OFFICE OF RAIL AND ROAD

Annual Report of Health and Safety on Britain's Railways

19 July 2023

Contents

Chief Inspector's Review

The industry continues to face considerable challenge, some associated with the changes in travelling patterns and working practices following the lifting of COVID-19 lockdown restrictions and the fall in passenger revenues, and others by rising inflation and the most significant industrial action for 30 years. The railway, both mainline, London Underground and beyond, face very real financial challenges, with ambitious planned changes to working practices, to modernise how the railway is delivered. There have also been some significant incidents, several caused by or linked to extreme weather.

With all these challenges, there remain many positives worth celebrating and understanding, so that we can learn and share better practice. Great Britain's railways consistently perform as one of the safest in Europe. The strong collaboration and good safety performance of dutyholders involved in the very successful start-up of the Elizabeth line is to be congratulated.

I want to highlight several key challenges to the industry for the coming years.

Industry challenge and change

All the railways in Britain are working hard to change and adapt to meet the unprecedented challenges I set out above. For the mainline railway, ambitious reform proposals to create a new guiding mind in **Great British Railways (GBR)** continue to be developed. and the process of development has created some uncertainty. This is why we continue to hold the industry to account for delivering the day job of a safe and healthy railway. We want to take an active part in supporting the creation of GBR by maintaining an ORR secondee in the GBR transition team. Irrespective of reform proposals, Network Rail is committed to modernising its working practices. Here again we have dedicated our focus to ensuring that these plans are based on a clear understanding of health and safety risks, and that they are implemented safely.

I continue to challenge Network Rail to ensure it delivers the changes needed to address the risks of **climate change, for example extreme weather to earthworks and civil structures** in particular. ORR continues to dedicate time and resource to the issues arising from the Carmont fatal accident in August 2020 in parallel with Network Rail's response to the Lord Robert Mair and Dame Julia Slingo report recommendations. There is clear understanding and good intention at the heart of the business, but we will now hold Network Rail to account to ensure the necessary changes are delivered in every region.

Transport for London (TfL) secured a longer-term funding agreement with HM Government during the year (running to March 2024) which provides greater stability and certainty to its operations and planning outlook. TfL also completed several large capital projects to improve the safety and travel experience for members of the public using its rail services across the capital during the year – these included extensive works at Bank station associated with the construction of a new tunnel section, passenger concourse and interchange route to improve connectivity between services. However, operational incidents, involving platform train interface risks, station asset management issues including enforcement action taken as a result of a track worker safety investigation at Chalfont, continue to highlight the importance of maintaining the focus on the day job. For London Underground Ltd, the implementation of changes to staffing as part of the modernisation programme will continue to test the effectiveness of their safety management systems, in particular the change management processes. TfL Rail dutyholders should ensure large-scale change and capital work programmes do not distract focus from frontline activities and must continue to monitor and review their own systems to ensure legal compliance and continuous improvement.

Our review of the **Light Rail Safety and Standards Board (LRSSB)** concluded it is fulfilling its intended purpose to better manage safety, standards, and good practice across the sector. We continue to have a keen oversight of the Sandilands RAIB recommendations,

working with the sector and the LRSSB to ensure these are implemented. As part of this work, we have taken robust action, including formal advice and enforcement notices to ensure timely implementation of automatic speed control and driver inattention systems. We are encouraging the mainline industry to learn from these initiatives, to better manage this risk shared across the railway.

We continued to engage across the **heritage sector** in order to maintain and increase its management of risk capability. This included specific reference to asset management and how railway organisations are responding to the challenges of ensuring aging rolling stock and infrastructure are safe. We are particularly concerned about how the sector is managing risks created from working at height. We continued to benefit from strong collaboration with the Heritage Railway Association and look forward to continuing this in 2023/24.

New technology and innovation

Well implemented technological advances offer great opportunity to design out risk, providing risk controls higher up the hierarchy of controls – removing people from risk altogether in some cases, providing robust engineering controls in others. Nevertheless, it can be hard to get it right, with projects dragging on leaving the old controls in place. The principles associated with safety by design offers real potential to design out risk, and this year our specific work on promoting health and

safety thinking at the design stage of projects focused on two areas: work with major projects, and with new innovative proposals under the Restoring Your Railways programme. Our overall aim remains to ensure that projects, of whatever scale or on any type of railway or tramway, make practical assessments at an early stage of their designs of how to build in good health and safety principles.

Network Rail have introduced **new protections to improve track worker safety**, but implementing this technology needs to go further, faster and properly involve the end user staff, to drive their buy-in. Network Rail's Weather Risk Task Force is starting to deploy both **weather forecasting improvements and more remote condition monitoring**, improving operational planning and mitigation of the risks of extreme weather events. The serious accident at Kensal Green in late 2019, where a worker suffered life changing injuries, underlines the risks of working with **electrical systems**. The rollout of technological solutions offers remote, safer, as well as more efficient, electrical isolations, and these must continue during CP7. There should be much greater use of remote asset monitoring technologies, such as track circuit testing, to remove technicians from the running line altogether. There is potential here for a further step change in worker safety, as well as much needed efficiencies.

Industry capability for introducing and operating existing and new technologies needs to develop. Some risks may only manifest themselves during operation and

mechanisms are needed to learn lessons quickly, adapt and mitigate these risks, cooperating across multiple parties with complex contractual and other relationships. We will be reviewing the practice and framework supporting the specification, design and introduction of rail subsystems, to ensure that responsibilities are clear and risk controls are well aligned. Existing software technology needs to be introduced using good risk management practices, and we expect that that is followed through into system integration, testing, commissioning and handover. Similarly, the industry needs to continue to develop robust approaches to assuring the use of decision support tools that rely on artificial intelligence, machine learning and other emerging technologies.

Leadership and Supporting People

Given the change, challenge and pressures on the industry, there will need to be a firm focus on maintaining and improving the health, safety and wellbeing of the railway's people through it all. This will require strong leadership and no doubt difficult decisions to implement the planned changes to how staff are organised and deliver the railway, and then assure their effects. It is imperative that, after a long period of difficult industrial relations, we show support and invest in our people to rebuild the discretionary effort needed to run a high-performing railway. Constructive and meaningful collaboration with industry trade unions will be essential.

We would like to see the industry improve their own investigation of safety incidents, and in particular, to adopt RSSB's guidance on incident factors in order to better understand and support **human performance** in managing safety.

We are pressing for a step change in the **management of fatigue**, a risk often implicated in a range of potentially catastrophic safety incidents. Network Rail needs to implement fully its own revised new standard. We also intend to issue revised guidance to the sector setting out our clear expectations and understanding of the law.

It is unacceptable that the industry fails to provide adequate **toilet facilities for staff** and indeed this is a legal requirement. There is an opportunity for operators to provide shared access to their own facilities and go some way to meeting the human need and dignity requirements of the workforce.

On health, the sector has made some really significant progress in recent years but there is more to do. Network Rail is moving forward in developing state-of-the art **occupational health services** provision. For the first time, these facilities offer centralised services to the whole mainline railway. The industry must build on the pilot to gather and share common **health benchmarking data**, with improvement in health management capability, including better health risk assessment. We will also continue to drive regulatory focus toward the risks of long latency diseases such as Hand Arm Vibration Syndrome (HAVS) and Respirable Crystalline Silica (RCS).

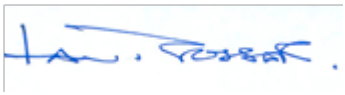
We continue to engage with the **heritage sector** to strive for a more mature, consistent and standardised approach to **safety leadership** and self-support. In particular, we are supportive of the Heritage Railway Association's efforts to establish a dedicated body to draft and publish guidance and standards for the heritage sector, and our RM3 workshops featured key messages around the importance of proper governance and leadership at dutyholder and sector level.

Policy developments

We have dedicated significant effort to working with the Department for Transport (DfT), the Health and Safety Executive (HSE) and others to understand the potential implications of the Retained EU Law (Revocation and Reform) Bill. As I write this, the Bill is still working its way through and has been subject to some amendments, but our key priority remains to ensure no unintended consequences to health and safety legislation result from it. At the same time, we are looking at the genuine opportunities afforded by the Bill to work with stakeholders to reform legislation where helpful, for example in the area of train driving licences where the recent Post Implementation Review of that legislation (published 19 May 2023) demonstrated a real case for change. We also continue to work with the sector to further enhance the use of RM3. It is now becoming a common language spoken across the sector, ensuring better collaboration with, and amongst, dutyholders as we seek to improve health and safety outcomes. We will look to further improve this collaborative working, exploring

the potential for industry to share assessments, both ours and their own, to support understanding of industry strengths and weaknesses, as well as learning from what has worked locally.

Finally, I want to thank my staff for their dedication and professionalism throughout a difficult period, continuing to challenge the industry and driving improvements across the sectors we regulate.



Ian Prosser, CBE
HM Chief Inspector of Railways

1. Health and safety across the railway sector: the regulator's view

Introduction

1.1 In this section we provide an overview of our main findings across each of the railway sectors that we regulate, setting out key risk areas and the effectiveness of their management by the railway sectors. We set out the evidence supporting our conclusions, including (where appropriate) the results of our Risk Management Maturity Model (RM3) assessments. RM3 is one of our key tools for assessing health and safety management systems; an explanation of RM3 is set out in Annex A: Risk Management Maturity Model (RM3) – Overview.

How ORR assesses harm and risk performance

1.2 The collection of good data from across Britain's railways is critical to:

(a) identify trends and quantify risk;

(b) set the correct risk control priorities; and

(c) measure performance.

1.3 ORR uses industry information about actual harm and modelled risk to measure health and safety performance on Britain's railways:

(a) **actual harm** caused to individuals, which is measured using the Fatalities and Weighted Injury (FWI) index. It is a composite measure of risk or harm that combines fatalities with physical injuries, which are weighted according to their relative severity.

(b) **modelled risk**, which uses historic data to periodically quantify the frequency and potential average consequence from a particular set of circumstances that could lead to a safety incident. The RSSB Safety Risk Model (SRM) periodically takes a snapshot of all significant risks on the mainline and their monthly Precursor Indicator Model (PIM) tracks trends in key catastrophic precursor train accident risk. London Underground (LUL) and the tramway sector use similar approaches with sector specific safety risk models.

1.4 However, these measures rely on, and are limited by, being outcome-based incident indicators: they measure harm-causing incidents to quantify current catastrophic train accident risk trends but are not necessarily useful as future predictive or underlying risk indicators. We overcome this through use of our RM3 assessment to 'triangulate' our view of industry performance using a broad range of data and intelligence sources, such as:

(a) **performance indicators**, for example, near-miss events, which had the potential to cause harm;

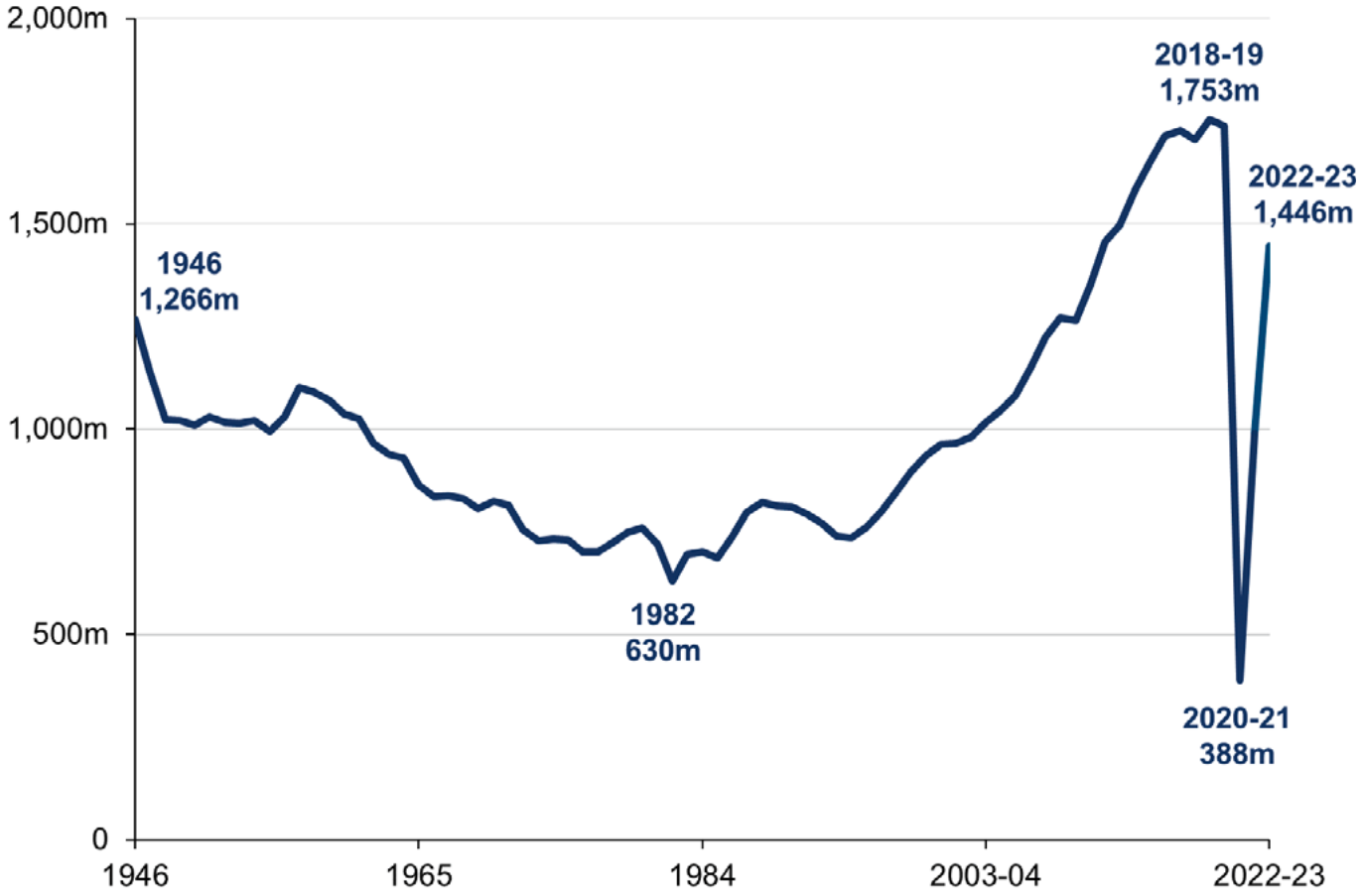
(b) **content indicators**, such as asset management performance; and

(c) **context indicators**, such as measures of safety management culture and duty holders' risk management values.

1.5 When analysing harm over time, it is important to consider the annual trends of passenger numbers and freight traffic (see Figures 1.1 and 1.2). Annual data is provisional due to passenger journeys being overestimated for the Elizabeth line, and consequently the national total, due to a technical issue in the rail industry's LENNON (Latest Earnings Networked Nationally Over Night) ticketing and revenue system. More information can be found in the Passenger rail usage – Quality and Methodology Report (orr.gov.uk) Provisionally, there were over 1.4 billion passenger journeys on Britain's mainline railway network between April 2022 and March 2023. This represents 83% of the 1.7 billion journeys made three years ago (pre-pandemic) but represents a large increase on the number of journeys made over the previous two years.

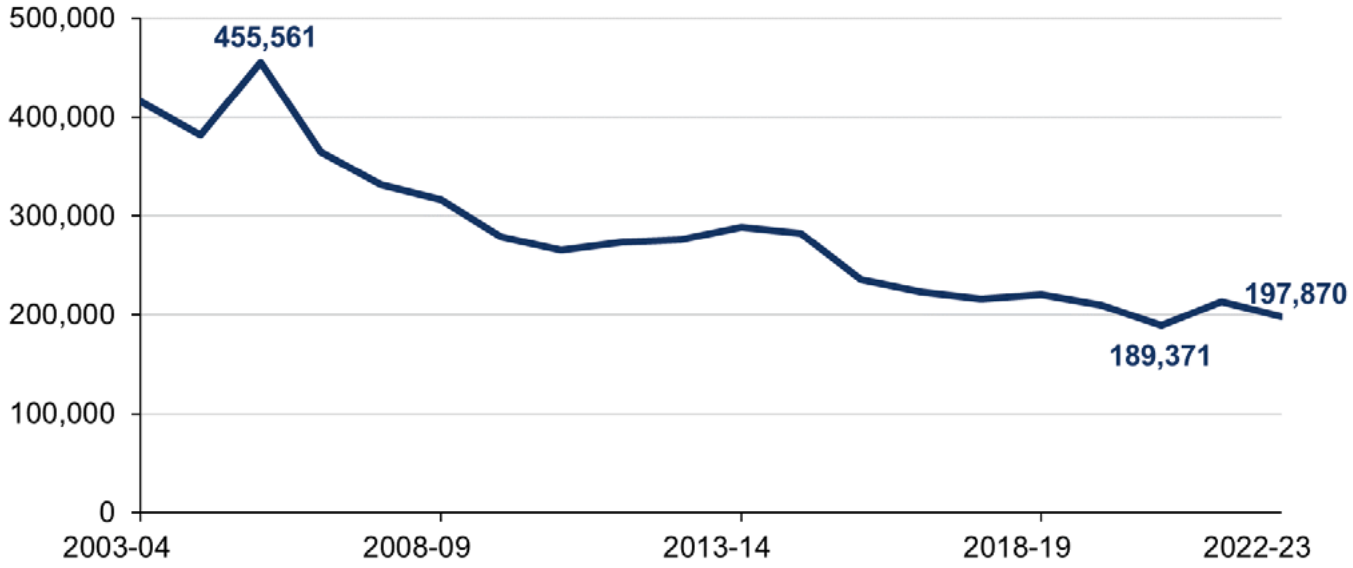
1.6 The number of freight trains running on the mainline railway network fell by 7% compared with the previous year, falling to just under 200,000.

