RAIB

Rail Accident Investigation Branch

Annual Report 2021

This page is intentionally left blank

Chief Inspector's review of 2021

During 2021 the coronavirus pandemic continued to have a significant effect on all our lives, and it has presented the railway industry and its people with a number of challenges. At RAIB, we have been able to adjust our methods of working to ensure that as far as possible, our investigations have continued to be to the standard which the public and the industry have come to expect over the sixteen years for which we have now been operating.

One event which occurred during the year marked an unfortunate but significant milestone: the accident at Salisbury on 31 October was the first time RAIB has had to investigate a collision between two passenger trains moving at significant speed on the national network. Thankfully, no one was killed, although 14 people were hospitalised, including the driver of one of the trains and a passenger, who were seriously injured. This accident is still under investigation.

The latter part of 2021 also saw a number of very serious, and some fatal, interactions between people and trams, two of which are now subject to investigation. In our 2020 report, we reflected that there had been four fatal accidents on the operational railway that year, including both those involving track workers, and the derailment at Carmont. Sadly, February 2021 saw the death of another track worker, at Surbiton, and February 2022, the death of a train driver at Worthing; our investigations into these accidents are still in progress.

Whatever the circumstance of an accident, these events are devastating for the people involved, and those who lose loved ones and friends; learning from them as individual events or as parts of trends is a vital part of improving safety and reducing harm.

There are seven main themes which have run through our work during 2021, the first of which is the safety of track workers. These make up the next section of this review.

Foreword

Our Purpose:

We independently investigate accidents to improve railway safety and inform the industry and the public.

Safety of track workers

The safety of people who work on the track continues to be a matter of considerable concern. The potential for brief lapses in concentration to have terrible results means that it is vital that people only go on the track while trains are running if it is absolutely necessary for them to be there, and that everyone whose duties take them on or near the line is fully equipped, competent and fit for the work they have to do. Our 2020 annual report described the recommendations that we made following the accident at Margam in 2019 that resulted in the death of two track workers, and the action the industry is taking to address them. We expressed concern that the industry had been unable to carry people with it in its attempts to bring about real change.

Early in 2021, we commenced our investigation into the death of a track worker at Surbiton and concluded our investigation into the death of a worker who was struck by a train at Roade on the west coast main line in April 2020 (report 03/2021).

In the case of the accident at Roade, as at Margam in 2019, we found that someone was on the track doing a task that was not really necessary. Proper planning would have identified that there was no reason for people to go on the track every day during this project to apply and remove earthing straps. We recommended that Network Rail reviews its processes with the aim of minimising the need for track access in connection with operating the electric traction supply system, and we hope that this will help to prevent any more such tragedies.

The year also saw further incidents in which people avoided death by a matter of a second or two, in which the outcome could so easily have been fatal. At Rowlands Castle (report 06/2021), at Llandegai tunnel (safety digest 03/2021) and at Eccles (safety digest 05/2021), mistakes and a lack of proper focus on the task led to people finding themselves in a desperate situation and having to dive out of the way of oncoming trains. Fortunately, they lived to tell the tale, but no one should undergo such an experience during a working day.

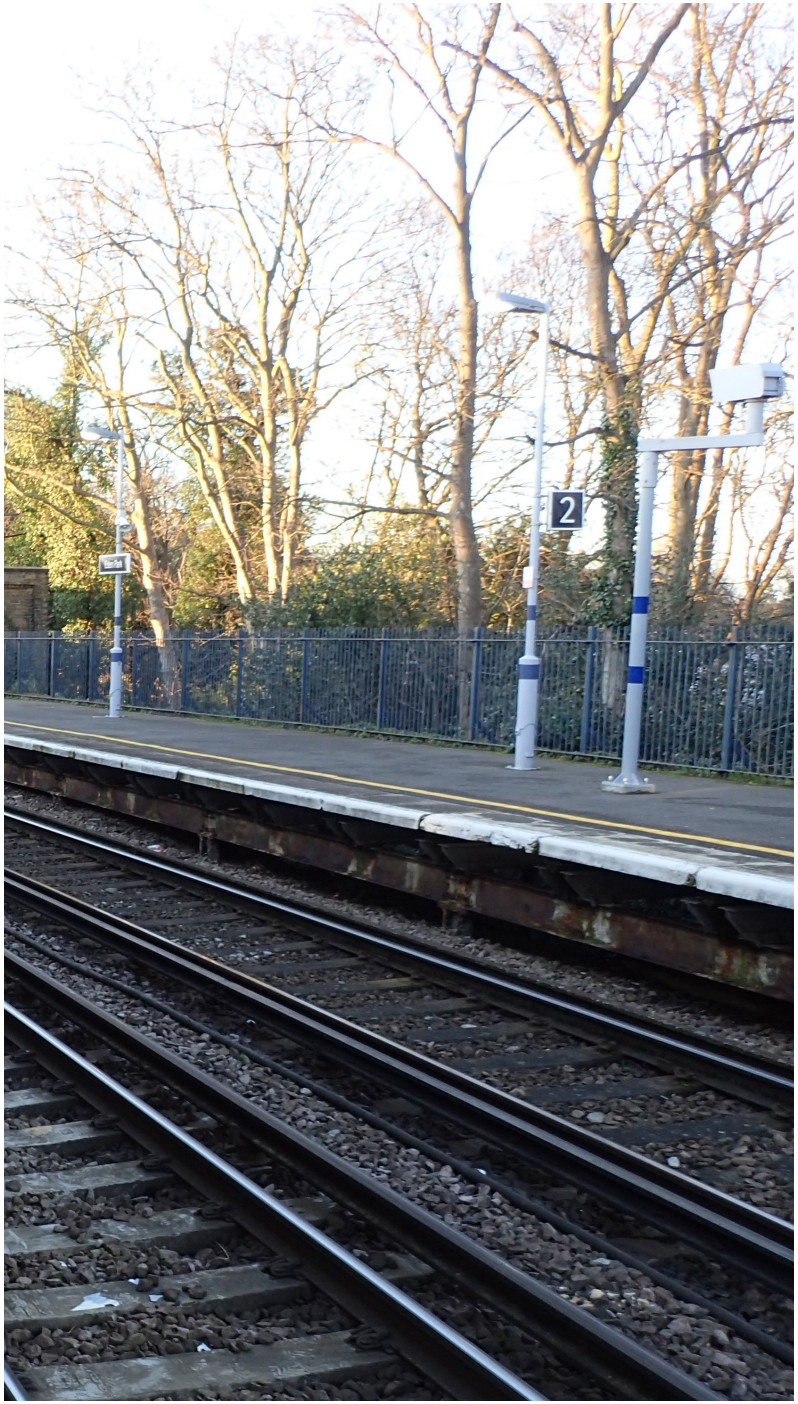
RAIB recognises the continuing efforts of the Office of Rail and Road and Network Rail to radically alter the way that track maintenance activities are delivered, with a fundamental move away from working on lines that are still open to traffic and reliance on warnings provided by lookouts (so called red zone working). We also applaud the renewed focus on effectively communicating the benefits of new working methods to the people who really matter, the track workers themselves. Despite this, our investigations during 2021 have shown that the risk to track workers is still there as the amount of red zone working declines. The close calls at Llandegai tunnel and at Eccles, both involved workers who believed that they were protected from approaching trains by temporary blockages of the line.

In the years to come the focus should be on developing the infrastructure and technology, along with safety behaviours and leadership skills in the workforce, that are needed to keep people safe from trains.

The safety of people getting on and off trains

Travelling by train is not always easy or safe for people who are disabled or vulnerable, even though they may rely on the railway as the only form of transport accessible to them. During 2021, we published two reports on accidents which led to the death of passengers who fell from the edge of station platforms.

At Eden Park station in south-east London, a visually impaired person fell off the platform less than a second before an arriving train struck and fatally injured him. Our investigation (report 01/2021) concluded that the absence of a tactile strip along the platform edge may have been a factor in this accident. These strips are used to provide visually impaired passengers with an indication that they are approaching the platform edge. Eden Park is far from unique: around half of all mainline stations in the UK were also not equipped with this valuable aid to the visually impaired.



Our investigation found that government and the railway industry have policies in place to make rail travel more accessible for people with disabilities. However, there appeared to have been no coherent risk-based strategy for the provision of tactile strips, despite their obvious importance to visually impaired people who value the opportunity to travel independently, without reliance on staff.

