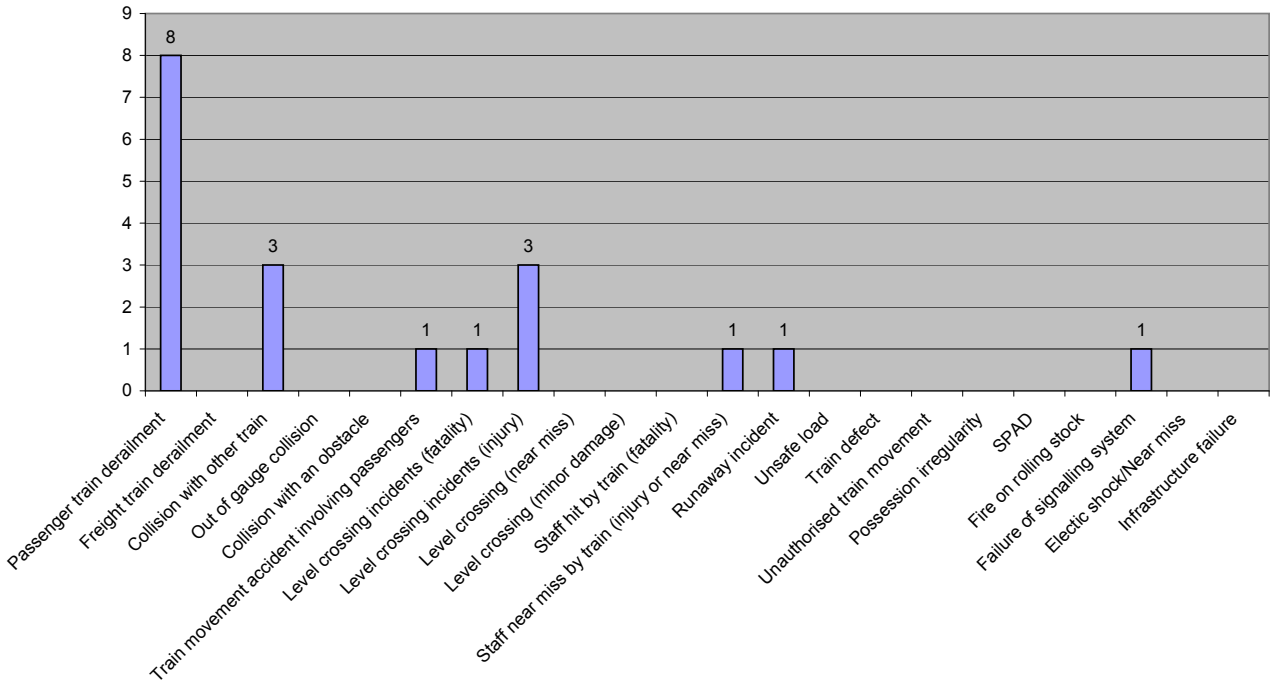



**Chart 4 - Types of incident/accident investigations 2005-2009 on Metro**

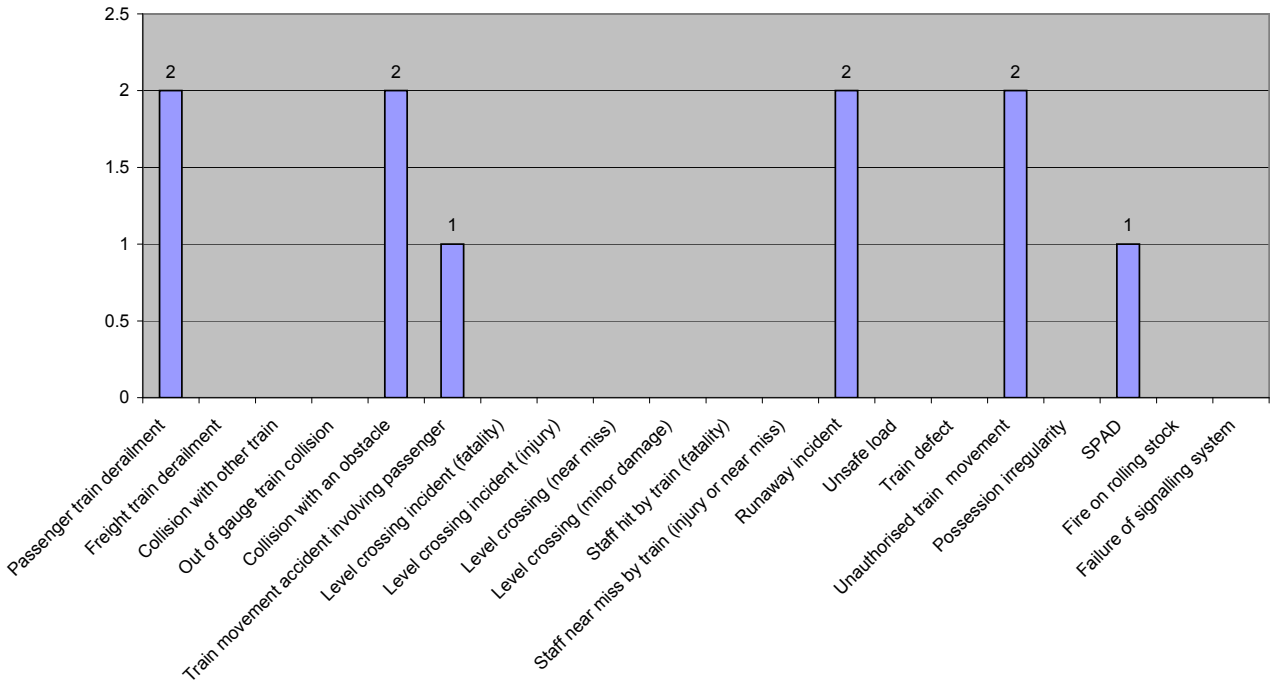
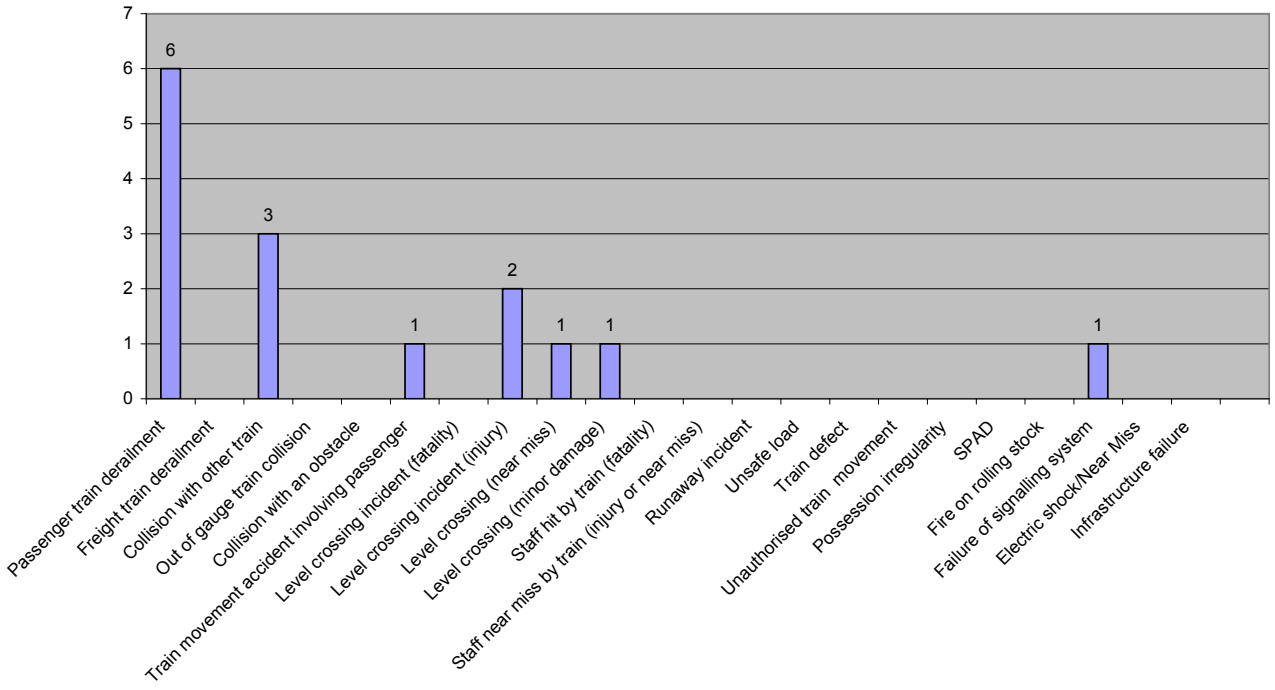