Figure 1.1 Passenger journeys, Great Britain, annual data, January 1946 to March 2023 (provisional)



Source: ORR

Figure 1.2 Number of freight trains run, Great Britain, annual data, April 2003 to March 2023



Source: ORR

1.7 This report uses final and some provisional railway data from within ORR and from a range of other sources, as set out below. Confirmed safety data for April 2022 to March 2023 will be issued in our rail safety statistical release, scheduled for publication in September 2023. It will contain finalised numbers from both mainline and non-mainline sectors.

1.8 We also rely on data obtained from various sources across the industry. Most data for mainline operations is held in the Safety Management Intelligence System (SMIS) administered by RSSB. More information about SMIS and data quality can be found on the RSSB website. We also receive and assess Network Rail's internal Safety, Health and Environment Performance Report (the SHEP).

1.9 For some events it has not been possible for RSSB to differentiate reliably between passengers (people on railway property with intent to travel) and other members of the public. For that reason, this report combines injuries to members of the public occurring on trains or in stations with those to passengers.

1.10 Data for non-mainline operations is primarily based on reports submitted by duty holders under the Reporting of Incidents, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR), either from LUL's Information Exchange (IE2) or our own online RIDDOR reporting tool. However, we also use reports supplied by duty holders and industry bodies such as the LRSSB, UK Tram and the Heritage Railway Association.

Mainline: Network Rail

Overall comments

1.11 April 2022 to March 2023 has been a challenging year for Network Rail. Taken together, industrial action, financial pressures and ageing assets had the potential to significantly impact health and safety performance. It reflects the strength and maturity of Network Rail's health and safety management system that performance has been sustained. In particular, Network Rail delivered a safe railway during industrial action, sensibly taking the decision to offer a much-reduced level of service in line with the imperative to deliver it safely and reliably.

1.12 The year saw Network Rail comply with four ORR improvement notices. The first two of these required

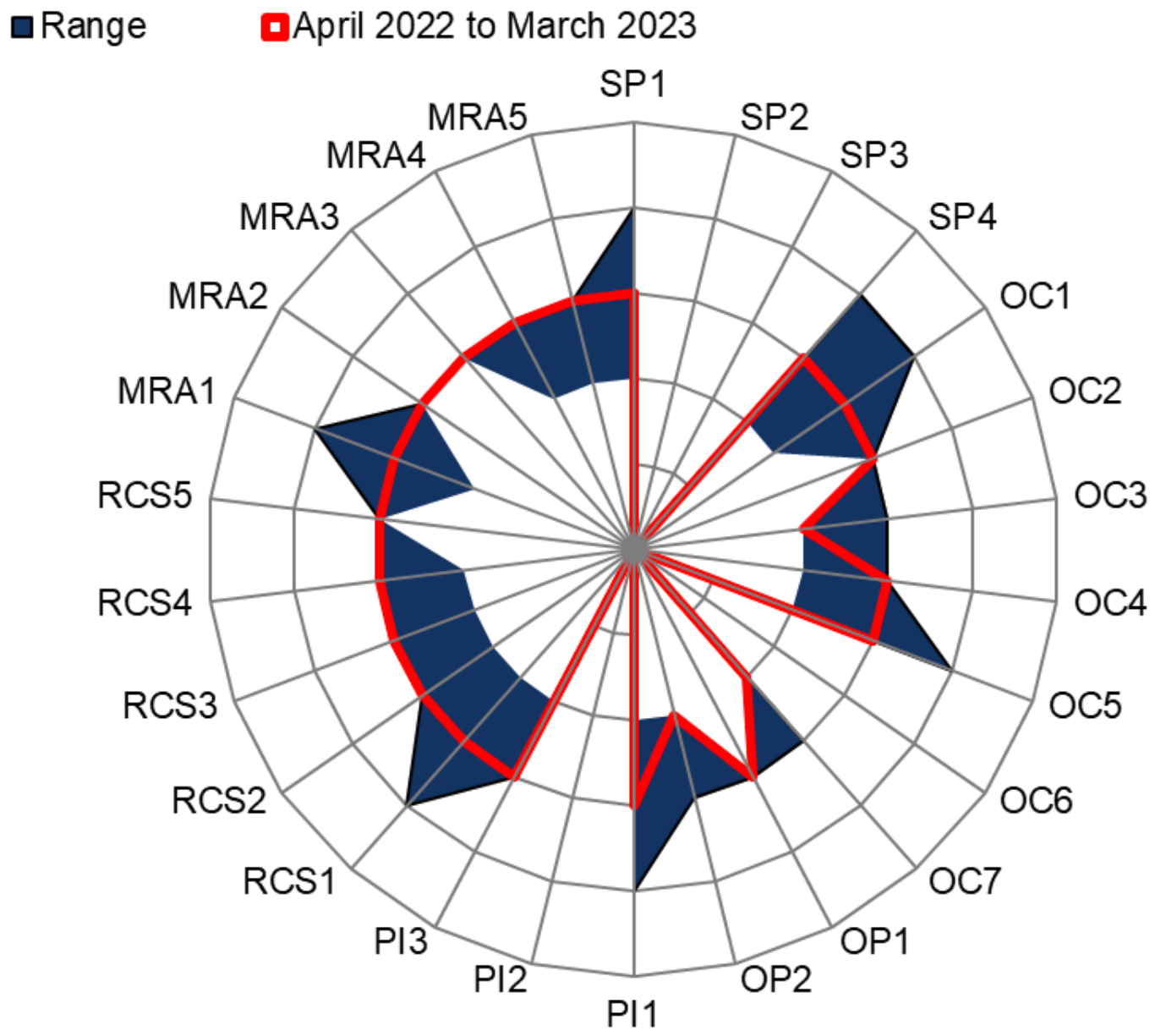
Network Rail to improve the safety of track workers. This led to a very significant move away from the Victorian warning methods of lookouts and flags to safer alternatives, and in July 2022 we accepted that Network Rail had complied with those notices. The second two improvement notices concerned safety of overhead electrified line (OLE) isolations. Again, Network Rail implemented a series of improvements to provide better warning of 'live' sections, better training, and improved 'test before touch' procedures. In both cases senior leaders rose to the challenge in a positive and constructive way that reflects positively on the safety culture of the organisation.

1.13 Work needs to continue to manage ageing assets and operations on the network to make them more resilient in the face of extreme weather events. This is evidenced by some underlying safety indicators and incidents such as the wingwall collapse at Yarnton, the abutment failure at Nuneham Viaduct, and the continuing work to implement the post-Carmont findings of Lord Robert Mair's and Dame Julia Slingo's reports. Building on our work in previous years, we continued to engage with Network Rail's 'Weather Risk Task Force' on their implementation of the Mair and Slingo reports' recommendations. Progress has been slow in some areas, and we believe Network Rail needs to do more to drive change across the regions.

RM3 assessment

1.14 We gathered evidence of management maturity across the range of our regulatory activities throughout the year. Our RM3 assessments obtained from our inspection work provide an independent, objective view of Network Rail's health and safety management maturity. Using this evidence, we made assessments for 22 elements (out of 26). Last year, our assessment noted 13 elements at 'standardised', six at 'managed', and two at 'predictable'. This year those findings improved, with 19 at 'standardised', just three at 'managed' and none at 'predictable'.

Figure 1.3 RM3 assessment for Network Rail



Code	Description	April 2022 to March 2023 score	Minimum score	Maximum score
SP1	Leadership	3	2	4
SP2	Safety policy	No score	No score	No score
SP3	Board governance	No score	No score	No score
SP4	Written safety management system	3	2	4
OC1	Allocation of responsibilities	3	2	4
OC2	Management and supervisory accountability	3	3	3
OC3	Organisational structure	2	2	3
OC4	Communication arrangements	3	2	3
OC5	System safety and interface arrangements	3	2	4
OC6	Culture management	No score	No score	No score
OC7	Record keeping	2	2	3
OP1	Worker involvement and internal cooperation	3	3	3
OP2	Competence management system	2	2	3
PI1	Risk assessment and management	3	2	4
PI2	Objective and target setting	No score	No score	No score
PI3	Workload planning	3	2	3
RCS1	Safe systems of work including safety critical work	3	2	4
RCS2	Asset management (including safe design of plant)	3	2	3

Code	Description	April 2022 to March 2023 score	Minimum score	Maximum score
RCS3	Change management (process, engineering, professional)	3	2	3
RCS4	Control of contractors	3	2	3
RCS5	Emergency planning	3	3	3
MRA1	Proactive	3	2	4
MRA2	Audit	3	3	3
MRA3	Incident investigation and management	3	3	3
MRA4	Review at appropriate levels	3	2	3
MRA5	Corrective action and change management	3	2	3

Source: ORR

1.15 Positively, this suggests improving consistency of management maturity across Network Rail as a whole, particularly in those areas we focused on as areas where risk controls were deemed weaker. However, this national assessment has significant variations at regional, route and topic level. In particular, the degree of leadership given to a topic or risk and the ability to manage risks in certain assets are issues that permeate through our assessments and provide an underlying variability in maturity.

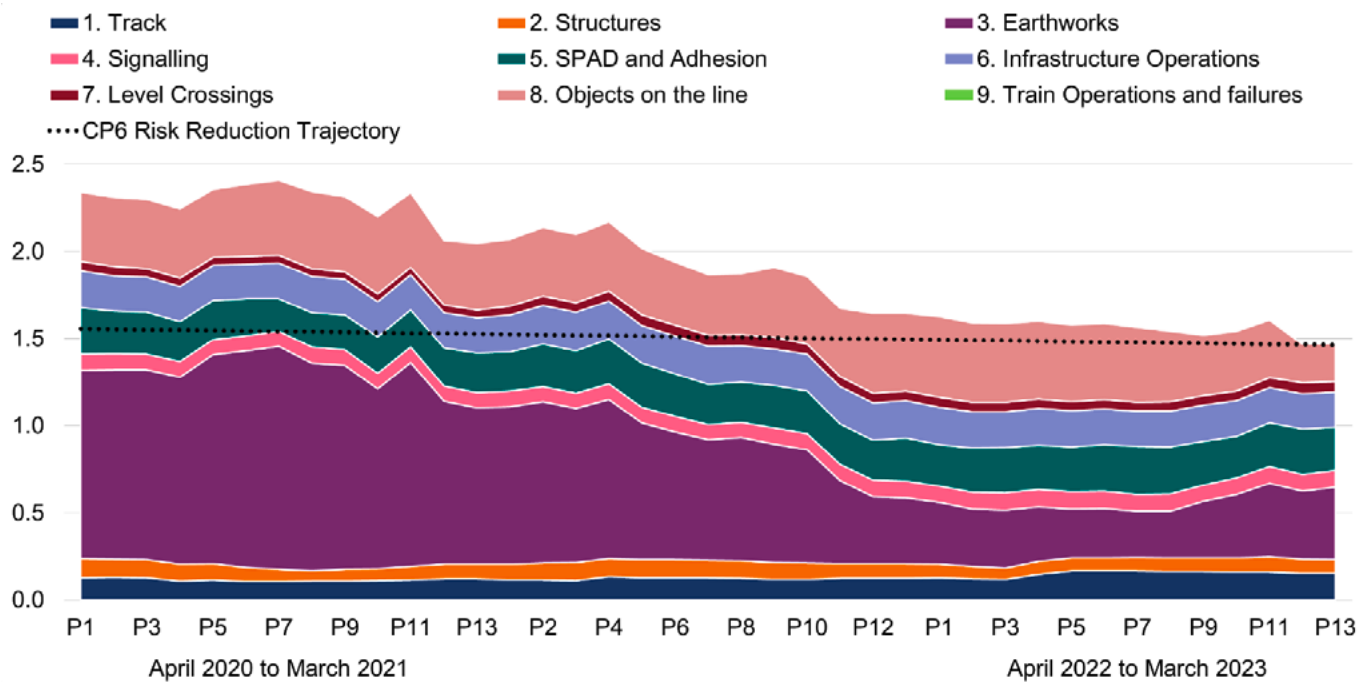
1.16 Although the assessment is positive, it needs to be remembered that many of the topics we chose to inspect (and which form the bulk of our assessment work) are repeated from the year before or arose from our enforcement action. Hence it is likely that the improvement in maturity at least partly reflects both our sustained regulatory focus on particular areas and our targeted enforcement action on track worker and electrical safety.

Asset Health and Safety Performance (April 2022 to March 2023)

1.17 RSSB's Precursor Indicator Model (PIM) is the way Network Rail measures failures that have the potential to result in a catastrophic accident. Overall, the PIM has shown slight improvement throughout the year, with Network Rail ending the year having achieved their Risk Reduction Trajectory target for Control Period 6. This is attributable to having both steady numbers and severity of risks in most areas and a fall in the number and

severity of "objects on the line" events. Conversely, a rise in earthworks events and their severity in the second half of the year nearly cancelled out gains elsewhere. Taken with similar increases in track and structures events and their severity, the overall picture suggests risks might be increasing in some key asset areas.

Figure 1.4 Train Accident Precursor Indicator Model (PIM)



Source: Rail Safety and Standards Board (RSSB)

1.18 However, the numbers of actual events that had the potential to cause a train accident fell significantly over the year, with numbers now in line with previous years' performance following a significant rise in the previous year.

Occupational Health and Safety Performance

1.19 There were two fatalities on Network Rail construction projects between April 2022 and March 2023 (neither individual was employed by Network

Rail). The first was on 21 July at Gatwick Airport Station redevelopment site, and the second on 3 November at an industrial unit undergoing refurbishment in Glasgow. Both incidents are being investigated by the Health and Safety Executive (HSE) as they have enforcement responsibility for the sites.

1.20 The trend in Network Rail's lost time injury frequency rate (LTIFR) slightly improved over the course of the year, owing almost entirely to Eastern region and Route Services; both have met, and in fact significantly exceeded, Network Rail's target reduction. All other regions have remained above target through the course of the year.

1.21 The national FWI, a measure of accident severity, had remained broadly static since 2020 but increased slightly in the latest year. The regional picture is more mixed with significant variation between regions and functions. This is partly the result of random events, but in part might reflect different approaches to controlling risks. In this respect, the strong direction and visibility of Route Services' 'Safe Service' initiative can only have contributed to having the lowest FWI and LTIFR in Network Rail.

1.22 Numbers of incidents with the potential to cause accidents to workers remained in line with previous years. This followed reductions after our enforcement action on track worker safety, starting in 2019. Some of these incidents are line blockage and possession irregularities. This encompasses, but is not limited

to, trains being wrongly signalled through blockages; blockages being requested for, or granted, in the wrong place; maintenance staff straying outside of blockages; and near misses with staff placing down detonators or boards for possessions.

Civils

1.23 **Weather Risk Task Force (WRTF):** we continued to pursue the implementation of recommendations arising from the Mair and Slingo reports (into earthworks management and weather forecasting respectively). The Mair recommendations have been translated by Network Rail into 17 action plans (with the Slingo recommendations being dealt with separately). The implementation of these actions is overseen by Network Rail's WRTF Steering Group, which is attended by representatives from ORR. This has enabled us to monitor the actions being taken and to suggest corrections or further action that may be required.

1.24 Whilst Network Rail has made progress in delivering its 17 action plans, the pace of delivery has been slow in some areas. More than two years on, none of the action plans is fully implemented. Network Rail needs to do more to drive change across its regions.