We recommended that Network Rail and the Department for Transport (DfT) should develop and progress a time-bound programme to install tactile surfaces at stations, where justified by safety benefits. In response, the DfT has told RAIB that it made an additional £10 million available for the priority stations not already funded, to be spent in 2021/22, and that additional funding has been secured to fit tactile surfaces along all Great Britain's platform edges that are not already scheduled to have them installed as part of another enhancement project or renewal. The Office of Rail and Road (ORR) has reported to RAIB that Network Rail has been funded to fit tactile surfaces along all platform edges on its railway network by the end of 2029, and that Network Rail expects most of the work to be carried out by 2025.

I am pleased to see that the risk to visually impaired passengers is recognised and that progress is being made with addressing our recommendation.

The extraordinary circumstances created by the COVID-19 pandemic were a factor in the death of a passenger at Waterloo station on London Underground's Bakerloo line, a place where a substantial gap between the train and the platform has been a constant feature for over a hundred years, because of the sharp curve the station is built on.

The passenger had alighted from a northbound train before falling back into the gap, where he remained trapped and unable to free himself for more than a minute before the train departed. Throughout this time, there was no one on the platform to see what was happening, despite it being mid-morning on a weekday. He was then struck by another train as it arrived at the station.

The investigation (report 05/2021) found that London Underground's risk assessment processes did not enable the identification and detailed assessment of all factors that contributed to higher platform-train interface (PTI) risk at certain platforms. Consequently, although London Underground had implemented some location-specific mitigation measures at the PTI, it had not fully quantified the contribution of curved platforms to the overall PTI risk, and so was unable to fully assess the potential benefits of additional mitigation at these locations. London Underground have since improved camera coverage at the station platform, amended their risk assessment processes, and taken measures to improve staff and passenger understanding of PTI risk.

Railway operations

Last year we commented on the possible effects of distraction on the performance of train drivers. This also gave us cause for concern in 2021. Our investigation into a near miss incident at Chalfont & Latimer (report 04/2021) found that a driver, who passed a signal at danger and then reset the train protection equipment to enable the train to proceed, was probably fatigued. This affected his reaction to the signals and the decisions that he made during the event. Chiltern Railways' management arrangements had not been effective in managing the safety risk associated with this individual. It is important that train drivers, whose actions are critical to the safe operation of the railway, get the best possible support from their employers. This includes the provision of accurate and up-to-date information about conditions on the network both when they come on duty and, where possible, once on duty. One consequence of poor practice in this area is trains travelling too fast through emergency speed restrictions, as we found in our investigations into multiple instances of this between Laurencekirk and Portlethen (report 08/2021). In the case of the overspeeding incident at Beattock (safety digest 02/2021), the emergency speed restriction board had been wrongly positioned, which gave the driver too little distance to slow to the mandated speed.

The industry needs to improve the methods that it uses to impose speed restrictions at short notice, to take advantage of modern technology to communicate effectively with drivers as the situation develops. Getting this right is critical since the railway is now making more use of local speed restrictions to mitigate the risk to its infrastructure during extreme weather events.

Management of bad weather

This concern about communication methods is linked to the need for the railway to respond to changing weather conditions. UK weather has always been liable to rapid changes from day to day, which can catch out people and organisations who are not adequately prepared. Heavy rain can result in flooding and landslips, and over the years we have reported on many incidents in which trains have run into trouble from this cause. Last year's Annual Report detailed the risks and options available to infrastructure managers and train operators.

During 2021, RAIB continued the investigation into the catastrophic derailment at Carmont, Aberdeenshire, in August 2020 which resulted in the death of three people. We published an interim report in April 2021, and the final report in March 2022 (report 02/2022). This accident has served as a stark reminder that extreme rainfall can endanger the drainage systems, earthworks and structures that the railway relies on, and that it is very difficult to predict where and when such failures may occur. The washout that derailed the train at Carmont was caused by the incorrect installation of a drainage system eight years before the accident. This drainage system, designed to reduce the risk of a much older earthwork failing, was itself vulnerable to failure when exposed to unusually heavy rainfall for several hours.

Given that it is so difficult to predict which assets will fail next, it is vital that the railway applies the precautionary principle. In practice this means slowing trains in areas exposed to extreme weather that poses a general but significant risk to assets. The most obvious example is heavy rainfall associated with summer convection storms of the type witnessed at Carmont. This should not be overly disruptive to the operation of the railway provided operations staff have been given the training and procedures they need to fully exploit the technology already available to forecast and track weather conditions in real time.

It was apparent from the Carmont investigation that the industry's arrangements for responding to bad weather were not adequate. We're pleased that following the accident, Network Rail took action to put in place revised instructions and processes that allow for the slowing down of trains in areas endangered by extreme weather events.

RAIB has made 20 recommendations to address the safety issues it has identified. These include: the management of civil engineering, design methodologies for drainage systems, processes for managing the response to extreme rainfall, measures to enhance the capability of the railway's operational control offices, management assurance and train design.

Freight wagon maintenance

Poor maintenance of freight wagons has featured in several RAIB reports over the years. During 2021 it was the focus of our investigation into the derailment, oil spillage and fire at Llangennech, Carmarthenshire in August 2020, published in January 2022 (report 01/2022).

Trains carrying dangerous goods play an important role in the UK economy, but the risks which their operation presents must be adequately controlled. The consequences when things go wrong can be disastrous. Thankfully in this case no one was hurt, but the damage, both to the environment and to people's livelihoods, will take years to put right.

The rail industry's approach to the safe management of these trains needs to improve. The accident was probably a result of inadequate maintenance practices, and a failure to appreciate the importance of the correct fastening of the various components of the tanks wagons' braking system. This was not the first time that we have investigated an accident related to the maintenance of the oil tanker trains which pass through Llangennech, and it is disappointing that the recommendation we made in our report published four years ago, that the maintenance processes and facilities at the depot where the tank wagons are based should be the subject of a full risk assessment, had not been implemented effectively.

As RAIB has been concerned about the quality of freight wagon maintenance for many years, we welcome the actions that ORR has taken to reinforce its supervision of entities in charge of maintenance (ECM). This will provide improved visibility of maintainers' work. It will verify the extent to which the important role of ECMs is properly understood and applied across the UK freight sector, and the adequacy of surveillance undertaken by certification bodies, whether based in the UK or in the EU.

Safety at user worked level crossings

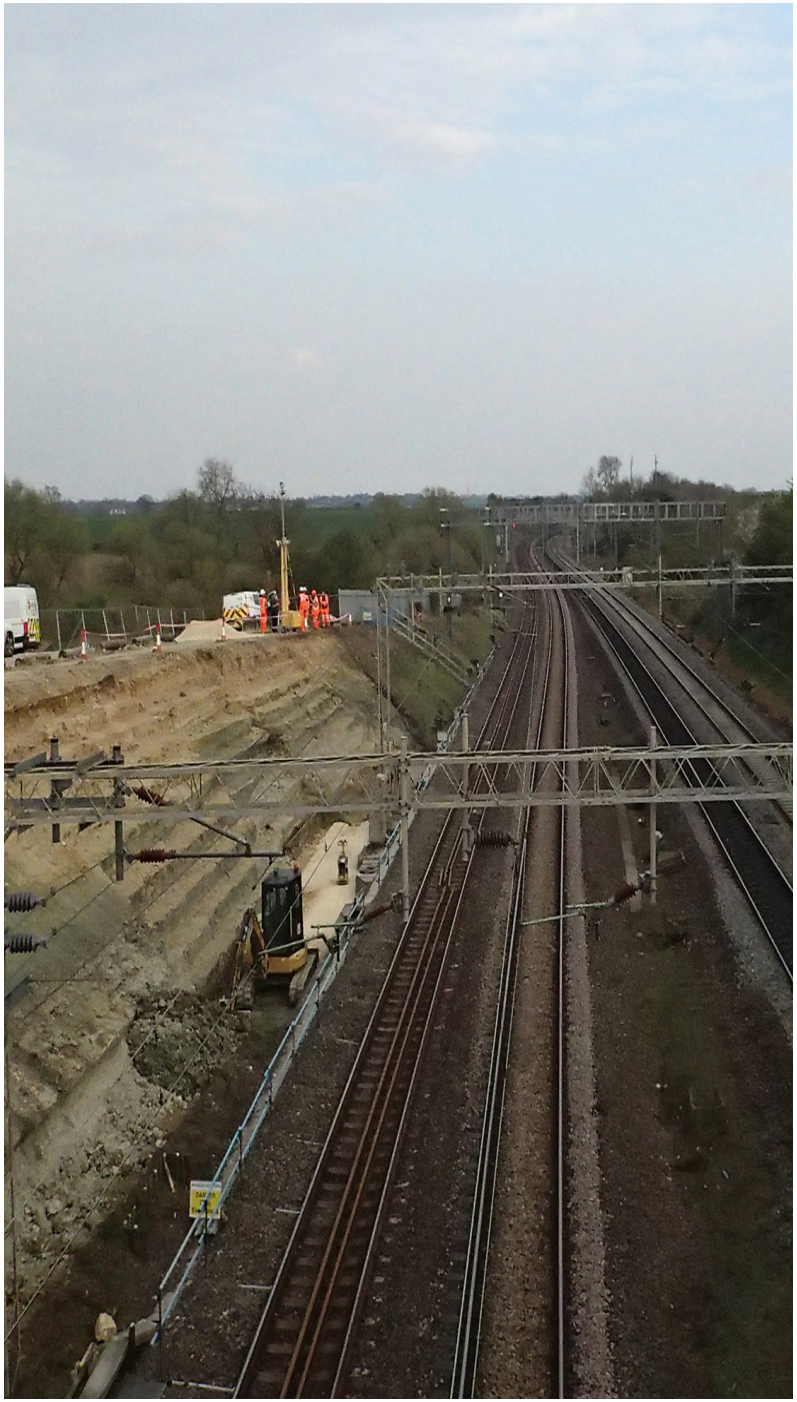
User worked level crossings (UWCs), where a person wishing to cross the railway with a vehicle has to operate gates or barriers themselves, have featured in 22 of our reports and safety digests since 2005. We have published a summary of learning outlining the hazards at this type of crossing and consider that UWCs have the greatest scope for safety improvement of any type of level crossing.