**Chart 5 - Types of incident/accident investigations 2005-2009 on Heritage Rail**



# 3 Operational experience

## Identification of important recurrent themes

### Level crossings

By the 31 December 2009 the RAIB had published a total of 21 reports into accidents and incidents at level crossings. The accidents investigated have resulted in ten fatalities on the national network, one fatality on Northern Ireland Railways and one fatality on a light railway.

#### User behaviour at level crossings

The railway industry attempts to influence user behaviour at level crossings by various means including active measures such as warning lights and passive measures such as signage. Despite these measures, a range of factors influencing human behaviour (such as distraction and loss of attention) can result in the measures provided at a crossing becoming ineffective. Such 'human factors' were found to be relevant to all of the investigations of footpath and User Worked Crossings. The RAIB has considered the ways in which the safety measures might better influence the behaviour of crossing users.

In none of the cases investigated was it proved that the accident had been caused by deliberate violation of the rules associated with the use of the crossing[9].

In 12 RAIB investigations (three of which were on a heritage line and two on light rail) the design of the crossing and/or the positioning of signage has been found to be a factor.

A general safety issue identified by the RAIB in three crossing investigations is the positioning of signs relative to the location at which the user is required to make their final decision to cross the line. This is a particular issue at those locations where the best sighting of trains is not obtained from the existing gate and/or sign. The implications of this, and the potential solutions, were discussed in a special RAIB report (report number 13/2009) examining the safety of User Worked Crossings that was published in 2009.

#### Inspection and risk assessment at level crossings

'Inspection' describes the process of checking that the crossing is in good condition and compliant with relevant railway standards and legal requirements. The term 'assessment' is a parallel process that the industry has implemented to assess risk at every crossing in the UK and to identify any reasonably practicable measures for improvement. Both inspection and assessment are opportunities to identify any deficiencies or risk factors at crossings.

In nine of the 21 RAIB level crossing investigations it was found that the application of the inspection and/or risk assessment process had been deficient and/or the findings of the inspection/assessment had not been fully implemented.

As a consequence of these findings the RAIB has examined the way that Network Rail applies its risk assessment and inspection processes and identified some areas of concern. These include:

- errors made during data collection and risk assessments (eg incorrect collection of data);
- inadequate consideration of local factors at individual crossings;
- competence of risk assessors and crossing inspectors;

[9] RAIB's policy is that it will not investigate accidents involving an action by a user that is both reckless and a deliberate violation of the rules. In other instances no investigation will be carried out if it considers that this is unlikely to lead to formal recommendations for the improvement of railway safety.

- actions not being taken in response to inspection and risk assessments at level crossings; and
- insensitivity of the All Level Crossing Risk Model (ALCRM) to certain inputs (eg sighting times).

## The railway industry's response to level crossing issues

The RAIB has made a range of recommendations to address the safe design, operation and maintenance of level crossings. The actions taken by the railway industry bodies concerned and reported by ORR[10] include:

- enhancement of guidance to staff carrying out inspections on the position of layout and warning signs at footpath, bridleway, user worked and station pedestrian crossings;
- a review of the position of signage at the above types of crossings with a view to relocating signs, or providing additional signs, to mark the best location to sight approaching trains where reasonably practicable;
- a review of guidance relating to the measurement of sighting times at level crossings (ie the time between the first sighting of a train at its arrival at a crossing) and the potential impact of local fencing;
- the continued roll-out of ALCRM to encompass all crossings in the UK and subsequent identification of reasonably practicable safety improvements;
- continuing trials of equipment designed to provide cost-effective methods of providing warnings of approaching trains at user worked crossings;
- improvement of the conspicuity of miniature warning lights at level crossings by installing 'LED[11]' technology; and
- installation of power operated gate opening technology at some user worked crossings to allow the opening and closing of gates without the need to cross the line.