1.25 We identified an important and positive work stream being pursued by Network Rail; the 'New Weather Tool', now known as Proportionate Risk Response When Implementing Mitigation Speeds to Assets (PRIMA). This is a development of an existing tool and aims to better target operational restrictions associated with severe

storms. We have sought to understand these proposals in more detail and consequently raised two main areas of interest: the first being how the outputs of the PRIMA Tool translate into reasonably practicable control measures; the second being how those outputs are implemented in practice, particularly in terms of human factors. We are further encouraged to see the progress Network Rail has made in improving its operational decision-making processes and capability in periods of extreme weather. We will continue to pursue these matters as the trial of the tool enters its next phase in the summer of 2023.

1.26 **Structures examination backlog:** this continues to be a significant problem for Network Rail, with no significant improvement in the last year. As of 4 March 2023 (the most recent data available from Network Rail for P12 at the time of writing), the non-compliance data indicates that there were significant numbers of structures that had not been examined on time either visually or in detail, equating to just over 10% of structures. Whilst there has been an improvement in terms of visual examinations, the detailed examination backlog remains the same. Concerningly, it is these examinations that are most important for understanding the condition of an asset.

1.27 However, all unexamined assets are subject to a risk assessment, aimed at identifying whether any interim work is required. In addition, although examinations are an important element of managing the safety of structures, not being examined does not in itself create a risk. Nevertheless, we will continue to monitor Network

Rail's work in this area. We will continue to monitor the regions' efforts to improve their action plans, which are aimed at improving their compliance position. This has resulted in some regions, particularly Eastern, putting much improved plans in place. We have agreed a timetable for Network Rail's final recovery plan by end of August 2023, including an audit of that plan in 2024.

1.28 **Drainage management:** much of our asset inspection work during the last year has focused on assessing Network Rail's progress with drainage management, in particular the completion of drainage asset inventories in a timely and effective way. The identification of these 'lost' drainage assets is the crucial first step to understanding and managing drainage, as highlighted by the findings of the various reports into the Carmont incident. We also looked at the resourcing of drainage inspection and maintenance work.

1.29 We found a consistent picture of 'work in progress' for completing the work to find 'lost' drainage assets, with all regions (apart from Scotland, where the work has been completed) stating that they will complete this work by the end of CP6 i.e., March 2024. However, the regions have found this work challenging for several reasons, and the ongoing difficulties in completing the process identified in some regions indicate that there is still considerable work to do to achieve this target. The regions must not be complacent. Completing this work will undoubtedly be a challenge, and we welcome recent actions and commitments from senior leaders to drive this work forward; it will need significant and continued

focus and leadership to be achieved. We will continue to pursue this matter closely, to ensure that adequate progress is made in the final year of this project.

1.30 Significant risk remains around the levels of drainage staffing and the provision of dedicated drainage teams. The substantial shortfalls in resource (against modelled requirements) in some regions are a particular concern. However, recognising our concerns about long timescales for filling vacancies, Network Rail has now committed to fully resource drainage teams by the end of March 2024. The preference of some regions to adopt differing resource management models is another concern, in particular plans to resource drainage as part of the region's maintenance function rather than as a separate, dedicated resource. Whilst it is ultimately up to regions how they deliver effective drainage asset management, there is a reason why Lord Mair included the recommendation about dedicated drainage teams, and continuing with, in effect, the *status quo* may lead to a failure to learn the lessons of Carmont.

1.31 We found drainage inspection shortcomings in all regions where we accompanied drainage inspectors. These varied from perfunctory work on visible and easily accessible assets, to inspections that did not show an 'enquiring mind' approach. There were also challenges with obtaining enough trackside access to do the work. Whilst the issues varied from region to region, and undoubtedly much good work is done, it seems clear that in some cases, drainage inspections were not being carried out with suitable rigour. Network Rail should

be ensuring effective inspections are carried out as a matter of course. It is our opinion that having dedicated teams, able to build up knowledge and capability and focus on these often safety-critical tasks, is the best route to ensuring greater quality and consistency of drainage inspections.

1.32 **Management of vegetation on buildings and structures:** following the failure of several structures, such as a section of viaduct wall at Nine Elms in December 2020 and a gable wall at Northwich station in May 2021, we this year carried out inspections in some regions to assess the effectiveness of vegetation management at structures and buildings. In addition, the inspections aimed to scrutinise the assessment of structures for damage caused by vegetation, and the rectification of defects that are identified.

1.33 We found that, across the three regions inspected, Vegetation Management Plans (VMPs), a crucial first step in effective vegetation control, were either absent or incomplete. These plans are a requirement of Network Rail's own standard, and this matter needs to be rectified as a first step to improving vegetation management. In addition (and possibly because of the lack of VMPs), arrangements for the management of vegetation appeared piecemeal and inconsistent. We noted that, anecdotally, engineers do not perceive vegetation as a significant risk. These issues also need to be addressed. More positively, we observed robust measures to identify and manage vegetation problems on gable walls at operational property, following nationally mandated,

targeted inspections in response to the Northwich station wall collapse.

Track and lineside

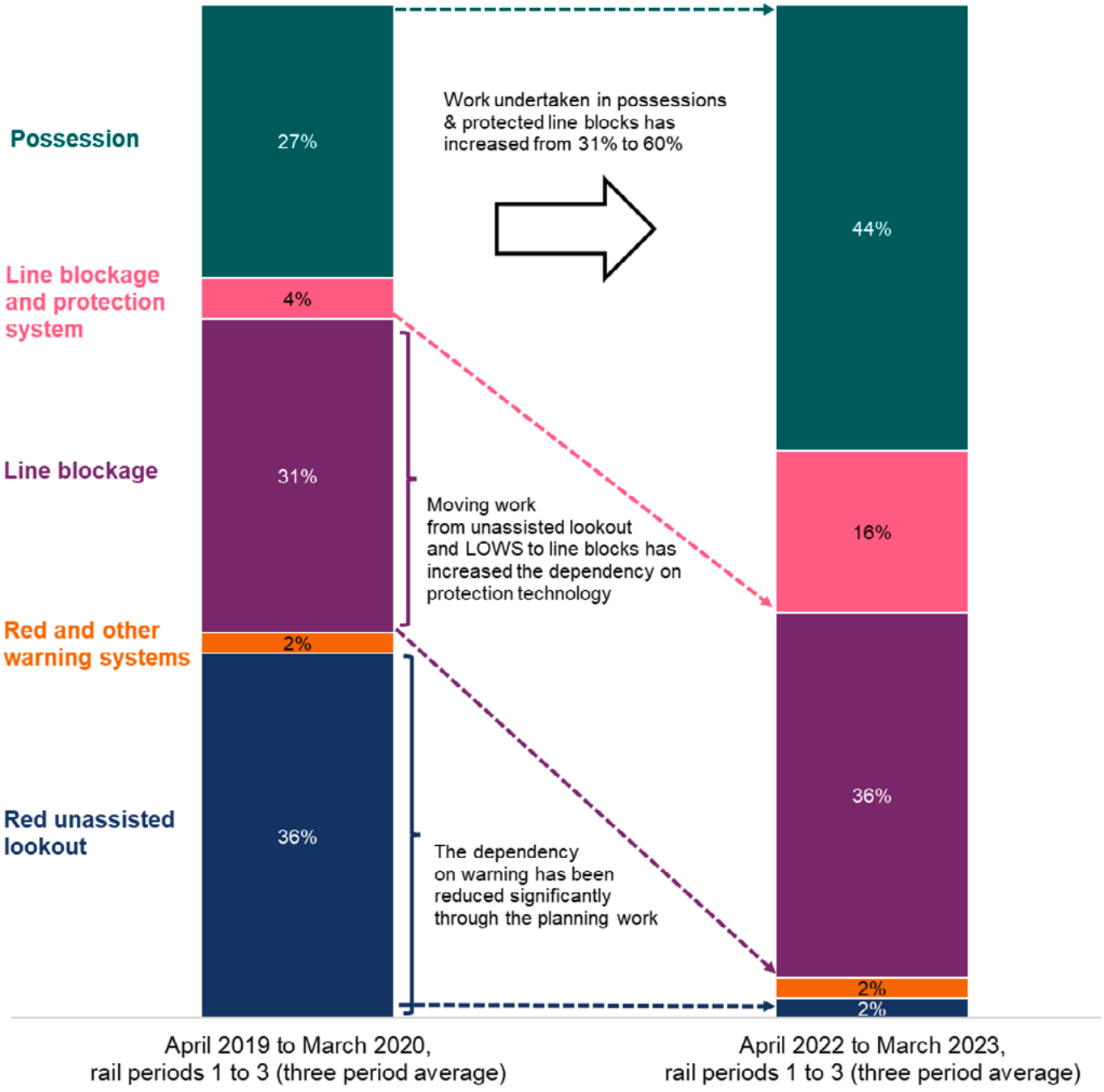
1.34 Network Rail's management of track continues to deliver consistent levels of safety. For this reason, other than monitoring performance and routine liaison, we did not carry out any proactive inspection work this year. The year saw some broadly steady or improving indicators, such as: numbers of wrong side failures; immediate action level faults per 100 kilometres; and rail breaks and serious defects. However, Network Rail needs to continue to be vigilant in this key area; increases in some types of wrong side failures, twist faults and a rise in track condition related temporary speed restrictions serve to remind of the continuing need for timely and effective maintenance. The very high temperatures in the summer of 2022 had a clear effect on track and underlying structures. Another challenge was adapting safer track access methods while delayed maintenance due to industrial action also affected performance.

1.35 We continued to monitor Network Rail's management of lineside risks, in particular the control of vegetation and maintenance of lineside fencing. The trend on animal incursions was unchanged over the year, although maintaining and renewing lineside fencing remains a constant challenge. The number of objects on the line was similar to previous years. We saw continuing efforts to improve vegetation data, with varying success across the routes. To this end, we continue to monitor

the development and introduction of digital lineside inspection technology, which offers the prospect of a step-change in vegetation management by replacing periodic inspection estimated growth with very frequent automated inspection and assessment.

Track worker safety

Figure 1.5 Changes in track worker protection between April 2019 and March 2023



Source: Network Rail

1.36 Between April and July 2022, we carried out national inspections to assess Network Rail's compliance with the two improvement notices served in July 2019. These inspections built on earlier work to assess whether Network Rail had done all that was reasonably practicable to comply. Network Rail demonstrated that they had reduced unassisted lookout working from 36% of all work to around 1%. As a consequence, near-misses to track workers reduced by 72%. This significant change was achieved principally by better planning, making better use of more engineering possessions and using protected line blockages. Network Rail also explored protection and warning technology, such as semi-automatic track warning systems and remote track circuit operating devices to allow more flexible track access. Progress here was more mixed, with the technology facing significant challenges with design, installation, and use. Nevertheless, the use of technology, particularly greater automation of tasks such as track patrolling and ultrasonic inspection, has significantly taken away the need to use lookouts to protect people on the track. Overall, our assessment was that Network Rail had complied with the improvement notices.

1.37 The challenge for Network Rail has been to embed these changes, especially the use of protection and warning technology, and not to revert to previous ways of working as the leadership focus moves on to other concerns. Recognising this, Network Rail set out action plans for all the routes to continue to drive improvements. We monitored these plans over the remainder of the

year. Our assessment suggests that, thus far, Network Rail has broadly sustained the initial improvement but has not progressed further. Most routes failed to deliver their action plan commitments, the chief obstacle being problems with design, approval, installation and use of technology. In particular, semi-automatic train warning systems (SATWS) and remote track circuit operating devices (T-COD).

1.38 The deployment of technology has been impacted by the need to address other priority work displaced during industrial action. Unassisted lookout working has risen to just under 2% (P10 SHEP, taking unassisted lookout working (ULO) and lookout operated warning system (LOWS) together), although there are wide variations between no unassisted lookout working in some routes. For example, in West Coast South it was 7.5% (albeit much of the work took place in low-risk locations).

1.39 Although incidents have reduced significantly since our enforcement action, incidents continue to happen. Significant issues include:

(a) mistakes around the placing of possessions boards and detonators;

(b) workers mistakenly working in unprotected locations; and

(c) trains entering line blockages.

1.40 Much work has now been done online blockages, and in most cases, these rely on the vigilance of signallers to prevent trains entering the area. Nationally, 29% (P10 SHEP) of line blockages have some form of extra protection against signaller mistakes. This hides a wide variation; some routes achieved 90% additional protection.

1.41 The regions continue to make piecemeal and incremental progress at embedding new ways of working. The principal challenges continue to be installing and using technology to improve the range of protection and warning options available to allow the greatest possible flexibility in accessing the track safely. SATWS has faced technical issues, requires design approval for complex installations, is subject to internal review and authorisation processes, and has faced installation problems. Furthermore, it has not always been installed where it can be of most benefit. Overall, the installation of SATWS has stalled. Remote T-CODs have faced challenges around batteries and connectivity, whilst installation has plateaued, and usage remains quite low.

1.42 More positively, Network Rail continues to develop potential new solutions, such as remote signal disconnection (a variant of remote T-CODs), automatic track warning systems, automatic switches and crossings inspection and axle counter operating devices.

Modernising Maintenance

1.43 Throughout the year we monitored Network Rail's plans to change ways of working in local maintenance delivery organisations through its 'Modernising Maintenance' programme. We continue to observe Network Rail's assessment of the changes, and the routes' implementation of changes, through targeted inspections. Whilst Network Rail believes there is a case for changing the way work is done, changes need to be made in a way that does not adversely impact the maintenance of a safe railway. Our work continues to focus on adequate resource provision that meets local requirements, consultation with employees and safety

representatives, managing staff competence and fatigue and reducing the amount of maintenance backlog. So far, we have found evidence of an adequate change management risk oversight and validation approach at national level. However, the proof of this will be in the implementation, and we plan to inspect this further between April 2023 and March 2024.

Industrial Action

1.44 One of Network Rail's major challenges this year has undoubtedly been managing the impact of industrial action. We carried out inspections to assess how well Network Rail managed risks on strike days, with particular consideration given to the competence of contingent staff such as signallers and electrical control room operators. Overall, we found that there were suitably trained contingent staff, who safely managed the much-reduced traffic volumes on the network. Sensibly, planning focused on providing a simplified service on key routes to manage the burden on contingent staff. In response to trade union concerns, we made enquiries into reported incidents or irregularities. Where there were lessons to be learned, we usually found a positive approach to taking action to prevent recurrences. However, in our assessment, most of these events had little or no potential safety impact.

1.45 Of greater concern is the impact of industrial action on maintenance work. The cancellation of essential work has contributed to a rise in maintenance work backlog and reprioritisations. Whilst Network Rail has a plan in

place to recover the work, and to manage safety matters, the backlog puts extra pressure on maintainers to identify and temporarily mitigate risks, prioritise work and monitor asset conditions in the interim. Latest figures suggest that with the ending of industrial action, the backlog is stabilising (figures provided by Network Rail at a liaison meeting on 15 May 2023). As suggested elsewhere, implementing safe and more sustainable track access solutions will help to improve matters.

Electrical safety

1.46 In response to two electrical safety incidents at Kensal Green in December 2019 and Wolverton in July 2021, we served two improvement notices requiring Network Rail to improve their safety arrangements when working on or near overhead line equipment (OLE). Network Rail needed to review their current arrangements for demarcating and proving 'dead', identify and implement improvements, and provide information, instruction, and training on the new safety measures.

1.47 Network Rail's review established that its existing procedures for demarcation and isolation were ad-hoc and inconsistent. As a result, it mandated the use of Reminder of Live Exposed Equipment (RoLE equipment) throughout its OLE infrastructure by its own staff and by contractors. The RoLE equipment, essentially warning lights, serve as a reminder to identify isolation limits and some residual electrical hazards. Network Rail also

developed a monitoring regime to ensure that the new measures were put into effect.

1.48 Network Rail's review of working practices also found that 'proving dead' procedures were unclear and inconsistent. In response, Network Rail developed a new standard for proving that OLE was dead (known as 'test before touch') and developed extensive training material and staff briefings on the new standard.

1.49 As a result of this work, we accepted that Network Rail had achieved what we had required. In doing so, if properly implemented and maintained, the new measures should be a significant improvement in the safety of people working on or near OLE. We plan to do more work between now and March 2024 to assess how well these improvements are becoming embedded in routine working practices.

1.50 More widely, we continued to monitor Network Rail's Electrical Safety Delivery Programme throughout the year. We see this programme as the means by which Network Rail will achieve improved compliance with the Electricity at Work Regulations 1989 in the medium to longer term, especially around security of isolations and prevention of accidental re-charging. We found that good progress has been made with the roll out of new safety infrastructure to this end. The programme is also making good progress challenging the working culture on and around electrical traction supplies through the 'Choose to Challenge' and the 'Electrical Safety Step up' campaigns.