In 2018 we reported on an accident at Frognal Farm UWC in Kent (report 12/2018). A particular concern identified by this investigation was that the signs presented to the crossing user, intended to tell them how to cross safely, were badly designed and hard to understand. We recommended that the Department for Transport (DfT), working with the industry and the regulator, should revise and update the regulations so that clear, effective signs can be used at these crossings.

Following delays caused by pressure of other legislation and the Covid pandemic, the DfT has indicated that it now intends to introduce new regulations. Consultation on these was launched on 6 April 2022 and once the responses have been analysed, the department plans to bring forward legislation to make the changes as soon as possible.

During 2021 a near miss occurred at Coltishall UWC in Norfolk. Our investigation into this incident was published in April 2022 (report 03/2022), but one issue that became apparent in the early stages of the investigation is that the UWC at Coltishall is on a public road. When the incident happened, the road was being used as a diversionary route due to the temporary closure of a nearby main road. Level crossings are one of the biggest sources of risk on the UK's railways. RAIB has investigated many accidents and incidents over the last sixteen years and noted considerable improvement in the way risk at many types of level crossing is managed.

However, we feel at present the greatest scope for safety improvement exists at user worked crossings, whether on private or public roads. The number of such crossings on public roads is of concern because most motorists are unlikely to be familiar with the concept of a level crossing which they must operate themselves. Because of this, they may not use the crossing safely, as was the case in this incident. Over the previous 20 years, the railway was aware that the safety arrangements at this crossing needed to be improved, but it seems that bringing about such improvement was too difficult. Our recommendations seek to promote safety improvements at user worked crossings on public roads and to check that regulatory actions being taken to make such improvements easier to achieve have the desired effect.



Management assurance and the management of safety

The investigation of the fatal accident at Roade, (report 03/2021), highlighted an issue which has also appeared in several other recent accidents: the arrangements (or lack of them) for management assurance about site and operational activities.

Unsafe behaviour on site is a familiar theme. Everyone working on the railway has a responsibility to themselves and their colleagues, which includes not letting dangerous or non-compliant actions go unchallenged. Managers need to be aware of staff behaviour, and the management structure should make it a normal part of their work to be getting out there and seeing what goes on. It's all very well to check paperwork, but it's important to know what is really happening on the ground.

In the accident at Roade, the person who was killed was reputedly in the habit of walking on the line when he didn't need to. His co-workers knew he did this, but he had not been picked up on it by anyone.

In all aspects of railway operations, management assurance is important. It matters that what happens on the ground corresponds with what all the carefully devised rules and processes say should happen.

In 2021, we have seen other examples of this disconnect in different fields: in the management of mobile operations managers (Rowlands Castle, report 06/2021); in the control of the unloading of vehicles at a heritage railway (Dereham, safety digest 01/2021); and in the approach to vehicle movements and access to the lineside when clearing up after engineering work (Penistone, safety digest 06/2021).

RAIB's investigation into the fatal derailment at Carmont identified that Network Rail's management assurance process had not highlighted the fact that controllers had not been provided with the training and procedures needed to exploit the weather-monitoring technology that had been installed in control offices. Furthermore, divergence between nationally mandated weather management processes and local practice in Scotland had not been detected.

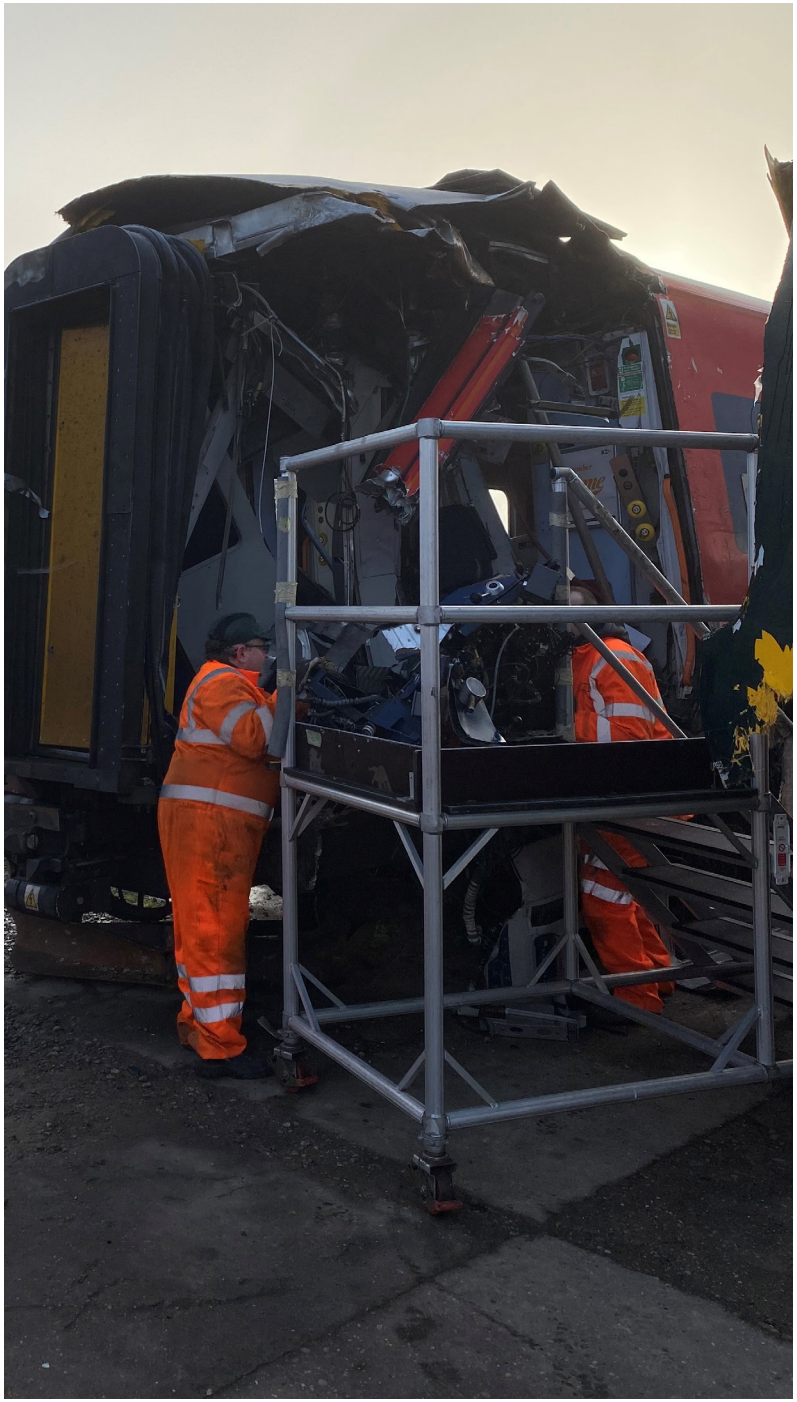
Management assurance is not just about audits and compliance checks. To work well, formal processes need to be complemented by an open and honest culture that encourages the flow of information throughout the organisation. People need to feel that they can speak about their concerns, or deliver bad news, without risk to themselves if managers are to be truly aware of what is happening in their organisation.