There have been 96 recommendations made in response to level crossing issues, of these:

Table 22: Recommendation implementation status

| Level crossing recommendations issued | | Measures to implement recommendation have been taken (ORR – Closed) | | Measures to implement recommendation are in progress (ORR – Open) | | No measures to be taken to implement recommendation (ORR – Closed) | | Awaiting response from the industry (ORR – Open) | |
|---|---|---|---|---|---|---|---|---|---|
| | Nos | Nos | % | Nos | % | Nos | % | Nos | % |
| TOTAL | 96 | 68 | 70.8 | 19 | 19.9 | 9 | 9.3 | 0 | 0.0 |

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

[11] Light Emitting Diodes

# 3 Operational experience

## Red Zone working

The 'Red Zone' is a railway term used to describe the practice of working on a line that is still open to traffic. The system of work is therefore reliant on the provision of a lookout to warn staff of the approach of trains.

By the 31 December 2009 the RAIB had published a total of eight reports into accidents and incidents involving staff working in Red Zone conditions (one of which related to a light rail route). The accidents investigated have resulted in a total of two fatalities and one serious injury.

### The need for Red Zone working

In four investigations the RAIB has questioned the need for the work to have been undertaken in the Red Zone. The RAIB continues to urge the minimisation of Red Zone working, particularly in areas associated with junctions, complex track layouts and high levels of railway traffic.

### Inadequate systems of work

In all investigations involving accidents to staff working in the Red Zone it was found that the system of work established by the team were ill-defined or poorly implemented.

### Accidents involving Red Zone working in proximity to junctions or complex track layouts

In six investigations the RAIB has identified proximity of a junction or a complex track layout as a factor in the accident that occurred. Additional risk at such locations is generated by the number of lines involved and the uncertainty about the route to be taken by trains.

### Competence of staff to work in the Red Zone

In five investigations involving Red Zone working the competence of the staff, and in particular the site safety supervisor (known as the Controller of Site Safety (COSS)), has been found to be a factor.

Another recurrent theme is the interaction between staff members leading to unsafe behaviour and the non-observance of rules. A particular concern raised by the RAIB is the ability of the COSS to influence the behaviour of experienced track workers.

### The railway industry's response to Red Zone working issues

The RAIB has made a range of recommendations to address issues associated with Red Zone working. The actions taken by the railway industry bodies concerned and reported by ORR include:

- delivery of additional training and briefing associated with working in the Red Zone in proximity to junctions;
- guidance issued to staff on how to respond to trains approaching their work sites areas of junctions and complex track layouts (including definition of the Rule Book term 'approaching train');
- a review of existing knowledge of the dynamics within groups of track workers and the identification of methods to encourage safe behaviour;

- consideration of how the COSS can be helped to deliver authority, compliant behaviour, leadership and challenge;
- a cross-functional review of track safety with the objective of reducing the exposure of staff to hazards and identifying the scope for the clarification/rationalisation of existing rules;
- a review of risk assessments associated with weld repairs of crossings in the Red Zone;
- a national review of systems of work associated with track patrols; and
- ongoing work stream examining ways of moving towards increased automated patrolling.

There have been seven recommendations made in response to red zone working, of these:

| Red Zone recommendations issued | | Table 23: Recommendation implementation status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Measures to implement recommendation have been taken (ORR – Closed) | | Measures to implement recommendation are in progress (ORR – Open) | | No measures to be taken to implement recommendation (ORR – Closed) | | Awaiting response from the industry (ORR – Open) | |
| | Nos | Nos | % | Nos | % | Nos | % | Nos | % |
| TOTAL | 7 | 2 | 28.6 | 5 | 71.4 | 0 | 0 | 0 | 0.0 |

# 3 Operational experience

## Planning and implementation of activities within an engineering possession

An 'engineering possession' is a railway term used to describe the closure of a line to normal traffic for the purpose of undertaking engineering work. By the 31 December 2009 the RAIB had published a total of nine reports into accidents and incidents associated with the planning and implementation of engineering possessions. Factors identified have included:

| Table 24: Engineering activity factors | **No. of investigations in which the factors have been identified** (some investigations feature more than one factor) | |
|---|---|---|
| | National network | Light Rail |
| Staff unintentionally working outside of possession limits due to miscommunications | 2 | - |
| Long/complex work sites | 3 | - |
| Poor planning/briefing | 5 | 1 |
| Excessive train speed in possessions | 2 | - |

### The railway industry's response to engineering planning issues

The RAIB has made a range of recommendations to address issues associated with engineering planning. The actions taken by the railway industry bodies concerned and reported by ORR include:

- rebriefing of the requirement for the COSS and planners to have sufficient geographical knowledge of the areas of planned work;
- enhancement of the planning process, including greater involvement of the COSS and an improved, user-friendly software package;
- targeted application of signage at access points; and
- enhancement of procedures governing pre-possession planning and briefings to more clearly define their scope and the list of required attendees.