On track plant

1.51 Network Rail's on-track plant has grown significantly in recent years. There have been several significant incidents in this time, some of them with serious consequences, most recently at Calverley in 2018 and Ramsden Bellhouse in 2021. For these reasons we carried out inspections of on-track plant in engineering work. We found well-understood controls on the ground such as adequate supervision and the use of machine controllers to keep vehicles and pedestrians apart. However, we also found variable standards in planning and risk assessment, resulting in some key risks being less well controlled, in particular keeping pedestrians and vehicles apart. Lifting plans were generally found to be comprehensive, although some included sections that were either non-specific or irrelevant to the work being carried out. Other documents occasionally failed to provide details of the mitigation measures that were in place.

1.52 In general, monitoring and assurance arrangements were adequate in terms of resource, coverage, and effectiveness. There is, however, room for improvement, particularly outside of major projects. Human factors and behaviours are not always captured, and our inspectors observed omissions and errors in paperwork that could have been found if more robust arrangements were in place.

Human Factors

1.53 We continued to engage with Network Rail on this important topic throughout the year. With the promise of new and developing technologies delivering improvements, it is vital that Network Rail devotes sufficient time, effort and resource to getting the human factor (HF) interfaces right. We found their ergonomics team continues to work hard to manage HF risks by providing oversight of multiple projects, intervening where essential to carry out valuable work and putting standards, procedures and guidance in place, where possible. However, in common with much of the industry, Network Rail continues to suffer resourcing pressures. This creates a risk that some important projects, such as Optimised Train Track Operations (OTTO) signalling or European Train Control System (ETCS) signalling on the East Coast mainline, might not receive the detailed human factors work they need.

1.54 We have concerns about Network Rail's proposal to rely on supplier-led human factors work. This approach could potentially leave Network Rail unable, or too late, to influence major design decisions, especially as there are known human factors resource constraints in the supply chain. This then puts pressure on Network Rail's ergonomics team to identify and recover shortcomings before flawed decision-making is embedded in design.

1.55 Awareness amongst Network Rail engineers and managers of the value and importance of HF will be key in holding suppliers to account. This will ensure

the delivery of products which have had suitable and sufficient human factors integration in their design, including the appropriate level of end user involvement. More widely, the industry Human Factors Strategy Group, of which we are a member, is considering what steps can be taken to address current limitations in HF competence as this issue impacts upon the whole industry.

Fatigue

1.56 We are encouraged by Network Rail's honest recognition that their fatigue controls require improvement and the willingness to pursue such improvements in a prioritised, incremental way. This will require supporting systems, with staff and management engagement, and efforts to nurture a more open, honest culture towards fatigue and alertness. Network Rail still has a long way to go to improve their management of fatigue, with exceeding mandated hours a too-frequent occurrence. We will continue to engage with Network Rail on this topic.

Level crossings

1.57 Sadly, there were five accidental fatalities at level crossings this year. These occurred at footpath and bridleway crossings, with four involving pedestrians and one involving a motorcyclist. While this is a decrease from the seven accidental fatalities at level crossings in the previous year, it demonstrates the need for continued focus on reducing risk at non-road level crossings. It also highlights the importance of Network Rail continuing to

pursue their 'Enhancing Level Crossing Safety 2019 to 2029' strategy.

1.58 The use of footpath level crossings increased during the coronavirus pandemic and between April 2021 and March 2022. Levels of usage continued to remain higher than pre-pandemic levels in the latest year. Reflecting this is the level of total modelled risk, a measure used to assess safety trends at crossings. The measure was broadly unchanged over the year, however the number of level crossing near misses fell by around 20%. Time will tell if this is a sign of an improving safety trend, or simply an isolated downward movement.

1.59 We continue to encourage Network Rail to pursue new technology. There were further developments, in particular automatic half barrier (AHB) boom extensions to prevent drivers 'weaving' around barriers, and work in Eastern region on overlay AHB crossings. "Meerkat", a lower cost active control that provides local audible and visual warning of an approaching train, was delayed again this year with continuing technical issues. This is disappointing as active control measures (i.e., warning technology) for currently passive level crossings (i.e., those where the user must look and listen) are the main focus of Network Rail's level crossing strategy.

1.60 The Department for Transport (DfT) progressed work this year to update the Private Crossing Signs and Barriers Regulations 1996, with new signs that are clearer and easier to understand. This followed several Rail Accident Investigation Branch (RAIB)

recommendations on the subject. We support the introduction of new signs for private level crossings. We supported the DfT in this work and were a member of the working group reviewing the new signs.

Occupational health

1.61 In 2022 to 2023 we continued our focus on exposures to causes of long latency lung disease, including asbestos, welding fume, and Respirable Crystalline Silica (RCS), and on worsening Hand Arm Vibration Syndrome (HAVS) cases.

1.62 **Asbestos:** the five-year national priority asbestos programme brought pace and consistency to managing a major health risk. The programme delivered an ambitious and comprehensive framework for asbestos management that brought about a step-change in this area. Now that it is due to close and has transitioned to business-as-usual management by regions, the challenge will be to maintain the progress without the governance, specialist resource, and national oversight that the programme brought. We will continue to monitor regional performance against new compliance-based asbestos key performance indicators (KPIs). This will allow us to assess whether the Technical Authority delivers on commitments to continuing asbestos assurance, including a planned review of their asbestos management standard in 2023 and subsequent completion of a formal audit.

1.63 **Welding fume:** following HSE's classification of welding fume as a carcinogen, we have monitored Network Rail's improvements to traditional control

measures by provision of exhaust ventilation, suitable respiratory protective equipment, segregation by exclusion zones, forced ventilation in tunnels and training. Progress has been slower than we hoped. This year, our inspections confirmed that risk controls broadly met Network Rail's current (interim) standards, with use of suitable powered Respiratory Protective Equipment (RPE) within 20m of welding exclusion zones and adequate arrangements for RPE maintenance. Using local exhaust ventilation as an engineering control in preference to RPE, other than in tunnels for major works, was much less common. Our overall assessment is that there is still more work to be done to improve the quality and consistency of welding fume control.

1.64 **Hand-arm vibration syndrome (HAVS):** over the last four years Network Rail has been responsible for reporting most of the industry's new HAVS diagnoses. Network Rail were also responsible for reporting all worsening HAVS diagnoses to ORR under RIDDOR. Reports of worsening HAVS are of particular concern as they are more likely to arise from vibration exposures in current jobs, rather than new diagnoses of pre-existing symptoms arising from exposures with previous employers. This dominance is to be expected given the size of the workforce under statutory health surveillance for HAVS, the main route by which HAVS is diagnosed. While the continued reporting of worsening HAVS remains a concern, it is encouraging that the most recent data confirm an improving trend in the last four years, down from 12 worsening HAVS between April

2019 and March 2020 to three in the latest year (up to 22 February 2023). Our investigations into these reports find a mixed picture with pockets of good practice, but overall evidence suggesting that the current monitoring and assurance regime is not working as well as it should. We identified failures by some routes to complete adequate local investigations and to implement individual health management action plans, and weaknesses in managerial supervision and training.

1.65 **Occupational health provision:** we welcome the decision by Network Rail to bring occupational health services in-house. We believe this, and the opening of 22 health centres around the country, will bring greater consistency and certainty to occupational health and wellbeing.

Signal technician competence

1.66 The competence of signalling maintenance technicians has been a factor in incidents such as Greenhill Upper Junction in 2009, Dalwhinnie in 2021 and Wingfield in 2022 as well as other incidents, where wrong-side signalling failures created serious risks such as derailment and the potential for train collision. In response to more recent incidents, Network Rail took the initiative and is requiring practical recertification of all Network Rail-employed signal technicians by September 2023. We carried out inspections to see how well this action had worked in practice. Overall, we found the recertification process revealed a high failure rate, which has seen several people have their

Signalling Maintenance Technician Handbook (SMTH) competencies removed or requiring further mentorship.

1.67 The inspections raised the issue of the competence management of signalling maintainers employed by contractors and the consistency of external SMTH training courses on offer. We identified that Network Rail needed to improve its monitoring of contractors' competencies and provide for a more consistent approach to recording signal technicians' competence.

1.68 More widely, for several years we have had concerns around Network Rail's 'assessment in the line' process for ensuring ongoing competence. This relies on the line manager having the time, and technical and interpersonal ability, to have a robust conversation with their staff about their competencies. The process does not necessarily identify gaps in knowledge and experience, and it does not necessarily identify that skills fade over time. This includes the potential for people carrying out safety-critical tasks to become 'unconsciously incompetent' over time. We have made it clear to Network Rail that we believe there is more work that they need to do here to provide greater rigour and consistency to managing competence.

Mainline – Great British Railways

1.69 As the significant work to plan and implement the transition to Great British Railways (GBR) has progressed this year, we have directly supported the work by providing advice on good safety principles to the GBR Transition Team.

1.70 We have worked with DfT and the RSSB to ensure that there is independent oversight of the safety implications on the developing proposals, and this work will continue as the transition stages develop over the next few years.

1.71 The GBR transition remains strongly linked to the ongoing devolution and reorganisation in Network Rail, which we monitor as part of regular assurance.

1.72 Our work to monitor the safety implications of transition is linked to, and informed by, the work of other parts of ORR who are looking at the other aspects of the transition.

1.73 Our goal is that we can offer authoritative advice to DfT if there are any perceived safety issues either in the proposed new structures, or as effects of the transition and reorganisation process. By doing this at an early stage, the industry has a better chance of dealing effectively with those issues. We will also undertake assurance around the impact of the overall package of changes on the health and safety management of the system as a whole. We will continue to seek assurances across the sector by confirming that duty holders are controlling risk effectively.

1.74 We will also be working with our partners to look for reasonably practicable opportunities for the management of health and safety in the industry to be improved as part of transformation.

Mainline operators

Overview

1.75 The mainline operators comprise charter operators, passenger train (TOC) and freight (FOC) operating companies that operate over infrastructure controlled by Network Rail and Amey Infrastructure Wales Limited (Seilwaith Amey Cymru).

1.76 In this annual report we have combined our summary of activities for TOCs and FOCs to reflect common themes that emerged from our inspections and investigations.

1.77 Our proactive inspections between April 2022 and March 2023 covered the following risk areas:

- Operational incidents (including Signals Passed at Danger (SPADs));
- Management of rolling stock (including software integrity); and
- Risk at stations (including platform train interface (PTI)).

1.78 We have also undertaken investigations of incidents arising this year and concluded the investigation and prosecution of incidents occurring in earlier years.

1.79 There has been a substantial amount of work with charter operators to assess the grounds for continuing operation of their heritage fleet of Mark 1 rolling stock and vehicles with hinged type doors.

1.80 This year we have not included a consolidated RM3 radar diagram for the TOC and FOC sectors. Instead, through our active involvement in industry groups, we are encouraging operators to share their own and our RM3 determinations with one another. They can then learn from each other's strengths to drive improvement within and across sectors.

Operational incidents

1.81 Our main work in the operational incident risk area has been around management of drivers, capability of driver managers and investigation of incidents in the second year of our three-year programmed focused on SPADs.

1.82 We also moved into year two of a two-year programme looking at management of operational incidents (not SPADs), including:

- Stranded trains due to mechanical, electrical, electronic or software failure;
- Incidents on stations and trains, including fire;
- Passengers taken ill on trains; and
- Train collisions or derailments.

1.83 We found consistency with themes from our year one inspections, namely that control room staff need further support. This is to ensure they are competent, have the capability to manage emergencies safely, efficiently and effectively and that their workload,

alongside working patterns, is reviewed to manage the risk of fatigue.

Signals passed at danger

1.84 In July 2022, a GB Rail Freight (GBRf) train passed a signal at danger at Loversall Carr Junction, near Doncaster, and collided with the rear of a Freightliner train which was stationary at a signal, also at danger. The collision resulted in the derailment of the GBRf locomotive and various wagons of both trains. Fortunately, there were no injuries, but this incident demonstrates why a SPAD is a precursor with the potential for a very serious outcome.

1.85 We are investigating this SPAD and other SPADs which have the potential to have a severe outcome. There were 10 of these events between April 2022 and March 2023 (there were also 10 in 2021 to 2022). These high risk SPADs are used by RSSB to estimate

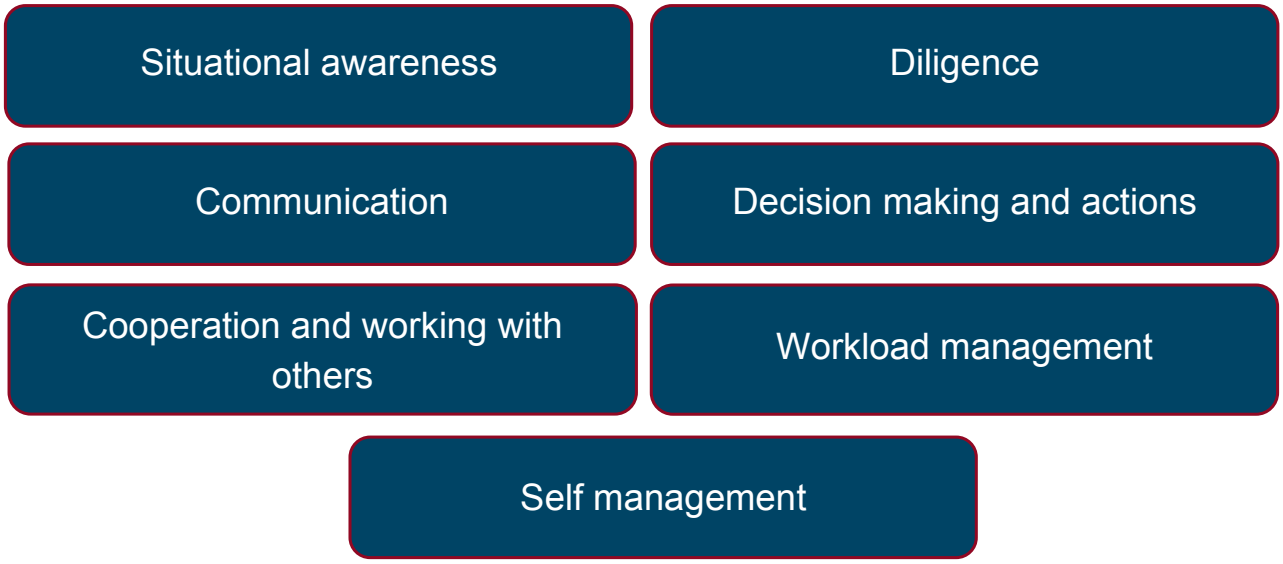
the contribution that SPADs could make to the risk of collision. Compared with a baseline of 100% in 2006, in March 2023 the estimated SPAD risk was 37% (33% in March 2022). September 2006 is used as the baseline for measuring SPAD risk, as it is representative of the system risk management post-Train Protection and Warning System (TPWS) implementation. So, whilst the overall trend since then remains downward, there has been an uptick since March 2022. We have also completed year two of our three-year proactive work around SPADs, and the key findings are set out in the case study below.

CASE STUDY 1: Effective SPAD investigations

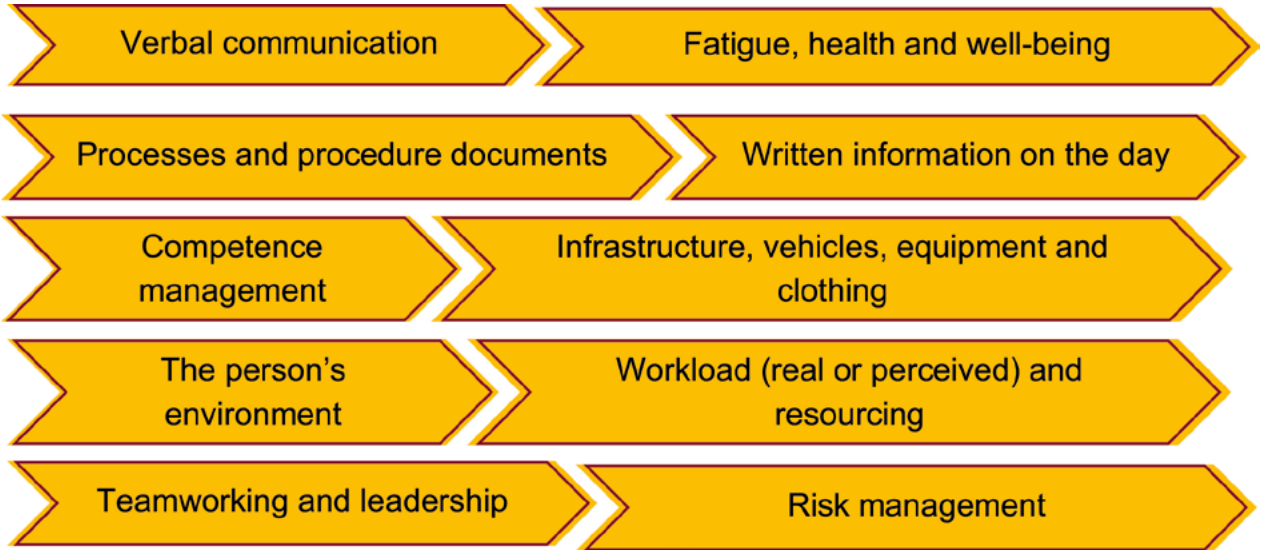
Our proactive inspections of SPAD management looked at three areas:

- How drivers manage their own professional competence;
- The competence management systems for driver managers; and
- The tools and techniques used to understand the underlying causes of SPAD incidents.