This is a problem that has existed from the earliest days of the railway and, more recently, was probably exacerbated by responses to the COVID pandemic. We recognise that the solution is not straightforward. However, it is important that the industry recovers quickly and continues to strive towards a better understanding of what makes management assurance work because, without it, the rest of the safety management system can be fatally undermined.

Concluding thoughts

The seven themes above result from a careful examination of our work throughout 2021. I would make two other more general observations over a longer timeframe.

The first relates to the railway now being awash with data. This is very useful to accident investigators because it can provide evidence of accident cause that in the past we would have struggled to identify. However, there are numerous examples of where data that provides evidence after a railway accident could, if known about and used to drive action, have been used to avoid the accident happening in the first place. The data may be there, but the management wherewithal to best use it to reduce risk, is not always. Also, not recognising this can lead to a false sense of security where having invested in equipment that gathers data, organisations can develop a belief that the risks such data can be used to manage have been mitigated, when they have not.



Secondly, the railway is statistically very safe and rightly strives hard for continual improvement. However, it is clear from RAIB investigations that quite a number of significant accidents over recent years could, with slight changes in circumstance, have been even worse. Such events are a stark reminder of the need for constant vigilance when thinking about and managing risk in a safety-critical industry like the railway.

Since our last Annual Report, Chief Inspector Simon French OBE has retired after nearly eighteen years with the Branch and everyone here appreciates the big role he played in the Branch's development and the tireless support he gave many of us over that time.

Over the course of a year, many organisations and individuals assist RAIB in its work, sometimes in very trying and stressful circumstances. As a Branch, we are acutely aware of this and appreciate it deeply. It has been a difficult year for everyone. As in previous years, the Branch has risen to the challenges and derived safety learning from railway accidents to improve safety, and inform the industry and the public. That we continue to successfully do so, is down to the expertise and dedication of those who work here, to all of whom I am very grateful.

Andrew Hall

Chief Inspector of Rail Accidents

May 2022

Our aims

We aim to be:

- world-class accident investigators, respected and trusted by the public and railway industry
- positive, sensitive and efficient in dealing with others, both inside and outside of the organisation
- adaptive to changes in industry, technology and society

We will:

- engender a culture of integrity, honesty, objectivity, impartiality, trust, respect and empathy
- encourage and help our people to develop
- act in accordance with the highest professional standards
- publish evidence-based safety learning as quickly as possible

Operational activity

As set out in the Regulations, the UK rail industry is required to notify us of certain accidents and incidents. During the period 1 January to 31 December 2021, we received 391 notifications. Of these, we deployed on 29 occasions to carry out a preliminary examination of the site along with supporting evidence. We identified 47 events requiring a preliminary examination, which in some cases was carried out remotely. By reviewing the findings of each of these examinations we were able to determine the most appropriate response.

During 2021 we did not issue any urgent safety advice.

Having reviewed the evidence, if we do not believe there to be sufficient safety learning gained from further investigation, we may write a letter to the industry. We may decide that sharing the evidence collected will assist the industry parties involved with their own investigations. We may also review industry investigations to inform ourselves about the quality of the investigation or technical aspects of the event that it relates to.

Outcome of the 47 preliminary examinations undertaken by RAIB in 2021

Lorem ipsum

- **16** Investigations commenced
- **9** Industry investigation reviews commenced
- **8** Safety Digests commenced
- **7** Letters to coroners (HM CORONER)
- **6** No further action
- **1** Letter to industry

RAIB outputs during 2021

- **9** Full investigations published (average time to publish: 12.2 months)
- **8** Safety Digests published
- **1** Interim Report issued
- **6** Letters to coroners (HM CORONER)

Accidents investigated by RAIB

The Railways (Accident Investigation and Reporting) Regulations 2005 (the Regulations) set out the types of railway accidents which are classified as 'serious'. RAIB has a duty to investigate all serious railway accidents including derailments and collisions of rolling stock resulting in the death of one person, serious injuries to five or more people, or extensive damage to the rolling stock, infrastructure or environment.

We have a similar duty for incidents and accidents which, under slightly different circumstances, could have resulted in serious accidents, and which have an obvious impact on railway safety regulation or the management of safety.

RAIB also investigates other notifiable railway accidents where an investigation will contribute to our statutory general aims to improve the safety of railways and to prevent railway accidents and incidents.

Before the United Kingdom's exit from the European Union, RAIB was also required to investigate serious accidents by Article 19(1) of the Railway Safety Directive (EU Directive 2004/49/EC). We were required to report the number of these mandatory investigations separately from non-mandatory investigations of events which under slightly different conditions might have led to a serious accident as defined in Article 19(2). RAIB will no longer report these separate classifications, as it is not a requirement of UK law. The total number of investigations below therefore includes those mandated by UK law and other accidents investigated in line with our statutory aims.

Operational activity

Visit us at:

www.gov.uk/government/organisations/rail-accident-investigation-branch/about#our-legal-basis

for more about the regulations.

Operational activity

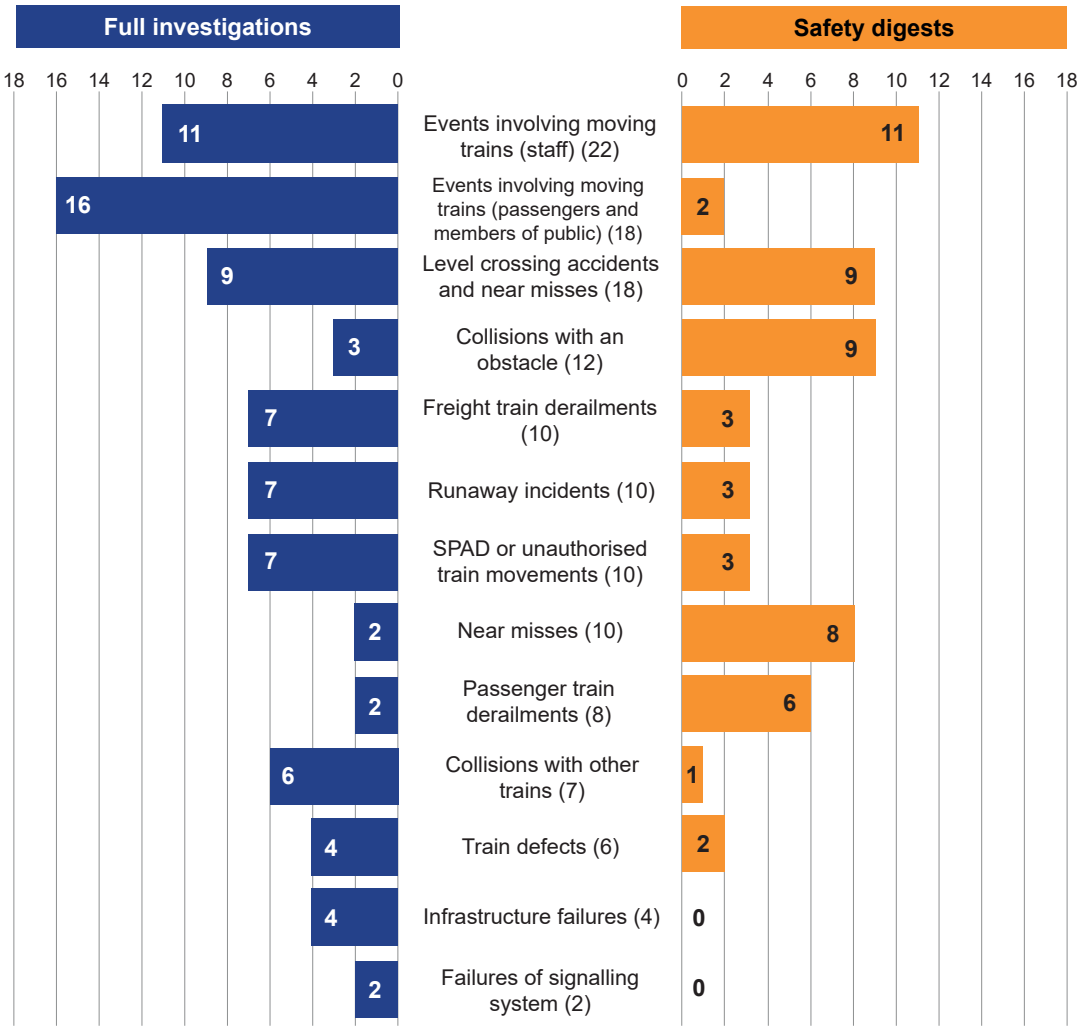
During the five-year period 2017 to 2021, we started 137 full investigation reports and safety digests.