There have been 16 recommendations made in response to engineering planning issues, of these:

| Engineering planning recommendations issued | | Table 25: Recommendation implementation status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Measures to implement recommendation have been taken (ORR – Closed) | | Measures to implement recommendation are in progress (ORR – Open) | | No measures to be taken to implement recommendation (ORR – Closed) | | Awaiting response from the industry (ORR – Open) | |
| | Nos | Nos | % | Nos | % | Nos | % | Nos | % |
| TOTAL | 16 | 14 | 87.6 | 1 | 6.2 | 1 | 6.2 | 0 | 0.0 |

## Track quality

The safe operation of trains is reliant on track being correctly installed and then inspected and maintained to ensure it remains in a fit condition. By the 31 December 2009 the RAIB had published a total of 15 reports into accidents involving poor track condition. Factors identified have included:

| Table 26: Poor track condition factors | **No. of investigations in which the factors have been identified** (some investigations feature more than one factor) | | |
|---|---|---|---|
| | National network | Light Rail | Heritage |
| Poor alignment | 7 | - | - |
| Shortcomings in inspection and maintenance | 8 | 4* | 1 |

* *Three involved the Manchester tramway infrastructure*

### The railway industry's response to track quality issues

The RAIB has made a range of recommendations to address issues associated with track quality. The actions taken by the railway industry bodies concerned and reported by ORR include:

- briefing, coaching and mentoring of staff to assist their identification of alignment faults and localised poor rail conditions;
- review of standards related to the measurement of track geometry where the effect of dynamic loading is known to be a factor;
- the preparation of technical briefings on actions associated with separate track geometry defects that are identified in close proximity;
- consideration is being given to the creation of a Geometry Fault Management System to record and manage faults associated with track alignment; and
- with regards to Manchester Metrolink:
  - the whole of the track in the city centre has been replaced;
  - changes in the maintenance organisation have been followed by a review of documentation and processes (including the definition of track maintenance tolerances); and
  - introduction of a new computerised asset management system.

There have been 46 recommendations made in response to track quality issues, of these:

| Track quality recommendations issued | | Table 27: Recommendation implementation status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Measures to implement recommendation have been taken (ORR – Closed) | | Measures to implement recommendation are in progress (ORR – Open) | | No measures to be taken to implement recommendation (ORR – Closed) | | Awaiting response from the industry (ORR – Open) | |
| | Nos | Nos | % | Nos | % | Nos | % | Nos | % |
| TOTAL | 46 | 34 | 73.9 | 12 | 26.1 | 0 | 0.0 | 0 | 0.0 |

# 3 Operational experience

## Defective points

Points are designed to enable the safe routing of trains from one line to another. Many critical defects will detected by the signalling system so preventing the normal operation of trains over the points. However, certain defects will not be detected in this manner and will create the possibility of a train being misrouted or even derailed.

By the 31 December 2009 the RAIB had published a total of nine reports into accidents involving defective points (three of which occurred on the national network, four on light rail systems, one on London Underground and one on a heritage line). The accidents investigated have resulted in one fatality (Grayrigg in February 2007).

Factors identified in investigations associated with defective points have included:

| Table 28: Defective points factors | **No. of investigations in which the factors have been identified** (some investigations feature more than one factor) | | |
|---|---|---|---|
| | National network | LUL | Light Rail |
| Poor switch rail condition (incorrect profile) | 2 | - | 1 |
| Undetected degradation of components | 1 | 1 | 3* |
| Incorrectly installed/adjusted | 1 | - | - |

* *Two involved the same set of points on the Croydon tramway*

### The railway industry's response to issues associated with defective points

The RAIB has made a range of recommendations to address issues associated with defective points. The actions taken by the railway industry bodies concerned and reported by ORR include:

- following the derailment at Grayrigg in February 2007 the following activities have been reported to the RAIB:
  - enhancement of procedures for the reporting and recording of point defects;
  - establishment of a new database for recording defects associated with fixed stretcher bars;
  - detailed assessments of the performance of existing stretcher bar assemblies by means of laboratory testing, measurements of dynamic loads during the transit of trains, theoretical analysis and historical data; and
  - with reference to the above, reviews of design proposals for revised stretcher bar assemblies and the subsequent implementation of a revised design;
- review and enhancement of instructions to staff inspecting the condition of switch rails; associated training and assessments.

There have been 45 recommendations made in response to defective point issues, of these:

| Defective point recommendations issued | | Table 29: Recommendation implementation status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Measures to implement recommendation have been taken (ORR – Closed) | | Measures to implement recommendation are in progress (ORR – Open) | | No measures to be taken to implement recommendation (ORR – Closed) | | Awaiting response from the industry (ORR – Open) | |
| | Nos | Nos | % | Nos | % | Nos | % | Nos | % |
| TOTAL | 45 | 29 | 64.5 | 16 | 35.5 | 0 | 0.0 | 0 | 0.0 |

## Management of earthworks

Failures of earthworks have the potential to endanger trains by blocking the track. By the 31 December 2009 the RAIB had published a total of four reports into accidents involving failed earthworks. It had also published a special report examining safety issues associated with the management of earthworks on the railway. A common theme of all but one of these investigations was the role played by inadequate drainage leading to an unstable earthwork and the importance of managing this risk.

### The railway industry's response to issues associated with earthworks

The RAIB has made a range of recommendations to address issues associated with the management of earthworks. The actions taken by the railway industry bodies concerned and reported by ORR include:

- a review of standards relating to the management of drainage;
- a nation-wide survey has commenced to identify existing drainage and future maintenance requirements;
- a review and subsequent increase of budget and manpower allocated to the management of drainage; and
- a review of procedures relating to the actions to be taken in case of adverse weather warnings.

There have been 19 recommendations made in response to earthwork issues, of these:

Table 30: Recommendation implementation status

| Earthwork recommendations issued | | Measures to implement recommendation have been taken (ORR – Closed) | | Measures to implement recommendation are in progress (ORR – Open) | | No measures to be taken to implement recommendation (ORR – Closed) | | Awaiting response from the industry (ORR – Open) | |
|---|---|---|---|---|---|---|---|---|---|
| | Nos | Nos | % | Nos | % | Nos | % | Nos | % |
| TOTAL | 19 | 15 | 79.0 | 2 | 10.5 | 2 | 10.5 | 0 | 0.0 |

# 3 Operational experience

## Safety of on track plant and trolleys

The railway industry utilises various types of track plant when undertaking maintenance on the infrastructure. This includes a fleet of vehicles that are designed to operate on both roads and railways, known as 'road rail vehicles (RRVs)'. These are provided with conventional rubber tyred road wheels and a set of rail wheels that can be lowered into the track to enable it to operate as a train within a railway possession. By the 31 December 2009 the RAIB had published a total of three reports into accidents involving RRVs (one of which occurred in Northern Ireland). Factors identified have included:

| Table 31: RRV Factors | **No. of investigations in which the factors have been identified** (some investigations feature more than one factor) | |
|---|---|---|
| | National network | Northern Ireland Railway |
| Staff competence | 2 | 1 |
| Poor braking in low adhesion | 1 | - |
| Loss of braking when being placed on the track | 1 | - |
| Derailment | - | 1 |

***Note:*** *The RAIB is aware that derailments of RRVs within engineering possessions are not uncommon. Such events are generally not notifiable to the RAIB and are not the subject of investigation.*

The RAIB has also published a special report examining safety issues associated with the operation of RRVs on the railway. This report identified a significant number of safety incidents involving the operation of RRVs in recent years and identified the need for the design of RRVs to be subject to careful scrutiny focused on the following areas:

- preventing runaway during on-tracking; and
- braking on gradients and in low adhesion conditions.