We found through our assessments of SPAD investigations by FOCs and TOCs that organisations embracing and supporting an understanding of non-technical skills for drivers and driver managers had a better understanding of why SPADs occurred and what support is needed for a driver to prevent recurrence. Non-technical skills are social, cognitive and personal skills that can enhance the way technical skills, tasks and procedures are carried out, and include:



TOCs and FOCs that sought to understand the underlying causes of SPADs achieved higher RM3 assessments by ORR. Most operators were collaborating with RSSB, referencing the 10 incident factors in their reporting of SPADs. Inspectors raised awareness of the incident factors with operators at inspections because comprehensive reporting against these factors will help RSSB understand the underlying causes of SPADs, leading to improved guidance and tools for the industry. The incident factors are:



Operators that have used the RSSB 'SPAD Self Evaluation Toolkit' have identified improvements they can make, including use of the incident factors, to continuously improve the management of SPAD risk. For example, with Driver Manager resourcing, we found several organisations had analysed the activities and workload of driver managers and are now moving to the ratio of one driver manager to 25 drivers through further recruitment. Going forward, this will be a starting point in our discussions with other operators working with higher ratios.

Management of rolling stock

Class 800 type trains

1.86 We have continued work from earlier years around the risk from climbing and surfing on Hitachi Class 800 type trains and the recovery programme to repair cracking around the bogies in the same trains.

1.87 The fitment of modified inter-vehicle connectors was completed on the London North Eastern Railway (LNER) fleet between April 2021 and March 2022. Great Western Railway (GWR) was then the only operator using trains with the original style inter-vehicle connectors which presented a 'ladder' to opportunists aiming to climb or surf on the trains.

1.88 With evidence from our investigation of an incident in October 2022, where a male climbed on to the roof of a Class 800 train at Westbury, we challenged GWR over the adequacy of their operational controls that relied on staff intervening to stop people climbing on trains. We concluded that the original plan for fitment at mid-life overhaul was no longer tolerable and GWR have now accelerated the programme to fit the new style connectors to the entire fleet by the end of 2025. We will conduct inspections between now and March 2024 to ensure this work progresses to programme.

1.89 We have supervised progress with Hitachi's recovery programme to repair cracking at the lifting end of the bogie bolster and around the yaw damper and anti-roll bar connections to the bodies of Class 800 trains. The complexity of the repair, and experience from modifying the first two trains, will mean that the programme is now anticipated to be completed in 2029 (originally forecast for late 2028). However, the interim mitigation, through enhanced inspection and maintenance activity continues to deliver trains safe for service.

Proactive and statutory work

1.90 Between April 2022 and March 2023, we have undertaken extensive proactive inspection and assessment work in the following areas associated with the management of rolling stock:

- Cyber security and software integrity;
- Entities in Charge of Maintenance (ECMs); and
- Statutory work on Railway Safety Regulations 1999 exemptions.

Cyber security and software integrity (TOCs and FOCs)

1.91 Electronic systems and hardware and management of these through software, are integral to modern train design. Technology has enabled:

- Improved levels of interrogation and reporting on safety critical equipment;
- Train drivers to have this information readily to hand;
- Operators to have real-time access to this data; and
- Better safety and accessibility information for passengers.

1.92 However, technological change has outpaced the safety management capability needed to effectively manage the associated risks in the mechanical and electrical engineering disciplines, where the rail industry can traditionally demonstrate strong capability and high maturity.

1.93 Between April 2022 and March 2023, we trialled an inspection of software integrity, focussing on change management and this work is described in the case study below.

CASE STUDY 2: Cyber security and software integrity in train-borne systems

This year we worked with a software integration and cyber security specialist team to improve our own competence in this field and develop an inspection programme which we trialled with East Midlands Railway (EMR). Findings from this trial, set out below, will be used to revise our inspection remit which we will then roll out across TOCs and FOCs between now and March 2024.

Supply chain management and competency

This is a key area as duty holders need to appreciate the whole supply chain and the competence of individuals to ensure the system is robust and that safety and security are considered holistically.

Engineering change process

This continues to be an important area as identified in last year's Annual Health and Safety Report. It is critical for managers of digital systems to ensure that any changes do not have adverse safety implications, and that robust testing is in place prior to live rollout. This is particularly significant where a train manufacturer will also be providing train maintenance and will be responsible for train software updates. In an earlier inspection with EMR, we found they had recognised this ahead of our cyber inspection, and their engineering change process is being reviewed to consider the impact of digital systems.

Information sharing

Improved cooperation between suppliers and duty holders is critical to ensure safety. With new fleets, operators need to be fully engaged with the manufacturer to understand the digital infrastructure on the train. There has been reluctance by manufacturers to share information as they are not typically used to being challenged around the impact of software and security decisions could have on safety. With third parties delivering cyber security provisions, it is important that operators have people with the relevant competency to manage these interfaces.

We are very grateful to Will Rogers, Managing Director at EMR for collaborating with ORR in this trial.

"At EMR, we welcomed the opportunity to be the initial subject for the ORR's Cyber/Safety assessment program testing. It allowed us to showcase the energy and effort we, as an operator of critical national infrastructure, have committed to both the areas of cyber security and safety. The collaborative approach to the questioning allowed us to clearly interpret the direction of thinking relating to safety and cyber security, and challenged our thinking on controls, risk and governance.

"The question steps were challenging and thought provoking, highlighting the need for the rail industry to embrace the complementing concerns of cyber threats creating safety risks, and to explicitly create governance around these areas. It also provided clarity on areas of maturity in our cyber approach, recognised our commitment in these areas, and provided a significant boost to the credibility of the cyber and safety program by sharing an overarching goal with the ORR.

"The initiative has been a positive one overall for EMR, so much so that we have shared our experience at NCSC's Rail Information Exchange and across Transport UK Group companies." NCSC is the National Cyber Security Conference.

Entities in Charge of Maintenance (ECMs) (freight vehicle maintainers)

1.94 We worked with the freight sector to address the recommendations made in the Rail Accident Investigation Branch (RAIB) report into the derailment at Llangennech in August 2020, where a freight train conveying petroleum products derailed between Llanelli and Swansea. A number of wagons caught fire, and escaped fuel caused significant pollution. We held a workshop with stakeholders in September 2022 to progress action against the two RAIB recommendations targeting wagon maintenance.

1.95 RAIB cited a possible cause of the derailment was failure of a brake component on a wagon, causing the unintentional scenario of wheels not rotating freely (wheelset locking) and the creation of a wheel defect that increases the risk of derailment. From our workshop, two workstreams were identified and these are now being managed by RSSB, with steering and working groups reporting to the National Freight Safety Group.

1.96 We continued an extensive programme of work with ECMs, both GB based and non-domiciled with British operations. We examined how the freight sector is managing rolling stock maintenance activities, focussing on the maintenance of brake components. The Case Study below describes this work and our findings.

CASE STUDY 3: Entities in Charge of Maintenance

An ECM is any person or organisation responsible for the safe maintenance of a rail vehicle. ECMs include people or organisations such as railway undertakings, infrastructure managers, a keeper or a maintenance organisation. During 2022 to 2023, we completed our work with ECMs to:

- determine if ECMs are complying with relevant legal requirements;
- assess the arrangements in place for the maintenance of locomotives and rolling stock; and
- seek assurance that rolling stock is returned to the network in a safe condition.

We used the theme of 'dragging brakes' which can lead to locked wheelsets. We focused our inspections on the associated underlying causes which might lead to a malfunction of the braking system, including:

Task Analysis: Facilities, tools and equipment at all maintenance locations and assurance of the security of fastenings.

Competence: Systems for ensuring the competence of those involved.

Organisational Responsibility: Management systems and instructions for assessing the quality of work undertaken.

Component Tracking: Processes for the identification and tracking of safety critical components.

We inspected three non-domiciled ECMs, two GB-based ECMs, two ECM maintenance providers and two FOCs that undertake their own ECM function.

Conclusions

In organisational responsibility, all ECMs inspected were reviewing their activities to identify weaknesses in their engineering maintenance arrangements and making changes to ensure these were being managed and mitigated. We found good progress being made in task analysis, competence, and serialised component tracking. There are positive efforts being made to attract further competent and experienced staff to the sector and a move towards trailblazing an industry-wide wagon apprenticeship and qualification; showcasing rail wagon maintenance as a career is a sector goal.

FOCs and ECMs understand their duties and roles. However, the interface between the two seems less clear and defined. Both have arrangements in place but do not always appreciate the role or responsibilities of the other. This has the potential to introduce conflict in the arrangements. These interface challenges should diminish as industry competence is raised and improvements to procedures and methods of working together and embedded.

We found that non-domiciled ECMs (particularly where there was limited, or no GB support) did not have a good understanding of the GB ECM certification regime, through interpretation and application. However, they understood the basic requirements even if they were not certificated to the same level as a GB-based and certificated ECM. Non-domiciled ECMs with GB-based engineering support had a better understanding and their arrangements were more robust.

In our inspections we found no evidence of wagons being released to traffic in an unsafe condition.

There is an emerging theory that extremely low adhesion between wheel and rail may also be a contributing factor to wheelsets locking. We will be working with industry groups to ensure this phenomenon is understood and mitigated, in addition to progressing the Llangennech recommendations. We will also carry out further inspections to ensure actions to address our findings from this year are being progressed by ECMs.

Mark 1 and Hinged Door rolling stock exemptions (Charter Operators)

1.97 This year we undertook extensive work with charter operators and vehicle owners reviewing their applications for exemptions under the Railway Safety Regulations 1999 (RSR), to allow the continued operation of Mark 1 rolling stock on the mainline network.

1.98 Where operators could demonstrate their systems can deliver effective maintenance, repair and record keeping, to ensure the structural integrity of these vehicles, thereby improving safety performance in the event of a collision (a fundamental principle of regulation 4 RSR) we have issued an exemption. This will allow them to continue to operate their Mark 1 rolling stock for another five years. We have used the soon to be published RSSB technical note TN106: Inspection and repair of structural corrosion in Mark 1 type rolling stock as a benchmark. We issued regulation 4 exemptions to eight charter operators in March 2023.

1.99 In 2018, 13 years after the RSR regulation 5 requirement to fit central door locking (CDL) to hinged vehicles came into force, we set out our expectation that operators of rolling stock with hinged doors would fit CDL before their exemptions expired in March 2023.

1.100 In 2021 we set out our policy on further exemptions to regulation 5. We advised that we would grant short-term exemptions to operators who had committed to fit CDL. Three operators were granted exemptions commencing April 2023, whilst they completed fitment over the next two years. Two charter operators have already completed fitment of CDL to hinged door rolling stock; Locomotive Services Ltd had complied with regulation 5 by March 2023 whilst Hastings Diesels Limited had completed fitment to their small fleet of heritage diesel-electric units in June 2008.

1.101 Between now and March 2024, we will verify that all operators with regulation 4 exemptions are working to the arrangements set out in their applications and validate that these arrangements are achieving effective structural integrity. We will also inspect progress against fitment of CDL for those operators with regulation 5 exemptions.

Risks on stations

1.102 This year we have continued activity around risks on stations, particularly at the platform-train interface (PTI). We have determined that many operators have 'standardised' RM3 maturity to risk control at the PTI, addressing hazards such as: passengers being trapped

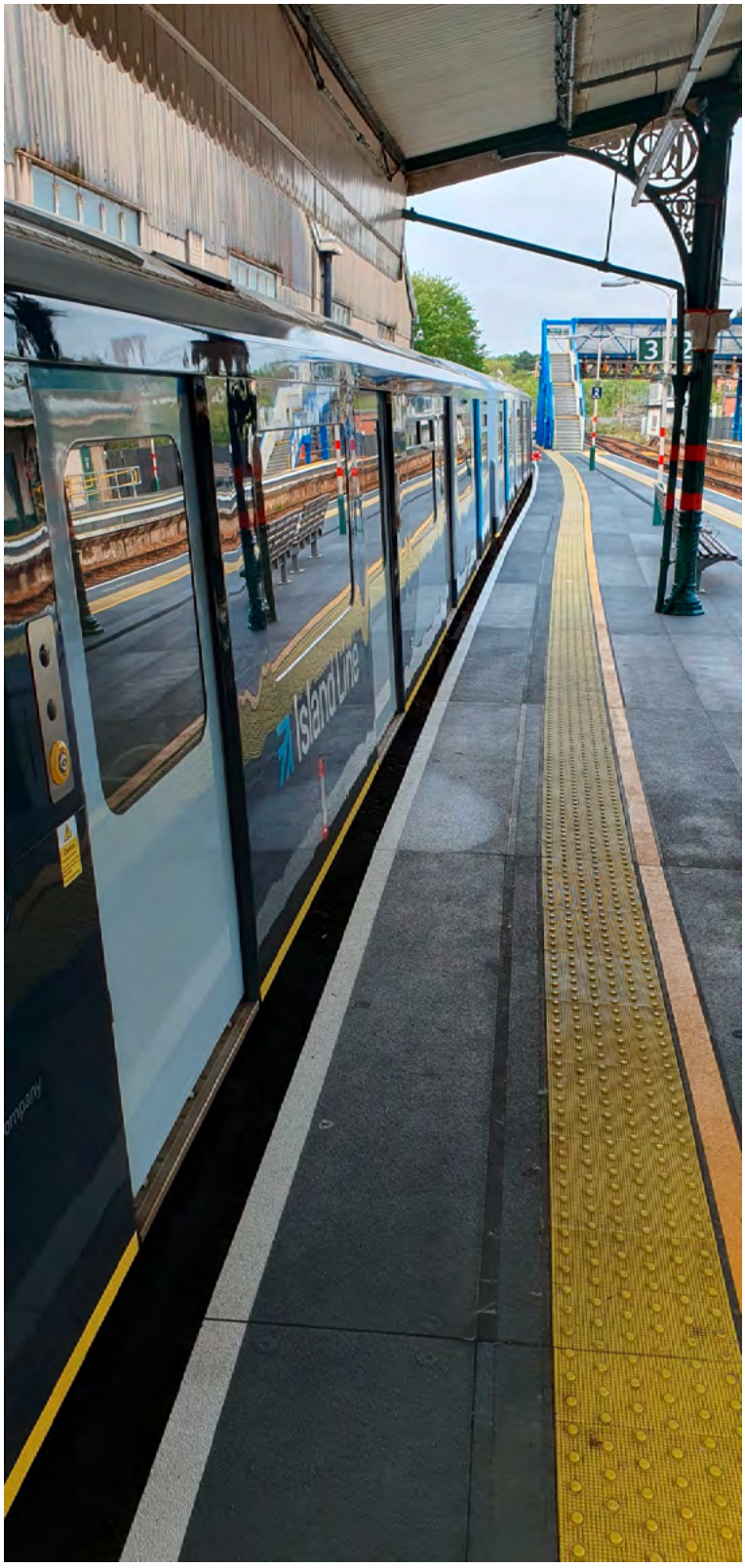
in train doors and being dragged by departing trains; and falling from the platform when walking or waiting near the platform edge. However, the controls rely on TOC staff following processes and procedures correctly.

1.103 Technological solutions, where fitted, are not consistent in design or operation. For example, some train doors will reopen when they detect an obstruction, others will not; some audible warnings sound before the doors are closing, others as the doors start to close. This inconsistency is not setting a common expectation for passengers, resulting in incidents of trapping. This needs a more strategic industry approach.