Twenty-two involved railway employees and moving trains (such as accidents to track maintenance workers) and eighteen involved passengers and moving trains (such as a passenger trapped in train doors).

Eighteen involved harm, or the risk of harm, to people at level crossings.

We also investigated 18 derailments (8 involved passenger trains and 10 freight trains), 12 collisions with obstacles, 10 unauthorised train movements, 10 runaways and 7 collisions with other trains.

Investigations and safety digests started, by type of accident, for the five-year period 2017 – 2021.



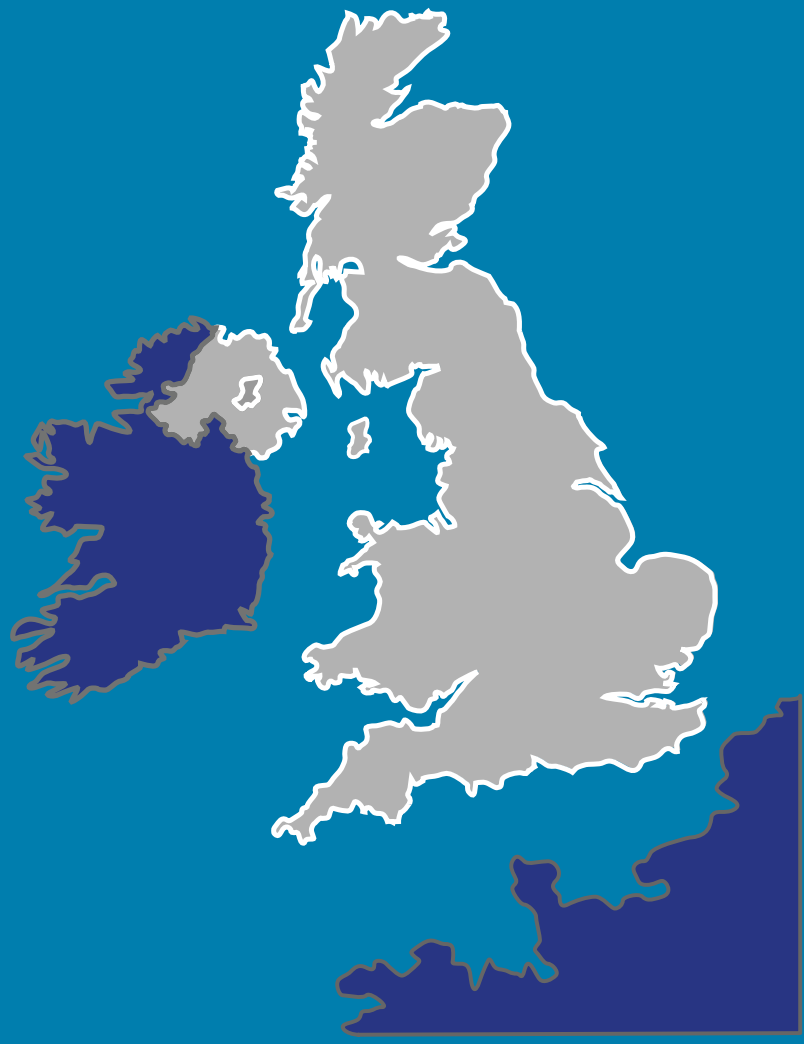
Northern Ireland and the Channel Tunnel

There have been no deployments to Northern Ireland or investigation activity related to Northern Ireland Railways (NIR) in 2021. RAIB has continued to liaise with NIR and the safety regulator, DfI (NI) on matters relating to accident investigation and safety learning. There have also been no deployments to the Channel Tunnel or investigation activity related to it in 2021.

We continue to maintain good working relationships with our counterparts in the Republic of Ireland (the Railway Accident Investigation Unit; RAIU), and France (the Bureau D'enquetes sur les Accidents de Transport Terreste; BEA-TT), and with the relevant infrastructure managers, railway undertakings, and safety authorities.

The UK's departure from the EU has necessitated a review and renewal of the Memoranda of Cooperation (MoC) with both of these organisations. The MoC with RAIU is an agreement on how RAIB and RAIU will co-operate in the event of an accident or incident on or near the international frontier or involving an international train service. Similarly, the MoC with BEA-TT is an agreement on how RAIB and BEA-TT will co-operate in the event of an accident or incident in the Channel Tunnel system (which includes the terminals in Folkestone and Coquelles).

Operational activity



Operational activity

Co-operation between RAIB and the other investigation bodies will always include mutual support and the exchange of information to the full extent permitted by our respective regulations. Furthermore, the revised MoC continue to allow the option of joint investigation teams and a single report. Such joint investigations have already taken place on two occasions, both related to fires in the Channel Tunnel.

The regulatory regime in the Channel Tunnel is currently in transition. Regulatory supervision of the Channel Tunnel is undertaken by the Intergovernmental Commission (for the UK part) and the l'établissement public de sécurité ferroviaire (for the French part).

The UK and French governments are working together to agree a new bi-national regulation governing the safety and interoperability requirements for railway operations, and rail accident investigation, in the tunnel. RAIB and BEA-TT have been party to these discussions and agreed text for inclusion in these regulations, which will reflect the intent of both bodies to co-operate in the event of an accident or incident.

Once this new regulation takes effect the ORR will assume the role of safety authority for the UK half of the tunnel. The IGC will continue to have responsibility for various roles under the Treaty of Canterbury and the Fixed Link Concession Agreement.

Our recommendations are made solely to improve railway safety. They aim to reduce the chance of a similar accident recurring, or to reduce the consequences if such an event were to happen again.

Recommendations clearly identify the organisation(s) we consider best placed to implement the changes required. We refer to these organisations as the 'end-implementers'. These include railway, non-railway, and private and public sector bodies.

Most recommendations are also addressed to the appropriate safety authority. On GB railways this is ORR. In Northern Ireland it is the NI Department for Infrastructure (who are advised by HSENI). The safety authority for the UK part of the Channel Tunnel system is the Intergovernmental Commission until ORR takes on this role under the new Channel Tunnel bi-national regulation.

If a recommendation relates to an organisation not regulated by the railway industry's safety authority it can be addressed to any other public body such as the Health and Safety Executive.

Having received our recommendations, the safety authority is legally required to ensure that the end-implementers consider the recommendations, and where appropriate, act on them. The Regulations also give the safety authority the power to require end implementers to provide full details of the measures they intend to take, or have taken, to implement the recommendation.

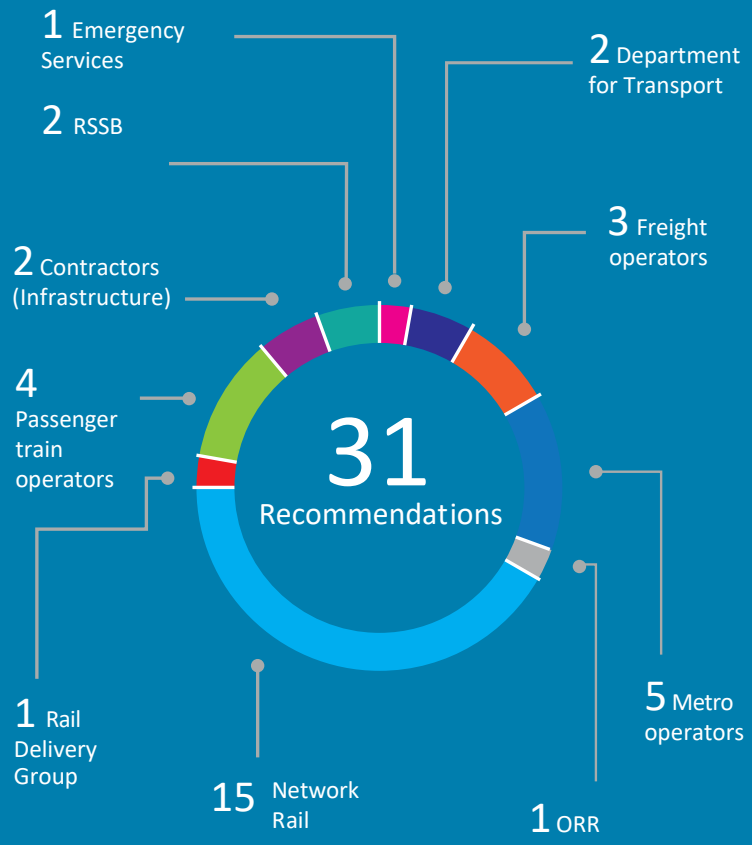
The safety authority is required to ensure proper consideration has been given to each recommendation and, where appropriate acted upon. It should also inform us of the measures taken in response to the recommendation, or the reasons why no implementation measures are being taken.