Another type of plant that has been involved in accidents and incidents is the trolley. Trolleys are lightweight vehicles with small rail wheels that can be carried by maintenance staff and then placed onto the track for the purpose of carrying people and/or materials. Some are manually operated, others are motorised. By the 31 December 2009 the RAIB had published a total of three reports into accidents involving trolleys (two of which occurred on London Underground infrastructure and one on the national network). The following factors were common to all three investigations:

- staff competency;
- operating procedures; and
- the inadequate design of the braking system leading to poor performance.

### The railway industry's response to issues associated with on track plant and trolleys

The RAIB has made a range of recommendations to address issues associated with on track plant and trolleys. The actions taken by the railway industry bodies concerned and reported by ORR include:

- steps to enable the briefing of gradient information to RRV operators;
- dissemination of guidance to RRV operators and controllers on the hazards of rail contamination and gradients (briefings supported by an animated reconstruction);

- review of the competence requirements for RRV operators and controllers and development of improved training encompassing operation on gradients, poor rail conditions and the avoidance of runaways when placing machines on the track ('on-tracking');
- ongoing discussions with RRV suppliers, manufacturers and convertors, also the infrastructure manager and the Rail Plant Association, with the objective of:
  - defining the capability of machines when operating on gradients and poor rail conditions (including maximum speed and permitted loads that can be hauled); and
  - disseminating guidance/instructions to involved staff;
- initiation of a process for the progressive removal of unbraked RRV trailers from the national network;
- completion of a programme of modifications to existing RRVs to prevent them from becoming unbraked during on-tracking (by the provision of brakes on rail wheels or safety interlocks to ensure one set of rubber road wheels is always engaged with the rail wheels);
- adaptations to designs and set-up of braking systems on trolleys in use on the national network and London Underground to improve braking performance on gradients and in case of key components becoming contaminated;
- enhanced training and briefing focused on the need for pre-work brake tests when using trolleys and the effect of gradients on braking performance;
- review and enhancement of documentation related to the maintenance and operation of trolleys in use on the London Underground; and
- review of the process for specification, design and approval of track plant and equipment for use on the London Underground.

There have been 34 recommendations made in response to on track plant and trolley issues, of these:

| On track plant and trolley recommendations issued | | Table 32: Recommendation implementation status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Measures to implement recommendation have been taken (ORR – Closed) | | Measures to implement recommendation are in progress (ORR – Open) | | No measures to be taken to implement recommendation (ORR – Closed) | | Awaiting response from the industry (ORR – Open) | |
| | Nos | Nos | % | Nos | % | Nos | % | Nos | % |
| TOTAL | 34 | 29 | 85.3 | 2 | 5.9 | 3 | 8.8 | 0 | 0.0 |

# 3 Operational experience

## Freight trains (including on track machines)

By the 31 December 2009 the RAIB had published a total of 16 reports into accidents involving the design, maintenance, preparation or loading of freight trains (two of which involved engineering trains in Northern Ireland). Factors identified have included:

| Table 33: Design, maintenance, preparation and loading factors | **No. of investigations in which the factors have been identified** (some investigations feature more than one factor) | |
|---|---|---|
| | National network | Northern Ireland Railway |
| Defective wagon | 7 | 1 |
| Poor train preparation before departure | 7 | - |
| Design deficiencies | 3 | 1 |
| Breach of operating restrictions | - | 1 |

### The railway industry's response to issues associated with freight rolling stock and freight train preparation

The RAIB has made a range of recommendations to address issues associated with freight rolling stock and freight train preparation. The actions taken by the railway industry bodies concerned and reported by ORR include:

- extensive checks by freight operators to identify two-axle wagons with excessively twisted frames and their removal from service until rectified;
- assessment of the derailment risk associated with the PHA-type wagon (including testing of its suspension);
- development of future proposals for using wheel impact measuring systems to identify unevenly loaded wheels;
- establishment of clear pass/fail criteria for the inspection of damaged wagon stanchions;
- a freight operator has reviewed its terminal operations, and associated computer system, with a view to minimise the chance of oversized containers being loaded on to a train;
- all freight operators have reviewed their procedures for conveying empty and lightweight containers in windy conditions;
- all freight operators have identified those container flat wagons that are fitted with non-compliant devices for securing containers (spigots) and, where necessary, have introduced risk mitigation measures (eg modification of the spigots and/or procedural controls).

There have been 63 recommendations made in response to freight rolling stock and freight train preparation, of these:

| Freight rolling stock and freight train preparation recommendations issued | | Table 34: Recommendation implementation status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Measures to implement recommendation have been taken (ORR – Closed) | | Measures to implement recommendation are in progress (ORR – Open) | | No measures to be taken to implement recommendation (ORR – Closed) | | Awaiting response from the industry (ORR – Open) | |
| | Nos | Nos | % | Nos | % | Nos | % | Nos | % |
| TOTAL | 63 | 50 | 79.3 | 12 | 19.0 | 0 | 0.0 | 1 | 1.7 |

## Recommendations

This section 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:

- Measures have been taken to implement the recommendation, or measures will be completed by a particular date. ORR is satisfied and do not propose to take any further action (closed).
- Measures are being undertaken, or are planned, to implement the recommendation. ORR has yet to decide whether it is satisfied with the response (open);
- Awaiting response from the duty holder (open); and
- No measures are planned to implement the recommendation. ORR is satisfied with the explanation and do not propose to take any further action (closed).

The ORR also uses the terms open and closed meaning:

- Open = Recommendation has been passed to duty holder for consideration and action where appropriate: however either the action has not yet been completed or feedback from the duty holder is awaited.
- Closed = Recommendation has been passed to duty holder. Duty holder has considered the recommendation and has either implemented measures or decided to take no measures. ORR has considered this and has closed the recommendation.

ORR's definition of closed has two meanings and does not provide clarity in helping people understand whether measures have been put in place to implement the recommendation or not. Following discussion between the ORR and RAIB, the ORR will, in future, use the following classifications:

- Implemented – to align with 12(2)(b)(i) of the Regulations – meaning that all associated actions to deliver the recommendation have been completed.
- In-Progress – to align with 12(2)(b)(ii) of the Regulations – meaning actions are being taken to agreed timescales.
- Non-Implementation – to align with 12(2)(b)(iii) of the Regulations – meaning that no measures will be taken to implement the recommendation. As agreed, and within our MoU we will seek to consult with you before reporting to you on non-implementation.

Further details of the recommendations made in 2009 and details of recommendations made in previous years which have not been closed by the relevant safety authority or public body are detailed in 'Annual Report Section 2: Report on RAIB's Recommendation Status - as reported to RAIB - 2009', which can be found at www.raib.gov.uk.

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 did not occur as a result of the actions taken. The statistical data on UK's railway safety is published by the ORR, the current report is the National Rail Trends 2008-2009 Yearbook and can be found at www.rail-reg.gov.uk.

# 3 Operational experience

Between October 2005 and December 2009, RAIB made a total of 802 recommendations. The following table provides a summary of the status

| Recommendations issued | | Table 35: Recommendation implementation status | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Measures to implement recommendation have been taken (ORR – Closed) | | Measures to implement recommendation are in progress (ORR – Open) | | No measures to be taken to implement recommendation (ORR – Closed) | | Awaiting response from the industry (ORR – Open) | |
| Year | Nos | Nos | % | Nos | % | Nos | % | Nos | % |
| 2006 | 133 | 124 | 93.2 | 5 | 3.8 | 4 | 3.0 | 0 | 0.0 |
| 2007 | 292 | 244 | 83.6 | 34 | 11.6 | 13 | 4.5 | 1 | 0.3 |
| 2008 | 181 | 119 | 65.7 | 56 | 31.0 | 6 | 3.3 | 0 | 0.0 |
| 2009 | 196 | 66 | 33.7 | 80 | 40.8 | 0 | 0.0 | 50 | 25.5 |
| TOTAL | 802 | 553 | 68.9 | 175 | 21.8 | 23 | 2.8 | 51 | 6.5 |

The full distribution of recommendations, over the period from Jan 2009 to 31 Dec 2009, addressed to duty holders identified by the RAIB is detailed in 'Annual Report 2009 Section 2: Reported status of RAIB's Recommendations 2009', which can be found at www.raib.gov.uk.

The majority of these were targeted at the following organisations:

- Network Rail (114).
- Mainline passenger and freight train operators (42).
- Railway contractors on the national network (18).
- Heritage railways (7).
- Light Rail Operators (tramways) (7).

**Chart 6 - National Network recommendation implementation status**

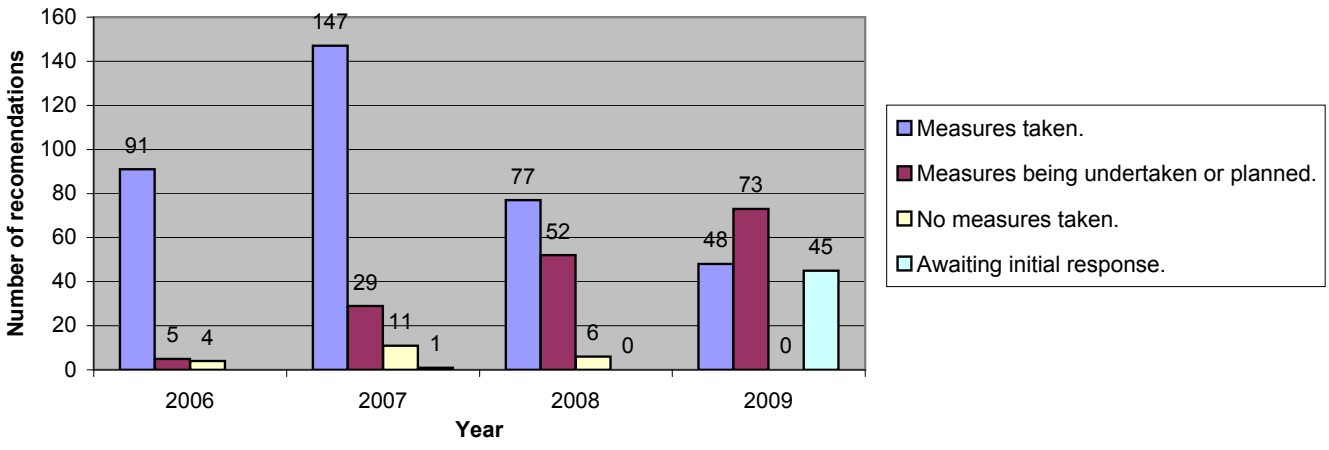


**Chart 7 - Light Rail recommendation implementation status**

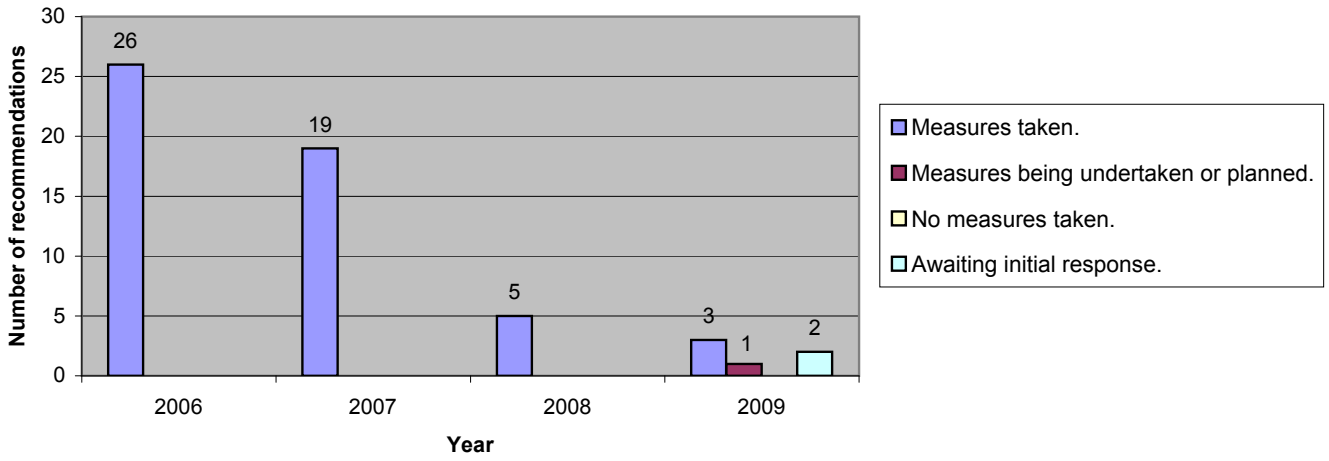



**Chart 8 - Heritage recommendation implementation status**

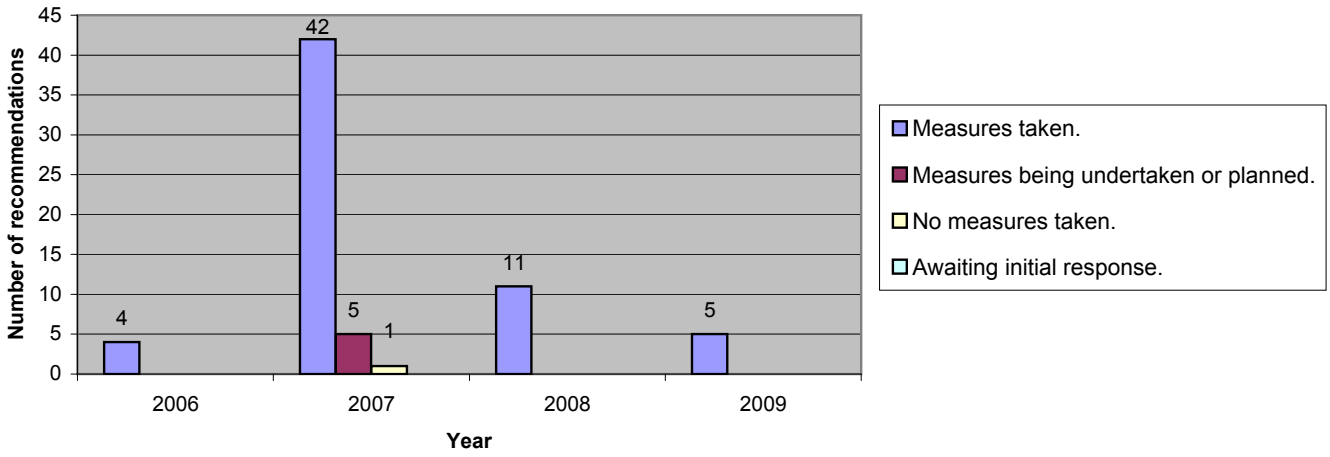
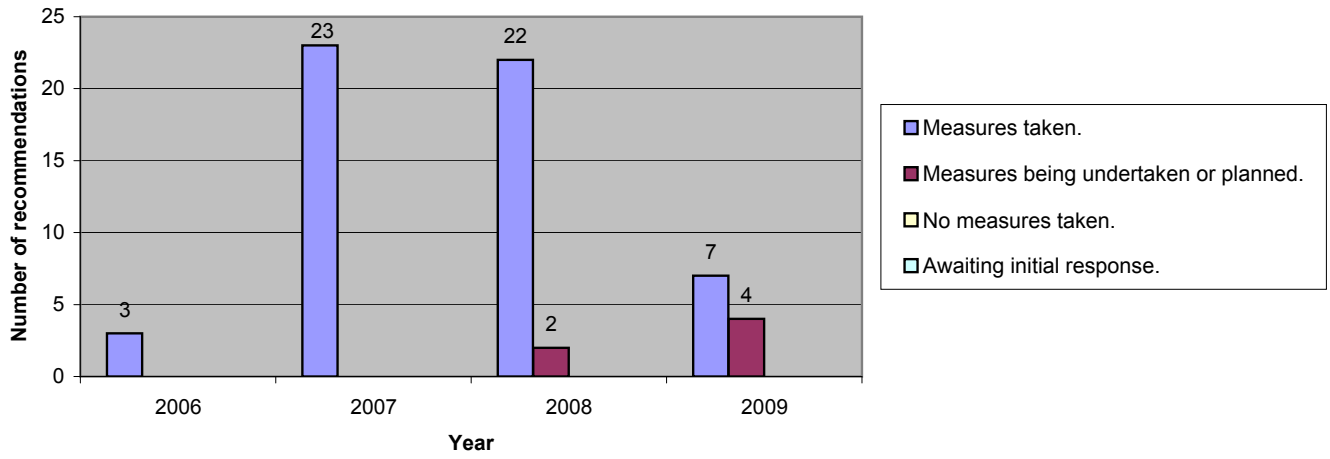



**Chart 9 - Metro recommendation implementation status**



# 4. Other Branch activities

## Conferences and Seminars

The RAIB believes it is very important to learn from the way others operate, as well as informing them about what the Branch does and how it operates. Besides ongoing liaison within the industry, the RAIB made presentations at local, national and international conferences and seminars throughout the year. This has included diverse organisations such as:

- International Transport Safety Association
- Institute of Mechanical Engineers
- National Operations Risk Group
- Parliamentary Advisory Council for Transport Safety
- Imperial College

## Emergency Services Training

The RAIB has provided presentations to the Disaster Victim Identification and Forensics training courses in England and Scotland. In addition, it has participated in emergency exercises organised by the Police and Emergency Services in Cheshire and West Midlands.

## International Activity

The RAIB continues to work closely with the European Railway Agency and other member states to further the requirements of the Railway Safety Directive for engendering European co-operation and standardisation. The RAIB was one of the first investigation bodies to fully implement the European Railway Safety Directive and has used this experience to try and assist ERA. As a result, the RAIB is a proactive participant in the ERA Network of national investigation bodies (NIBs). The objective of this network is to establish good practice and where appropriate develop common investigation methods and common principles for the follow-up of safety recommendations and to exchange views and experience in all fields of rail accident and incident investigations.

RAIB also participates in four of the ERA Task Force groups, which are developing advice and guidance for ERA as part of its assistance to other Member State's NIBs.

The RAIB continues to receive visits from overseas accident investigation organisations.

Protocol of Co-operation with BEA-TT

BEA-TT is the French national independent investigation body and has agreed a cross-border protocol of understanding with RAIB. This protocol, which was signed on 23 October 2009, covers the practical arrangements for joint investigations in the Channel Tunnel.

This provided the framework of co-operation for the investigation into the shuttle train fire that concluded with the report being published in October 2007, and the ongoing investigation into the fire on an HGV shuttle train in the Channel Tunnel dated 11 September 2008, which is being led by BEA-TT with RAIB assisting.

# Other branch activities 4

## Memorandum of Co-operation with the Rail Accident Investigation Unit Ireland

The Railway Accident Investigation Unit (RAIU) is the permanent investigating body for railway accidents and incidents in the Republic of Ireland and has agreed a cross-border Memorandum of Co-operation between RAIB and the RAIU. This memorandum was signed on 27 January 2009 and covers the practical arrangements for joint investigations when investigating accidents in the following circumstances; an accident or incident that occurred on or close to the border; and an accident or incident which occurred anywhere in the jurisdiction of the RAIB or the RAIU involving a train or vehicle from either the UK or Ireland.

## Protocol of Co-operation with RTA Dubai

In 2008, the Roads and Transport Authority (RTA) in Dubai, United Arab Emirates, requested that RAIB provide strategic advice and to support the RTA in the establishment, development and operation of an accident investigation regime for Dubai Railways.

A Memorandum of Understanding between RAIB and the RTA was signed on 5 October 2009.

# Annexes

## Annex A

### Glossary of abbreviations and acronyms

| | |
|---|---|
| COSS | Controller of Site Safety |
| ERA | European Railway Agency |
| LUL | London Underground Ltd |
| ORR | Office of Rail Regulation (Her Majesty's Railway Inspectorate) |
| RSSB | Rail Safety & Standards Board |
| SPAD | Signal Passed At Danger |
| TPWS | Train Protection and Warning System |

## Annex B

### Glossary of terms

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

| | |
|---|---|
| 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. |
| On Track Plant | Engineering Plant with Rail Wheels, including On Track Machines (OTM) and Road Rail Vehicles (RRV). |
| 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.* |
| 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.* |

# Annexes

**Annex C**

## Annual Report feedback questionnaire

Now you have had the chance to read the RAIB annual report, we would like to know your opinion of it. To help us improve the annual report we would welcome your feedback. A form with expandable boxes is available on our website www.raib.gov.uk/publications.

To what extent do you agree or disagree with the following statements:

1. I found the information is easy to understand:
   a. Strongly agree
   b. Tend to agree
   c. Neither agree nor disagree
   d. Tend to disagree
   e. Strongly disagree

Comments:

| |
|---|
| |

2. I found that there is sufficient detail in the report to make it interesting to read:
   a. Strongly agree ☐
   b. Tend to agree ☐
   c. Neither agree nor disagree ☐
   d. Tend to disagree ☐
   e. Strongly disagree ☐

Comments:

| |
|---|
| |

3. I found the information useful:
   a. Strongly agree ☐
   b. Tend to agree ☐
   c. Neither agree nor disagree ☐
   d. Tend to disagree ☐
   e. Strongly disagree ☐

Comments:

| |
|---|
| |

4. I found separation of the recommendations progress section from the main report useful:
   a. Strongly agree ☐
   b. Tend to agree ☐
   c. Neither agree nor disagree ☐
   d. Tend to disagree ☐
   e. Strongly disagree ☐

Comments:

| |
|---|
| |

5. I found the section on operational experience useful:
   a. Strongly agree ☐
   b. Tend to agree ☐
   c. Neither agree nor disagree ☐
   d. Tend to disagree ☐
   e. Strongly disagree ☐

Comments:

| |
|---|
| |

6. I found the section on the identification of important recurrent themes useful:
   a. Strongly agree ☐
   b. Tend to agree ☐
   c. Neither agree nor disagree ☐
   d. Tend to disagree ☐
   e. Strongly disagree ☐

Comments:

| |
|---|
| |

7. I found this report is useful in providing an overview of how the RAIB conducts its investigations:
   a. Strongly agree ☐
   b. Tend to agree ☐
   c. Neither agree nor disagree ☐
   d. Tend to disagree ☐
   e. Strongly disagree ☐

Comments:

| |
|---|
| |

8. What did you particularly like about the report?

Comments:

| |
|---|
| |

9. What did you particularly dislike about the report?

Comments:

10. What improvements would you like to see in the presentation of the report?

Comments:

11. Is there any particular information you would like to see in future reports?

Comments:

Please send any comments to the RAIB using any of the contact methods below:

Telephone: 01332 253300
Fax: 01332 253301
E-form on the website at the end of the annual report, or alternatively cut and paste this link:
http://www.raib.gov.uk/publications/annual_report.cfm
E-mail: Annualreportfeedback@dft.gsi.gov.uk

Or write to:

Publications Team
Rail Accident Investigation Branch
The Wharf
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