1.104 Our engagement with industry groups, including RSSB's People on Trains and Stations Risk Group (PTSRG) and Rail Partners Passenger Operators Safety Group (POSF), is an effective way for us to understand how TOCs, rolling stock owners (ROSCOs) and Network Rail are working strategically to understand and drive improvement in risk control. Feedback from the chair of POSF confirmed 'the group has found that involving ORR in the meetings has helped the discussion both in terms of ensuring the Regulator is aware of operator initiatives to improve safety and in providing operators with timely updates on the Regulator's safety concerns and priorities.'

1.105 In previous years, we have recorded our support for the RSSB PTI Risk Assessment Tool. This year we called together a small group from RSSB and TOCs to look at progress with revisions to the tool and a

demonstration of its improved capability. Extra elements have now been added concerning risks to Persons with Reduced Mobility (PRM). We consider the tool is now more aligned with the roles of TOC PTI specialists, meeting its strategic aim of providing a common and comprehensive approach to risk assessment at the PTI for the whole industry to follow and we welcome its relaunch in 2023 to 2024.



1.106 In the coming year, we will be looking at how the industry is building on the success of the tactile paving fitment to work strategically on improving stepping distances between train and platform and consistency with engineering and technological solutions for PTI risks. This would move operators to higher levels of RM3 maturity in this key risk area. For example, we inspected

the recent work on the 'Island Line Upgrade' where focus was on the risks with the introduction of new trains. This has resulted in reopening formerly disused platforms, reconstructing existing platforms with improved stepping distances, resurfacing, and installation of tactile surfaces at all hazards to visually impaired persons.

Transport for London (TfL)

1.107 April 2022 to March 2023 was a significant year for Transport for London railway duty holders, with passenger journeys recovering to around pre-pandemic levels across all modes.

1.108 This year also saw the successful completion (or near completion) of several significant capital projects. These included London Underground's Northern Line new tunnel and passenger concourse, the new interchange route to improve connectivity between the DLR and Northern lines at Bank station, Barking Riverside station opening, delivery and testing of the first new DLR trains to Beckton depot and the opening of the Elizabeth line Central Operating Section.

1.109 Longer term funding was secured for TfL at the end of August 2022 until March 2024, which has provided some long-needed stability since the start of the pandemic in 2020. The funding includes the securing of ongoing investment for the Piccadilly line upgrade, new DLR rolling stock and the Four Lines Modernisation (4LM) project. However further efficiencies are required by TfL to ensure managed decline is not a risk.

1.110 All TfL Rail duty holders continue to demonstrate risk management maturity in the "managed" to "standardised" ranges, with some tending to "predictable".

1.111 We continued to consolidate and build stronger collaborative working relationships with TfL railway duty holders through regular liaison meetings and providing scrutiny and challenge through the proactive interventions we delivered.

London Underground Limited (LUL)

Track Assets

1.112 This year we closed out the actions from the previous year's proactive inspection of LUL's track management. However, an investigation was launched during the year following a serious incident during traffic hours track patrolling. We identified a lack of risk control through this work and took formal enforcement to secure necessary improvements and compliance with the law (see case study 1 below).

1.113 Given this context and concern, a further series of follow-up inspections were undertaken to assess the adequacy of TfL's track patrol safe systems of work across other parts of their network, which reassuringly identified good levels of risk management.

Electrical assets

1.114 We completed a series of inspections into the management of electrical substation assets during the year which demonstrated that there were established

and consistent arrangements in place across LUL sites. Consistently high standards of good working practices by staff were observed. This work forms part of the TfL team's larger proactive electrical and power inspection programme looking at the adequacy of LUL's electrical asset management which will continue in the coming year.

Dockland Light Railway (DLR)

1.115 We continued the monitoring of Keolis Amey Dockland's change management process for the introduction of new rolling stock, including the maintenance challenges for the end-of-life B92 fleet. Through this work, and their ongoing operations, it is evident that the duty holder is continuing to build the maturity of their health and safety management system.

Reactive activities

1.116 We continued our work to monitor LUL's change management approach for the highly complex 4LM project through its development and migration stages. 4LM is a large-scale programme to modernise and upgrade London Underground's sub-surface railway lines; the Metropolitan, Hammersmith and City, Circle and District. This project included the introduction of new rolling stock, new track and drainage works, and now complete re-signalling using the implementation of Communication Based Train Control (CBTC) System to provide automatic train operations. This work will continue to form a key strand of our activities in the coming year.

1.117 We also conducted several enquiries and investigations between April 2022 and March 2023 which can be broadly grouped into five key risk topic areas:

- PTI: enquiries were undertaken into 10 incidents across TfL railway duty holders, ranging from falls between train and platform, to trap and drag incidents. Sadly, one incident resulted in significant life changing injuries. Although no evidence of health and safety breaches were found through our enquiries, the incidents reinforce that whilst PTI risks continues to be one of TfL railway duty holders' priorities, opportunities for continuous improvement remain, whether in development of further controls at the PTI or with train operations.
- Station Infrastructure: we received several incident reports relating to station fabric (roof panels collapse, tiles and other station fabric damage). Our enquiries revealed areas of incomplete asset information leading to gaps in TfL's maintenance and management arrangements. These issues have since been addressed, and arrangements put in place to resolve this.
- Fleet technical and software issues: TfL rail duty holders have experienced several technical issues, including faults and software incidents that have required management of stock availability and changes to inspection and maintenance arrangements. Alongside TfL railway duty holder fleet

teams, we continue to work collaboratively to monitor the ongoing work and changes.

- Escalator incidents: we conducted enquiries into several escalator incidents which resulted in limbs being drawn into the moving parts of the equipment. Whilst our work did not identify any material breaches of health and safety law, the duty holder has committed to working with industry partners to identify any potential areas of improvement that could be made.
- Minor derailments: there have been a small number of minor derailments in depots during the year. However, our enquiries did not reveal any material failings and considered the risk to be relatively minor in relation to each incident. We continue to monitor these types of operational incidents for any potential trends.

CASE STUDY 4: Chalfont and Latimer track worker safety

On 15 April 2022 at around 9.30 am, a track worker acting as a second lookout during a routine track patrol on the single, bi-directional line at Chesham, just west of Chalfont and Latimer, was struck by a northbound Metropolitan line train travelling at around 25mph.

The track worker sustained a serious head injury and extensive bruising, which has resulted in ongoing health issues. Our investigation identified several failings with regards to the system of work adopted, the suitability and sufficiency of risk assessments and the adequacy of protection arrangements in the management of track worker safety.

Underlying causes identified, included the track patrol being undertaken during traffic hours (when passenger trains are running), with persons on or about the tracks relying on protection in the form of human lookout warnings. This represents the lowest position on the hierarchy for the principles of prevention.

As a result of the findings from the investigation, an improvement notice was served on LUL in December 2022 with regard to the Metropolitan line track patrol and failing to provide safe systems of work.

LUL has since undertaken actions to secure compliance with the requirements of the improvement notice and the team is continuing to closely monitor TfL's action to ensure compliance across the rest of the network.

CASE STUDY 5: Elizabeth line Central Operating Section (COS)

This year was a significant year for the Elizabeth line, although we did not conduct a specific proactive topic inspection during the year. However, our monitoring and liaison with the Elizabeth line project team and duty holders continued. The collaborative and constructive engagement which saw us engage with a wide range of disciplines within Mass Transit Rail Elizabeth Line (MTREL) and Rail for London Infrastructure (RFLI) on several operational issues.

May 2022 saw the long-anticipated opening into public service of the COS of the Elizabeth line. This added nine new stations, four of which are managed by MTREL and five of which are managed by LUL. The service was the first time MTREL operated 12 trains an hour between Paddington and Abbey Wood under CBTC signalling in the COS.

In November 2022, both the Eastern and Western ends of the line were connected to the central tunnel sections, with the service operating a peak of 22 trains per hour. In December 2022, the last of the seven-car "reduced length" units were converted to nine-car full length units.

The final stage of the project was planned to implement the full timetable of 24 trains per hour running between Paddington and Whitechapel with the operation of Auto Reverse starting in May 2023. The challenges around safety assurance of the operational auto-reverse (AR) functionality on the trains continued throughout 2023, and whilst this has been delayed, the COS infrastructure manager RFLI has developed an innovative solution. This is supported by comprehensive risk assessment and assurance process to meet the standard of a vigilant driver in the lead cab and there continues to be progress on this work.

Trams and Light Rail

1.118 During the year, our work focused on ensuring the tramway sector managed health and safety risk. We delivered a proactive inspection programme and responded to significant incidents across the seven modern tramway networks and heritage tramways.

1.119 Safety performance has been on a par with the previous year. Once again, the tram sector reported no workforce fatalities in connection with their operations. There have also been no passenger fatalities on board trams since 2016. There were 11 incidents which resulted in passengers or members of the public being taken directly to hospital and three fatalities resulting from collisions between members of the public and trams.

1.120 Our RM3 assessment of the sector indicates that health and safety management system (HSMS) maturity remains around the "standardised" range. However, there was clear evidence that some elements of tramway operators HSMS were operating in the "ad hoc" range, increasing the likelihood that their risk controls could be ineffective. This contributed to a failure to comply with reasonably practicable standards set by legislation. This suggests that operators, supported by tools developed by the Light Rail Safety and Standards Board (LRSSB) need to increase their focus on the efficacy of the design and implementation of their HSMS to reduce risk in a systematic manner. Where our interventions found deficiencies, we took prompt and effective formal enforcement action to bring these duty holders back into legal compliance, as illustrated in the case study below.

1.121 Our proactive work with second generation systems included exploring how tramway operators assess and mitigate the risks associated with conflict points at high-risk road junctions. We also examined the effectiveness of operators' arrangements to prevent employee exposure to respirable crystalline silica dust when filling tram vehicle sanding units. During 2022 we also began a programme of targeted inspections with the heritage tramway sector, focusing on critical aspects of their HSMS, such as risk assessment, record keeping, and monitoring and review.

1.122 Our reactive work focused on following up incidents that met our mandatory investigation criteria and responding to third party complaints. This work

included signals passed at stop, minor derailments and reviewing assurance arrangements on new tramway extensions and new trams. Following these inquiries, and where necessary, we required or recommended improvements to be made to either the management arrangements or control measures themselves.

1.123 Our investigation into the fatal Sandilands tram overturning in November 2016 concluded at the end of March 2022 with a decision to prosecute TfL, Tram Operations Limited (TOL) and the tram driver for breaches of health and safety law. TfL and TOL pleaded guilty to charges brought under section 3 of HSWA. The tram driver was found not guilty on 19 June 2023.

1.124 We continue to have a keen oversight of the RAIB's recommendations on the Sandilands tram incident, working with the sector and the LRSSB to ensure these are fully implemented. As part of this work, we took robust action, including formal advice and enforcement, to ensure timely implementation of automatic speed control and driver inattention systems.

1.125 We published our review of the LRSSB at the end of March 2022 which concluded that LRSSB was fulfilling its intended purpose to better manage safety, standards, and good practice across the sector. Our report made five recommendations for the sector and one on ourselves. During this year, we monitored the sector's response through our attendance at LRSSB's board and routine inspection activity. We continue to progress the development of a new memorandum of understanding

(MOU) to replace the current MOU with UK Tram. At a working level we have developed an excellent and productive relationship with LRSSB, helping them shape the strategic direction of health and safety in the light rail sector.

1.126 A practical example of LRSSB's work is the significant research they are leading into pedestrian safety, to better understand pedestrian behaviour in spaces shared with trams, such as at Piccadilly Gardens in Manchester. The output will help tramways maximise the benefits of shared spaces whilst ensuring safety.

1.127 We continue to use risk-based interventions to assess the sector's capability to comply with health and safety legislation. Our priority proactive inspection topics for the coming year include competence management arrangements for engineering personnel, and risk control arrangements to ensure track workers working on or near the track are protected from tram movements. Recognising the significant increases in reported violence and aggression towards tramway staff, we will also review how each tramway is engaging with the wider community to tackle this disturbing upward trend.

1.128 We will continue to foster our relationship with the LRSSB and UK Tram at a strategic level to help guide the sector and take account of emerging threats and opportunities.

CASE STUDY 6: Transport for Greater Manchester (TfGM) Improvement Notices

Following the RAIB investigation into the overturning of a tram at Sandilands junction, Croydon in November 2016, RAIB made a series of recommendations. Two of these, recommendations 3 and 4, were intended to eliminate and reduce the risk of trams derailing or overturning due to excessive speed at tight radius curves.

Implementation of recommendations 3 and 4 is key to achieving significant improvements in the reliability of line-of-sight driving, and crucially, in reducing the risk of future potential catastrophic event such as Sandilands.

We actively engaged with the sector in the years following the publication of the recommendation and several tramways began the process of identifying suitable solutions and suppliers. LRSSB also produced guidance to assist tramways.

Although TfGM provided us with a written commitment including outline plans to implement controls aligning with RAIB recommendations 3 and 4 and subsequent LRSSB guidance, timescales in the plans were missed and progress stalled. We formed the opinion that TfGM were in breach of Sections 2(1) and 3(1) of HSWA and served two improvement notices requiring implementation by December 2024.

TfGM's cooperation and commitment following the issue of the notices has been extremely positive and significant progress has already been made through a streamlined procurement process and a clear, detailed implementation strategy.

CASE STUDY 7: Potential exposure to carcinogenic respirable crystalline silica (RCS) dust during sand filling operations

RCS dust is generated during activities related to filling trams with the sand they need to help wheel on rail adhesion. Uncontrolled, repeated exposure to this dust is linked to lung cancer and other serious respiratory diseases.

We received a complaint detailing concerns that, at a particular tramway, staff were being exposed to significant amounts of dust containing RCS when engaged in filling trams with sand. We carried out an inspection visit, finding several serious concerns, both with risk assessments, and practical control measures. We took immediate action and as a result, conditions for employees improved dramatically with appropriate engineering controls put in place with the back-up of the correct types of respiratory protective equipment provided.

Following this successful intervention, we undertook a further programme of inspections looking at the issue of exposure to RCS dust across the remaining tram networks. We found differing levels of conditions and compliance with the law. We took action where it was needed and worked with tramways to ensure improvements were made where required.

As a result, the tram sector now has significantly improved levels of control over this higher risk activity, ensuring workers are protected against serious health effects in the future.

Channel Tunnel

1.129 Throughout the year, we continued to provide leadership, expert advice, and secretariat support to the Intergovernmental Commission (IGC) and supported the activities of the Channel Tunnel Safety Authority (CTSA). The IGC is the current National Safety Authority (NSA) for the UK half of the Channel Tunnel with the CTSA advising and assisting the IGC on all matters concerning safety in the construction and operation of the Channel Tunnel.

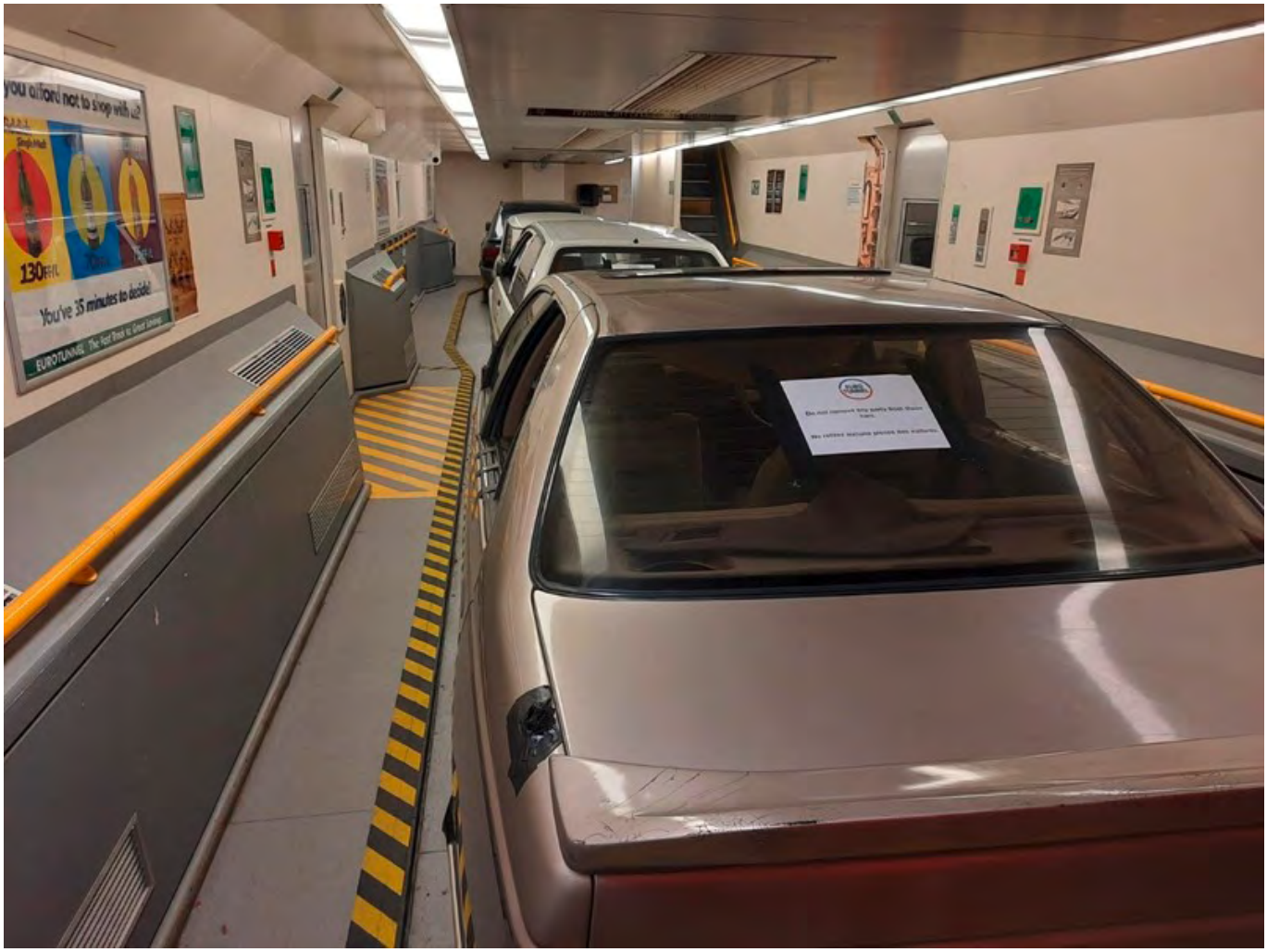
1.130 The IGC was previously the NSA for the whole of the Fixed Link, but since 1 January 2021, and following the UK's withdrawal from the EU, the French railway regulator Établissement Public de Sécurité Ferroviaire (EPSF) has taken on the role of NSA for the French half of the Tunnel.

1.131 Our inspectors are appointed, alongside their French counterparts, to lead and deliver the CTSA inspection plans. These aim to assure that Health and Safety Management Systems (HSMS) of Eurotunnel and railway undertakings are capable of managing the specific risks associated with Channel Tunnel operations. We also manage, monitor, and close out outstanding recommendations from the CTSA and NSA bi-national inspections and investigations.

1.132 This year the CTSA continued to work closely with Eurotunnel on multi-year projects which include:

- the modernisation of its passenger shuttle fleet
- reviewing their risk assessments for the carriage of lithium-ion batteries (both as freight and as components of electric vehicles)
- and proposals for the future transportation of liquified natural gas (LNG) powered trucks through the Tunnel.

1.133 The CTSA reviews relevant safety documentation to ensure that risks are identified, assessed, and appropriately mitigated. Given the unique Channel Tunnel operating environment, this includes scrutiny around the provision of effective emergency fire and rescue response arrangements and enhanced on-board train crew capability to deal with safety issues.



1.134 Two significant incidents occurred in August 2022 on French regulated infrastructure. Both were investigated by Eurotunnel and continue to be scrutinised by the CTSA, due to potential of the risks materialising on the UK infrastructure. These consisted of:

- A derailment of a Eurotunnel freight wagon on the main French terminal track whilst it was being moved to a workshop, and
- A stoppage and full underground evacuation of 306 passengers from a Eurotunnel passenger shuttle following technical problems.

1.135 We continued to work closely with French Transport ministry colleagues in developing the remaining technical appendices that support the Cooperation Agreement between ourselves, EPSF and the IGC. The Cooperation Agreement, which was signed by all parties in 2021, helps facilitate the supervision of Channel Tunnel operators by the NSAs following the UK's exit from the EU. The Agreement sets out the cooperation arrangements between the signatories in line with the relevant regulations. The Cooperation Agreement will be supported by a total of six technical appendices. Between April 2022 and March 2023, work focussed on completing Appendix II (Vehicle and vehicle type authorisation) and Appendix III (Safety Certificate). These were signed by the three signatories in February 2023. We are collaborating with French colleagues to complete the remaining technical appendix, Appendix VI (Authorisation for the placing in service of fixed installations), during the coming year.

1.136 Between now and March 2024, CTSA inspectors will undertake planned inspections of asset management and emergency procedures at Eurotunnel and bi-national arrangements at UK and French sites of freight operators, DB Cargo, and GB Railfreight.

CASE STUDY 8: Investigation of Change Management at Eurotunnel

UK inspectors formally investigated revisions to an operating procedure for the management of train fires which was not risk assessed prior to implementation. The investigation highlighted weaknesses in the duty holder's (Eurotunnel) approach to the management of changes which are deemed "non-significant" under European legislation.

As a result of this investigation, improvement notices were served on Eurotunnel legal entities in August 2022 (legal entities are Channel Tunnel Group Limited and France Manche SA). These notices required Eurotunnel to put in place arrangements for the effective review of risk assessments where there is reason to suspect they may no longer be valid, and for effective control, monitoring, and review of proposed changes.

Eurotunnel commissioned external expertise to create a new management procedure for changes below the threshold of significance under European legislation, but which are still required to be suitably and sufficiently risk assessed under UK legislation. Eurotunnel complied with the improvement notices in December 2022, ahead of the statutory deadline.

CASE STUDY 9: Change Management Inspection of Eurostar International

This year a UK led CTSA inspection was undertaken of Eurostar International Limited (Eurostar). The scope of the inspection concentrated on the change management process related to the long-term storage and reintroduction of the Eurostar E300 fleet.

Eurostar was severely impacted by the covid pandemic but had the unique challenge of international passenger demand being significantly reduced. At the height of the pandemic, Eurostar was limiting its service to a single train to Paris and Brussels each day. This led to Eurostar making the strategic decision to place its E300 fleet into long term storage until service demand increased.

The storage of the E300 fleet and its subsequent reintroduction presented several challenges for Eurostar which included, (but was not limited to):

- Maintaining staff competence;
- Engaging staff and managing welfare; and
- Managing the risks of returning the fleet to service.

UK CTSA inspectors reviewed the change management arrangements through interviews, site visits and document reviews. The report concluded that there was "predictable" evidence found for the RM3 criteria of:

- RCS 3: Change management;
- PI1: Risk assessment and management; and
- OP2: Competence Management System.

Heritage and Minor Railways

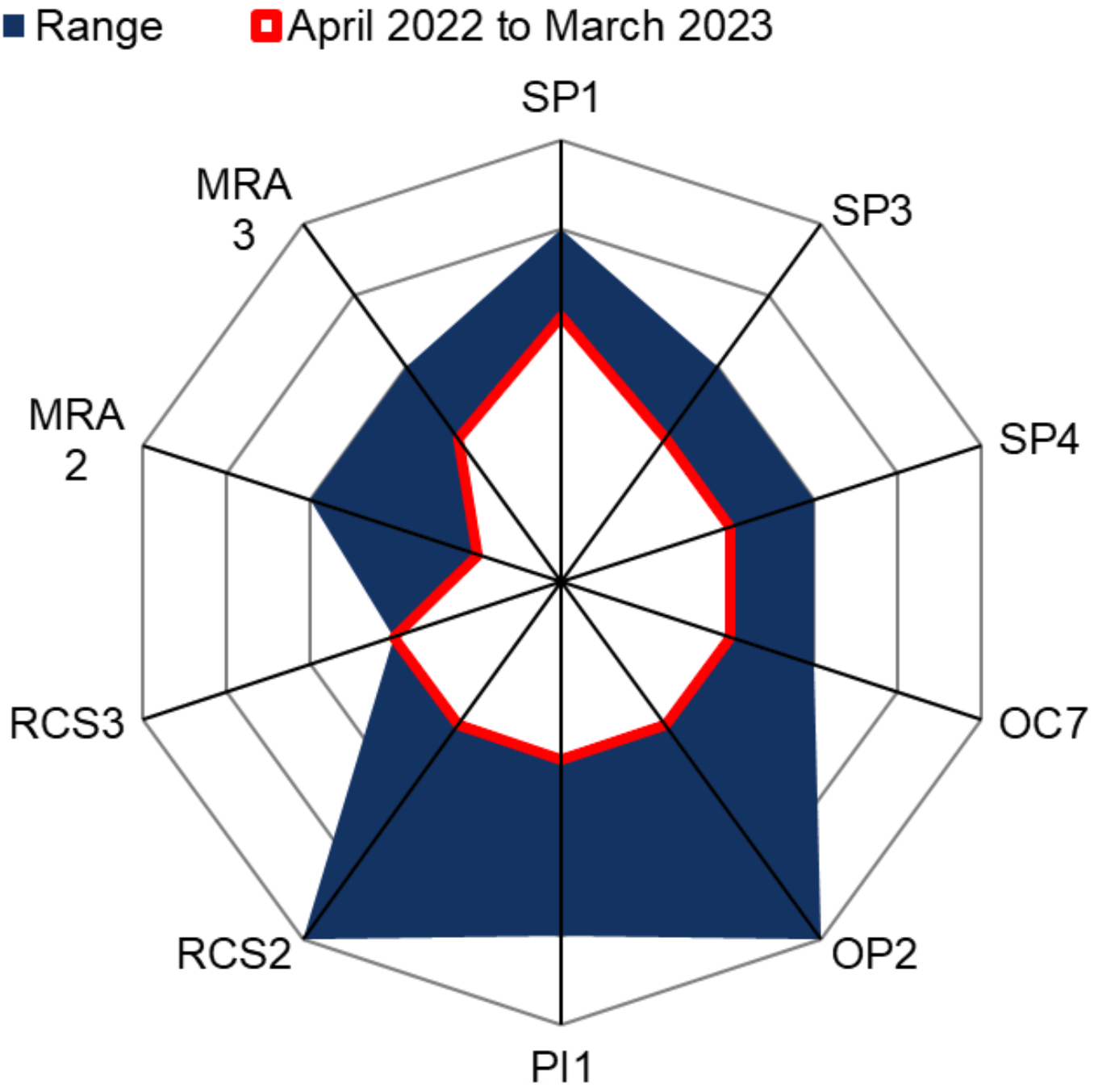
1.137 A strong but proportionate HSMS should form the foundation of how the railway organisation manages risks. As stated in last year's report, our planned work this year was defined by how the HSMS helped organisations systematically manage the safety risks associated with running their railway. This included specific reference to asset management and how railway organisations are responding to the challenges of ensuring aging rolling stock and infrastructure are safe.

1.138 There were no heritage railway caused workforce or passenger fatalities this year. Although the number of RIDDOR reported non-worker injuries remains low, there was one passenger that lost their footing and sustained a serious injury while alighting from a train at a platform. They subsequently died in hospital, but from unrelated causes.

1.139 The number of RIDDOR reported dangerous occurrences remained at similar levels to the previous year. Although none resulted in serious consequences, it was not uncommon for the incidents to result in damaged rolling stock or infrastructure. SPADs and derailments continue to account for around half of all reported dangerous occurrences, highlighting the continued need for the focus on competence in managing operations, rolling stock and infrastructure.

1.140 Using the Risk Management Maturity Model (RM3) and evidence from our inspection and investigation activities, we assessed the sector's safety management maturity as predominantly 'managed'. Figure 1.6 shows our RM3 assessment based on criteria from RM3 Topic Set 1 for Heritage Railways, indicating the maximum and minimum levels determined for each key heritage criterion. Our assessment found both stronger areas, such as Leadership at 'standardised', and areas that require further effort. A consistent weakness is the approach to audit which remains at 'ad hoc'. However, the sector also demonstrated an ability to improve maturity; our assessment of competence management has improved from 'ad hoc' to 'managed'.

Figure 1.6 A composite RM3 assessment of the heritage railway sector's risk management maturity in 2022 to 2023



Code	Description	April 2022 to March 2023 score	Minimum score	Maximum score
SP1	Leadership	3	2	4
SP3	Board governance	2	1	3
SP4	Written safety management system	2	1	3
OC7	Record keeping	2	1	3
OP2	Competence management system	2	1	5
PI1	Risk assessment and management	2	1	4
RCS2	Asset management (including safe design of plant)	2	1	5
RCS3	Change management (process, engineering, professional)	2	2	2
MRA2	Audit	1	1	3
MRA3	Incident investigation and management	2	2	3

Source: ORR

1.141 Through our proactive inspection programme, we have continued to see examples of weak HSMS safety management systems at some heritage and minor railways. Such weaknesses can result in the organisation not controlling safety risk, often associated with the organisation's leadership being unaware that this has occurred. This can result in incidents and injury to workers, passengers, and the public. Weaker HSMS has been an ongoing theme in previous annual reports, and in 2021, as discussed in case study 10 below, we produced a specific version of RM3 for the heritage sector. Building on this initiative, and to support the sector's development, in the coming year we will be publishing specific guidance on HSMS for the heritage sector. With assistance from the Heritage Railway Association (HRA), we will support this with further engagement later in the year.

1.142 We continue to engage with the sector to strive for a more mature, consistent, and standardised approach to safety leadership and self-support. We are supportive of HRA's efforts to establish a dedicated body to draft and publish guidance and standards for the heritage sector.

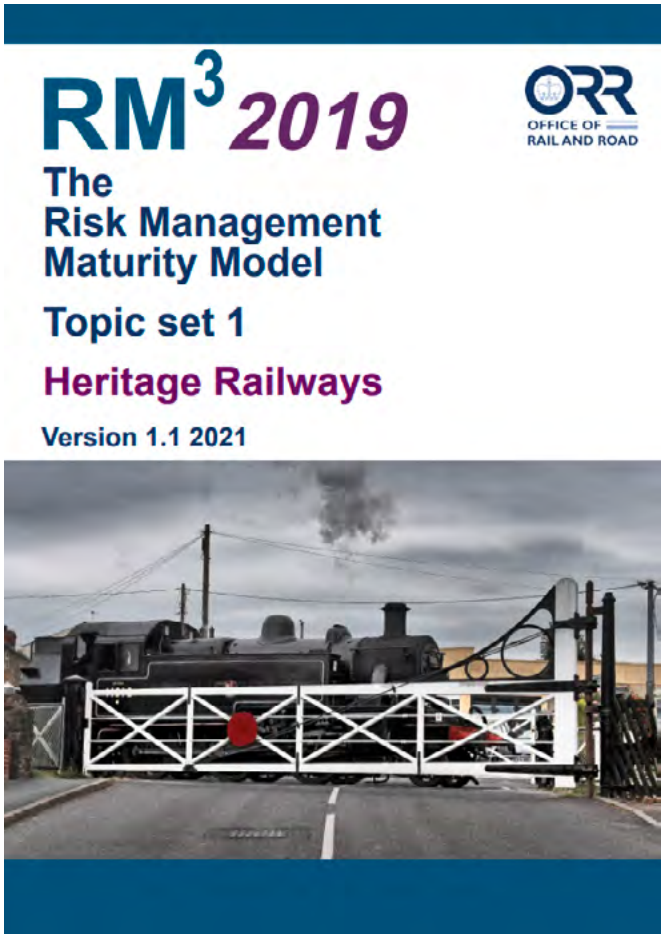
1.143 Work at height is a particular concern at present within the sector. There have been several incidents at standard gauge railways this year, resulting in serious injuries to staff and volunteers. These incidents have occurred in a variety of different circumstances. We served a prohibition notice with regards to unacceptable work at height arrangements at one heritage railway and are planning to undertake a programme of specific

inspections at railways on this topic by the end of March 2024.

1.144 We continue to see a high number of runaway incidents at heritage and minor railways. We served an improvement notice at one heritage railway due to insufficient processes in place to prevent vehicle runaway. Human error has been a factor in several of these incidents, so railways are encouraged to ensure appropriate management of competence amongst safety critical roles and that clear operational procedures are in place.

1.145 This year, we undertook a programme of targeted inspections on the management of civil engineering assets at heritage railways. At almost all of the railways visited, we identified weaknesses in how the railway defined its processes for managing this risk within its HSMS. We also found many railways had weaknesses in record keeping. We discuss our inspection findings in more detail within the case study below.

CASE STUDY 10: RM3 Workshops for Heritage and Minor Railways



We recognise that there is scope for the heritage railway sector to improve its maturity of safety management. In 2021, we published a specific topic set for the heritage railway sector which focused on RM3 criteria of most relevance to heritage railways. We believe that RM3 can be a valuable tool for heritage railways to determine where the strengths and weaknesses of their HSMS lie and to identify how they can improve.

Between April 2022 and March 2023, we delivered five RM3 workshops specifically for heritage and minor railways in collaboration with the HRA. These workshops were spread across different regions and predominantly held at heritage railways. The objective was to increase knowledge and understanding of applying RM3 within the sector and further encourage use of the model. Each workshop featured an overview of RM3, a specific section on the importance of good governance, and an opportunity to apply the model in a group exercise. The workshops also included a presentation from a heritage railway that had applied RM3, explaining the challenges they had faced and the benefits they had seen as a result. Feedback from the events has been very positive and over the five events around 170 delegates from over 90 organisations attended the workshops. We will continue to use RM3 as part of our toolkit in encouraging heritage railway organisations to take a systematic approach to understanding and managing their key risks.

CASE STUDY 11: Inspections of Civil Engineering Asset Management

Heritage railways have a wide range of historic civil engineering assets including viaducts, bridges, culverts, retaining walls, tunnels, and earthworks. Throughout the year, we undertook specific inspections to assess how the sector manages the risk associated with these assets.

Our inspections focused on a sample of railways across Great Britain, including both standard and narrow-gauge operators. Generally, we found the condition of assets to be satisfactory, however the asset management processes for ensuring this were not always in place. In many cases there was limited detail within the railway's HSMS on the management of civil engineering assets. We also found record keeping to be weak in several cases, particularly when prioritising and recording identified actions.

We found there is often a short-term approach to the management of assets. This not only presents a risk to safety but also a financial risk to railways as it can result in the railway having to make a significant investment once the asset fails.

We found that there is often a reliance on one or two individuals within the railway who retain long-term knowledge of the assets. Not all railways have sufficient internal competence and as a result may seek external support. We found that some railways are not informed well enough to interpret all of the external advice provided, and sometimes the roles and responsibilities between the railway and its external support are not clearly understood.

During the inspection some items of good practice were observed. These included:

- Development of a five-year plan for asset management demonstrating a longer-term approach than most railways sampled.
- Adopting a proactive approach to extreme weather, with high-risk locations inspected during and after extreme weather events.
- Making full use of an electronic database to maintain records of assets and their conditions, and to record progress of actions.

Safety by design

1.146 This year our specific work on promoting health and safety thinking at the design stage of projects has focused on two areas: work with major projects, and with new innovative proposals under the Restoring Your Railways programme.

1.147 We have continued our liaison and monitoring of both HS2 and the TransPennine Upgrade. These two projects represent the bulk of significant new design and build in the UK system and will create new infrastructure that will be in place for the long term.

1.148 We have worked with the promoters of schemes in the DfT sponsored Restoring Your Railways programme to help with their understanding of how to interpret risk assessment and technical good practice in the

outline development of proposals. We have worked collaboratively with the DfT and Network Rail on this and continue to support the Better Value Rail website material. Our involvement in the programme continues to help us engage with these third-party proposals earlier than might normally happen, ensuring that we have early opportunity to promote good practice.

1.149 We are supportive of Network Rail's work on Health and Safety by Design. This year they have updated their Health and Safety by Design principles to version 2.1 and continued to embed their updated company standards that promote the early stage optioneering and life-cycle considerations in the design process. Network Rail also continue to engage with their supply chain to spread and share learning and good practice.

1.150 Our overall aim remains to ensure that projects, of whatever scale or on any type of railway or tramway, make practical assessments at an early stage of their designs of how to build in good health and safety principles. This affects all stages of a project lifecycle from construction, operation, maintenance, and eventual demolition or disposal. By embedding good practice at an early stage, the industry can begin to reduce long term underlying safety and health risks. Early action is also more cost effective than making changes at a late stage or needing ongoing operational control of risk.

1.151 To ensure our strategic focus on health and safety thinking at the design stage remains relevant,

we will be refreshing two of our Strategic Risk Chapters in the coming year: 'Health and Safety by Design' and 'Management of Change'.

Case study 12: supporting organisations to develop options

One of the unsuccessful bidders in the DfT Restoring Your Railways programme approached us for advice on some of the technical challenges that their route presented, including two potential level crossings on significant roads. We helped the project by explaining the duties around exploration of options and alternatives and how comparative cost benefit analysis needs to be used to help support decisions on option selection. We also helped the project to focus on spending time and effort on key issues that were potential blockers to progress rather than trying to develop the whole scheme at once.

This approach helps projects engage with the right partners and stakeholders to develop realistic potential solutions, building an understanding of how schemes could support wider regional objectives and help those other stakeholders build the scheme into their plans.

2. Our health and safety policy, strategy and statutory work

2.1 In the year to March 2023, we continued to look for opportunities to develop, improve and promote the regulatory framework for railway health and safety and to improve our supporting processes. We also delivered a range of statutory work through health and safety permissions and approvals.

Improving legislation, guidance and processes for train driving licences

2.2 During the year, the Train Driving Licences and Certificates Regulations 2010 (TDLCR) were subject to a Post Implementation Review (PIR) which we carried out on behalf of DfT. The PIR was an opportunity to review whether the Regulations continue to meet their original objectives and assess their impact on businesses. The evidence gathered and analysed demonstrated that there was a case for change, and we recommended that further work should take place with stakeholders to help develop more detailed proposals for reform. DfT accepted these findings and recommendations, and the PIR report was published in May 2023. It highlighted aspects of the train driving licensing regime where there may be potential to address some of the more prescriptive legislative requirements which impede clarity

or add burdens without benefit. Areas for potential reform include train driver medical, training and examination requirements. We look forward to working with DfT and stakeholders on this legislative reform in the coming year.

2.3 We revised and improved our guidance for train operators on our policy and process for the suspension or withdrawal of a train driving licence. Published in April 2023, this reflected lessons learned from suspension and withdrawal casework over a period of time and updated legal advice. It is supported by a new internal quality management system process which we will follow for all casework.

Figure 2.1 Example of a train driving licence

Source: ORR

2.4 We had hoped to launch our new, improved web-based portal to support the efficient processing of new train driving licences and renewals in summer 2022 but the project faced several setbacks meaning this was not possible. We continue to work to deliver this important upgrade as soon as possible. In the meantime, we continued to process licences using our current system:

- We issued 1263 new train driving licences within our statutory deadline. This was a decrease of 172 compared to 1434 in the previous year.
- We also processed 72 train driving licence renewals. This was the first year of renewals coming around. We now expect numbers to increase each year and have held information meetings with train operators to help manage this.
- We recognised a further six doctors and six psychologists and added them to our registers as required under TDLCR.

Other policy developments and improvements

2.5 Significant time and resource were directed to analysing the Retained EU Law (Revocation and Reform) Bill as it progressed through the parliamentary stages. We worked hard to clarify any potential impacts on rail health and safety legislation to help determine next steps, liaising closely with DfT and Health and Safety Executive (HSE) colleagues. As noted in the Chief Inspector's Review, our key priority remains to ensure there are no

unintended consequences to health and safety legislation whilst utilising the genuine opportunities afforded by the Bill to work with stakeholders to reform legislation where helpful, such as train driving licences as mentioned above.

2.6 We also conducted a PIR of The Health and Safety (Enforcing Authority for Railways and Other Guided Transport Systems) Regulations 2006 on behalf of DfT. This legislation clarifies the respective responsibilities of ourselves and HSE for the enforcement of health and safety law in relation to railways. This PIR concluded, on the basis of the evidence provided, that the legislation continued to meet its objectives and work effectively. The report was published in May 2023.

2.7 We also made several improvements to our guidance on the Railways and Other Guided Transport Systems (Safety) Regulations 2006. Published in December 2022 these changes updated some of the wording to better reflect changes following EU Exit, consolidated information that was contained in other documents so that it was all in one place, and where possible implemented some of the recommendations from the last ROGS PIR.

2.8 Following the report by RAIB into a freight train derailment at Llangennech, we have worked with DfT to review the certification arrangements for ECMs for freight wagons operating in Great Britain. As a result, from 30 June 2023, EU certification for entities in charge

of maintenance for domestic freight wagons will no longer be recognised in Great Britain.

Working with other regulators, safety authorities, and industry bodies to share best practice and aid continuous improvement

2.9 In September 2022 we agreed and signed a new tripartite Memorandum of Understanding (MOU) relating to railway safety in Northern Ireland. This facilitates effective working between three bodies: ourselves, the Department for Infrastructure (Northern Ireland) and the Health and Safety Executive (HSE) Northern Ireland (NI), and streamlines several different agreements into one, simpler and more principle-based approach.

2.10 We also worked with EPSF (the French national safety regulator) to develop and implement practical guidance on how the two regulators will work together and share information in relation to train drivers that hold both UK and EU train driving licences.

2.11 We chaired three meetings of the Railway Industry Health and Safety Committee, which brings together representatives of employers, employees, passengers, and government bodies to discuss and contribute to health and safety matters.

2.12 We maintained a regular dialogue with HSE colleagues as co-regulators and in May 2022 published a revised HSE and ORR Memorandum of Understanding between the two organisations which was

less prescriptive and more strategic than the previous version, and more reflective of the collaborative, agile, approach to working between the two regulators. In May 2023 we published a new joint guidance document on interpretation of the Enforcement Authority Regulations by ORR and HSE to clarify our respective enforcing authority responsibilities. This will assist our inspectors in making decisions about who should act in situations in which some interpretation of the legislation is required.

2.13 We also continue to work with industry colleagues to further enhance the use of Risk Management Maturity Model (RM3) as part of our ORR RM3 Strategy. We are seeing an increasing use of RM3 as a common language spoken across the sector, ensuring better collaboration with, and amongst, duty holders as we seek to improve health and safety outcomes. We have now delivered five RM3 workshops for the heritage and minor railways sector. We have collaborated with industry to develop individual topic toolkit spreadsheets which will assist assessors in determining an organisation's level of maturity against each of the 26 RM3 criteria for a specific risk area or topic, such as change management. Through our long-term RM3 strategy, we will look to improve this collaborative working, exploring the potential for industry to share assessments, both ours and their own, to support understanding of industry strengths and weaknesses, as well as learning from what has worked locally.

2.14 We continued to work with other railway safety authorities via the International Liaison Group of

Government Railway Inspectorates (ILGGRI), to which we provide the secretariat. ILGGRI continues to remain a valuable forum for exchanging knowledge and good practice on key railway safety topics and for us to gain insight into legislative and standards developments in the EU. Towards the end of the year, we started preparations to re-join some National Safety Authority (NSA) Network related meetings following agreement from the European Union Agency for Railways (ERA) that we could have observer status.

2.15 We were an active participant in the UK Health and Safety Regulators' Network (a group of senior health, safety and environmental regulators that share information and best practice) and chair its innovation sub-group set up to support the government's growth and net zero strategic objectives.

2.16 We have been actively engaged in cross government work to develop an appropriate regulatory framework for the future regulation of connected and automated mobility solutions for operation on segregated routes which are not public roads.

2.17 We have reviewed the functions which ORR carries out on behalf of the Secretary of State for Transport, including issuing level crossing orders, and updated our Agency Agreement with DfT to ensure it remains accurate and relevant. The updated version was published in February 2023.

Delivering a range of statutory work

2.18 During this year we:

- Delivered 11 Level Crossing Orders, four Variation Orders, four Directions, and one Authorisation for Traffic Signs. This was lower than the previous year's figures, reflecting delays in level crossing works and the fact that we do not yet have responsibility for authorising private crossing signs.
- Issued 35 mainline safety certificates and safety authorisations and eight non-mainline safety certificates and safety authorisations.
- Processed one application to exempt a non-mainline duty holder from the requirement to hold a safety certificate and safety authorisation whilst operations were being carried out above 25mph.
- Received a high number of applications for further exemptions from regulations 4 and 5 of the Railway Safety Regulations 1999, ahead of their expiry on 31 March 2023. We issued six exemptions from regulation 4 and four exemptions from regulation 5 to enable, respectively, Mark 1 rolling stock and rolling stock fitted with hinged doors to continue operating from 1 April 2023.
- We reported to RAIB on a total of 98 recommendations. Using our simplified status definitions (implemented 1 January 2023), 50 were reported as closed, one superseded, 42 open, three insufficient response and two for other public bodies.

3. Our enforcement activities

3.1 We secure improvements in health and safety for passengers, the workforce and public through evidence-based advice and encouragement to duty holders to improve and adapt their risk management.

3.2 On some occasions however, we use our formal powers under the Health and Safety at Work etc Act 1974 (HSWA) to ensure compliance with the law or to deal with immediate risk. We use enforcement notices to stop an activity involving serious risk, or to rectify serious gaps in duty holders' risk control. If required, we will hold duty holders to account through prosecution in the criminal courts. Our Enforcement Policy Statement sets out how we ensure rigour and consistency in our enforcement decisions by using our Enforcement Management Model.

3.3 During the year we issued four prohibition notices and 12 improvement notices and, where appropriate, prosecuted duty holders in the courts to ensure compliance with the law. As prevention is always better than addressing issues after an incident has occurred, the prohibition notices stopped activities that posed a risk of serious personal injury and the improvement notices identified serious breaches of the law that required changes to be made.

3.4 The first court hearing for our prosecution relating to the 2016 Croydon tram crash took place in June when pleas were entered. TfL, First Group-owned Tram Operations Limited (TOL) and driver Alfred Dorris

were accused of health and safety failings after seven passengers died and many injured, with 19 people seriously injured. On 19 June 2023 the driver was found not guilty by a jury at the Old Bailey.

3.5 We successfully concluded several prosecutions:

- In May 2022, Network Rail were fined £1.4m for breaching Section 2(1) of HSWA following an incident in which a worker was crushed between a 25-tonne ballast distributor conveyor and people carrier whilst undertaking track maintenance. Network Rail was found guilty of failing to provide the necessary information, instruction, training and supervision to ensure the health and safety of its employees.
- Also in May 2022, Volker Rail Limited was convicted of an offence under section 33(1)(c) of HSWA for contravening Regulation 31 of the Construction (Design and Management) Regulations 2007 and fined £550,000. The court found the company failed to take reasonable steps to prevent danger to workers undertaking excavation work, after a trench wall collapsed outside Stafford Station, burying and seriously injuring a worker.
- In January 2023 train driver Mr Mark Andrew Hubble was sentenced to eight months' imprisonment, suspended for 18 months, for breaching health and safety legislation following an incident in which he failed to control the speed of the locomotive he was driving, while using a mobile phone. The locomotive, owned and operated by DB Cargo (UK) Limited,

ran through buffer stops, causing it to derail onto the adjacent running line, where it was struck by a passing Cross Country passenger train. No-one was injured, but there was extensive damage to the locomotive and the passenger train. Mr Hubble was also ordered to undertake 120 hours of unpaid work and pay £600 compensation to the passenger train driver.

- In February 2023, Siemens PLC was fined £1.4m for breaching Section 3(1) of HSWA. This followed an incident in 2017 in which a 650kg traction motor fell on a self-employed contractor working at Siemens Old Oak Common depot, causing fatal crush injuries. ORR's investigation revealed defects in task planning, including the failure to carry out an appropriate task-specific risk assessment and a lack of clear allocation of supervision responsibility.

Annex A: RM3 Overview of Assessment Levels

In the main body of the report, we provide an overview of our main findings across each of the railway sectors that we regulate, setting out key risk areas and the effectiveness of their management. We set out the evidence supporting our conclusions, including (where appropriate) the results of our Risk Management Maturity Model (RM3) assessments.

RM3 is one of our key health and safety assessment tools. It measures an organisation's ability to manage risk maturely and achieve excellence in risk control. It looks at the areas of policy, monitoring, audit and review, planning and implementing, securing co-operation and confidence and organising for control and communication. It uses a five-level scale to assess performance and identify areas for improvement: This Annex provides an overview of the RM3 five-level scale.

RM3 five level scale

Level 1 'ad-hoc': processes are typically undocumented and in a state of dynamic change, tending to be driven in an ad-hoc, uncontrolled and reactive manner by users or events. This provides a chaotic or unstable environment for the processes.

Level 2 'managed': some processes are repeatable, possibly with consistent results. Process discipline is unlikely to be rigorous but where it exists it may help to

ensure that existing processes are maintained during times of stress.

Level 3 'standardised': there are sets of defined and documented standard processes established and subject to some degree of improvement over time. These standard processes are in place (i.e., they are 'as-is' processes which define the current state of the business process in an organisation) and are used to establish consistency of process performance across the organisation.

Level 4 'predictable': using process metrics, management can effectively control the 'as-is' processes. Management can identify ways to adjust and adapt processes to projects without measurable losses of quality or deviations from specifications. Process capability is established from this level.

Level 5 'excellence': there is a focus on continual improvement of process performance through both innovative and incremental technological changes/ improvements.

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