RAIB collates data on the actions in response to recommendations. In most cases, the data is based on reports received from the safety authority (usually ORR). Public bodies who are recipients of our recommendations are required to respond directly to us.

Recommendations

2021 recommendation distribution

During 2021, we made 31 recommendations which were directed to 36 different organisations including operators, manufacturers and other authorities. In five cases, recommendations were made to more than one end implementer.



Recommendations

Visit us at:

www.gov.uk/government/publications/index-of-raib-recommendations

to find out more about the latest status of our recommendations.

The current status of RAIB recommendations

An up-to-date status of each recommendation is available in the Index of RAIB recommendations. The Index provides information as supplied by the relevant safety authority or public body. Each entry is linked to a recommendation status response that provides the full text of each recommendation.

Responses to RAIB recommendations, as reported to us, are categorised as follows:

i. Implemented - all actions to deliver the recommendation have been completed

ii. Implementation ongoing - work to deliver the intent of the recommendation has been agreed and is in the process of being delivered

iii. Implemented by alternative means - the intent of the recommendation has been satisfied in a way we did not identify during the investigation

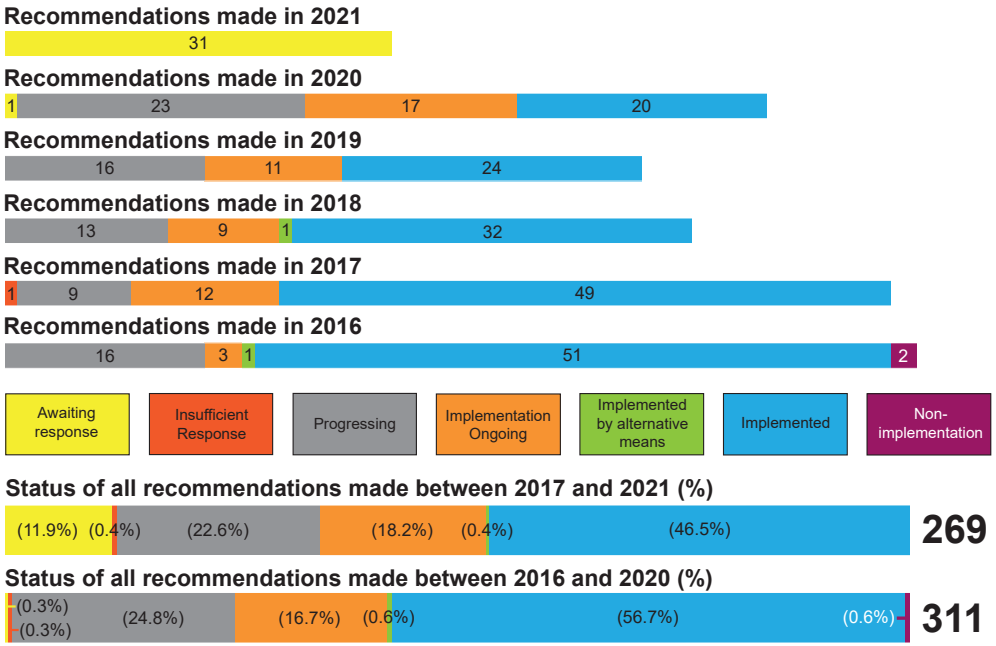
iv. Progressing - the relevant safety authority has yet to be satisfied that an appropriate plan, with timescales, is in place to implement the recommendation; and work is in progress to provide this

v. Awaiting response - the relevant safety authority has yet to receive a report from the end-implementer on the actions that have been taken, or are planned, in response to an RAIB recommendation

vi. Insufficient response - the relevant safety authority considers that the response received from an end-implementer is insufficient

vii. Non-implementation - recommendation considered, and no implementation action is to be taken.

The status of all recommendations made in the five-year period between 2017 and 2021 is as follows:



Status of recommendations by the year that they were made (as reported to RAIB by 31 December 2021)

- 65.1% are either implemented, or their implementation is ongoing
- for 22.6% of recommendations the safety authority has yet to be satisfied that an appropriate plan, with timescales, is in place for implementation (i.e. the response is still 'progressing')
- for 11.9% of recommendations a sufficient response has still to be reported to the safety authority (these are mainly recommendations made during 2021)
- for 0.4% of recommendations the relevant safety authority considers that the response received from an end-implementer is insufficient
- No recommendations have been reported as not being implemented.

Recommendations

Of all the recommendations made in the five-year period between 2016 and 2020 (i.e. recommendations that were more than one year old on the 31 December 2021), 74.6% have already been reported as implemented or are in the process of being implemented.

The remaining 25.4% of recommendations made between 2016 and 2020 remain open. This is because ORR has yet to receive a sufficient response, or because ORR is still considering the duty holder's response.

There is inevitably a time lag between a duty holder reporting the actions taken or planned in response to a recommendation, and ORR reporting the outcome to RAIB. This period of time is required for ORR to consider the appropriateness of the actions and can sometimes be prolonged if ORR needs further information from the duty holder or is concerned about the appropriateness of the actions.

Recommendations

Areas of concern to RAIB

The status of each recommendation is reported to RAIB by the safety authority, or other public body, to whom the recommendation was addressed. Based on our understanding of the risk, we may sometimes have concerns about the way an organisation has responded to a recommendation, or the information provided to us by the safety authority.

When this happens, we will first discuss the issue with the relevant safety authority or public body, before recording any remaining concerns in the next Annual Report. The following summaries are all such issues that were identified during 2021.

When we record any concerns regarding the actions taken in response to recommendations, we denote them with coloured triangles according to the following categorisation:

Red  we have concerns that no actions have been taken in response to a recommendation

Blue  we are concerned that the actions taken are inappropriate or insufficient to address the risk identified during the investigation

White  we note that substantive actions have been reported but we still have concerns about the underlying risk.

Report 08/2018 – Collision at Stainforth Road level crossing

Recommendation 1

Intent of recommendation – Ensure that the risk of existing level crossings being open to road users during the passage of trains is recognised and actively managed on Network Rail managed infrastructure.

ORR status – Implemented

RAIB concern – ORR's view is that the approach taken by Network Rail routes to identify relevant level crossings and to assess and provide solutions, with expected timescales for the work to be completed, addresses the recommendation. RAIB's concern is that, while many of the identified crossings have individual plans to put in place engineered mitigations, a few crossings still lack a timebound plan for action to be completed.

Recommendations

Report 02/2013 – Freight train derailment at Reading West Junction

Recommendation 2

Intent of recommendation – Freightliner should review its operating procedures and conditions of carriage for freight containers. It should then implement any changes necessary to require that.

ORR status – Implemented

RAIB concern – ORR's view is that Recommendations 2 and 3 should be considered together as the issues of a container being unevenly loaded and how this is detected are closely linked. ORR feel that the work undertaken by the cross-industry freight derailment working group (XIFDWG) to consider the 10 key control measures for managing intermodal derailment risks has implemented the recommendation. RAIB's concern is that, while there is no doubt that work has been undertaken by the rail freight community, there does not appear to have been any material change as a result of this recommendation other than making changes to container loading patterns (where this is an option).

Report 02/2013 – Freight train derailment at Reading West Junction

Recommendation 3

Intent of recommendation – Freightliner should develop requirements for a system to monitor and prevent load offsets from containers resulting in wagons with a side-to-side wheel load imbalance entering traffic from its terminals. The system should be considered when terminal equipment is planned to be installed or upgraded, and where practicable the system should be implemented.

ORR status – Implemented

RAIB concern – ORR's view is that Recommendations 2 and 3 should be considered together as the issues of a container being unevenly loaded and how this is detected are closely linked. ORR feel that the work under by the cross-industry freight derailment working group (XIFDWG) to consider the 10 key control measures for managing intermodal derailment risks has implemented the recommendation. RAIB's concern is that, while the rail freight community has examined the use of container weighing equipment and wheel weighing equipment to identify off-set loads during routine lifting and concluded that installing this equipment is not currently possible, there has been no attempt to create a set of system requirements which could allow such equipment to be specified when terminal equipment is planned to be installed or upgraded in the future.

Recommendations

Report 06/2016 – Collision between a tram and a pedestrian near Market Street tram stop, Manchester

Recommendation 3 

Intent of recommendation – The intent of this recommendation is for guidance on tramways explicitly to promote measures to evaluate and manage the risk to pedestrians arising from the operation of trams through pedestrianised areas such as Piccadilly Gardens.

ORR status – Implemented

RAIB concern – ORR's view is that the sum of the guidance available to tramway organisations creates a framework for managing pedestrian safety risk which can be applied to shared space areas. ORR feel that the tramway sector would generally follow practice intended for highways and that tramway organisations may have little or no role in the wider design of shared space areas. RAIB's concern is that none of the guidance discussed in the response to the recommendation includes any reference to 'pedestrianised areas' as specified in the intent of the recommendation, which was intended to address the need for guidance on managing a particularly high risk environment.

Report 12/2018 – Collision at Frognal Farm User Worked Crossing

Recommendation 3

Intent of recommendation – to improve the understanding that users of private level crossings equipped with power operated gates have of the process for using such crossings safely, so that the risks created by automating part of a user worked crossing are appropriately mitigated. This recommendation repeats recommendation 2 of RAIB's report on the accident at Oakwood Farm level crossing on 14 May 2015 because there is evidence that the original recommendation was not being implemented as intended.

ORR status – Implemented

RAIB concern – ORR's view is that Network Rail has undertaken several measures to implement this recommendation (along with Oakwood Farm Recommendation 2), including the introduction of interim improvements at relevant level crossings, changes to design and application standards, the development of new equipment and obtaining limited authorisation for the use of new designs of signs, in advance of wider legislative change. RAIB's concern is that, although this recommendation has been implemented, the safety benefits of it will not be fully realised until Recommendations 1 and 2 of this investigation are also implemented, and the new signs referred to in Network Rail's closure statement are authorised for wider use via legislative change.

Recommendations

Report 07/2016 – Collision between train and tractor at Oakwood Farm UWC

Recommendation 2

Intent of recommendation – to reduce the risk to users of other POGO equipped crossings. Network Rail should develop and implement a programme for a timely review of the safety of other user worked crossings it has fitted with POGO equipment and those it intends to fit in the future.

ORR status – Implemented

RAIB concern – ORR's view is that Network Rail has undertaken several measures to implement this recommendation (along with Frognal Farm Recommendation 3), including the introduction of interim improvements at relevant level crossings, changes to design and application standards, the development of new equipment and obtaining limited authorisation for the use of new designs of signs, in advance of wider legislative change. RAIB's concern is that, although this recommendation has been implemented, the safety benefits from it will not be fully realised until Recommendations 1 and 2 of the Frognal Farm investigation are also implemented, and the new signs referred to in Network Rail's closure statement are authorised for wider use via legislative change.

Summaries

Find out more about each of these themes at:

gov.uk/government/collections/summaries-of-learning

Summaries of learning

Since starting our first investigations in 2005, RAIB has generated insights into a range of accidents and their causal factors. This has allowed us to identify a number of recurrent themes. We felt it beneficial to improving safety across the industry to share these as short summary reports. As a result, we introduced 'Summaries of learning' in our 2019 Annual Report and have since added to and updated them as necessary. They currently cover following themes:

1 Design and operation of user worked level crossings

2 Protection of track workers from moving trains

3 Managing risk at the platform-train interface

4 Safe management of abnormal train-operating events

5 Freight train derailments

6 Safe design, operation and maintenance of on-track plant and trolleys

7 The safe management of weather-related events which affect train operation

8 The integrity of train braking systems

These themes remain the same as those listed in the 2020 Annual Report, updated as necessary to incorporate learning from 2021.

RAIB's own safety record

RAIB is committed to ensuring it has the highest standards for health, safety, and wellbeing in all areas of our work. We are in the process of updating our health and safety governance arrangements and continue to learn from accidents and incidents to enhance working methods and promote safe behaviours. Three minor incidents were recorded in 2021.

RAIB adapted it's COVID-19 response strategy during the year, developing operational guidelines to support both deployment activities and hybrid working arrangements.

We continue to develop close working relationships with external partners, including the air and marine investigation branches. We co-operate across a variety of different work areas related to health, safety and wellbeing; working together where we can benefit and sharing best practice.

Funding

Our operating budget for the 2020-21 financial year was around £5 million.

Safety and funding

You can keep up to date with our latest updates and announcements by subscribing to our news alert service

Follow us on our social media channels:

Other activities

Working with Academia

RAIB continues to develop relationships with a small group of universities, chosen for their expertise in subjects relevant to our work. This includes fields such as human factors and mechanical engineering.

The initiative is mainly aimed at improving our investigation capabilities by ensuring we keep informed of the latest scientific developments. But these relationships are also two-way: offering universities sources for ideas and assistance for student projects, as well as the opportunity for RAIB Inspectors to deliver guest lectures on relevant topics.

With the support of the Accident Investigation Chiefs' Council (AICC), RAIB has formed an academic working group across the three accident investigation branches (Air, Marine and Rail). This group aims to develop more effective collaboration across areas of mutual interest. This has included providing guest lecturers to Loughborough Design School and the University of Southampton and delivering training at the Cranfield University Fundamentals of Accident Investigation course.

Rail accident investigators' good practice seminar

The Fourth Railway Accident Investigation Seminar

November 2021 saw the return of the Railway Accident Investigation Seminar, after its enforced cancellation due to the pandemic in 2020. This provided a great post-lockdown opportunity for the industry's accident investigators to get together. As always, the day focused on practitioners sharing best practice and issues faced with accident investigation.

The seminar was structured around a series of presentations with plenty of time for Q&A and networking. Following some observations from Simon French, the retiring Chief Inspector of RAIB, the morning presentations considered the real experience of investigating the accident at Margam in July 2019, in which two track workers sadly lost their lives. The lectern was shared by investigators from RAIB, Network Rail and Loughborough University.

The afternoon sessions covered investigation of software failures, RSSB's use of corporate memory in investigations, thoughts about how Safety II (learning from what goes right, as opposed to what goes wrong) could support an investigation and the RAC Foundation's new approach to road collision investigations. Again, with much lively and interesting audience participation.

The event was the best attended seminar so far, showing the desire and need for practitioners to get together and share ideas. Plans are already underway for the 2022 seminar.

International relations

RAIB has been a longstanding member of the International Transportation Safety Association (ITSA). ITSA is an international network of heads of independent safety investigation bodies, covering all modes of transport, including aviation, marine, railways, road transport, pipelines and underground infrastructure. The membership includes major investigation bodies across five continents, such as the NTSB in the USA and the ATSB in Australia.

The 2020 meeting of ITSA, planned to take place in Sydney, was cancelled due to the pandemic. However, the heads of the investigation bodies were able to meet virtually.

RAIB has maintained professional links with the network of EU National Investigation Bodies and continues to work to promote the sharing of information, learning and good practice across international borders in Europe and beyond.

Other activities

External events

While continuing to follow restrictions in line with COVID-19 requirements meant that RAIB participated in less external events than usual during 2021, we were still able to present either in person or virtually at a number of conferences.

These included events hosted by RSSB, Sheffield University, Police Scotland, UK Pathology, Rail Safety Forum, Parliamentary Advisory Council for Transport Safety and the Institute of Occupational Health and Safety.

Find out more about our previous presentations at:

gov.uk/government/publications/raib-papers-and-presentations.

Other activities

Due for completion by summer 2022, the Project's interim findings informed the DfT's decision to undertake a public consultation exercise on the formation of a new Road Collision Investigation Branch to undertake future 'no-blame' safety investigations of road collisions (www.gov.uk/government/consultations/creating-a-road-collision-investigation-branch-rcib).

Consultation closed in December 2021 and the DfT is analysing the responses before deciding next steps.

Find out more about the project and the work of the RAC Foundation at:

www.racfoundation.org/collaborations/road-collision-investigation-project

Road accident investigation

We continued to provide support to the RAC Foundation as it progresses the closing stages of its Road Collision Investigation Project (RCIP).

The project has sought to establish whether there is a business case for putting more resource into the investigation of road crashes, based on a comparison with the approach to accident investigations used for other modes (rail, air and sea) and safety-critical industries (oil and gas). RAIB has been assisting the RAC Foundation by releasing an experienced investigator to work with the RCIP team.

The project has involved undertaking 37 investigations of road collisions in three police force areas (Humberside, West Midlands and Dorset, Devon & Cornwall) to assess the potential for better safety learning from road collisions in the future. This allowed the development and trial of a different approach to identifying causal and contributory factors that result in death and injury on the public highway. It also included undertaking studies to support the investigations and inform the DfT's decision making about the need for a future independent Road Collision Investigation Branch.

The Accident Investigation Chief's Council (AICC)

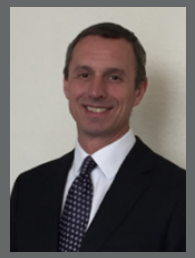
The Accident Investigation Chiefs' Council (AICC) comprises of a non-executive chair and the Chief Inspectors from Air, Marine and Rail Accident Investigation Branches.

The AICC aims to promote the AIBs' effectiveness, efficiency and resilience through collaboration; establishing common positions on issues of mutual interest, including the development of joint Memoranda of Understanding and other collaborative working arrangements; developing joint policy across the three Branches; maintaining an overview of quality, the timeliness of outputs and value for money; and actively promoting the AIBs as centres of excellence.

During 2021 the AICC completed its Strategic Framework for 2021 – 2026. This documents the AICC's core mission and vision for the next five years, a set of values that are common to each of the three branches and also defines high-level objectives and governance arrangements. AICC continued to work on a wide range of Memoranda of Understanding between the AAIB, MAIB and RAIB and external stakeholders. AICC also developed a number of working groups, formed by the three branches, and continued to develop joint approaches and techniques related to a wide range of topics throughout 2021.

Other activities

Air Marshall
Richard Garwood



Crispin ORR
Chief Inspector
AAIB

Capt Andrew Moll
Chief Inspector
MAIB

Andrew Hall
Chief Inspector
RAIB

Find out more about the role of the AICC, its terms of reference and its Memorandum of Understanding (MoU) at:

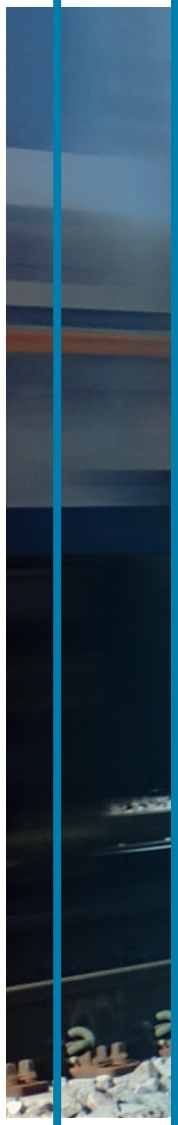
gov.uk/government/publications/accident-investigation-chiefs-council/accident-investigation-chiefs-council

Table of RAIB investigations started, published or ongoing during 2021

(Items prefixed with the letter 'D' are safety digests, the remainder are full investigations)

Event (National Network unless stated otherwise)	Event date	Status/ report ref.	Published	Occurrence type
Freight train derailment at **London Gateway**	24/12/2021	Investigating	n/a	Freight train derailment
D - Collision with a tree and derailment at **Balderton**	26/11/2021	Investigating	n/a	Collision with an obstacle
Collision between a tram and a pedestrian at **Fleetwood Road** (Blackpool Tramway)	24/11/2021	Investigating	n/a	Train movement event involving passengers / pedestrians
Collision between passenger trains at **Salisbury Tunnel Junction**	31/10/2021	Investigating	n/a	Collision with other train
Collision between train and engineering trolley at **Challow**	21/10/2021	Investigating	n/a	Collision with an obstacle
Collision with buffer stops at **Enfield Town**	12/10/2021	Investigating	n/a	Collision with an obstacle
D - Collision between a locomotive and a passenger train at **Grosmont** (North Yorkshire Moors Railway)	21/09/2021	D08/2021	23/12/2021	Collision with other train
D - Near miss at **Forestry UWC**	18/09/2021	D07/2021	13/12/2021	Near miss - Level Crossing
Collision between a tram and a child cyclist near to **Audenshaw** tram stop (Manchester Metrolink)	01/09/2021	Investigating	n/a	Train movement event involving passengers / pedestrians
Collision between a train and lorry stabiliser leg at **Penistone**	27/08/2021	D06/2021	07/12/2021	Collision with an obstacle
Collision and derailment of a freight train at **Kisby UWC**	19/08/2021	Investigating	n/a	Level crossing event
D - Near miss with track workers at **Eccles**	22/07/2021	D05/2021	30/09/2021	Train Movement Event involving staff
D - Train collision with fallen tree near **Glencarse**	21/05/2021	D04/2021	06/09/2021	Collision with an obstacle
Runaway of a mobile elevated work platform from **Belle Isle Junction**	16/05/2021	04/2022	12/05/2022	Runaway incident
Signal passed at danger and near miss at **Sileby Junction**	05/05/2021	Investigating	n/a	SPAD or unauthorised train movement
Collision between RRVs at **Ramsden Bellhouse**	02/05/2021	Investigating	n/a	Collision with an obstacle
Derailment at **Dalwhinnie**	10/04/2021	Investigating	n/a	Passenger train derailment
Buffer stop collision at **Kirkby station**	13/03/2021	Investigating	n/a	Collision with an obstacle

Event (National Network unless stated otherwise)	Event date	Status/ report ref.	Published	Occurrence type
Track damage between **Pencoed and Llanharan**	06/03/2021	Investigating	n/a	Train/track interaction
D - Near miss with track workers at **Llandegai tunnel**	13/02/2021	D03/2021	30/06/2021	Train Movement Event involving staff
Track worker struck by a train near **Surbiton**	09/02/2021	Investigating	n/a	Train movement event involving staff
Near miss at **Coltishall Lane UWG** level crossing	21/01/2021	03/2022	14/04/2022	Level crossing near miss
Runaway and derailment of wagons at **Toton**	17/01/2021	09/2021	20/12/2021	Runaway incident
D - Overspeed through emergency speed restriction near **Beattock**	20/12/2020	D02/2021	24/03/2021	SPAD or unauthorised train movement
Near miss with a member of staff at **Rowlands Castle**	19/12/2020	06/2021	29/09/2021	Train movement event involving staff
D - Runaway at **Dereham station** (Mid-Norfolk Railway)	10/12/2020	D01/2021	16/03/2021	Runaway incident
Trains overspeeding between **Laurencekirk and Portlethen**	04/12/2020	08/2021	15/11/2021	SPAD or unauthorised train movement
Freight train derailment at **Sheffield station**	11/11/2020	07/2021	05/10/2021	Freight train derailment
Derailment and fire involving a tanker train at **Llangennach**	26/08/2020	01/2022	13/01/2022	Freight train derailment
Passenger train derailment near **Carmont**	12/08/2020	02/2022	10/03/2022	Passenger train derailment Fire on rolling stock
Signal passed at danger and subsequent near miss, **Chalfont and Latimer station** (Chiltern Trains and LUL train, on LUL infrastructure)	21/06/2020	04/2021	26/07/2021	SPAD or unauthorised train movement
Fatal accident at **Waterloo underground station**	26/05/2020	05/2021	07/09/2021	Train movement event involving passengers / pedestrians
Track worker struck by train near **Roade**	08/04/2020	03/2021	09/06/2021	Train movement event involving staff
Person struck by a train at **Eden Park**	26/02/2020	01/2021	19/02/2021	Train movement event involving passengers / pedestrians
Freight train derailment at **Eastleigh**	28/01/2020	02/2021	04/03/2021	Freight train derailment



This annual report is published by the Rail Accident Investigation Branch (RAIB).

Any enquiries about this publication should be sent to:

RAIB
The Wharf
Stores Road
Derby UK
DE21 4BA

Email: enquiries@raib.gov.uk
Telephone:01332 253300
Web: www.gov.uk/raib

Follow us on: