Annual Report of Health and Safety Performance on Britain's Railways 2019/20

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Section 1 – Chief Inspector's Review

The last few months have been the most challenging period in recent years for the country as a whole, the railways and the Inspectorate. Sadly, during the coronavirus (COVID-19) pandemic, many people in the UK have lost their lives before their time. Our thoughts are with so many bereaved families and friends.

The Inspectorate is now approaching its 180th birthday. Looking back, it has lived through previous great historical challenges and is still supporting the railway as it continues to provide a transport service for those who cannot work from home and keeping goods moving in difficult times. I want to acknowledge the great efforts of the railway through the present crisis along with the efforts of my own team as we continue to support and regulate the industry.

Our railway remains one of the safest in Europe. Efficient improvements in health and safety continue to be made to the operation of Britain's railways including metros, tram and heritage operations. This bears testimony to the great efforts made across the industry over the past decade.

In the past 12 months, we have seen important progress both in level crossing safety, with a repeat of last year's lowest-ever number of level crossing fatalities (two) and the publication of Network Rail's long-term strategy for efficient improvements to level crossings. Network Rail also continues to improve electrical and track asset safety. Significant progress has been made by the tram sector in completing the Rail Accident Investigation Branch (RAIB) recommendations resulting from the Sandilands investigation. The Light Rail Safety and Standards Board (LRSSB) is now firmly established and we welcome the funding that the Department for Transport (DfT) has provided to LRSSB recently. A summary of progress is contained in the Tramways Section of this report. Notably, we also saw the lowest number of trespass fatalities in the last ten years as well as a slight reduction in the number of reported trespass incidents in the second half of 2019/20. However, the overall trend has been slowly increasing over time so this remains among the areas where progress still needs to be made.

I highlighted track worker safety prominently in my review last year. This reporting year we have seen the tragic loss of life to four railway workers in three separate incidents at Margam, Tyseley and Waterloo. This number does not include a subsequent further fatality at Roade in April 2020, which again further emphasised the high-risk environment in which many railway staff are required to work. In July 2019, we issued two key improvement notices on Network Rail which were targeted around improved access, planning and improving the use of technology. These are together designed to eliminate planned work taking place on railway lines that are open to traffic where the only protection is a lookout. Network Rail must comply with the Notices by July 2022. Network Rail has responded by putting together a significant task force, involving both the centre and the regions. Improvements to the deployment of new technology to protect workers has already started to be implemented.

Looking back to my 2018/19 report, I commented that "London Underground's safety performance remains strong, despite the company going through significant changes as part of the Transport for London (TfL) Transformation programme" and I committed my inspectors to monitor outcomes closely. We have done this and safety performance remains good, albeit with a number of significant incidents that required our follow up. I note with regret that one of these incidents resulted in the tragic fatality to a contractor's employee while cleaning a moving walkway at Waterloo station. This is the first work related fatality within the London Underground Limited (LUL) workforce during my tenure as Chief Inspector. I am committed to seeing LUL embed its changes and use these to drive forward a steady improvement in safety management capability and risk control. My inspectors will continue to work closely with LUL in the next two years of our inspection programme to ensure this is achieved.

Earthworks, despite a lot of focus over recent years, also remain a real challenge. Influenced by heavy rainfall, we have seen a significant increase in the risk over the last 12 months. This is the main reason why the overall risk on the mainline railway has increased over the last year.

The RSSB Precursor Indicator Model (PIM) for Train Accident Risk to end March 2020
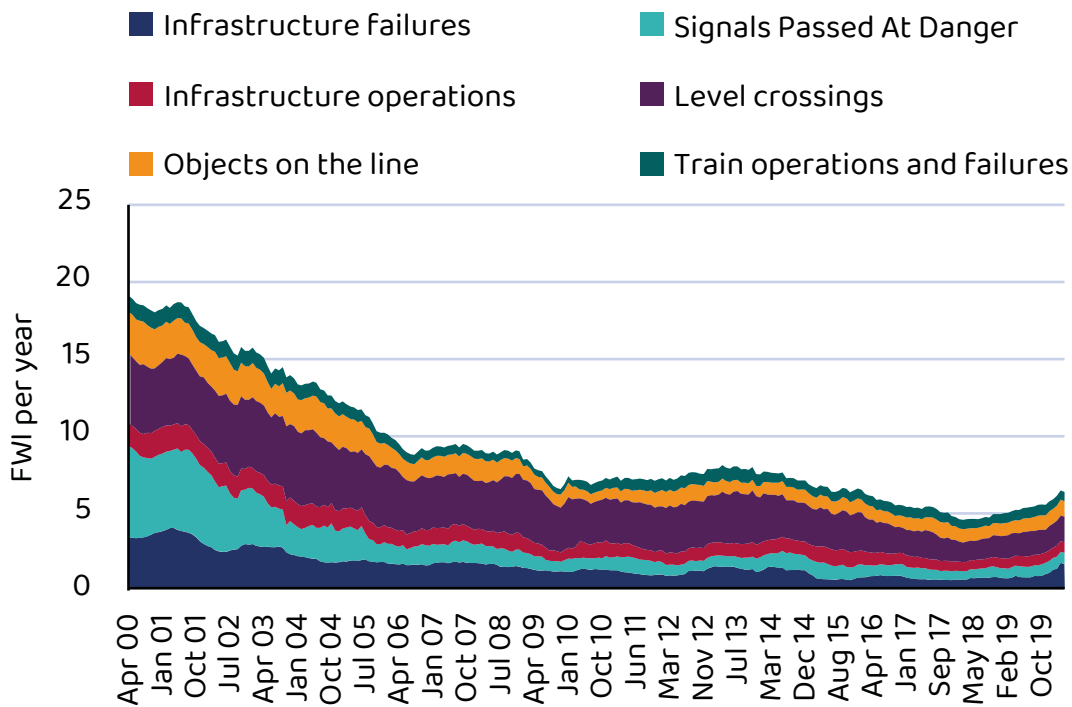
Source: RSSB

In recent years, my annual health and safety report has focused on three main challenges for the industry, which I believe remain relevant today. In this year's report I have reintroduced a fourth - managing change:

Pressure on the system: Before the coronavirus pandemic, we had seen increasing train services and congestion on the network, which has been linked to the increased number of Signals Passed at Danger (SPADS). Bad weather events, crowding and changes in public and passenger behaviour, the problematic introduction of new technology and new working practices (leading in some cases to industrial disputes) added to the pressure. This led to resources being stretched. Although some of this may change in the aftermath of the present pandemic, some will not and the recovery itself is putting a different kind of pressure on the system. Therefore, we need clearly to address the following three challenges, which I believe over the next year will be key.

Supporting people: It is important that the lessons of our landmark prosecution of Renown Consultants Ltd. for the tragic A1 Newark fatalities are learnt across the whole sector; particularly in the supply chains so that the management of fatigue is improved in supporting people. I feel that communication between the top and the bottom of organisations can still be improved. This, along with continuing to improve health management and the management of stress, will improve staff engagement. Our Closing the Gap Report on progress in the sector on health management still shows improvements can be made. We also see from the evidence of our inspections that risk assessment involving health and safety representatives can be improved and more effectively implemented on the ground. It is vital to show that we truly care about our people, particularly those on the front line.

Technology: It is key that industry manages the effective introduction of new technology while taking human interaction into account. Passengers and workforce alike can benefit from the introduction of new technology. For example, in the case of passengers, improving safety at the platform train interface by the use of new technology enabling driver-controlled operation. In the case of the workforce, deploying technology that allows people to be taken away from harm is a key requirement of one of our track worker improvement notices. Technology does not have to be novel or complicated: body worn cameras have been shown by British Transport Police (BTP) to be effective in tackling staff assaults. However, it is vital to manage its introduction well and fully involve the workforce and employ the principles of health and safety by design. For example, over the past year ensuring the safe introduction of new rolling stock which will have real benefit for passengers has occupied a great deal of our time because operational software and hardware issues were missed, resulting in delays for the new fleets. As part of our response to this, we continue to work closely with the industry to learn the lessons from these delayed introductions and to reiterate our expectations regarding health and safety by design. We will continue in the coming year; and will use the opportunity to review how the regulatory framework is operated so we have earlier engagement in the early stages of both rolling stock and infrastructure projects. We have addressed head-on the accusation that safety might be increasing the costs of enhancement projects and have demonstrated that, if time and resources are given at the front end of projects like the proposed Beeching Line re-openings, both safety and efficiency can be improved.

Managing change: It is so important that the sector employs best practice in change management if we are going to meet all the pressures in the future, and to make sure the railway plays its full role in improving air quality and reducing carbon emissions. Having a strategic plan for delivering electrification and modernisation of train dispatch is crucial if they are to be rolled out efficiently, with all the safety and other benefits they bring. In recent years the management of change in the sector has been uneven and we all know it could be better. Issues like the December 2018 timetable change show deep assurance of the arrangements needs to be in place to effect the change required, along with quality risk assessments to ensure the plans are truly robust allowing time, for example, for the shake down of new rolling stock. Too often recently the plans have not been realistic, with too strong an optimism bias, showing inadequate risk assessment had taken place.

While I am pleased to see that the trend in SPAD risk reduced over the second half of 2019/20, we have also observed that the number of lower-risk SPADs has reached the highest for over 10 years so it is important that focus is maintained. The rising trend we saw over the past two years has been a concern and our inspectors will continue to focus attention on driver performance and driver management during their engagement with duty holders.

Management of the risk at the Platform Train Interface (PTI) remains a priority for us and I am pleased to see the proactive work being done by duty holders and by the RSSB, especially around new (longer) trains. However, we continue to see incidents and we have issued two improvement notices relating to PTI this year, so clearly there is room to improve. I particularly want to see greater collaboration between designers, manufacturers and operators in this area, to bring into service trains that have been designed to reduce risk to passengers to a minimum.

Mental health is of particular concern in the rail industry, where the rate of suicide in the workforce is 1.6 times higher than the UK average, and 60% of workers have experienced mental health issues. It is obviously very important to focus on our staff's mental wellbeing, and with many people having been isolated from the outside world – it is important to keep communicating so people don't feel lonely and to keep an active community going. By talking about it more we can reduce the taboo, change our culture and ensure that people know and accept that many of us have mental health issues. I am personally pleased to see that the sector has recognised the need to do more on mental health, an issue it has certainly recognised during the coronavirus pandemic. In the aftermath, it will be crucial this focus is not lost.'

There's no doubt that the coronavirus outbreak has led to many people becoming isolated, and it will take time to adjust but we are all in this together and can all play a role in supporting one another. In recent years the rail industry has made significant strides with its partners in preventing suicides on the railway. Despite an increase in suicides, we have also seen an increase in successful interventions, with rail employees, BTP and public intervening in more than 2,200 suicide attempts on the railway in 2018/19, an increase of 33 per cent since 2017/18. That's a sobering thought. It means those individuals have gone on to live their lives, and that staff and passengers have been spared the trauma of being involved in potentially tragic events.

Last year I helped to set up the Million Hour Challenge – a five-year project which is encouraging staff to donate their time, energy and skills to help the Samaritans in their vital work. Volunteering can benefit the mental health of all of us by encouraging us to talk with each other, and the wider community, about the issues involved.

Our hope is that as more and more colleagues get involved in volunteering this attitude will fade away and we will come to terms with the idea that mental health is as important as physical health.

I am pleased to see that the whole sector has reacted positively to the updated version of our Risk Management Maturity Model (RM3 2019) particularly the new approach to assessing and improving in the vital area of organisational culture.

We are continuing to work closely with Government to provide advice and support on how the regulatory framework should respond to proposed industry changes at the end of the EU exit transition period. As the industry engages with these issues whilst also emerging and recovering from the coronavirus pandemic, it seems inevitable that the next year will be a period of significant challenge and change.

Ian Prosser CBE
Director of Railway Safety, ORR
HM Chief Inspector of Railways

Section 2 – Health and safety across the railway sector: The regulator's view

Introduction

1   In this section we provide an overview of our main findings across key risk areas. We go on to set out the evidence supporting our conclusions about risk management effectiveness for each sector, including (where appropriate) the results of our Risk Management Maturity Model (RM3) assessments.

2   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:

- **level 1 'ad-hoc':** processes that 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 process. In particular, management can identify ways to adjust and adapt the process to particular projects without measurable losses of quality or deviations from specifications. Process capability is established from this level.

- **level 5 'excellence':** a focus on continual improvement of process performance through both innovative and incremental technological changes/improvements.

RM3 2019

On 1 April 2019 we published an updated version of our Risk Management Maturity Model known as RM3 2019. Our aim was to make the model more accessible to first-time users whilst stretching the existing, experienced users to continue toward excellence

The industry has engaged with RM3 2019 and in particular has welcomed the changed approach to assessing organisational culture, now embedded in all criteria.

Throughout 2019/20 we also held a number of user workshops throughout the sector and published additional tools, including an RM3 reporting spreadsheet to assist duty holders with adopting the updated model. We continue to engage with stakeholders on the management and implementation of RM3 via the RM3 Governance Board and to respond to a variety of queries and requests via the RM3 inbox.

We have made significant progress with engagement with the heritage sector. Sector-specific topic sets have been trialled during workshops and a formal consultation is being prepared ahead of finalising those sets.

The RM3 Governance Board is currently working on the creation of a wider training strategy to support duty holders and encourage consistency in application of the model.

How we assess harm and risk performance

3   The collection of good data from across Britain's railways is critical in order to:

- identify trends and quantify risk;

- set the correct risk control priorities;

- measure performance.

4   We use industry information about actual harm and modelled risk to measure health and safety performance on Britain's railways:

- **actual harm** caused to individuals, which is measured on the mainline using the fatalities and weighted injury index (FWI)[1].

- **modelled risk,** which uses historic mainline data to periodically quantify the frequency and potential average consequence from a particular set of circumstances that could lead to a safety incident. The Safety Risk Model (SRM) periodically takes a snapshot of all significant risks on the mainline and the monthly Precursor Indicator Model (PIM) tracks trends in key catastrophic precursor train accident risk.

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[1] The methodology for calculating FWI is explained on page 12

5   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:

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

- **content indicators,** such as asset management performance; and

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

6   When analysing harm over time, it is important to consider the annual trends of passenger numbers and freight moved. Overall, the number of passenger journeys on Britain's mainline railway network in 2019/20 decreased by 0.8% compared to the previous year. However, in the first three quarters of 2019/20 passenger journeys increased by between 2.4% and 3.4% compared to the same quarter in previous years suggesting that the overall reduction may be the result of the coronavirus pandemic. Freight moved has continued the declining trend that started in Q1 2014 to 16.6 billion net tonne kilometres, the lowest for 23 years.
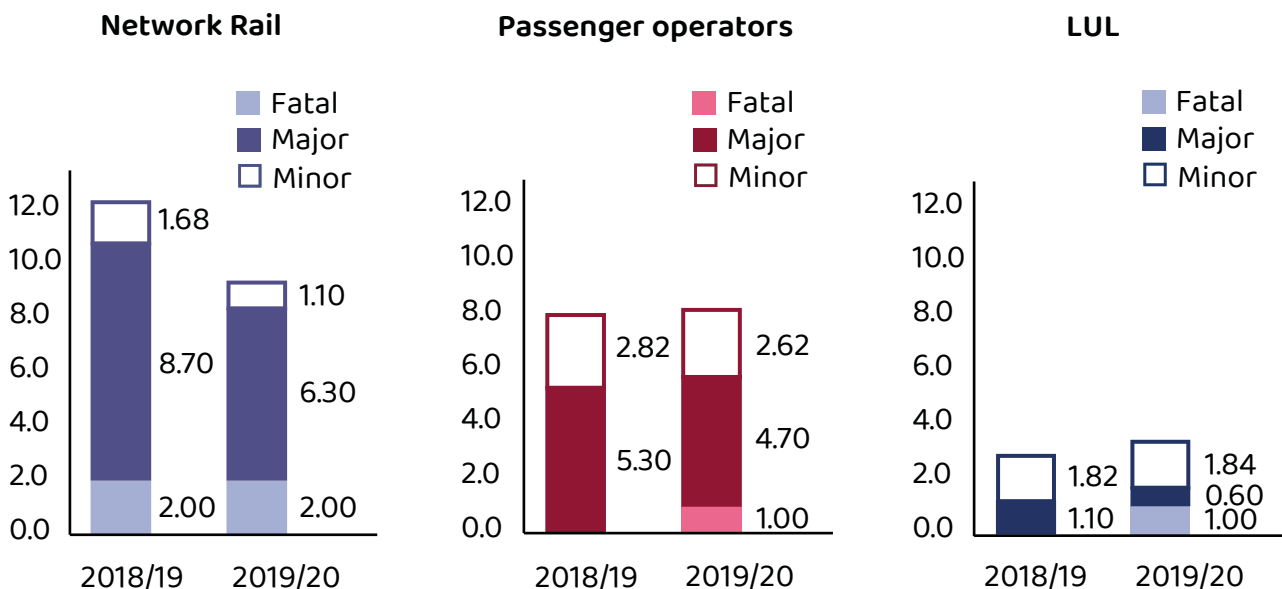
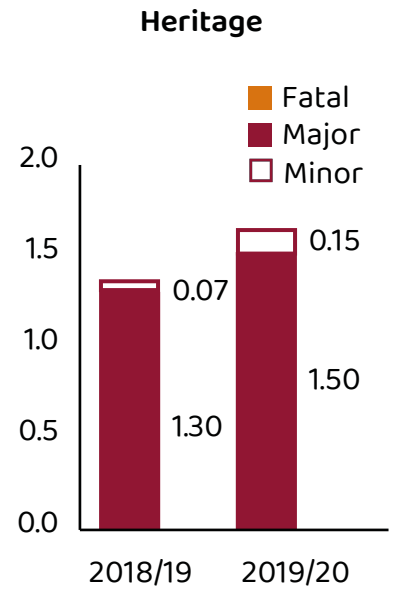**Franchised passenger journeys (millions)**
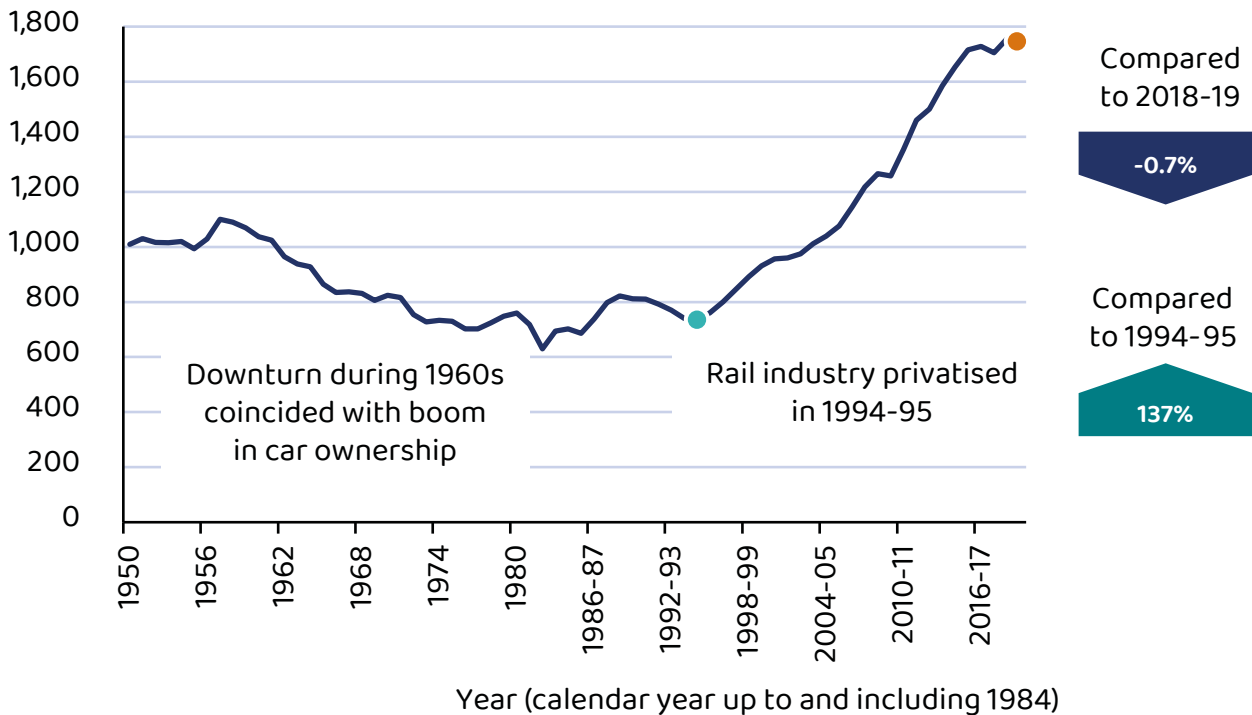
Source: ORR

Key safety performance data 2019/20

7   This report uses final and some provisional railway data from within ORR and from a range of other sources reported up to and including 2nd June 2020. Confirmed 2019/20 safety data will be issued in our key safety statistics release in September 2020. It will contain finalised numbers from both mainline and non-mainline sectors.

8   FWI and other figures may differ from any equivalent figures produced by RSSB because they are based on a provisional RIDDOR[2] data set and because of differences in the methodology for calculating FWI.

9   Our FWI figures are calculated on the following basis:

- 1 fatal = 1

- 1 specified worker injury or equivalent injury to member of public = 0.1

- 1 over 7-day injury to worker or equivalent injury to member of public = 0.01

10   This report includes FWI totals and trends for all the separate sectors we regulate. It is important to note that the figures have not been normalised to take account of the respective sizes of operations or the workforce in those sectors. A chart showing the number of track-kilometres operated by each sector (not including heritage railways) is provided to give an illustration of the relative sizes of these sectors.

Workforce harm (FWI) by sector

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[2] Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 https://www.hse.gov.uk/riddor/

Contractors

Legend: Fatal, Major, Minor

- 2018/19: 0.55 (Minor), 1.30 (Major)
- 2019/20: 0.49 (Minor), 0.90 (Major)

Freight operators

Legend: Fatal, Major, Minor

- 2018/19: 0.25 (Minor), 0.90 (Major)
- 2019/20: 0.28 (Minor), 0.60 (Major)

Heritage

Legend: Fatal, Major, Minor

- 2018/19: 0.07 (Minor), 1.30 (Major)
- 2019/20: 0.15 (Minor), 1.50 (Major)

Other transport systems

Legend: Fatal, Major, Minor

- 2018/19: 0.11 (Minor), 0.10 (Major)
- 2019/20: 0.08 (Minor), 0.10 (Major)

Tramways

Legend: Fatal, Major, Minor

- 2018/19: 0.16 (Minor), 0.20 (Major)
- 2019/20: 0.08 (Minor), 0.10 (Major)

Source: ORR/RSSB/LUL

Infrastructure Size by Route Kilometres

Legend:
- Mainline
- Other
- LUL
- Other transport systems
- Tramways
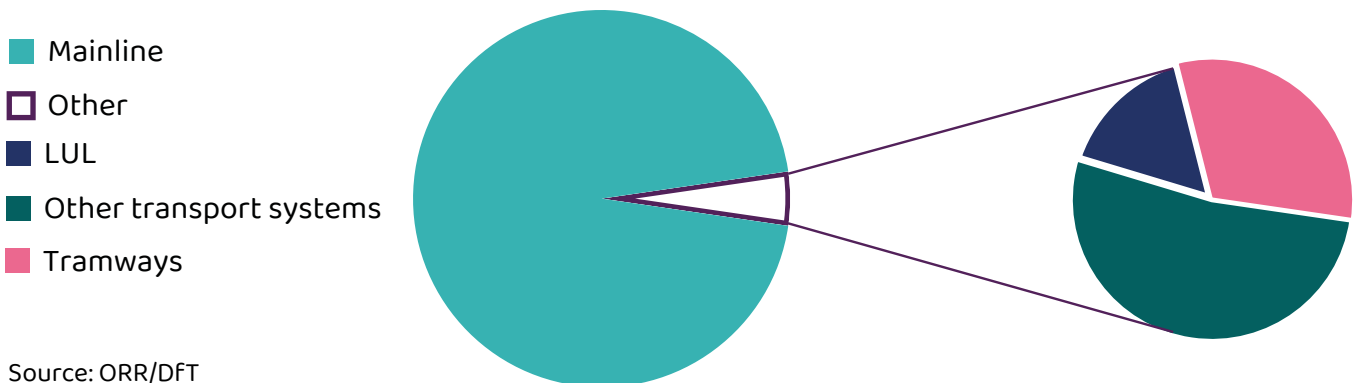
Source: ORR/DfT

Data and data quality in this report

11   This report is compiled using data obtained from various sources across the industry. The majority of data for mainline operations is held in the Safety Management Intelligence System (SMIS) administered by RSSB. More information about SMIS and data quality[3] can be found in the RSSB Safety Performance Reports https://www.rssb.co.uk/Standards-and-Safety/Tools--Resources/Safety-Reporting-and-Intelligence-Systems/The-Safety-Management-Intelligence-System/Current-Activity/SMIS-Data-Quality.

12   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. This report combines public injuries occurring on trains or in stations with those to passengers.

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[3] In 2018 the industry average data quality measure for accuracy was 98.1%. The score for accuracy by mainline operator is: 98.3% for Network Rail, 97.8% for freight operators and 97.4% for passenger train operating companies.

Mainline: Network Rail

A composite RM3 assessment of Network Rail risk management maturity in 2019/20
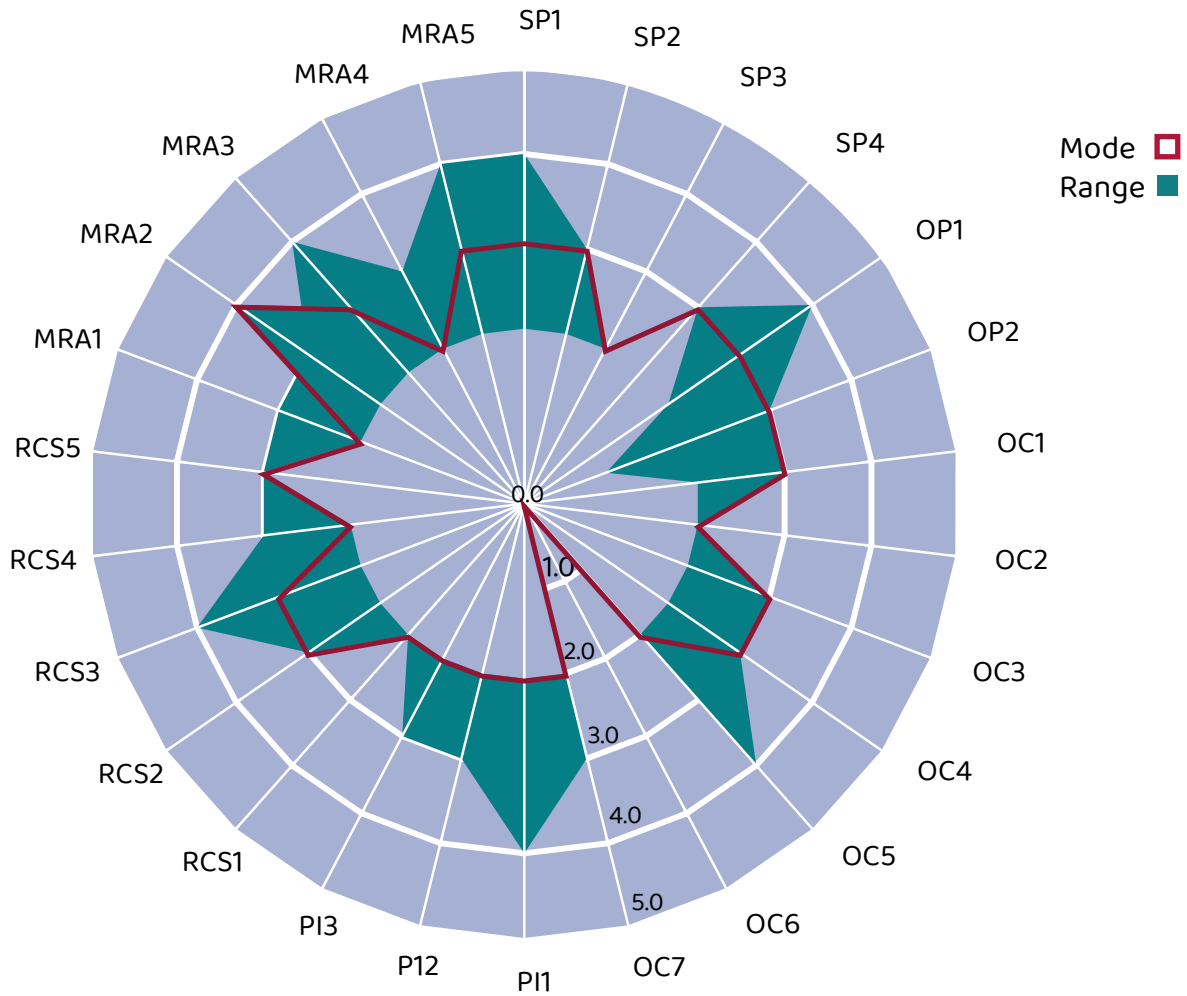
SP1 Leadership

SP2 Safety Policy

SP3 Governance

SP4 Written SMS

OP1 Worker Involvement

OP2 Competence Management

OC1 Allocation of responsibility

OC2 Management and supervisory accountability

OC3 Organisational Structure

OC4 Internal Communication

OC5 System Safety and Interface

OC6 Organisational Culture

OC7 Record Keeping and Document Control

PI1 Risk Management

PI2 Target Setting

PI3 Workload Planning

RCS1 Safe Systems of Work

RCS2 Asset Management

RCS3 Change Management

RCS4 Control of Contractors

RCS5 Emergency Planning

MRA1 Proactive Monitoring

MRA2 Audit

MRA3 Incident Investigation

MRA4 Management Review

MRA5 Corrective Action

Source: ORR

Overview: This was a year overshadowed by the deaths of two track workers who were struck by a train at Margam in July 2019. The outcomes of our work for 2019/20 show some of the underlying reasons why it is possible that Network Rail can experience such a tragic failure of its risk control framework. Although we found some examples of good practice on the network, we continue to find too many examples of inconsistency and variation in the application of rules, standards, processes and procedures. This culture of unreliable compliance compromises dependable safety management. The vulnerability of some asset to the challenges of climate change and more frequent extreme weather events was illustrated during 2019/20. The year saw substantial increases in flooding events, earthworks failures and trains striking trees on the line. The success of measures to increase resilience and improve risk control will be undermined if Network Rail continues to have imperfect means of assuring itself of the effectiveness of its Safety Management System (SMS). This is why the outcomes of our Assurance inspections are so important and will be followed up rigorously.

13   **Evidence:** For the second consecutive year our assessment evidence contained fewer 'extremes'. This indicates continued improving consistency in application of risk controls within Network Rail. While welcome, it is at the lower range of assessed maturity; the majority of our assessments lie in the 'managed' or 'standardised' levels. The focus now must be for the business to achieve a consistently higher level of maturity, capability, reliability and quality in the application of its SMS.

14   One striking feature of the evidence collected is that there is often a pronounced difference between the quality of the framework set by central functions and delivery of programmes by routes. In RM3 criterion SP1 'Leadership', for example, the evidence for all of the routes was assessed at 'standardised', whereas the vast majority of national/central evidence was at the higher 'predictable' level. This indicates a gap between the vision arising from strong leadership and its realisation on the ground. The best evidence of higher maturity at route level was generated in areas where there was a perceived focus from the business and a degree of oversight from the centre, such as Putting Passengers First (PPF, a major structural change that took place throughout 2019/20).

15   Attainment in areas not perceived to be such a priority was poorer – our inspections of level 1 Assurance, for example, generated almost universal assessments of 'managed' and the one 'ad hoc' rating. This is not consistent with a high performing organisation. We saw good evidence of Network Rail's ability to learn, respond and improve. At the start of the PPF programme, for instance, we were concerned by weaknesses in the level of understanding of risk that were demonstrated by the project team. The scope of the change being undertaken was not well articulated. In a positive sign of its growing maturity, Network Rail's own safety validation mechanisms identified many of these shortcomings. Senior managers reacted appropriately - by enhancing the project's resources and capability, especially in safety management. We saw improved hazard identification and better compliance with legal requirements for risk evaluation and assessment. We were sufficiently satisfied with the level of scrutiny and assurance taking place that we were able to reduce our inspection activity.

16   **Activities:** We undertook a range of network-wide inspections of aspects of Network Rail's SMS. We paid particular attention to Level 1 Assurance[4] arrangements. We carried out scrutiny of a number of aspects of management of Track, Lineside and Civils assets. We have regular central strategic liaison meetings covering a range of priority topics, where we raise concerns and pursue solutions. We carried out local inspections tailored to the characteristics and risk profile of individual routes and regions. We followed up the findings from last year's work, especially in the area of workforce safety. We oversaw Network Rail's response to a number of Rail Accident Investigation Branch (RAIB) recommendations and we carried out our own investigations of significant incidents. All of this activity generates evidence to inform our RM3 assessments of the effectiveness of Network Rail's application of its SMS. We made a number of promises in last year's annual report. Some are addressed in the following sections. The remainder are discussed here:

- Our Chief Inspector committed to our continuing to promote better industry processes for the introduction of new rolling stock fleets and our Mainline Operators Division continued to work on specific issues in the new fleets. In Network Rail Division we introduced a new role of 'Vehicle Systems Specialist'. This post has improved our regulatory scrutiny of the interface between infrastructure and vehicle. We have contributed to the development of a new forum in Network Rail to secure improved introduction of fleets.

- We pledged to maintain focus on operating irregularities and the risk from trains striking objects on the line. We have regular discussions with Operations specialists in Network Rail. Last year witnessed some modest improvements in performance indicators for signaller related irregularities. We have planned work to pursue sustained future improvements. There were significant weather-related increases in flooding events and trees on the line. We have required Network Rail to review the efficacy of its arrangements in these areas.

- We undertook to maintain focus on the industry's efforts to reduce the number of people who take their own life on the network. Regrettably, there were 14 more suicides in 2019/20 (283) than the previous year. However, we inspected Network Rail's leadership of cross-industry efforts in this area and are confident that without industry interventions this figure would have been even higher.

17   **Conclusions:** We hope that PPF will deliver a new regional structure that will promote more predictable, reliable achievement of safety leadership. Greater devolution has the potential to encourage the routes and regions to fully 'own' the risk control framework rather than see it is something imposed on them by safety and engineering professionals. The business as a whole needs to recognise that assurance is not functioning as well as it should. Until this is addressed and improved, Network Rail's maturity is unlikely to progress beyond the 'managed/standardised' level. As the business embraces greater use of RM3 itself it should become clear which aspects of its SMS require more attention. This will enable a more reliable risk control framework.

18   We have drawn up a targeted inspection programme for 2020/21 informed by trends in Key Performance Indicators (KPIs) for risk areas, our RM3 findings, investigation outcomes and our strategic priorities for the industry. During 2019/20 we strengthened our expertise in human factors and ergonomics. We look forward to reporting on that team's increasing contribution to our work.

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[4] Level 1 assurance is work undertaken to produce a route strategic plan and assess its deliverability

Workforce safety

Overview: Sadly, our long-term focus on the issue of track worker safety was again highlighted by the deaths of two track workers at Margam in July 2019. Earlier in 2019/20, following our inspections in 2018/19, we concluded that Network Rail was not doing enough to control risks to track workers, resulting in formal enforcement action. In particular, too much emphasis was placed on track workers implementing and following complicated safe systems of work that depended on everyone doing the right things in the right way at the right time. We found that much worker protection also depends on the vigilance of lookouts armed with flags and whistles. As train frequencies and speeds increase, and the maintenance needs of the railway rise accordingly, these forms of protection are no longer safe enough. There are now technological solutions available, the development of which was funded in part in Control Period 5 (CP5), which allow workers to be protected and warned by automatic means. In parallel, Network Rail Eastern Region has developed a means of matching scheduled maintenance tasks with available access opportunities, i.e. possessions or protected line blockages. This offers the potential to remove track workers from close proximity to trains.

19   We have long had a vision for the industry to achieve zero industry caused workforce fatalities. Network Rail has achieved this occasionally, but until it is sustained we will continue to prioritise work in this area. Our previous inspection outcomes revealed the weaknesses described above. We therefore took enforcement action. We have required Network Rail to ensure that planned and foreseeable trackside work is done in the safest way, so far as reasonably practicable. Network Rail has responded by putting in place a programme, the 'safety task force', requiring the regions to make fundamental changes to the way they manage track worker access. It is an ambitious, demanding programme. It needs to be, because our enforcement was designed to deliver lasting strategic change. It is our aim that reliance on unassisted human lookouts will be eliminated when work is planned.

20   **Activities:** We presented our findings from our 2018/19 inspections and discussed with Network Rail how it should respond. This culminated in our formal enforcement in July 2019. Over the past eight months we have monitored first steps towards compliance by the routes. We are encouraged that Network Rail has taken up the challenge by committing resources and senior-level backing to the programme. However, progress this year has been variable. We found that all routes have made a start in assembling teams and management arrangements to comply with the notices, with varying amounts of progress, visible leadership, drive and enthusiasm. At local levels we found widespread lack of awareness. We have impressed on Network Rail that this must change. Much improvement will come from changing entrenched attitudes to track worker safety and work planning in the depots. Some routes appear to be focusing their efforts on deployment of protection and warning technology. While this is an improvement over using flags and horns to alert track workers of approaching trains, we have made it clear this is the second best option in comparison to work in possessions or line blockages. This is the fundamental, resource-intensive task that we are pressing all routes to get on with. The routes need to make a start on matching foreseeable tasks with access opportunities and avoid the temptation to deploy technological solutions before the scope for planned access has been assessed.

21   **Conclusions:** Probably the biggest challenge for Network Rail will be to bring about significant and lasting cultural change. Without this, local maintainers could all too easily default to the 'easy' option of using lookouts and working close to live tracks. To effect this, we are pressing the regions to show the required strong leadership with clear expectations, to involve delivery units in developing track access opportunities (so that they are part of the solution, not victims), and to set up effective monitoring systems to ensure compliance. In addition, making effective use of technology to avoid the need for track access (e.g. automated track inspection such as Plain Line Pattern Recognition (PLPR), and deploying protection and warning technology sensibly, where it will have the most benefit, will be important. We have set aside time in next year's work plan to maintain our monitoring of progress on the Safety Task Force – both centrally and at a regional level. We are committed to ensuring that this fundamental improvement to planning and achieving safe systems of work is delivered successfully.

Track and Lineside

Overview: Our RM3 analysis demonstrates that the track discipline is maintaining its overall performance, with improvements in some areas. Management of lineside assets showed a noticeable step forwards this year. Track asset management continues to demonstrate a good level of maturity and capability with KPIs at unprecedented standards of achievement in many areas. Lineside management has not reached the same level of maturity yet but significant improvements have been made on previously assessed levels. Both asset disciplines have shown the vulnerability of parts of Network Rail's portfolio to the effects of climate change and increased frequency and severity of extreme weather events.

22 **Evidence:** The Track discipline has led the way amongst engineering and asset management in developing its maturity and capability. This is reflected both in consistently higher RM3 assessed levels and in key performance indicators that remain at or near best ever levels. However, it could be even better. Seasonal weather conditions continue to adversely affect performance, with the dry summer impacting track formation on clay soils, leading to seasonable dips in geometry performance. The particularly wet early part of 2020 has affected recovery in some areas, however overall recovery has been positive.

23 Our assessed RM3 levels of maturity for lineside asset management showed notable progress from the previous year. This reflected the seriousness with which Network Rail staff responded to our inspection findings and the challenge of being on the economic regulatory escalator for vegetation management. Likewise, Network Rail responded positively to the recommendations in the Varley report on management of vegetation and bio-diversity by increasing its resource and capability in this area.

24 While there has been a decrease in the number of reported events involving animal incursions, this has been overshadowed by the number of events involving trains striking objects on the line. These are predominantly related to weather events with trees and other objects blown onto the line. This increase was identified late in the year when a data transfer issue was identified that had led to significant under reporting during most of the year. The number of recorded events involving trains striking objects increased almost four fold compared to last year, with period 12 (2 February to 29 February 2020) being the most significant period. It should also be noted that the overall long-term trend for the number of tree and animal-related track incursions is upwards and a significant proportion of high risk Wrong Side Failure (WSF) incidents are related to Overhead Line Equipment (OLE) issues.

25 **Activities:** We continued to monitor Network Rail's progress in developing its track and lineside asset knowledge, understanding of risk, and risk control delivery through central strategic liaison meetings, targeted probing of incidents, and a programme of proactive inspection. These inspections have involved work in all routes. In relation to track we inspected rail defect management, section manager workload, and derailment risk on tight curves. Our incident investigations revealed areas of weakness in the risk control framework for managing track assets. We followed up previous inspection findings and we pursued the response to RAIB recommendations.

26   We found some variation amongst the routes in how well they were implementing measures to address section manager workload. We found a generally strong control framework for the management of rail defects - but identified areas for improvement in relation to the ratio of suspect to actual defects found. We found that some of the data used to demonstrate control of derailment risk at tight radius curves was inaccurate. These findings illustrate there is no room for complacency, even in an area where Network Rail's overall performance is strong.

27   For lineside asset management we looked at competence of staff, we investigated issues around management of vegetation adjacent to OLE and we challenged the rationale for measures taken during high winds. We also continued to monitor Network Rail's response to vegetation management being on the regulatory escalator.

28   We identified a number of areas where management of lineside assets can be improved–and we will continue to measure progress in the coming year. But we also found demonstrable improvements in capability. A competence framework has been developed for a range of roles vital to lineside management. Good progress was made in addressing the challenge to improve vegetation management. Increased and more specialised resource was recruited in response to the Varley report. We saw evidence of development of a strategy to make better use of technology to assess lineside vegetation and inform a decision support tool for section managers.

- In last year's Annual Report our Chief Inspector pledged that we would work to bring real improvements to risks from objects on the line. Regrettably, the last year has seen a continuation of a significant upward trend in trees on the line. We challenged Network Rail to justify its controls for forecast high winds – and we have just gone back to them with a request for further analysis. We will carry out inspection work on boundary security.

- We also promised that we would monitor closely the industry response to the Varley report. We have held regular meetings to track progress and are satisfied that Network Rail is addressing the issues identified. The PIM showed a 25% improvement on autumn season vegetation and wheel-rail interface-related WSFs.

29   **Conclusions:** Network Rail's management of its Track assets shows sustained mature performance but also reveals there is no room for complacency as there is still evidence of some inconsistent application of risk controls and some assets are vulnerable to extreme weather effects. Management of Lineside assets is developing in maturity and capability but is also susceptible to disruption from the impacts of climate change. We will continue to target proportionate interventions in both disciplines.

Level 1 Assurance

Overview: Our RM3 assessments for this aspect of Network Rail's SMS were all clustered at the 'managed' level, with the occasional 'standardised' assessment. This inspection assignment generated our sole assessment of 'ad hoc'. This is not where a high performing organisation should be in relation to something as fundamental to its SMS as assurance.

Our findings forced us to question the overall effectiveness of the current health and safety level 1 assurance processes and their ability to deliver robust assurance of the business critical and vulnerable safety systems

30   **Evidence:** We inspected Level 1 Assurance activities on every Network Rail route. We focussed on Planned Assurance Inspection and Site Surveillance (PAISS) Management Self Assurance (MSA) checks and how outcomes were reviewed and acted on by Business Assurance Committees (BACs).

31   We found that MSA and PAISS checks were often superficial. They were frequently perceived as an imposed burden and compliance was driven by achieving target numbers by specified dates. There was little appreciation of the potential value and benefits such assurance activities could deliver. This may be because there was little or no training of staff in how to carry out assurance activities. Outcomes from assurance activities were frequently largely trivial in nature, with the focus often being on missing documents and signatures rather than substantive health and safety risks. The quality of the recording of the outcomes of assurance activity was very variable with the MSA questionnaires often leading to yes/no type answers without any meaningful supporting information provided.

32   Although routes had set up Business Assurance Committees (BACs) their scope is broad and much of the focus are on matters other than safety. The establishment of BACs has not yet led to the routes taking ownership of the targeting, delivery and review of Level 1 Assurance, resulting in a lack of focus on critical and vulnerable tasks/systems. This has led to a risk that priority issues are overlooked during frontline assurance, or that they receive only superficial checks.

33   **Activities:** We inspected every Network Rail route. We have provided feedback both locally and centrally. We have made one recommendation that Network Rail should review and improve the review function of its BACs so that they are more risk-related and better equipped to identify and remedy areas of poor practice.

34   **Conclusions:** For a number of years we have been prioritising improvement of Network Rail's Assurance regime. Network Rail made suitable changes to its framework, but these inspections show that these changes have not delivered significant frontline improvement yet. This is a vital area of Network Rail's SMS that we intend to maintain proactive scrutiny of its effectiveness in the coming year.

Civil engineering assets

Overview: Our work in 2019/20 continued to find evidence of immaturity in some areas of risk control and inconsistency between routes in the application of the risk control framework. The year also provided vivid illustrations of the vulnerability of these assets to extreme weather, especially to the impact of intense rainfall.

35 **Evidence:** Network Rail's management of its civil engineering assets ("Civils") portfolio is a priority for us because of the number and age of the assets, and their significance as precursors to catastrophic risk should they fail. It is simply not possible to renew these assets to modern resilient design standards in any wholesale way. Remediation should, therefore, be prioritised by risk – especially the consequences of failure. These assets, particularly earthworks, are susceptible to failure in extreme weather. Although Network Rail has drawn up plans to address climate change and increase resilience to extreme weather, these plans are not keeping up with the frequency and severity of these events.

36 This can be seen by looking at the changes to RSSB's PIM. There have been over six times more flooding events in the year and earthworks failures nearly trebled. 2019/20 saw seven consecutive months where long-term average rainfall was exceeded – culminating in the wettest February on record[5]. The winter period also saw a number of earthwork failures that led to extended line closures.

37 It is nearly inevitable that failures will occur. This is why Network Rail must focus on improving identification of imminent failure by means of remote monitoring and on refining the measures it has to respond to forecasts of extreme conditions.

38 **Activities:** Our work over the year was a mix of central strategic activities and route-based inspections. We found:

● **Delivery of drainage management plans:** The drainage management process put in place in response to the ORR Improvement Notice is still immature across Network Rail as a whole, and requires further attention both locally and centrally to ensure effective implementation. In particular, a wide variation was observed in the approach to Drainage Management Plans (DMPs) and the effectiveness of their delivery across the routes. Some routes were able to demonstrate that DMPs were being implemented, whereas others were not convincingly able to do so. In some instances, the delays to DMP programmes have been a result of gaps in the asset data. It is imperative, therefore that outstanding drainage inventory and identification programmes are completed in an effective and timely manner.

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[5] Data from the UK Meteorological Office: https://www.metoffice.gov.uk/about-us/press-office/news/weather-and-climate/2020/2020-winter-february-stats

- **Drainage provision at tunnel portals:** The majority of routes have completed assessments of drainage at high risk tunnel portals. This is a positive outcome and demonstrates the importance of maintaining effective drainage at these locations. Several routes still have to complete the work for lower risk tunnel portals, and clear timescale or progress milestones are not always in place. There are also indications from some routes that outputs of reviews may not yet have been pursued to completion. It is essential that this is done and that the necessary remedial works take place.

- **Management of culverts:** Inspections identified a discrepancy in the information available about culverts across routes between the structures and drainage databases. It is fundamental that routes ensure that all culverts are correctly and consistently identified and are included in the inspection and maintenance programme. Arrangements for identifying and managing unlocated culverts are absent or very basic in some routes. Earthworks failures in extreme weather.

- **Management of retaining walls:** There appears to be a general hesitancy among the regions to make use of the Safety Technical and Engineering (STE) team's lists of risk-ranked retaining walls, although there is some variation in this. Some regions have had technical issues, such as being unable to make amendments to the information in the lists, and being unable to log in directly. All regions are aware of the forthcoming requirement for implementation of retaining wall management arrangements in accordance with STE's management policy matrix, and some are making preparations for implementation. STE needs to assure itself that regions are making constructive use of the new risk-ranked retaining wall data, and should consider setting a deadline for compliance.

- **Earthworks failures in extreme weather:** A persistently wet winter, culminating in several storms in February 2020 resulted in a number of earthwork failures and these were particularly prevalent in the Southern Region. We engaged with Network Rail to understand the causes and responses. None of these incidents led to a derailment or other serious incidents, although in some cases there was an element of good fortune involved, for example with trains striking ballast or landslips being discovered by trains on adjacent lines. These incidents highlight the importance of the effective implementation of the Extreme Weather Action Team procedures in mitigating the consequence of earthwork failures. They also show the need for routes to develop and implement weather resilience and climate change plans to mitigate against the risks of future weather events

- **Examination of tenanted arches:** During the year, we became aware of concerns arising within some Network Rail routes about their ability to carry out examinations of tenanted arch structures, following the sale of these assets to The Arch Company (ArchCo). Reports were received that access was being denied for examinations, and this was leading to significant a backlog and potentially an uncontrolled risk. Network Rail claims to be confident in their contractual right to enforce access and cladding removal, although this has not yet been implemented. We have also attempted to engage with representatives of The Arch Company, but a lack of response from them has meant that we have been unable to establish adequate contact to date. This is an, as yet, unresolved concern which will be the subject of further attention and potential intervention by us during 2020/21.

- **Platform coping stone failures:** Concerns were raised following an accident caused by the failure of a platform coping stone at Newington Station, which presented a significant concern because Network Rail stated that the coper had not previously appeared to have shown any signs of damage or other significant defects. It was reported that, on investigation, Network Rail identified no common factors between the failures that have occurred over recent years, but that there is some commonality in terms of the design of the platforms affected. However, the concern remains that some of these structures may be reaching the end of their operational life, and in the longer term a strategy for their replacement will be needed. Our Civils Project Team will further pursue this matter during 2020/21.

39   **Conclusions:** The safe management of Civil assets is a significant element in Network Rail's control of precursors to catastrophic risk on its infrastructure. It is developing a mature framework to enable it to prioritise interventions to remediate asset condition and mitigate the consequences of failure. However, we do not see consistent evidence of the application of that control framework and it is challenged by the vulnerability of these assets to climate extremes. We will continue to target our work at seeking improvements to remote monitoring of assets and more sophisticated responses to forecast adverse weather.

Level crossings

Overview: Network Rail has continued to prioritise risk reduction at level crossings through 2019/20. This is despite all the pressures on the system tending to increase risk and the absence of a dedicated risk reduction fund, which existed in Control Period (CP) 4 and CP5. Publication of its strategy for level crossings was a welcome milestone achieved during the year. We will be focussing on how well the strategy is implemented.

40 **Evidence:** Modelled risk at level crossings (as measured by the All Level Crossing Risk Model ALCRM) rose over the year. This is a continuing pattern based on rising numbers of trains and increased line speeds in some locations. Despite these pressures, Network Rail has succeeded in achieving its risk reduction target; exceeding it for year one of CP6, closing 77 crossings (bringing the total since CP4 start to 1,254).

41 Regrettably, there were two fatalities at level crossings in 2019/20, both at footpath crossings. Of the 106 accidental fatalities at crossings since April 2006, three quarters have been pedestrians which emphasises the heightened risks to pedestrians compared to other types of crossing users. The risks at 'passive' crossings (those with signs) are more significant than those at 'active' crossings (those with barriers, gates and/or warning lights and sirens). That is why it is so important that Network Rail published its strategy for level crossings, targeting long-term improvements to passive crossings in particular and setting goals to introduce technological improvements to achieve this. This is in addition to continuing to pursue closures wherever possible.

42 **Activities:** Our work over the year was focussed on central strategic influencing activities. We pressed Network Rail to address previous inspection findings, to address RAIB recommendations and to pursue the continued development of overlay technologies such as 'Meerkat' to enhance the safe management of passive crossings – as described in its Strategy. We had constructive engagement with the central Level Crossing Team in Network Rail. Their task of continued risk reduction is made more challenging by the absence of any ring-fenced funding for the purpose.

43 We gave a number of undertakings in last year's Annual Report. We said:

- We would scrutinise the delivery of Network Rail's Strategy, particularly the realisation of the benefits of technology deployment. We have had regular liaison meetings to ensure the publication of the Strategy and to monitor development and deployment of overlay systems. During 2020/21 we will be inspecting the execution of the Strategy by each region of Network Rail.

- We would try to improve and streamline the Level Crossing Order Process so it reflected the principles of a structured risk assessment. We trialled a new approach, but decided that it did not lend itself as well as we had hoped to fulfilling all the legal requirements of an order. We will proceed with simplifying the order process but will shift the structured risk assessment principles to new guidance that will be published by April 2021.

44   **Conclusions:** Network Rail has continued to meet its risk reduction targets for level crossings, despite pressures leading to increased modelled risk and despite no dedicated funds. It took a significant step towards the next level of improvement in risk control by publishing its long-term strategy to strengthen arrangements at passive crossings through the targeted deployment of a range of technologies. We will inspect delivery of the strategy by routes and regions throughout the 2020/21 work year.

Occupational Health

Overview: Our RM3 assessments show that leadership on occupational health and wellbeing has continued to strengthen this year, driving more consistent compliance in several health risk areas. Examples include strong direction and support from the centre to routes and functions on improving Hand Arm Vibration Syndrome (HAVS) health surveillance compliance; provision of enhanced health and wellbeing services and training; and on delivery of the national asbestos management programme. Network Rail has also shown leadership across the wider industry, collaborating with contractors, train operators, worker representatives and others to drive improvements in control of silica dust, via the Ballast Dust Working Group, and on Diesel Engine Exhaust Emissions (DEEE) via air quality focus groups for Birmingham New Street and London Euston stations.

45   Our assessments for the areas of risk assessment and for management review are not so positive. They vary in different parts of the business and provide further evidence of the gap we often find between vision and delivery. Network Rail should consider how best to proactively support, deliver and monitor more consistent legal compliance on health across regions and functions.

46   **Evidence:** Progress with HAVS health surveillance against the year-end target of 95% has been good. Support from the central team to those Regions (Eastern, North West and Central) and functions (Route Services) behind target was particularly welcome. Scotland's Railway and Southern Region exceeded the year-end target, reporting close to full compliance with planned health surveillance this year. This year has seen a significant and welcome reduction in the number of HAVS diagnoses reported to us via SMIS. We expect to see a consistent downturn in the numbers of HAVs cases diagnosed and further targeted action at route level to prevent disease progression. On data quality, we continue to see delayed or unclear reporting of some HAVS diagnoses into SMIS. It is vital that this is improved.

47   We have continued to track progress with delivery of the national Asbestos Management Programme (AMP) via periodic updates from, and quarterly meetings with, the central STE team who continue to provide good direction and support to the routes. Progress in completing asbestos surveys, management plans, asbestos removal (red sites), training, and Asbestos Risk Management System (ARMS) enhancement has been broadly on target. Progress with scoping and surveying low priority assets currently appears slow when viewed against the agreed target to survey 10% of low priority assets and have Site Specific Asbestos Management Plans in place by September 2021.

48   Network Rail's internal audits of asbestos management for certain routes, and the health check audit on the wider national AMP completed across December 2019 and January 2020, have rightly focused attention on the remaining gaps and challenges. Ongoing work by STE to develop guidance and processes for Level 1 assurance on asbestos by route duty holders (by May 2020) and Level 2 assurance by STE (by September 2021) is a positive development. We welcome the decision to look beyond completion of phase one of the AMP (September 2021) to phase two – to include arrangements for managing those assets not surveyed in phase one (75% medium and 90% low priority assets).

49 Given the length of time Network Rail has had to become legally compliant in relation to asbestos management it is not surprising that we are disappointed at the performance of some parts of the business. This led to formal enforcement action on two routes.

50 **Activities:** Our work over the year was focussed on central strategic influencing activities, backed up by local monitoring in significant areas. A clear vision and strong leadership from the central health and wellbeing team, led by the Chief Medical Officer (CMO), has delivered more resilient external health service provision this year. The evident drive from the CMO and team to obtain, quality assure and report more health data and metrics is to be commended. An evidence-based approach on health is essential to identifying what works and where further effort is needed, and can be powerful in demonstrating the wider benefits, for example reductions in sickness absence costs. Work to enhance monitoring and assurance in priority health risk areas, such as auditing of HAVS health surveillance diagnoses, is particularly welcome, and could be extended to other areas, including timely and accurate reporting of HAVS diagnoses. As carefully targeted health initiatives mature, such as early intervention on musculoskeletal disorders via self-referral to physiotherapy services, clear benefits to the business and individuals are being demonstrated. The 'one stop shop' model of comprehensive and dedicated clinical services in regional clinics has the potential to deliver more efficient and effective occupational health service provision. The example of the 'enhanced service' offered at London Victoria clinic to fast track referral to a sleep specialist for diagnosis and treatment of obstructive sleep apnoea in safety critical workers is one example.

51   In last year's Annual Report we committed to publish a review of our second five-year Occupational Health Programme The 'Closing the Gap on Health'[6] report was published in November 2019.

52   **Conclusions:** Based on the evidence from our assurance activity for the priority health risk topics assessed, we judge that health risk management overall continues to improve. This is, in large part, due to proactive leadership in key parts of the business, including the CMO and central health and wellbeing team, as well as Route Services and STE Plant teams. However, delivery in the routes and capital projects is less consistent and we continue to find evidence of compliance gaps in health risk control, particularly for conventional renewals where many of the "traditional" occupational health hazards are found, and where responsibility has recently been devolved to regions and functions. If the hard-won progress on health is to be maintained, Network Rail needs to be clear about expected performance standards on health, put in place improved monitoring and assurance arrangements, and continue to provide effective leadership.

Electrical safety

Overview: The year 2019/20 saw a number of incidents that revealed Network Rail has yet to realise its vision of improvements in risk control and legal compliance; these improvements will be delivered by the Electrical Safety Delivery Programme (ESDP). The Programme is well resourced and governed and has the potential to transform Network Rail's safe management of its electrical assets. It was particularly disappointing that our site visits and investigations highlighted continued confusion and non-compliance with aspects of the electrical Life Saving Rules (LSRs). These are Network Rail's principal interim means of controlling risk until the longer-term benefits of ESDP are realised with the introduction of a range of physical upgrades and procedural improvements. They are another illustration of the gap between Network Rail's safety vision and the delivery of that vision on the ground.

53   **Evidence:** We investigated a number of incidents, which showed that rules and procedures are not always well followed on the ground. These non-compliances included some of the LSRs establishing that equipment has been made safe before work commences. We found confusion in the routes about appropriate prioritisation of management of vegetation in proximity to OLE. We raised concerns about the continued competent maintenance of legacy equipment pending the roll out of modern Supervisory Control And Data Acquisition (SCADA) deployment.

54   There are fewer KPIs for electrical safety than for other asset disciplines. During our efforts to promote the adoption of a wider range of measures it became clear that there was an issue with the under-reporting of mandatory events. The issues are being addressed by Network Rail and RSSB, but it means there is little meaningful data to use to analyse trends in safety performance.

55   **Activities:** Our work over the year was focussed on central strategic influencing activities. We carried out a significant amount of reactive work, which constrained our ability to do more proactive inspections. Centrally, we have prioritised monitoring progress on Network Rail's ESDP. This is consistent with a commitment we gave in last year's Annual Report.

56   There has been good progress in fitting Negative Short Circuiting Devices to the third rail network

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[6] https://orr.gov.uk/__data/assets/pdf_file/0010/41986/closing-the-gap-on-health-industry-progress-2019.pdf

and in continuing to develop remote securing of AC isolations. In response to pressure from us and the evidence from incidents, Network Rail issued further guidance on the application of the electrical LSRs on the electrical systems. The document describes how these rules are applied to electrical power systems. This guidance is based upon requirements stated in the existing company standards.

57 A trial using equipment to assist in the demarcation of electrical isolation limits was completed in Scotland. A review of the impact of using the equipment gave positive results. This equipment has now been made available for use by other regions and Network Rail is to publicise its availability. This is a vital element in Network Rail's efforts to prevent and mitigate harm.

58 **Conclusions:** Network Rail has made good progress in implementing the physical improvements it promised in its ESDP. It remains prone to lapses in implementation of a range of instructions and LSRs designed to control risk. It must make more effort to embed LSRs and to embed the 'Single Approach to Isolations'. We will continue to measure progress in ESDP delivery closely. We will also continue our scrutiny of the roll out of SCADA – both the effective introduction of new systems and the safe management of legacy systems affected by its late delivery.

Mainline: Passenger train operating companies

Management maturity

A composite RM3 assessment of passenger train operators risk management maturity in 2019/20
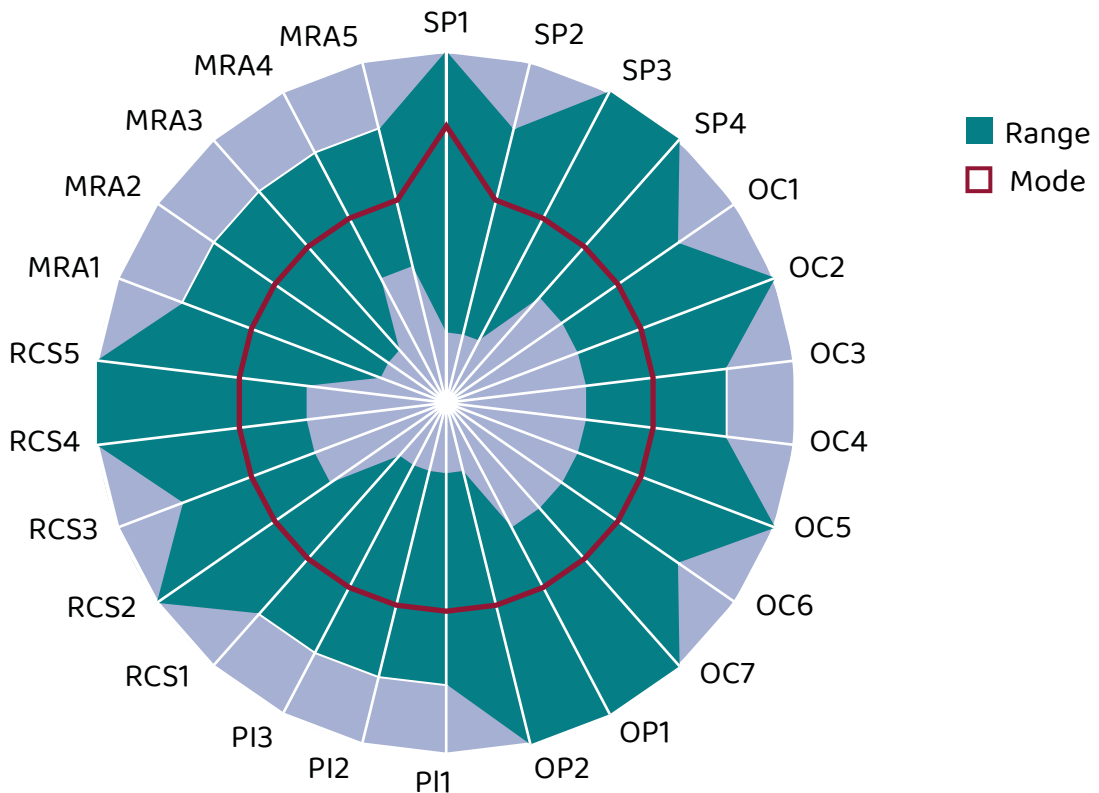
Source: ORR

Overview: Train operating companies continue to embrace RM3, embedding the approach in their organisations, and drawing on their previous experience was vital in the development of RM3 2019. Overall, train operators have demonstrated a steady improvement in maturity over the last seven years. They have recognised that the new model aimed to be more challenging for established users, demanding collaboration and innovation to achieve higher levels of maturity. We have been pleased to find that assessed levels of maturity have not decreased as we expected with the more demanding requirements of RM3 2019, and there are many examples of further improvement in maturity.

59   **Evidence:** The figure above is a composite of the results that we have obtained from all of our interactions with duty holders in 2019/20 and not just from proactive inspection work, as previously. This enables us to assess more evidence and give a more rounded view of each duty holder to support our end of year discussions with them.

60   This year we have seen an improvement in the assessed levels around leadership, policy and board governance, with the industry delivering against the challenge we set in 2018/19 to improve maturity in leadership.

61   **Activities:** We have undertaken a programme of proactive inspections throughout the year on a range of topics, following on from previous years, including: management of risks at the Platform-Train Interface (PTI); driver competence; emergency planning; and depot health and safety. We have also undertaken more work on crowding management on stations and reviewed conductor competence. These activities are prioritised based on our knowledge of the sector, previous incidents and our strategy for regulating health and safety risks on Britain's railways.

62   Since the beginning of the coronavirus outbreak our inspection teams have worked proactively with duty holders to understand the implications of the coronavirus pandemic working together to identify workable controls to manage the risks of exposure to the virus to employees and passengers. This work has demonstrated how the train operating companies have collaborated through the crisis and will continue to do so through the phased lifting of restrictions. We will use this evidence in our assessment next year.

63   **Conclusions:** Through all of our activities we have found that the train operating companies understand the key health and safety risks they face in delivering their operation. In all cases, our statutory assessments of applications for safety certification have concluded that train operating companies have the capability of delivering effective risk control through their safety management systems. Our inspections, investigations and other activities have found good evidence of the effectiveness of driver competence arrangements, management of aging train fleets and crowding management. However, we have found weaknesses in the management of conductor competence, PTI risk assessments and continue to have concerns over the management of the introduction of new trains, including trains that have gone through major upgrade and refurbishment.

New Trains

Overview: Delays in the delivery of new train fleets have meant that some older rolling stock, with the associated risks from slam doors and droplight windows, has remained in service much longer than planned. Many of the delays are associated with software communication issues and the ability of the industry to deal with such rapidly evolving technology. Solutions are still being worked through for other new fleets, which have been introduced with outstanding safety issues, and some refurbished fleets have been returned to service with latent safety defects. However, we are also seeing more early engagement between train operators and manufacturers with innovative solutions to address significant and longstanding risks.

64   **Evidence:** The complexities of electronic systems and software continue to challenge effective risk control. In August 2019, one operator experienced a widespread shutdown of its trains after the electrical supply frequency dropped in the overhead wires. Drivers were unable to restart 23 trains due to a software version update that required a technician to reset the train systems. This resulted in a stranded train full of passengers, with a potential that they may self-evacuate, due to it not being properly assessed as part of the software change. All 23 trains were subsequently evacuated in a controlled manner, without any injuries.

65   The risks of droplight windows, where passengers lower a window to reach an external door handle, were further highlighted in February 2020, when a 17-year-old male climbed through a droplight window and onto the roof of the train which had just arrived at Norwich Station. He came into contact with the 25,000 volt overhead wires and died.

66   In August 2019, a newly refurbished electric multiple unit ran for 16 miles at up to 80mph with a door open. Fortunately, the train was on an early morning service out of London with few passengers. The bracket that secures the door to the operating mechanism had become detached and the safety digest that was subsequently issued by the RAIB noted that the bolts had not been marked to indicate they had been checked as being secure, by the manufacturer.

67   Two train operators are leading the industry, having engaged with one manufacturer at the design stage. The outcome of this collaboration is that three types of train are now being built with doorway steps that extend out from the train, bridging the gap between the train and the platform. This removes the risk of falling between the train and platform when boarding and alighting. One of the train types has also been fitted with train body extensions which also minimise the risk of falling elsewhere along the train

68   Some new fleets are also being fitted with Assisted Selective Door Opening. This system should reduce the likelihood of drivers being able to open doors which are not next to a platform, for example where the platform is shorter than the train, and therefore reduce the risk of passengers falling from a train. Our inspections identified some issues with the equipment, which relies on satellite technology. Operators should work to resolve these issues so as to achieve a valuable reduction in risk.

69   **Activities:** We have investigated the incidents that were caused by electronic and software issues, including the frequency drop incidents involving 23 trains. We have gained assurance that the lessons have been learned from the experiences of a number of operators and that improvements in their safety management system arrangements around change management have been made. We have sought assurance that operators and Network Rail have implemented changes around the management of stranded trains.

70   We have maintained pressure on train manufacturers and the relevant train operators to reduce the risk of people surfing or climbing up onto trains, where the inter-car connector cables appear to take the form of a ladder, giving ready access to the overhead line equipment. We continue to insist that the risk is addressed through engineering adaptations to this area, rather than responsibility being passed to the operators to manage the life-time of the fleets. Workshops have taken place involving manufacturers, train operators, engineers, risk specialists and our inspectors from the ORR. An agreed design solution is now available and retrofitting is planned.

71   In May 2019, we wrote to all mainline passenger train operators setting a new standard for what we consider to be reasonable measures to control the risk from drop-light windows. In short, we expect:

- physical control measures, such as window bars, or locked windows and internal door handles, where this is not grossly disproportionate to the time the fleet is to remain in service;

- interim measures from now, including using other vehicles for higher-risk services (events or weekend evenings, for example), additional staffing where this isn't possible, and better labelling in all cases; and

- mainline charter operators to implement engineered solutions by 2023, so long as their more intense stewarding is effective

72   We have also maintained our challenge to charter operators to look at central door locking solutions for their slam door vehicles. We have informed this sector that we will no longer issue exemptions from this legal requirement after March 2023. We want charter operators to be able to offer a heritage train experience with 21st century levels of safety.

73   **Conclusions:** We have seen the benefits of early engagement between operators, designers and manufacturers and we will continue to promote the importance of this collaboration to achieve effective risk control for the environment new trains will operate in.

74   We will look to all parties to improve their intelligence and resilience to deal with software issues and we are looking to improve our own capability in this area.

75   With another death related to droplight windows, we want to see faster implementation of engineering controls where vehicles with this feature will remain in service for the foreseeable future. We will undertake enforcement to secure this improvement where necessary.

2019/20 Operational incidents including Signals Passed at Danger (SPADs)

Overview: There has been a levelling out of the estimated risk from SPADs. Some operators have yet to apply the RSSB SPAD strategy, with evidence indicating that organisations that have applied the strategy, and embedded non-technical skills training and assessment are achieving a reduction in SPADs. Further work, through cross-industry work needs to be done to understand the underlying causes for SPADs and other operational incidents.

76   **Evidence:** The sharp rise in the estimated risk from SPADs in 2018/19 which we highlighted in our last annual safety report[7] continued into 2019/20, but started to level out. This estimated risk is heavily influenced by the number of SPADs with a potentially severe ranking.

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[7] https://orr.gov.uk/rail/health-and-safety/annual-health-and-safety-report

77   Through our inspections and investigations, we find that driver alertness is persistent as an underlying cause to SPADs. We have also investigated SPADs where medical fitness has been a contributory factor and in one instance a driver who was known to have a medical condition was sent in error for the wrong medical examination, his condition was not assessed, and he was deemed fit to drive.

78   We have seen many operators apply the RSSB SPAD strategy and use the Red Aspect Approaches to Signals Tool (RAATS). As well as realising the benefits of incorporating training and assessment of non-technical skills into their driver competence management systems, this all contributes to good progress in reducing the number of SPADs. One organisation has included non-technical skills management as a KPI.

79   There is evidence that train operators, including some that have managed a reduction in the number of SPADs, are now experiencing an increase in other operational incidents where driver alertness is an underlying factor. These incidents include:

- stopping the train at the wrong position on the platform so that part of the train is not next to the platform and releasing the doors – in one instance a passenger fell from a train;

- opening or releasing the doors on the opposite side (wrong side), again introducing the risk of a fall onto the track; and

- failing to call at a station.

80   **Activities:** We investigate potentially severe SPADs (those ranked by the industry risk ranking process as 20 and above) as set out in our Mandatory Investigation Policy.

81   Inspection of driver management and competence is a priority activity and this year's inspections have generally found good arrangements in place for managing driver competence. However, we have found weaknesses in workload planning which may contribute to driver alertness and fatigue. We recognise that operators need to do more to understand and address the reasons for the losses of concentration. We will be looking at the driver management team's competence to understand the underlying cause of SPADs, and other operational incidents, and how they identify appropriate corrective action.

82   Across the ORR we support the RSSB Driver Attention and Alertness Working Group. The group has developed a set of principles around using technologies designed to monitor the attention and alertness of train drivers and these were due to be presented at workshops in June 2020. These have now been deferred due to restrictions in place to control the spread of the coronavirus. However, a literature review of what is currently available, with analysis of the results from these technologies, is currently underway.

83   A SPAD KPI table which provides the detail of actual SPADs against targets, for each operator, now enables our inspectors to identify operators we need to focus on in the next work year. Through our proactive inspection activity, and regular meetings with duty holders, we will look to ensure the improvements in SPAD performance made by poor performing train operators in 2019/20 is used to support a cross-industry improvement, working with RSSB to achieve this.

84   **Conclusions:** Across the ORR, we continue to promote the RSSB strategy and the Red Aspect Approaches To Signals Tool (RAATS), as train operating companies that have applied the RSSB SPAD strategy, and increased their capability in managing non-technical skills, are seeing a reduction in SPADs. Train operating companies should collaborate and share successes in managing the reduction in SPADs and other operational incidents.

Workforce health and safety

Overview: We have served two improvement notices on train operators during 2019/20 relating to the management of workplace safety. We are also investigating the death of a driver at a train maintenance depot. We continue to assess the adequacy of controls for both occupational health and safety risk.

85   **Evidence & Activities:** In December 2019 at Tyseley depot, a train driver died from the injuries he suffered as he walked between two trains that were being coupled together. We investigated this incident and during a site inspection we determined there were significant issues with the management of safe walking routes at the depot. An improvement notice was served on the operator in March 2020, which has subsequently been complied with.

86   Another operator has experienced an increase in slip, trip and fall incidents at its engineering depots and also reported an incident where a train displaying a "not to be moved board" was driven out of a depot. Potential issues had been identified with the organisational culture in the operator's depots in 2018/19, and these later incidents indicated this was still an issue.

87   In August 2019, a fitter came into contact with live train electrical equipment at 750 Volts at a depot in North Kent. An improvement notice was served on the operator to assess and review their safety arrangements which protect against electric shock and implement changes at the depot. In 2017, we prosecuted the same operator when a contractor died after falling across a live rail at another depot operated by them. The operator was fined £2.6 million, but the lessons learnt from that incident did not result in effective change elsewhere.

88   Following similar activity in 2018/19, we again identified that a new fleet of trains had been introduced, but the depots they are maintained in had not been equipped to control DEEE effectively. The Local Exhaust Ventilation (LEV) was set up for the exhaust positions on the old trains which did not line up with exhausts on the new vehicles. Although a plan is in place to provide effective LEV by 2021, this work should have been completed in time for the introduction of the new trains. This would have avoided the need to manage the DEEE by other means and further illustrate the failure to adequately assess occupational health risks as part of managing an engineering change, in a timely way.

89   We are represented at the Passenger Operators Safety Group (POSG), a sub group of the Rail Delivery Group attended by senior safety professionals from train operating companies. POSG is undertaking a review of depot safety as part of its delivery plan in 2020/21.

90   **Conclusions:** This year we have investigated both worker safety and occupational health issues that are similar to events that have happened previously in the same organisation or had been subject to well publicised enforcement action taken against other organisations. We have had to serve enforcement notices to secure improvements. Train operators need to apply the learning from these incidents, share experiences and ensure that occupational health and safety risks at depot locations are understood and controlled, so far as is reasonably practicable.

Platform Train Interface (PTI)

Overview: Management of risks at the boundary between a train and platform, which is commonly referred to as the Platform Train Interface (PTI) remains a high priority activity for us at the ORR. In 2019/20 there was an incident in South Wales where a train departed after a passenger fell down the gap between the train and the platform. We have issued two improvement notices related to management of risks at the PTI. Our inspections highlight that there is still work to be done around improving the competence of staff involved in undertaking risk assessments and undertaking dispatch activities.

91   **Evidence:** On 25 July 2019, a passenger fell between the train and platform while alighting at a station in South Wales, which was not noticed by the guard. The train was dispatched and moved approximately 10 feet before passengers alerted the driver.

92   Our inspections indicated that a number of operators are still working to understand and reduce risks when longer carriages were introduced on their services. The 26-metre long vehicles, introduced in 2017, increased the stepping distances between the train and platform and created bigger gaps between carriages where people could fall. The design of the new trains should have reduced and not increased risk of the PTI.

93   We have reviewed the work of two train manufacturers, who are new entrants to the mainline sector. They have collaborated with the operators to identify PTI risks that can be reduced through the design of their new diesel and electric trains, introduced in 2019/20 around operator requirements. They have reduced the height of the train floor, reducing the stepping distance from the platform, and introduced innovations such as extending steps between train and platform. We have also seen how other operators are working with Network Rail to realign platforms and adjust heights. One operator has reduced incidents at the PTI by introducing 'gap fillers' to platform edges which can be walked on, but compress under sideways pressure from a train.

94   Inspection and investigations undertaken by our inspectors indicate that there is still work needed by four of the operators we looked at this year to improve the competence of staff involved in train dispatch, undertaking risk assessments associated with the PTI or reviewing PTI incidents. One operator was able to demonstrate a robust process for conducting PTI risk assessments but then did not follow this through to ensure that recommendations were implemented.

95   **Activities:** We have undertaken a programme of inspections associated with management of risks at the PTI with seven operators this year, continuing our programme with other operators in 2018/19. We have issued two improvement notices on one operator, one relating to post-incident reviews of conductor competence and the other requiring suitable and sufficient train dispatch risk assessments.

96   In October 2019, we updated our position statement on crowding. We now include crowding on stations and platforms as there is evidence that crowding can increase the risk of slips, trips and falls, particularly at stations and when getting on and off trains.

97   The Platform Train Interface Risk Assessment Tool[8], developed by RSSB, provides the industry with a common approach to assess PTI risk at station platforms. We are encouraged by the number of train operating companies applying the tool but want to see operators, who have not already done so, use the tool and reduce this risk, further.

98   We have representatives at the RSSB People on Trains and Stations Group (PTSRG). This group is driving a number of initiatives aimed at reducing safety risk at stations, including:

● research into technologies to detect passengers and their belongings from being trapped in doors and the risk of being dragged along the platform by the train;

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[8] https://www.rssb.co.uk/en/Standards-and-Safety/Tools--Resources/Rail-Risk-Toolkit/
Platform-Train-Interface-Risk-Assessment-Tool

- collaborative work between Network Rail and operators to review actual dimensions at stations and prioritise work to those platforms where the platform is higher or the train is closer to the platform (high and tight) – forcing the design and modifications of trains to accommodate these platforms but introducing a worse gap at platforms elsewhere; and

- reviewing the PTI risk assessment tool and making recommendations to improve usability.

99 We are finalising our Driver Controlled Operations (DCO) principles, developed through cross-industry work. These principles will support risk reduction at the PTI by setting clear guidance on responsibility for the final safety check, the confirmation needed that it is safe for a train to depart after completing platform duties.

100 **Conclusions:** We want to see all train manufacturers step up to the new benchmark set by new entrants to the mainline railway in collaborating with operators in the design of new trains to minimise risks at the PTI. All operators should ensure that staff involved in assessing and managing risks at the PTI are competent, and where improvements are identified they are implemented.

101 The excellent work of RSSB and research driven by PTSRG needs to be embraced by all operators and the recommendations put into practice. In particular, we want to see comprehensive application of the PTI Risk Assessment Tool across all operators as the tool is further refined.
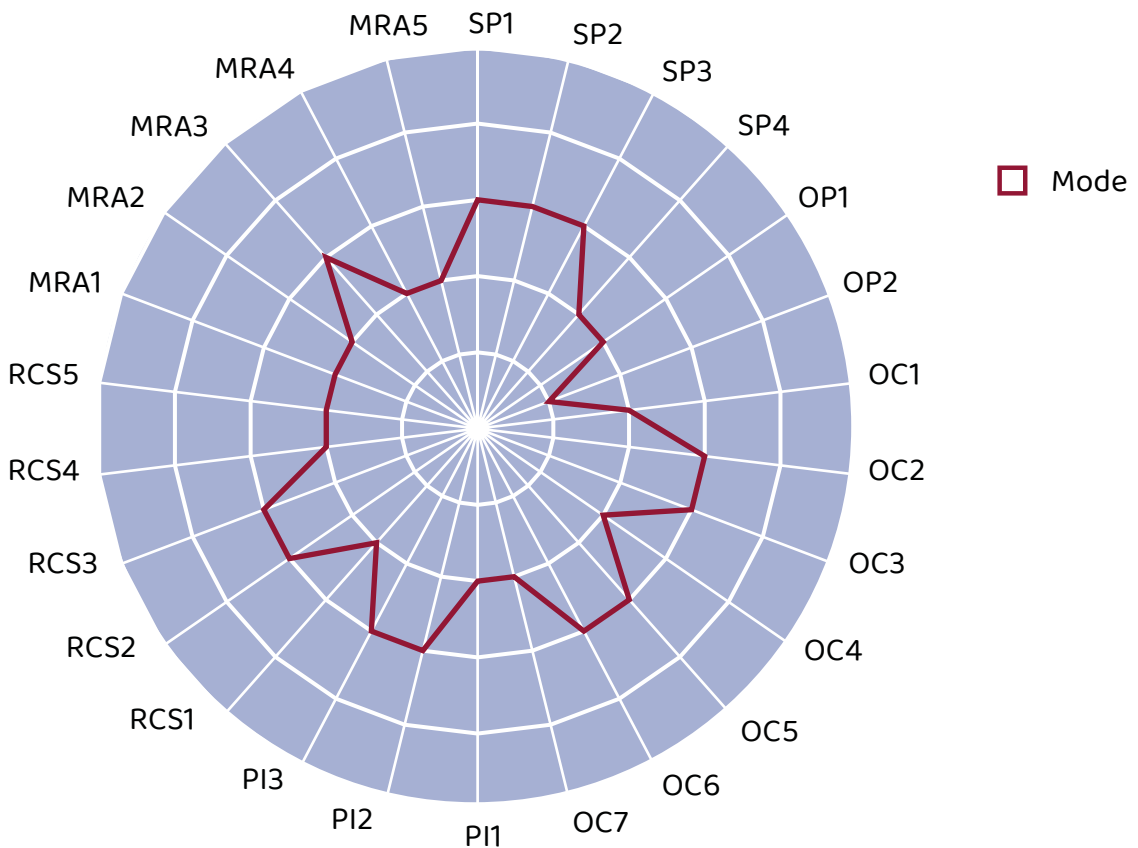
Mainline: Freight operating companies

Management Maturity

Overview: While caution should be exercised in reaching a common conclusion for the freight sector, our work with freight operators found that overall management maturity in the sector remains at a managed or standardised level. The collaborative approach from the freight sector continues to deliver sector-wide improvements to risk management, although at the same time inspectors are increasingly finding examples of inadequate or missing risk control arrangements at an operational level.

A composite RM3 assessment of freight train operators risk management maturity in 2019/20

Source: ORR

102　**Evidence & Activities:** The figures above show the average of the results we obtained from our inspections, investigations and statutory work undertaken with mainline freight operators during the year.

103　**Conclusions:** The freight sector continues to lead the industry in its collaborative approach to the management of health and safety risks. The National Freight Safety Group (NFSG) continues to make progress in addressing key industry risks and at the time of writing the cross-industry group

on freight derailment has almost concluded its work addressing the system risks associated with freight train derailment. However, it is concerning to note examples of poor risk management throughout the sector, indicating that there is still much work to be done.

Driver Management

Overview: In 2019/20, we continued our focus on driver management, in particular in relation to SPADs. We found both examples of good practice and areas for improvement. We are continuing to work with duty holders to improve performance.

104   **Evidence and Activities:** We continued to examine freight operator arrangements for the management of drivers during 2019/20, with a particular focus on driver training and the monitoring of drivers. Our inspections identified examples of good practice through the use of simulator technology for both initial driver training and post-incident refresher training. We also found areas for improvement around driver monitoring and inspectors provided written advice to one duty holder in relation to a failure to maintain records of driver competency. SPADs by freight services remain an area of concern particularly given the potential consequences of any incident involving a freight service. During 2019/20 we commenced a number of investigations into serious SPADs by freight trains. As part of our inspection work, inspectors carried out cab rides on freight services, which not only allows inspectors to see how individual duty holder driver management arrangements are functioning, but also allows inspectors to engage directly with the people on the frontline of delivering freight services.

105   **Conclusions:** Duty holders need to have effective arrangements in place to monitor the competence of train drivers. The risks associated with SPADs mean that we expect duty holders to take all appropriate actions to mitigate the risk of SPADs from their operations.

Workplace Health and Safety

Overview: We have carried out inspections of operational premises to assess duty holders' management of occupational health and safety risks. This is an area where we expect duty holders to have robust arrangements in place to control risks to the workforce, contractors and railway users.

106   **Evidence:** Our inspections of maintenance facilities and operational depots identified both good practice and areas for improvement across a range of duty holders. These included:

- Robust arrangements for face-test and monitoring of respiratory protective equipment at a wagon maintenance depot in Derbyshire, where the nature of the site meant that there was a risk of exposure to respirable crystalline silica;

- Poor pedestrian-vehicle segregation at a yard in the East Midlands; and

- Inadequate protection arrangements for staff carrying out maintenance activities in marshalling yards.

107   **Activities:** During 2019/20 we carried out announced and unannounced visits to a range of operational premises across the country. During one unannounced inspection, inspectors identified track maintenance contractors working in a yard in the West Midlands without adequate protection from moving vehicles. After making enquiries, we issued an improvement notice, requiring the company in control of the yard to put in place appropriate procedures to prevent third party staff from being struck by trains.

108   **Conclusions:** Inspectors are continuing to identify examples of poor risk control on operational sites. We expect duty holders to have robust monitoring arrangements in place to ensure the ongoing effectiveness of health and safety risk controls

Emergency planning

Overview: In 2019/20 we again found a mixture of practices during our inspections of emergency planning arrangements. In particular, at the start of the coronavirus pandemic we concentrated on ensuring duty holders' arrangements were appropriate and provided guidance where necessary.

109   **Evidence and Activities:** Our inspections focussed on the management of emergencies and operational incidents by freight operators. We identified both good practice and areas for improvement in this field:

- One freight operator demonstrated good practice in the management of emergencies involving dangerous goods, this included regular table-top and practical exercises with the relevant emergency services;

- At other locations we found limited evidence of staff receiving refresher training on emergency processes;

- Control room operations appear to be effectively run, with increasing use of technology to aid controllers in their duties. FOCs need to ensure that the competence and fatigue of control room staff taking safety-critical decisions is managed in accordance with other staff carrying out safety-critical roles;

- A lack of communication between planning and operational staff that led to a loaded freight service being stabled at an unsuitable location during a period of severe weather. The train, which had been stabled on a slight gradient, subsequently ran away;

- For many freight operators there is a reliance on Network Rail to take the lead when dealing with operational incidents on mainline infrastructure.

110   Following the implementation of restrictions to control the spread of the coronavirus in late March 2020 we have started to monitor freight duty holders' contingency arrangements during this time, as well as provide advice and guidance so that freight operators can continue their vital work to support British homes and businesses during this unprecedented time.

111   **Conclusions:** We expect duty holders to have arrangements in place to manage emergency situations that are appropriate to the organisation's scope and operations.

Trespass at freight depots and sidings

Overview: After several incidents of trespass at freight sites we have continued to encourage duty holders to improve their management of trespass. The law requires duty holders to take reasonably practicable measures to prevent unauthorised access to railway infrastructure. Where duty holders fail to meet this standard, we will take enforcement action.

112   **Evidence & Activities:** In January 2020 a freight operator was sentenced following an incident in 2017 where a child suffered life-changing injuries after receiving an electric shock from 25,000 volt overhead line equipment having entered a railway depot in the West Midlands through an unsecure boundary fence. The duty holder pleaded guilty and was fined £1.2 million. A number of other incidents remain under investigation.

113   **Activities:** We have continued to engage with freight operators and their customers on this issue and have examined duty holders' arrangements to prevent unauthorised access during site visits.

114   **Conclusions:** Fatal consequences can result from individuals trespassing on railway sites. The law imposes clear duties on all railway duty holders to take reasonably practicable steps to prevent unauthorised access to infrastructure under their control.

Third Party Infrastructure Management

Overview: Particular care needs to be given to infrastructure inspection and maintenance at boundaries between infrastructure managers. There is currently considerable variation in the arrangements that freight operating companies and terminals use carry out track inspection and maintenance.

115   **Evidence & Activities:** Following the September 2018 derailment of an intermodal freight service on leaving a freight terminal in the Birmingham area that resulted in considerable damage to both the terminal and adjacent Network Rail infrastructure, we carried out a series of inspections of track inspection and maintenance arrangements on 3rd party infrastructure where derailment could impinge upon Network Rail infrastructure. The inspections focussed on intermodal terminals, with inspectors looking at terminals operated by both FOCs and third party logistics providers.

116   Our inspections found that inspection and maintenance processes varied significantly across third parties in terms of both the approach taken and the level of maturity of asset knowledge, with some infrastructure managers using in-house staff to manage track assets and others contracting track inspection and maintenance work out.

117   **Conclusions:** We recommend that the wider freight sector takes steps to develop a harmonised, risk-based approach to track maintenance and inspection of third party sites and staff competence.

Cross sector collaboration

Overview: Collaborative working amongst competing duty holders in the freight sector continues to demonstrate its potential to contribute to the delivery of sector-wide improvements in health and safety risk control.

118   **Evidence:** The cross-industry group on freight derailment has made considerable steps towards a state of "business as usual" for the sector in terms of the implementation of control measures

designed to reduce the risk of freight train derailments. Not only should this be regarded as a considerable achievement in its own right, but the collaborative nature of the working group which combined representatives from across the freight sector, should be seen as a model to emulate in order to address other cross-industry issues.

119   The NFSG continues to make progress with addressing key industry risks. It is reassuring to note the progress that has been made with a number of NFSG workstreams, including the development of a template for common safe systems of work at multi-user freight sites. This has the potential to lead to safety and operational benefits for operators. In July 2019, senior leaders from FOCs and Network Rail committed to supporting the work of NFSG by signing a revised Rail Freight Project Charter. Senior leadership support is essential to successful health and safety management and it is reassuring to see freight sector leaders endorse this work.

120   Freight End Users (FEUs) play an important role in ensuring safe operations, both within their own sites and where their activities interface with mainline operations. It is reassuring to note the steps taken by FEUs and the wider freight sector to start to collaborate on relevant safety matters.

121   **Activities:** We have continued to engage with industry working groups and Network Rail's Freight and National Passenger Operator route. Safety issues are also routinely discussed with FEUs at ORR's freight customer events. We also liaise regularly with colleagues at the Health and Safety Executive and the Office of Nuclear Regulation to share intelligence on areas of common interest. In March 2020, we held our first Freight Safety and Operations conference. Attended by over 30 leaders from across the industry, the conference focussed on the importance of effective leadership at all organisational levels to delivering safe freight operations.

122   **Conclusions:** The freight sector's industry-leading collaborative approach continues to deliver improvements in health and safety risk control. However, it is important that this work continues and freight duty holders strive to achieve excellence in the management of health and safety risks.

Heritage railways

Overview: The SMS is the cornerstone of good risk management and remains the focus of our inspection and investigation activity. Strong safety management systems that are proportionate and relevant to each individual heritage railway's operating characteristics will ensure that the railway can not only emerge and recover from the coronavirus pandemic but continue to grow and secure a long-term future.

Our strengthened supervisory capability has provided greater scope for delivering more proactive inspections; a feature which will continue into 2020/21. Evidence from our inspections and investigations are that the capability and maturity of the heritage sector is broad; some are very good and others require work. The quality of safety management systems is improving, often in response to our interest, but significant gaps remain in capability to demonstrate how risk is systematically controlled. Consequently, lack of incidents in the past at those railways is not necessarily a reliable indicator of how well risk is managed, or what may occur in the future. We have intervened where we have discovered it was necessary to address such issues.

The Heritage Railway Association (HRA) remains an important part of the heritage sector and recognises that it can strengthen its leadership role. We support the steps it is taking in developing its strategic approach for the next five years to increase its capability. Amongst a number of positive actions, work will commence to establish a Heritage Safety and Standards Board aimed at increasing cross sector cooperation, sharing safety related information, and delivering an important role in developing, reviewing and promoting proportionate ways to manage safety risk. Initial reaction from individual railways appears positive although it is too early to assess how the coronavirus pandemic will impact on progress.

We will promote and use RM3 as part of our intervention programme; and finalise the heritage-specific topic sheets to increase RM3's usefulness as a tool to identify weaknesses and to target actions to drive management improvements. We will also continue to support HRA and the wider heritage sector as it develops its capability and explores the potential to create a safety and standards function.

123   **Evidence:** The non-mainline heritage sector (the 'heritage sector') has around 220 railways travelling along 562 miles of track of different gauges, operating at a maximum speed of 25mph over lengths varying from under 0.25 miles to 38 miles. Many operate at significantly lower speeds consistent with infrastructure and rolling stock capability. One railway holds a non-mainline safety certificate to allow limited operations on the national railway; others have similar plans. The sector is growing and we continue to see new heritage operations emerging with ambitions to commence operating trains in the future, or existing operators with extension plans. In line with our safety-by-design strategy, we spend a small, but significant proportion of our time engaging with operators, providing advice on safety risk matters and the essential requirement to demonstrate how operators are identifying, assessing, and reducing risk to levels which are as low as reasonably practicable.

124   The ORR **RM3 2019** is relevant to the heritage railway sector and is a useful tool to help both us and railways themselves consider safety management system capability, and to identify areas for development. Where we gained sufficient evidence during our supervisory activity we used RM3 to assess the companies SMS maturity using a smaller number of practically applicable RM3 criteria. In conjunction with the HRA, we ran six RM3 seminars across Great Britain for the heritage sector during 2019/20, introducing and illustrating how to use RM3 in a heritage railways environment, and offering opportunities to practice applying it using a variety of evidence sources. There was a high level of engagement across all the seminars and a real enthusiasm for how RM3 could help railways enhance their own capabilities to asses and improve SMS implementation.

125   **Our assessment of the sector's overall maturity** in 2019/20 shows a wide range of risk management maturity. The chart below shows a composite of the results we obtained from our inspections and other supervisory activity, indicating the maximum and minimum maturity levels determined by inspectors for each key heritage criterion.

A composite RM3 assessment of heritage railway operators' risk management maturity in 2019/20
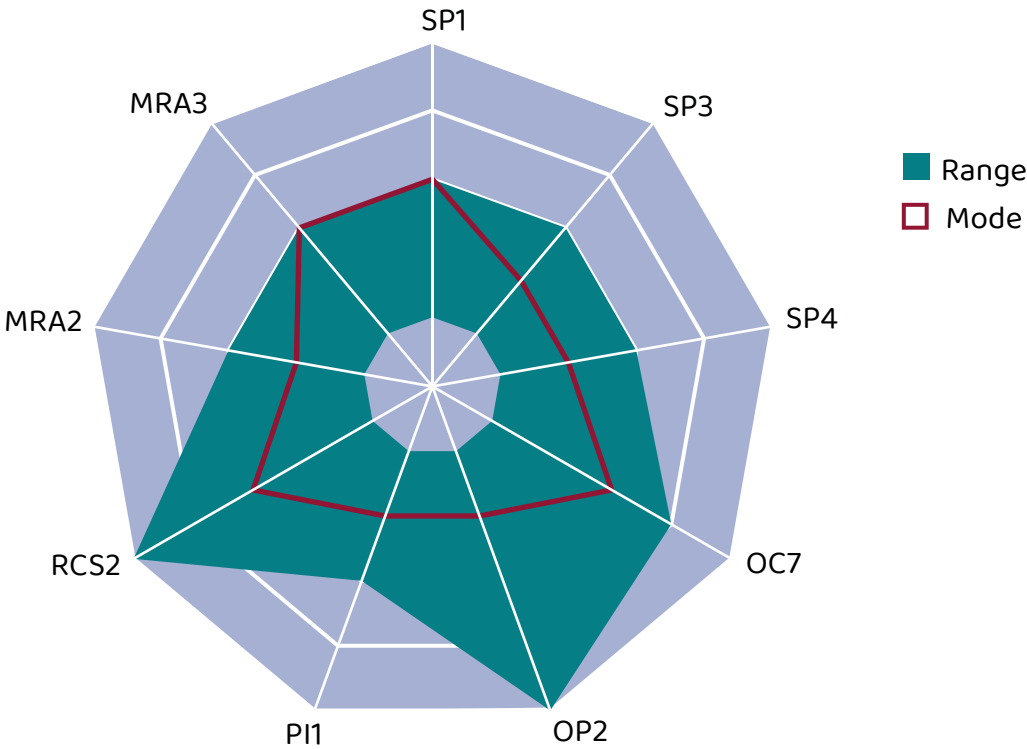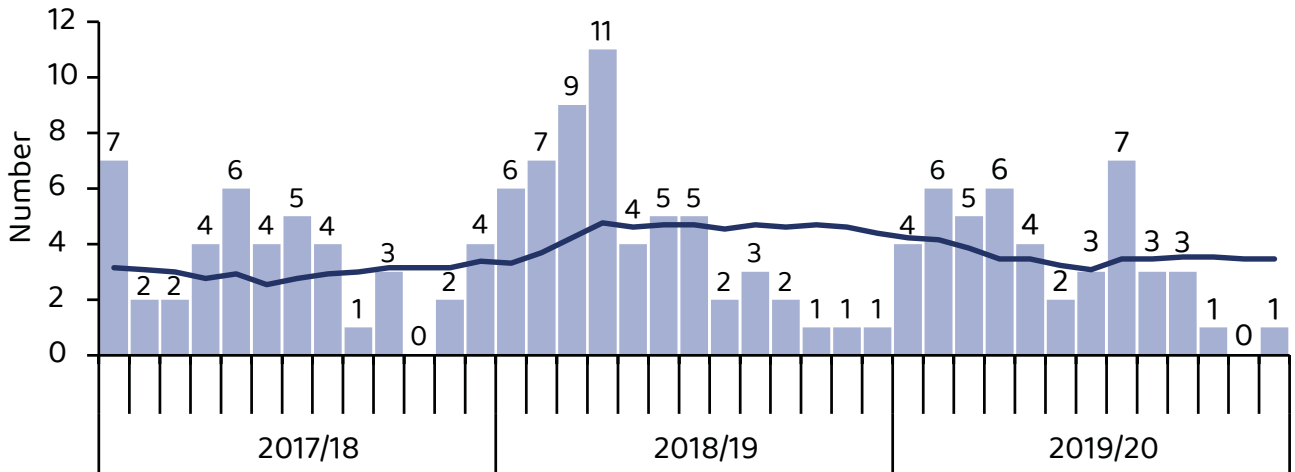

Source: ORR

Our RM3 assessment for the heritage railway sector risk management maturity in 2019/20, based on inspection and investigation activity; with the range shown in grey, and our composite assessment in red.

126 We require all operators to have a **safety management system** that is proportionate to the risk they are managing. Positively, risk is generally controlled on a day-to-day level but many safety management systems remain immature. Our composite RM3 assessment found that most operators are operating in the managed or standardised level, with the written health and safety management system criterion (SP4) in the ad-hoc to standardised range. Heritage railway operator's safety management systems varied from good to poor; in some instances lacking appropriate detail or references to indicate how safety is managed as a system. Our inspections revealed varying standards between similar sized organisations, as well as differing standards between departments within the same organisation. Where we did see good approaches, these often used technology to promote a system approach; digital platforms to share information and to deliver a system approach to asset, information, and competence management. Heritage operators continue to show enthusiasm to learn and manage their operations safely, and have responded appropriately to inspector advice.

127 The role of a heritage railway's Board plays an important part in ensuring that safety is given appropriate attention, and that regular effective reviews take place. We found that the quality of Board oversight was variable and, in some instances, having a detrimental impact on railway performance. Informed by research into **leadership and governance** in the heritage sector, guidance on board governance forms a key element of our draft RM3 heritage topic sheets and supplementary guidance.

128 We continue to use **RIDDOR data** to provide granularity on safety performance, recognising the restrictions that the relatively small data sets and RIDDOR definitions present. We use this data, amongst other things, to inform our inspection priorities.

129 There were **no heritage railway-caused workforce fatalities** in 2019/20, now making it eight years since a workforce fatality. The number of major and minor injuries resulted in a slight increase in the FWI, up from 1.37 to 1.65. The main cause of injuries continues to be slips, trips and falls.

130 As in previous years, there were **no passenger fatalities in connection with heritage operations.** The number of RIDDOR reported **passenger / public injuries remains low** and small changes in numbers can lead to dramatic shifts in the indices of performance. The total number of reported injuries fell; and the FWI returned to 2017/18 levels at 0.21.

131 The total number of reported RIDDOR **dangerous occurrences** across the heritage sector fell by one fifth during 2019/20 back close to 2017/18 levels. Although none of these dangerous occurrences resulted in serious consequences, it was not uncommon for the incident to result in serious damage to rolling stock or infrastructure. In one instance, we served a prohibition notice due to the lack of risk assessment resulting in an unsafe system of operation. Whilst the sector continued to report a spike in the number of incidents towards the beginning of the operational year, the increase was lower than in previous years with fewer high risk events. Nevertheless, this higher proportion of incidents at the beginning of the year suggests operators still need to increase their levels of vigilance, and particularly competence assurance, as they bring services back into operation after a winter shut down. SPADs and derailments continue to account for just over half of all reported dangerous occurrences.
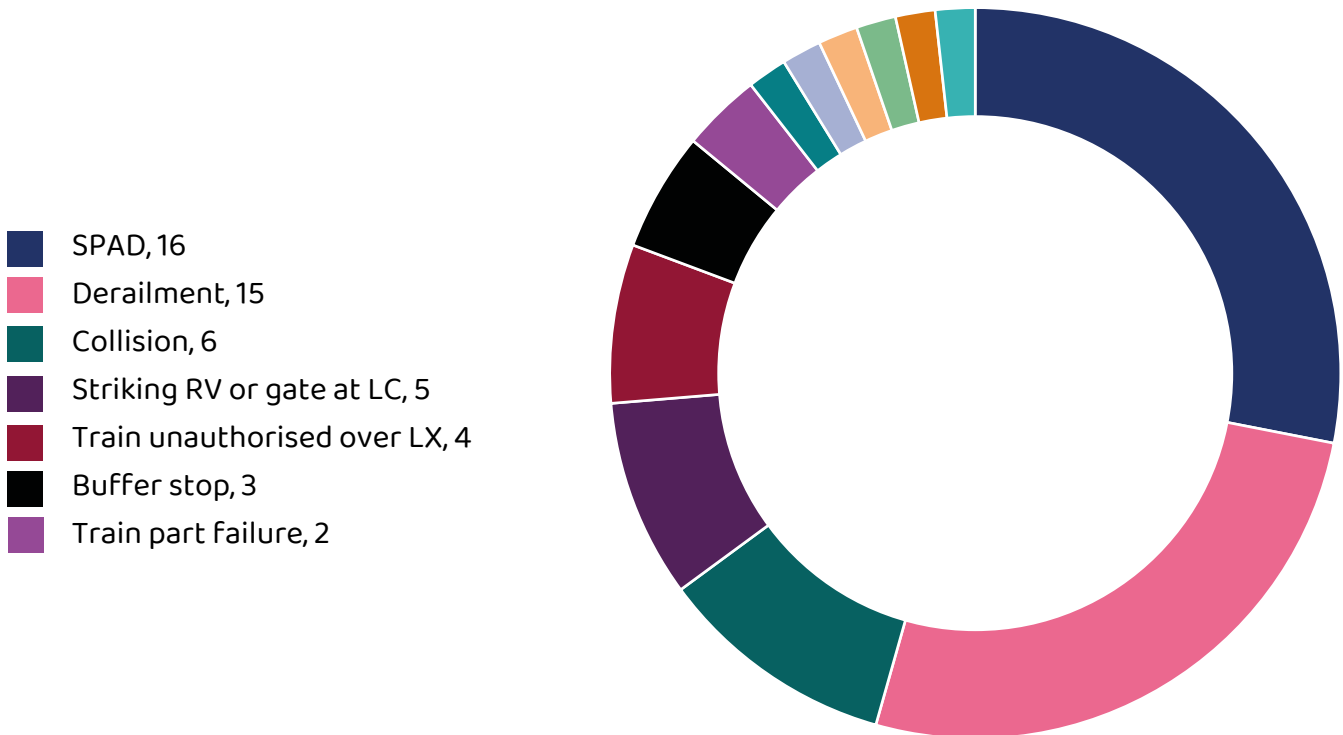
Heritage railways Dangerous Occurrences 2017/18 to 2019/20

Source: ORR
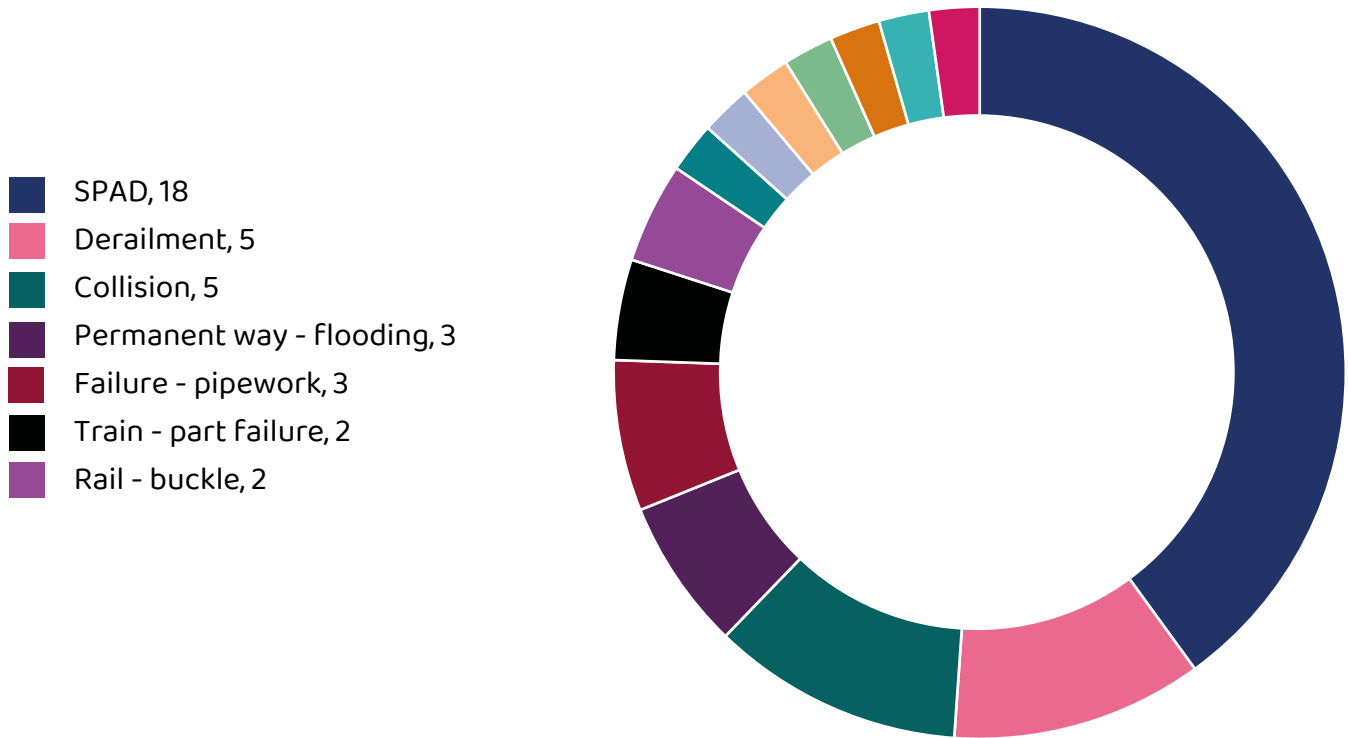
Number of Dangerous Occurrences (DO) 2018/19 and 2019/20

2018/19, 57 DOs

- SPAD, 16
- Derailment, 15
- Collision, 6
- Striking RV or gate at LC, 5
- Train unauthorised over LX, 4
- Buffer stop, 3
- Train part failure, 2

Source: ORR

2019/20, 45 DOs

Legend:
- SPAD, 18
- Derailment, 5
- Collision, 5
- Permanent way - flooding, 3
- Failure - pipework, 3
- Train - part failure, 2
- Rail - buckle, 2

Source: ORR

132   Heritage railways continue to rely on the competence of individuals as a key risk control measure, reflecting in part the desire to retain a link to operating practices of the past, coupled with limited opportunities to 'engineer out' risk. Our supervisory work found that the maturity of the competency management arrangements was variable, even between departments within railway organisations. Generally, the operations departments (footplate crew, guards, signallers) were better than engineering departments at demonstrating how competency was managed, and were able to provide documentary evidence to support a worker's assessed competency level. All three prohibition notices we served during 2019/20, and several voluntary cessations, featured the management of competence as a factor; illustrating the direct relationship between competence and management of risk. HRA's work on competency management and associated workshops are positive steps in developing capability in this area, and will enable railways to develop the maturity of their current arrangements.

133   A common theme during the year was the inadequacy of several railways' arrangements to manage permanent way. Whilst the majority of railways we visited had suitable arrangements in place, some were unable to demonstrate an effective approach to managing derailment risk. Common issues included missing or unclear standards setting out the requirements for inspection and maintenance, and an absence of competency and asset condition records. We issued a prohibition notice to one railway stopping all train movements due to the condition of the permanent way, and provided significant advice to several others on gaps in their arrangements that needed addressing. This included providing guidance on how permanent way condition impacts on route availability, leading to suspension of operations due to lack of asset condition knowledge.

134   The sector has responded positively to the challenges identified around ensuring carriages are in suitable condition for operation after our earlier interventions. Railways were generally able to demonstrate that they had arrangements in place to assess and respond to age related condition deterioration and we saw significant actions to restore carriages to operational condition. The next stage will be finalising and publishing HRA's Code of Practice for carriage maintenance, and we expect HRA to make significant progress during 2020/21. The HRA assisted the sector to improve the risk controls associated with droplight windows in a proportionate manner, centring on risk assessment as the basis for action.

135   **Activities:** At the beginning of 2019/20 we formalised our increased supervisory capability, allowing us to shift focus from reactive inspection and investigation towards a more proactive programme of monitoring of the heritage sector, supplemented by investigation in line with our processes. Using our risk assessment risk ranking process (RARR) we reviewed and confirmed our key risk priorities for the year as:

● Leadership & governance

● Safety Management Systems

● Inspection and maintenance of infrastructure, traction and rolling stock

● Competence management systems generally, with particular focus on operating and engineering staff;

● Workshop safety

● Level crossings risk management

136   The team undertook around 20 **inspections** of significant heritage operator's safety management systems; typically interviewing managers and staff, reviewing and discussing SMS documentation, and undertaking site inspections. This proactive initiative has been seen by the sector as a major stepping up of our interest and activity, and further resulted in a very high level of engagement in six RM3 workshops run by ORR with the assistance of the HRA.

137   Incidents during the year fell into five themes:

● Rolling stock runaways;

● Poor train control;

● Operating irregularities (including an incident resulting in two trains heading towards one another on the same line);

● Train preparation (including train divisions); and

● Slow speed derailments.

138   Each instance provided an opportunity to test the effectiveness of the safety management system, with particular focus on the risk priority topics listed above. Many of the incidents illustrated that slightly different circumstances could have resulted in very different outcomes. Whilst not as a result of safety events, we supported the sector to challenge material quality issues that could affect steam boiler safety, drawing on expertise from the Health and Safety Executive.

139   We served three **prohibition notices** (two relating to inspection and maintenance, and one operations) and one **improvement notice** (relating to occupational health) during 2019/20. Common themes across were a lack of suitable and sufficient risk assessment to identify suitable control measures. In the case of the prohibition notices, we concluded that the controls in place were inadequate to control risk.

140   In common with the mainline railway, heritage railways operate a variety of different types of **level crossings**; and we provide guidance and advice to railways on the types of issues they should be considering as they prepare their risk assessments. We also spend a small, but significant amount of time providing guidance on the creation of new level crossings, usually associated with proposed line extensions. Whilst we do not provide permission or approve new level crossings, we give our opinion on whether there are reasonably practicable alternatives to a proposed level crossing, including to Transport and Works Act Order enquiries.

141   Recognising the important role that both paid staff and volunteers play at all levels in securing safety within heritage railways, we continue to take specific action to help the sector maintain and improve its management of risk. During 2019/20 we have:

- Delivered six RM3 + safety update workshops across Great Britain to provide practical guidance in how to use RM3 in a heritage environment to improve safety management capability;

- Developed specific targeted RM3 guidance tailored to the heritage railway environment;

- Supported HRA's competence sub group in developing a refreshed approach to competence management;

- Attended and presented at a variety of HRA and local railway safety events and safety / technical meetings;

- Engaged with HRA's Operating and Safety Committee; and providing input into its core operating principles and guidance development activities;

- Provided sector specific guidance on managing risks associated with the coronavirus pandemic.

142 Looking forward, it is difficult to ignore the particular challenge that the coronavirus pandemic will present to the heritage sector in 2020/21 and beyond. Whilst it will only have a small impact on physical asset condition, it will potentially bring into sharp relief the resilience of the sector's workforce (at all organisational levels) and the capacity of railways to safely re-commence operations with potentially fewer workers and with greater commercial pressures. Strong safety management systems that are capable delivering safe operation in changed circumstances will be essential. Well-developed competency management systems that are able to reliably develop and demonstrate competent workers will assist in ensuring railways remain safe. In the context of, the coronavirus pandemic we have published specific guidance to assist operators as they prepare to reintroduce services.

143 Of course, alongside the coronavirus pandemic, there remains the ongoing challenge of managing health and safety risk on the railway. Specific to the heritage sector is the absence of reliable consolidated data concerning incidents and accidents. Whilst individual operators may collect data, we recommend that arrangements developed to analyse and share such information is shared across the sector. Sector level analysis may identify significant risk issues, or missed opportunities that could be used to improve the sector's resilience, and its understanding and management of risk. The HRA has taken a significant and important role in providing, amongst other things, safety leadership to the sector, most visibly by developing and promoting proportionate ways to manage safety risk. In 2019/20 we asked the HRA to review and increase its leadership capability. It embraced the challenge and responded positively by developing a five year strategy for growth. One of the elements of this strategy was to investigate the creation of a safety and standards type body to drive forwards increasingly effective cooperation and information sharing to improve the management of safety risk across the whole sector. Whilst the challenge in doing this may appear daunting in the current environment, we believe such a body will provide real support as the sector reinvigorates itself and emerges stronger from the current circumstances.

144 **Conclusions:** The heritage sector is a diverse collection of different types of railway with very different scales of operation. It remains a growing sector, but significant challenges must be

addressed if it wants to remain sustainable in the 21st century, relating largely to reliance on an enthusiastic but largely voluntary workforce performing safety critical tasks professionally.

145 The SMS is the cornerstone for risk management, and these vary across the sector. The SMS should assist a railway to operate safely so it is critical that it sets out how the railway actually manages risk. We provided significant advice to several railways on areas to improve their SMS to allow continued operation.

146 Operational competence is generally well managed across the majority of operators visited; engineering functions less so, where demonstrable competence remains a challenge. This became a significant issue in the permanent way function where we took enforcement action on several occasions due to unacceptable track condition. We will continue to look at the management of competence in engineering functions in 2020/21.

147 Overall the safety performance in the sector has plateaued, and the advent of asset management solutions (such as electronic records management and scheduling); increased focus on competence management; and the introduction of RM3 provides a series of tools to enable improvements in the reliability of risk control arrangements. The development of a heritage safety and standards type body will introduce a new level of capability to the sector as it focuses on its future resilience and sustainability.
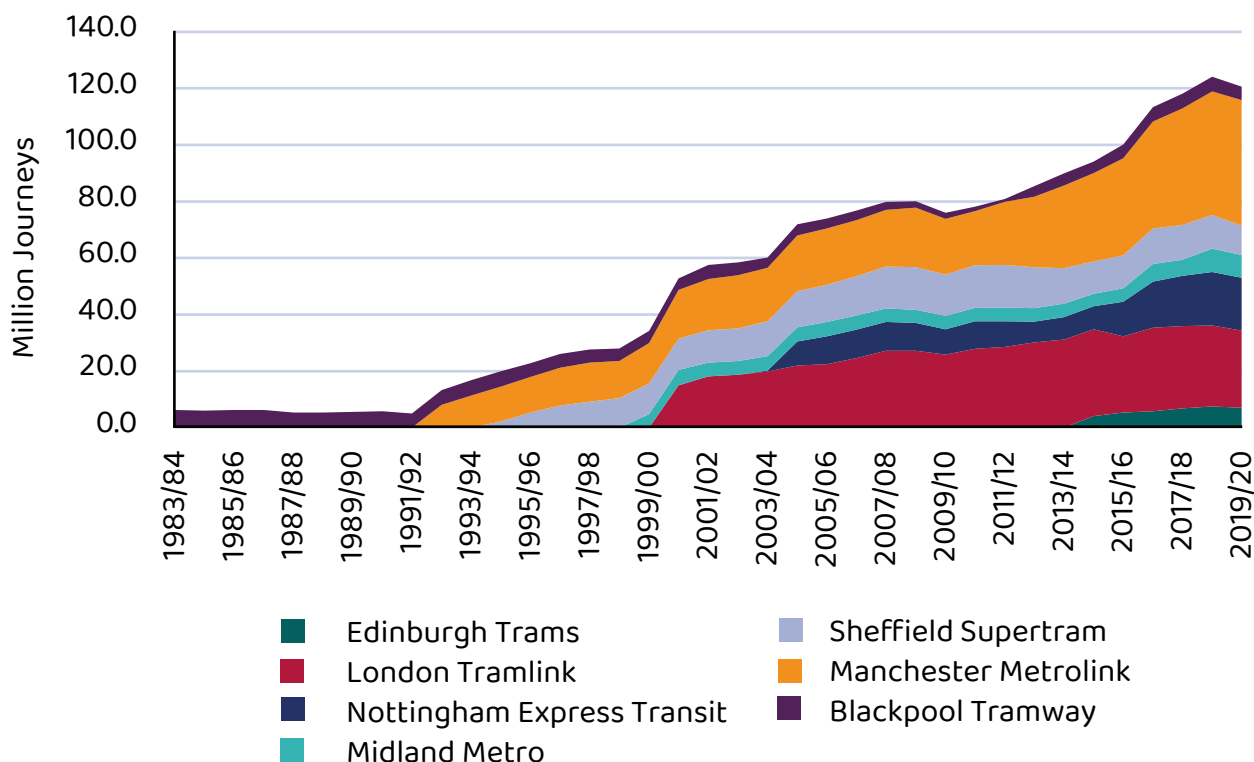
Tramways

Overview: Great Britain's light rail and tram sector continues to grow with increasing numbers of passengers using existing services. Health and safety performance across the tramway sector has improved on 2018/19, with improving trends in reported numbers of dangerous occurrences and injuries. While there were no reported worker or passenger fatalities during the year, two pedestrians were fatally struck by trams operating in an on-street environment.

The sector has continued to respond positively to the 15 recommendations made by RAIB in their investigations in to the overturning of a tram at Sandilands in 2016. The sector has taken significant steps to improve the identification and control of risk, most notably in establishing the Light Rail Safety and Standards Board (LRSSB); and delivering significant work around the development of systems to monitor driver attention and physical prevention of tram overspeed. LRSSB has an important role to play in supporting owners, infrastructure managers and operators deliver full implementation of the remaining recommendations; as further action is dependent on the outputs of research and guidance led by LRSSB. Some of this work is dependent on continued funding by DfT, and we were pleased at their recent announcement regarding funding for 2020/21.

During 2019/20 the BTP concluded their investigation and the Crown Prosecution Service subsequently concluded that they would not take forward any prosecution. The case has now been passed to us to consider under the health and safety legislation. In accordance with our policy, we will await the outcome of the inquest before making a final decision on prosecution.

148   **Evidence:** There are seven tram systems in Great Britain: Blackpool Tramway; Edinburgh Trams; Manchester Metrolink; London Tramlink; Nottingham Express Transit; Sheffield Supertram; and West Midland Metro. Outside London there are also two light rail systems: the Tyne and Wear Metro system and the Glasgow Underground.

149   The tram sector remains important; trams play a critical role in the public transport arrangements of several key cities, enabling people to travel for work and leisure purposes. The sector has ambition: several existing systems are either expanding or exploring opportunities for expansion, and several urban conurbations are investigating options for new tram/train, light rail, or very light rail solutions. Passenger journeys increased by over 2.8% in 2019/20 to just over 120 million passengers across Great Britain's tram operation, and passenger satisfaction remains high. Route miles also increased, with the opening of the West Midland Metro's Centenary Square extension, and Manchester Metrolink's Trafford Park extension. Following the successful introduction of the first UK trams to operate with an On board Electrical Storage System in 2018, further vehicles have been ordered, due in 2021.
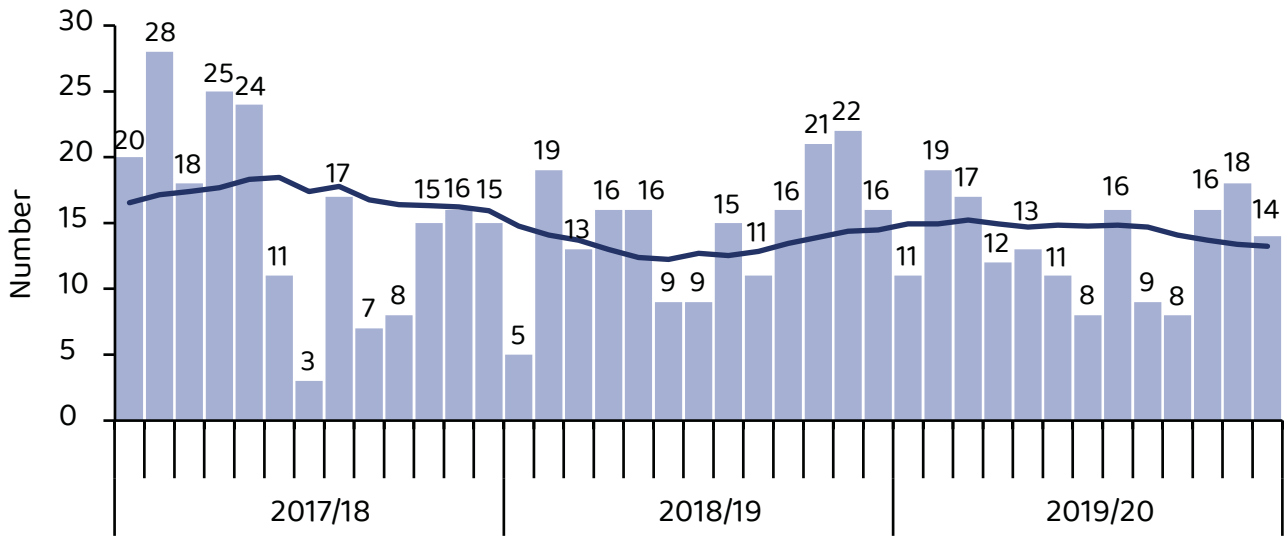
Passenger journeys on trams by system

Source: ORR/DfT

150   With LRSSB's support the sector has made significant progress in introducing its new **Tram Incident and Accident Reporting** system across the tramway systems, and this will begin producing sector level reports during 2020/21. In the interim we continue to use RIDDOR data to provide granularity on safety performance, recognising the restrictions that the relatively small data sets and RIDDOR definitions present. There have been some minor changes to the 2018/19 data due to late reporting and data cleansing. We use this data, amongst other things, to inform our inspection priorities.

151   Once again the tram sector reported **no workforce fatalities** in connection with their operation in 2019/20 and the number of reported workforce injuries fell. The RIDDOR reported workforce injury trends and FWI continue to fall, down to 0.18 from a high of 0.50 in 2016/17.

152   There have been **no passenger fatalities** since 2016, and the number of reported injuries continues to fall. Based on RIDDOR reports, the passenger and public FWI increased primarily due to two tragic incidents when trams fatally struck a pedestrian. Our enquiries concluded that neither incident was due to the actions or inactions of the tram company; one a tragic accident and the other as a result of a separate criminal act investigated by the Police.

153   The number of mandatory reported **dangerous occurrences** across all tramways fell to 172 in 2019/20 continuing the long term reducing trend. This is at the lowest level since 2013/14. The overall reduction has been driven by a fall in the number of reported collisions between tram and road vehicle. Work to address a number of the RAIB Sandilands recommendations have the potential to reduce the risk associated with these types of incident.

Dangerous Occurrences, 2017/18 to 2019/20
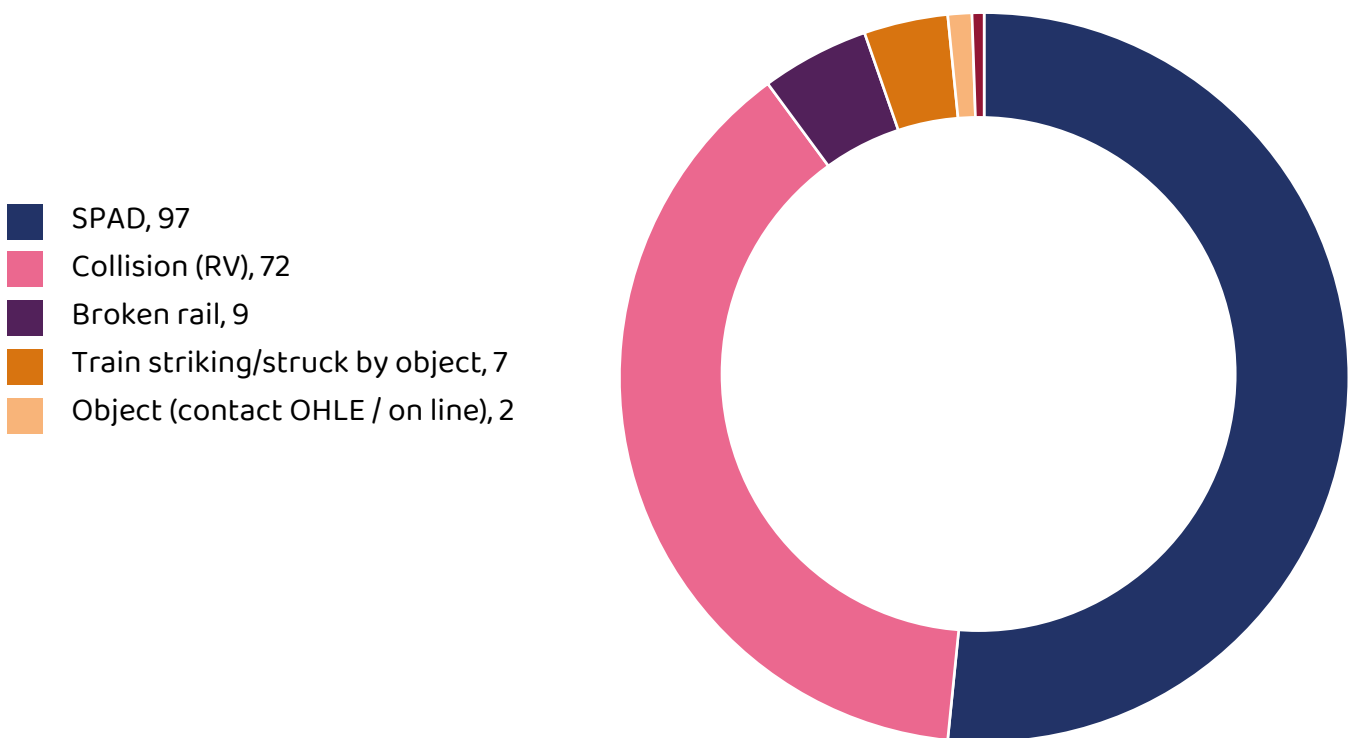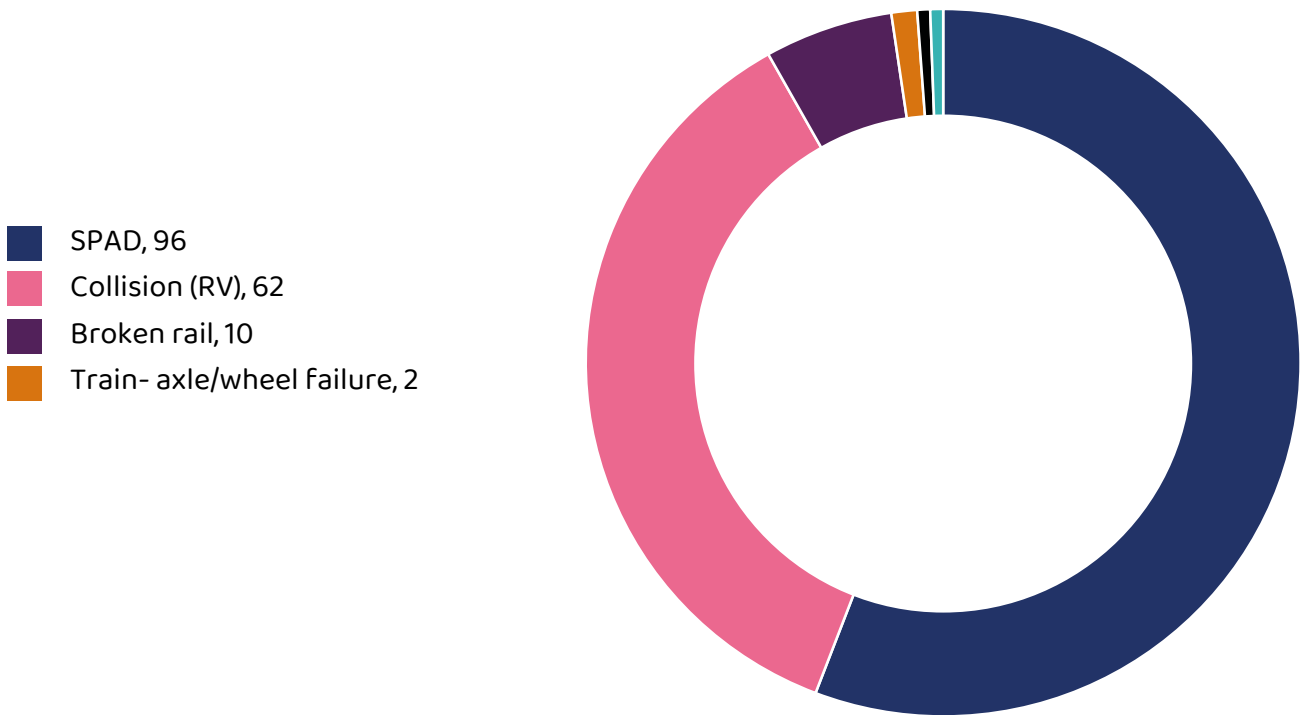

Source ORR

Number of Dangerous Occurrences to end March 2020

2018/19: 188 DOs

- SPAD, 97
- Collision (RV), 72
- Broken rail, 9
- Train striking/struck by object, 7
- Object (contact OHLE / on line), 2

Source ORR

2019/20: 172 DOs

SPAD, 96
Collision (RV), 62
Broken rail, 10
Train- axle/wheel failure, 2

Source ORR

154   The **Light Rail Safety and Standards Board (LRSSB)** completed its first year of operation in 2019/20. We consider that LRSSB's roles and remit make it capable of delivering the matters raised in RAIB's Sandilands Recommendation 1 as well as other safety initiatives. We have formal arrangements in place to monitor its work. LRSSB's first year has been successful; it has developed and rolled out an industry risk model and Tram Accident Reporting Database; established a process for producing and managing standards and guidance; published a number of industry guidance documents; and is supporting significant work around the development of systems to monitor driver attention and physical prevention of tram overspeed. LRSSB also took responsibility for the Tramway Safety Principles publication from UKTram and updated and re-issued it in 2019. LRSSB plays an important role in supporting the sector to deliver the final elements of the outstanding Sandilands recommendations, where further action is dependent on the outputs of research and guidance led by LRSSB. Some of this work, and the pace at which it is delivered, is dependent on the continued funding by DfT.

155   A key component of our health and safety strategy for tramways is that the sector looks for opportunities to identify safety improvements and **embrace appropriate risk control technologies.** The sector is responding positively to this, particularly around how individual operators and LRSSB are delivering the Sandilands recommendations. Tram Operations London have spent significant time and resources on implementing the RAIB Sandilands recommendations and have delivered industry leading work on fatigue and vehicle integrity. This is also clearly seen in the actions exploring driver attentiveness, the ongoing trials of the Simove continuous speed monitoring solution on Manchester Metrolink and the obstacle detection trials at Blackpool Trams.

156   With the successful introduction of the LRSSB and introduction of the safety risk model across all operators, the sector is able to improve its understanding of **risk profile** at individual system and national level to better control emerging risks/precursors to incidents. The first output of LRSSB's risk model indicates that the top hazardous events relate to collisions with people and road vehicles; passenger/public slip, trip and fall incidents; and overturning of a tram. The precursor analysis output supports the priority that the sector is placing on LRSSB's current guidance and research work and its own work to progress driver attentiveness and speed control solutions. All tramway systems now have in place arrangements to determine and then install systems to increase the monitoring of driver attentiveness and speed control at high risk locations. We continue to support the delivery of this work.

157   Tramway infrastructure managers and operators are required to have **safety management systems** proportionate to their operations and the risks they are managing. During 2019/20 we have seen improvements in fatigue management and safety culture, and are aware that LRSSB hosted best practice days that are having positive impact on company process and standards.

Our RM3 assessment across a range of criteria judged that tramway systems are operating in the standardised and managed level, and occasionally predictable. Positively we did not assess any tramway systems to be operating in the ad-hoc level; or non-compliant with legislative requirements in the areas inspected that warranted formal enforcement action.

158 **Activities:** Our 2019/20 structured programme of work focused on delivering proactive supervision of the tram sector, including inspection and investigation activity. Informed by our strategic risk chapter and risk assessment risk ranking process, our intervention programme targeted the effectiveness of duty holder's arrangements

159 We participate in a number of **industry forums**, including UKTram's Light Rail Engineering Group meetings, and supporting LRSSB's board meeting. We also provided comment on a number of LRSSB's guidance documents.

160 We continue to engage with owning authorities who are procuring **new vehicles** and **constructing extensions** to ensure that opportunities are taken to design out risk so far as reasonably practicable. Our interventions focus on ensuring that the authority and operator have suitable level of safety assurance in place. We provided advice on safety verification, including the advantages offered by using the Common Safety Method for Risk Evaluation and Assessment. This is being used as part of the procurement of Tyne and Wear Metro's new fleet and will assist in delivering requirements to operate on both Network Rail and Metro infrastructure. Working with colleagues across ORR we will continue regular engagement as we are required, on behalf of the Secretary of State, to approve these vehicles under section 9 of the Tyneside Metropolitan Railway Act 1973.

161 We made initial enquiries in to **several incidents** on UK tramways, including persons or objects trapped in tram doors, collisions with pedestrians and cyclists on highways or tram stops and objects placed on the line. Where we identified that improvements were required, we took action in accordance with our enforcement policy statement. As in previous years, a number of tram collisions with road vehicles resulted in proposed prosecutions of the motorist for traffic violations.

162 Following an incident on the London Tram system which resulted in a low speed derailment we served an **Improvement Notice** as the owner of the tramway had failed to make a suitable and sufficient assessment of the risks arising from unauthorised access onto segregated sections of tramway infrastructure. The owner has now complied with the requirements of the notice.

163 The long term impact of the coronavirus pandemic on the light rail sector is unclear; but we understand the challenges, both operational and financial, that the sector is facing. As the impact of these challenges become clearer, each system should use its change management processes to assess the safety impact of any proposed changes. We expect such arrangements to include robust risk assessment involving meaningful consultation with health & safety representatives to cover all aspects of change, including the impact of any delay on research or planned work to rolling stock and infrastructure.

164 **Conclusions:** Our inspection findings continue to indicate that the sector has safety management systems capable of managing risk and are taking action to improve reliability of these systems in key areas, such as fatigue management and safety culture. Whilst the number of safety incidents that are under the control of tramway systems continue to fall, events such as Sandilands

illustrate that LRSSB's work remains essential so as to enable the sector to better understand risk and identify where reasonably practicable solutions are available. In particular, actions designed to increase the reliability of line of sight operation, such as driver assistance tools, should drive down risk for workers, passengers and public.

165   We have seen the significant progress individual owners, infrastructure managers, and operators have made in implementing the Sandilands recommendations, noting that further material action is dependent on the outcome of LRSSB research work.

166   LRSSB's work in establishing itself as a trusted source of information during its first year of operation is positive. Its work in establishing a core suite of light rail standards and guidance documents has made a good start and should improve consistency of risk control. The risk model and TAIR system have the potential to provide clearer information on risk profile and precursor events, which allows duty holders to identify and prioritise where to target effort. The current research, including driver attentiveness devices, has the potential to ensure that operators are able to make best use of technological opportunities as they become available as reasonably practicable solutions. The support and engagement for LRSSB's work at the highest level in member organisations is essential to deliver continued progress, as is a long term funding agreement with DfT. Both are essential to secure the final implementation of remaining Sandilands recommendations.

Transport for London, including London Underground and other metro services

Overview: Health and safety performance across Transport for London (TfL) managed infrastructure has again remained stable during 2019/20. For TfL duty holders, RM3 provides a broader and longer term view of organisations' maturity in management of health and safety and these continue to be in the range of standardised (3) and predictable (4). London Underground Limited (LUL) and London Overground (LO) passenger volumes have fallen year on year, down by 3.2% on those in 2018/19. However, in the first 12 periods of 2019/20 journeys increased slightly suggesting the overall reduction may be the result of the coronavirus pandemic. Docklands Light Railway (DLR) also saw a slight decrease in passenger volumes, down 3.9% on 2018/19. TfL Rail passenger volumes increased by 8.2% during the year, most noticeably in early 2020 before the impact of COVID-19 took effect. This increase is partly attributable to the transfer of London Paddington to Reading stopping services to TfL Rail from Great Western Railway on 15 December 2019.

Once more there have been no workforce fatalities arising from TfL railway operations (i.e. LUL, DLR, LO, and TfL Rail). Tragically, however, an employee of an LUL contractor sadly died while cleaning a moving walkway. This is the first workforce fatality in connection with LUL for over 11 years; and we continue to work alongside BTP investigating the circumstances of the incident to determine if there were any breaches in health and safety legislation.

During 2019/20, we served two improvement notices on TfL companies. One notice was served on LUL in relation to lifting operations at Stratford Market Depot and the other on Tramlink Croydon Ltd (see Tramways section of this report for further information).

London Underground Ltd (LUL)

Overview: London Underground Ltd has continued to deliver a good level of safety for the travelling public and its workforce. After the significant changes in 2018/19 as part of TfL's Transformation Programme there has been less change in 2019/20 and risk management maturity remains stable. Looking forward, embedding change on the recently reconfigured organisation requires careful attention, particularly around maintaining effective management of risk through reliable implementation of new and established processes. Continued positive leadership on health and safety with effective monitoring and assurance arrangements are essential as LUL recovers from the coronavirus pandemic.

167   **Evidence:** Tragically, an employee of an LUL contractor sadly died whilst cleaning a moving walkway at Waterloo Station during engineering hours. We continue to work alongside BTP investigating the circumstances of the incident to determine if there were any breaches in health and safety legislation. Together with an increase in all the injury classifications this led to an overall increase in infrastructure worker harm: recorded FWI rising to 2.51.

Infrastructure workforce harm (FWI) to end March 2020

Year	Major Injuries	Minor Injuries	Shock & Trauma
2004/05	1.1	0.619	0.006
2005/06	1.2	0.575	0.003
2006/07	0.8	0.587	0.01
2007/08	1.1	0.437	0.002
2008/09	1.4	0.804	0.008
2009/10	1	0.793	0.016
2010/11	0.6	0.694	0.018
2011/12	0.8	0.492	0.014
2012/13	1.8	0.745	0.017
2013/14	1.1	0.389	0.026
2014/15	0.5	0.253	0.002
2015/16	0.6	0.273	0
2016/17	0.8	0.333	0.002
2017/18	0.3	0.425	0.003
2018/19	0.2	0.399	0.007
2019/20	1 (Fatalities), 0.7	0.679	0.127

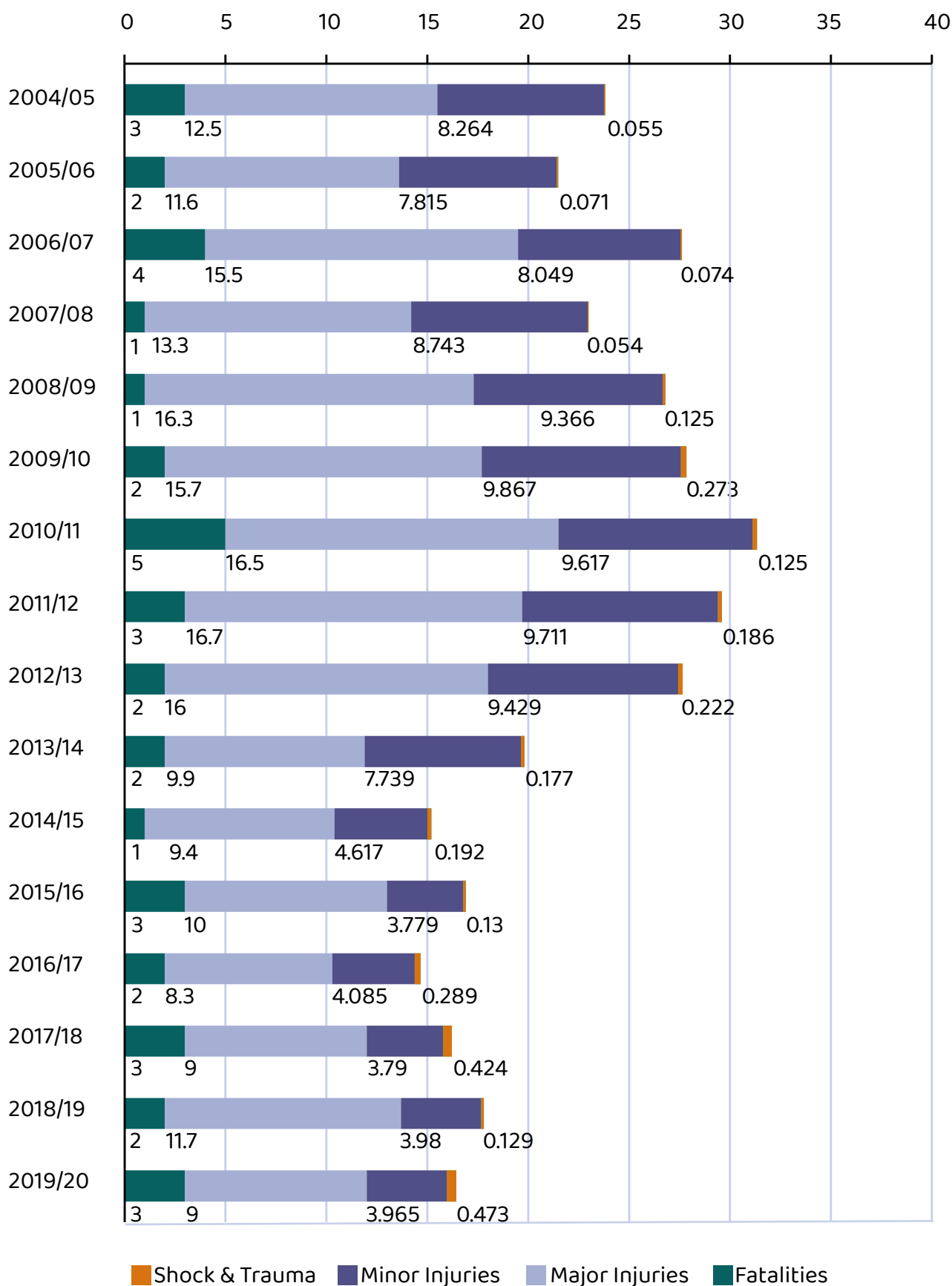Legend: Shock & Trauma, Minor Injuries, Major Injuries, Fatalities

Source: LUL

168   During 2019/20 LUL's focus was on reducing serious injuries to its workers and contractors, and improving the reporting of all injuries and near misses, with particular emphasis on minor injuries This work included launching of a new approach to operational communications, the strategy on workplace violence and aggression and additional safety awareness sessions in Asset Operations. Unfortunately, due to an increase in workplace violence incidents, overall a reduction in workforce injuries was not achieved by LUL this year.

169   In response to the fatal accident at Waterloo, amongst other things, LUL is working closely with other UK escalator/moving walkway maintainers to ensure that lessons from this tragic accident are learned and shared across the UK industry.

170   Over a billion passenger journeys are completed on the Underground each year. Unfortunately, there were three accidental passenger fatalities in 2019/20, a decrease of one on 2018/19. Our inquiries concluded that none were due to actions or inactions of LUL. The passenger FWI for major injuries was 9.00, an improvement on 2018/19 and returning to levels seen in previous years. Whilst there was no material change in passenger minor injury, shock and trauma FWI rose to its highest level seen over the last 15 years. The overall impact is that passenger harm has reduced slightly to an FWI value of 16.44.

Passenger Harm (FWI) to end March 2020

Year	Fatalities	Major Injuries	Minor Injuries	Shock & Trauma
2004/05	3	12.5	8.264	0.055
2005/06	2	11.6	7.815	0.071
2006/07	4	15.5	8.049	0.074
2007/08	1	13.3	8.743	0.054
2008/09	1	16.3	9.366	0.125
2009/10	2	15.7	9.867	0.273
2010/11	5	16.5	9.617	0.125
2011/12	3	16.7	9.711	0.186
2012/13	2	16	9.429	0.222
2013/14	2	9.9	7.739	0.177
2014/15	1	9.4	4.617	0.192
2015/16	3	10	3.779	0.13
2016/17	2	8.3	4.085	0.289
2017/18	3	9	3.79	0.424
2018/19	2	11.7	3.98	0.129
2019/20	3	9	3.965	0.473

Legend: Shock & Trauma, Minor Injuries, Major Injuries, Fatalities

Source: LUL

171   LUL's customer safety focus in the past year has been on reducing the number of serious customer injuries, in particular at three key locations in stations – escalators, stairs and at the Platform Train Interface (PTI - 80% of all customer accidents on the Underground happen in these three areas). LUL has taken a new approach this year which is increasingly more targeted and evidence-based, concentrating on the top 12 stations which contribute to the majority of injuries across the network. They are, using improved customer injury data, workshops, and trialling different intervention methods to drive forwards improvements. This has resulted in a reduction in the number of serious injuries to customers and LUL plans to continue this work for 2020/21 to ensure these changes are sustained across all stations on the network.

172   **Activities:** The main areas that our TfL team focus on are aligned with LUL's reorganised structure that came into effect in July 2018 to reflect LUL's wider transformation programme. These are:

- Network Operations

- Asset Operations

- Renewals and Enhancements,

- Tfl Major Projects, (in particular, 4 Lines Modernisation)

173   Towards the end of 2019, LUL continued its plans intended to make the Underground more efficient as part of the modernisation program. Focus is on improving competence management and making processes leaner and more efficient. This inevitably has led to the loss of some long serving and very experienced LUL staff, but it has also provided opportunity for new joiners with fresh perspectives. During this period of modernisation, we are conscious that such changes can potentially create additional challenges for LUL to manage as they continue to manage the residual impact from the last transformation.

174   Early in 2019/20 evidence suggested that LUL needed to increase its focus on how it implemented the requirements of its SMS. London Fire Brigade (LFB) has issued two formal enforcement notices and we were making an increasing number of preliminary enquiries into incidents that appeared to meet our formal investigation criteria. We wrote to LUL in June 2019 outlining our concerns and subsequently met with senior LUL management. We highlighted that whilst it was positive that LUL had maintained its risk management maturity as it had undergone its 2018/19 transformation, there was now a danger that any failure to begin moving health and safety forwards again would in reality become regression.

175   LUL acknowledged our concerns and committed to resolving them whilst agreeing to look more widely at the lessons to be learnt from understanding the underlying reasons for the incidents highlighted by LFB.

176   Our engagement and interventions with **LUL Network Operations** found positive senior leadership working closely with a very experienced Safety, Health and Environmental (SHE) organisation. Our supervisory work focused on how the transformation project affected risk management arrangements, concluding that new processes have matured and are providing a step change in

how risk assessments are delivered. This is a particular strength for LUL Network Operations that is providing benefits to a number of small business areas such as customer risk at stations and in Fleet Maintenance. We support the potential for this initiative to be rolled out to other parts of LUL.

177   A clear strength of LUL **Asset Operations** is that they have clear structure for each asset area; each with clear plans for short, medium, and long term work to ensure continued safe system. Our 2019/20 supervisory work found that whilst we did not identify uncontrolled risk, there is a lack of consistency in how Asset Operations monitor and supervise implementation, with in some cases no mechanism to track or follow up issues. We note that LUL is consolidating asset information into a single asset management system across the whole network to enhance its approach to asset maintenance.

178   **Conclusions:** The wider evidence from our supervisory activity during 2019/20 is that LUL's health and safety management system continues to have the capability to manage risk and that overall they continue to implement its requirements to a satisfactory standard. We identified areas of strength but also areas that indicate that LUL needs to take action to prevent further stalling in performance.

TfL Major Projects (Rail)

Overview: Our engagement and interventions confirm that the Major Projects Division is supported by a skilled and experienced health and safety team and that it has made notable improvements in the delivery of Construction Design & Management (CDM) Regulations responsibilities in response to our 2018/19 interventions. There was a clear shift towards focusing on applying the 'Principles of Prevention' at design stage, which should deliver long term improvements in risk management.

Rail for London Infrastructure Ltd / Crossrail

Overview: Rail for London Infrastructure Ltd (RfLI) will be responsible for managing and operating the Elizabeth Line infrastructure, the central operating section of Crossrail.

179   **Evidence & Activities:** We continue to engage strongly and effectively with the Crossrail project to ensure that all parties have a clear understanding of regulatory requirements and associated timescales. During 2019/20 we delivered the necessary ROGS exemptions and authorisations / certificates commitments to the project within its required timescales.

180   We issued a ROGS authorisation to RfLI Ltd in 2018 to allow them to act as infrastructure manager for the Crossrail central operating section. Due to delays in the Crossrail project, the organisation has yet to begin operations.

181   During 2019/20 we continued with our general liaison activity and carried out an intervention on the developing Competence Management System to ensure that RfLI have suitable arrangements in place ready to be implemented as they take on their infrastructure manager responsibilities. To date, indications are that RfLI is maintaining its safety management system and has developed their competence management system for signalling and maintenance staff. RfLI is training staff and taking opportunities to do work under control of the commissioning contractor during their testing and commissioning works.

TfL Rail (MTR Corporation)

Overview: Our intervention work shows that the TfL Rail franchisee, MTR Corporation, continues to demonstrate a positive and planned approach to the management of health and safety. Our inspections found health and safety performance to be good, responding appropriately to issues as they emerged.

182   **Evidence & Activities:** Clear and positive MTR leadership is apparent in our interventions and liaison activity. Adherence to, and implementation of, change management arrangements are robust, as exhibited during introduction of class 345 rolling stock and required modifications to several stations. MTR takes an active approach to introducing new rolling stock, most recently demonstrated by how it cooperated with Bombardier to obtain the class 345 ETCS authorization to start passenger services to Heathrow Airport in summer 2020.

183   Our intervention work concluded that MTR's monitoring, audit, and change management arrangements are operating effectively. The arrangements broadly target monitoring arrangements on the key risks currently facing and emerging as MTR progresses towards full operational services on the Elizabeth Line. We identified that its arrangements to review and evaluate results from monitoring and audit activity required strengthening, and MTR have put in place arrangements to address this.

184   MTR are aware of the impact of the delayed Crossrail project and have reviewed its arrangements to ensure that the large cohort of drivers who are not fully utilised maintain their competence in line with MTR's competence management system.

Overview: Arriva Rail London (ARL) have made steady improvements throughout 2019/20 particularly with regards to emergency preparedness and arrangements for responding to unplanned events. Overall health and safety performance of ARL remains stable.

185   **Evidence & Activities:** Our activities in 2019/20 focused on fleet operation and driver management. ARL presented sound evidence of cooperation with the infrastructure manager and train manufacturer regarding the introduction of the new fleet of class 710 electric multiple units and train surfing risk.

186   ARL has strengthened train driver management with a newly created role of Head of Operations Strategy. This should provide renewed focus on the management of SPADs.

Docklands Light Railway (DLR) and Keolis Amey Docklands Ltd (KAD)

Overview: Docklands Light Railway Ltd (DLR) and its franchisee Keolis Amey Docklands Ltd (KAD) continue to deliver stable health and safety performance with a low incidence of workforce and customer harm.

187   **Evidence & Activities:** KAD enjoys a strong collaborative working relationship with DLR in managing a relatively modern railway which benefits from a high degree of automation, security and passenger accessibility. We renewed KAD's safety certificate and authorisation in October 2019.

188   Trespass at and from stations remains an issue and potentially forms the greatest risk of fatal or life changing injuries. We continue to monitor actions that DLR/KAD are taking to reduce the risk, including the application of robust procedures to retrieve items passengers drop onto the track at stations. There has also been a number of trespass incidents including climbing on trains, train surfing and trespassing at stations. KAD are involving BTP at an early stage in their investigations and the new train design should deter train surfing further.

189   Our engagement with KAD identified a need to improve its current processes and systems for incident reporting and investigation; KAD are responding positively to the challenge.

190   KAD remains fully engaged with the Automatic Transit Forum and its members in respect of common issues including shoegear fires and shoegear failures.

191   Looking forwards, we note that some of the operating equipment on DLR is approaching or is at the point of being life-expired and will require both DLR and KAD to ensure ongoing review of the effectiveness of their risk control arrangements pending refurbishment or replacement. We note TfL's recent announcement to introduce 43 new trains to replace the oldest rolling stock; scheduled for introduction in 2023.

Automated Airport People Movers

Overview: Through ongoing active engagement with Gatwick, Stansted, and Heathrow airports we are content with the safe operation of all three airport track transit systems (TTS) and Heathrow's PoD system. The number of incidents remains exceptionally low, are of a minor nature and none have occurred through system failure. Similarly, staff incidents are minimal.

192   We established the Automatic Transit Forum (ATF) to provide a mechanism for operators of automatic people movers such as airport TTS, DLR and Glasgow Underground to share common issues and improve risk control. The ATF is proving successful, most recently with respect to issues such as shoegear failure. It is our intention that the system operators eventually take over the management of this forum.

The safety of the Channel Tunnel

193   Health and safety regulation of the Channel Tunnel is carried out by the bi-national (UK and French) Channel Tunnel Intergovernmental Commission (IGC). To assist in this role we continue to provide leadership, expert advice and secretariat support to the IGC and Channel Tunnel Safety Authority (CTSA), applying the key principles of our health and safety vision and strategy for the railway in Great Britain equally to the Channel Tunnel. Our inspectors are appointed, alongside their French counterparts, to lead and deliver the CTSA inspection plan, which aims to provide assurance that Eurotunnel's and train operators' management systems are capable of managing the specific risks associated with Channel Tunnel operations.

194   During the year, the IGC and CTSA have continued to regulate the users of the Channel Tunnel in a way that facilitates the safe operation and growth of cross-Channel railway traffic. In the latter part of the year, the coronavirus pandemic has had a particularly severe impact on levels of passenger and freight traffic using the Tunnel and on the revenues of all Channel Tunnel operators. The arrangements for ensuring safety during the recovery from the pandemic will be a focus of IGC and CTSA's activity during 2020/21.

195   Our core priority this year has been the ongoing monitoring of Eurotunnel's approach to safety related issues in respect of its ElecLink project. We continue to invest significant resource to scrutinising the project's approach to risk management, including the procurement of the external expertise needed to examine this novel and complex project. At the time of writing, IGC's consent for the project to proceed remains suspended and its 2017 Direction that Eurotunnel may not proceed with installation remains in place.

196   Other activities included the IGC authorisation of the use of GSM-R voice equipment on Eurotunnel's shuttle locomotive fleet and the issuing of a letter of 'no-objection' to Eurotunnel's proposal to reintroduce four pagodas to each of its Arbel and WBN shuttle wagons to reduce the risk of over height objects coming into contact with catenary in the Channel Tunnel. In August 2018 an Improvement Notice was served on Eurotunnel requiring it to provide safe systems of work in respect of employees escorting customer vehicles from the terminal platforms onto shuttles. This action arose following a serious accident at Folkestone terminal in 2017. Eurotunnel demonstrated compliance with this Notice in January 2019.

197   Our inspectors also provided the IGC and CTSA with support in the bi-national assessment of an application for the renewal of Eurotunnel's five year safety authorisation (authorised by the IGC in March 2019) and an application from GB Railfreight for the renewal of its Channel Tunnel Part B safety certificate (authorised in August 2018).

198   The IGC produces its own annual safety reports which are published on its website at http://www.channeltunneligc.co.uk/IGC-reports,27.html?lang=encccccc

Train driving licences

199   In 2019/20 we continued to work collaboratively with train operators to enable the processing of applications for new mainline train drivers to be licensed under the Train Driving Licences and Certificates Regulations 2010 (TDLCR) and to ensure that the national register of licensed train drivers was kept up to date. 1636 applications for new train driving licences were processed between 1 April 2019 and 31 March 2020.

200   We also considered and approved new applications to be placed on our registers for recognised persons during 1 April 2019 and 31 March 2020 as follows:

- Register of recognised Doctors – 9 added

- Register of recognised Psychologists – 12 added

- Register of training and examination centres – 2 added.

201   In June 2019 we published a new suite of TDLCR guidance aimed at the different groups of people with duties under the regulations - a guide for train operators, a guide to the medical and occupational psychological fitness requirements, a guide to the training and examination requirements, a key facts leaflet for train drivers, and expanded guidance on the process we follow when considering the suspension or withdrawal of a train driving licence. We also produced specific guidance on relevant impacts of the coronavirus pandemic and lockdown on train driving licensing matters, for example around the requirements for periodic medical assessments.

Our safety policy work

Developments in the regulatory framework

202   We have continued to develop, improve and promote the regulatory framework for railway safety. In particular:

- We have continued to provide advice to Government aimed at ensuring rail specific safety legislation remains workable once the implementation period for the UK's exit from the European Union is complete.

- We published an updated position statement on crowding. This followed industry research that we prompted. Our policy now encompasses crowding at stations, as well as on trains, and reflects the impact of crowding on passenger wellbeing.

- We also published a suite of guidance to support full implementation of train driver licensing in Great Britain. This included simplified and updated guidance for operators employing and managing drivers; advice for medical providers; guidance on our process for suspending and withdrawing licences and a key facts leaflet for train drivers.

203   We concluded a review of our Memorandum of Understanding with HSE to improve clarity in some areas of our enforcement boundary. These had been identified by our earlier statutory review of the Health and Safety (Enforcing Authority for Railways and Other Guided Transport Systems) Regulations 2006.

204   We were also extensively involved in a DfT-led review to modernise and improve signage at level crossings on private land. We look forward to the Department taking forward the necessary improvements to the related legislation.

205   Right at the end of the year, we worked at pace to develop and publish guidance to the whole rail sector on dealing with the health and safety management implications of the coronavirus pandemic.

Our work in Europe

206   We continued to participate in the activities of the EU Agency for Railways and in EU decision-making on the future of the legal framework for railway safety until 31 January 2020.

207   Since February, we no longer have direct access to the work of EU institutions. We have focussed our efforts on advising Government on relevant aspects of the UK's future relationship with the EU, with a particular emphasis on the arrangements for safety regulation of international services via the Channel Tunnel.

208   We also continue to work with other national 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 to exchange knowledge and good practice on key railway safety topics and, for ORR, to maintain insight into legislative and standards developments in the EU.

Permissioning

Safety Certificates and Authorisations

209   Safety Certificates are issued to duty holders where the transport system operates at speeds above 25mph or 40kph. A Mainline safety certificate comes in two parts. The Part A sets out the general safety management arrangements. The Part B relates to one transport system and it includes details of how the specific transport system requiring a safety certificate is operated safely.

210   Non-mainline certificates come in one part. The requirements are broadly similar to a mainline application. They are only valid in the country of issue.

211   Mainline and non-mainline safety authorisations are specific to the relevant infrastructure and are not valid across Europe. The main difference in applying for a mainline or non-mainline authorisation is the size and nature of the infrastructure being managed.

212   The number of safety certificates and safety authorisations issued during 2019/20 are shown below

Certificate/Authorisation type	New	Updated / Amended	Renewed	Total
Mainline Part A Safety Certificate	4	7	7	**18**
Mainline Part B Safety Certificate	4	8	7	**19**
Mainline Safety Authorisation	5	2	3	**10**
Non-mainline Safety Certificate	0	0	1	**1**
Non-mainline Safety Authorisation	0	0	2	**2**

213 A new mainline safety certificate (Parts A & B) and mainline safety authorisation was assessed and issued to Northern Trains Limited as the DfT Operator of Last Resort (OLR) for the Northern Rail franchise. Our policy on issuing a safety certificate and safety authorisation to an OLR is that they will be valid for either 12 months from date of issue or to the expiry date of the current franchise incumbent's safety certificate and safety authorisation, whose safety management system is being adopted, whichever is the shortest.

214 An application for a new mainline safety certificate (Parts A & B) was assessed and issued to a new duty holder who to avoid the potential scenario of a no-deal EU Exit affecting its operations in the UK. The duty holder who is based in the UK had set up a subsidiary company that is registered in Austria and held a part A from Austria with a UK part B issued linked to the Austrian part A.

215 A new mainline safety authorisation was assessed and issued to Amey Keolis Infrastructure Limited (AKIL) for the role of infrastructure manager on the Core Valley Lines in South Wales. AKIL took over the role on 28th March 2020. The assessment was challenging at times with significant issues being raised and as a result, required us to pause the assessment whilst AKIL dealt with these. The authorisation is valid for 12 months and the team that led the assessment have ensured that a rigorous inspection programme is in place during the validity period.

216 The number of amended / updated safety certificates relate mainly to the introduction of new rolling stock fleets or extending the scope of routes operated.

Exemptions

217 A number of exemption applications were processed and issued to DfT Operators of Last Resort under Regulation 30(2) of ROGS enabling them to be exempt from the requirements of Regulation 17(3)(a)(i) & (ii) of ROGS, in needing to consult affected parties with applications submitted for safety certificates and safety authorisations.

218   An application was processed and an exemption issued under Regulation 30(1) of ROGS to a duty holder exempting them from the requirements of holding a safety certificate (Regulation 4(1)(b)) and safety authorisation (Regulation 4(2)(b)) in respect of testing and commissioning on the Central Operating Section of Crossrail infrastructure.

219   Under the Railway Safety Regulations 1999, an exemption application in relation to regulation 3, train protection system, was processed and issued to a number of duty holders for the operation of Classes 345 and 387 and accompanying rolling stock on the running lines between London Paddington to Heathrow Airport Junction and Heathrow Airport Junction to Heathrow Tunnel Junction. A number of conditions have been put into the exemption certificate. We will monitor progress with these on a regular basis.
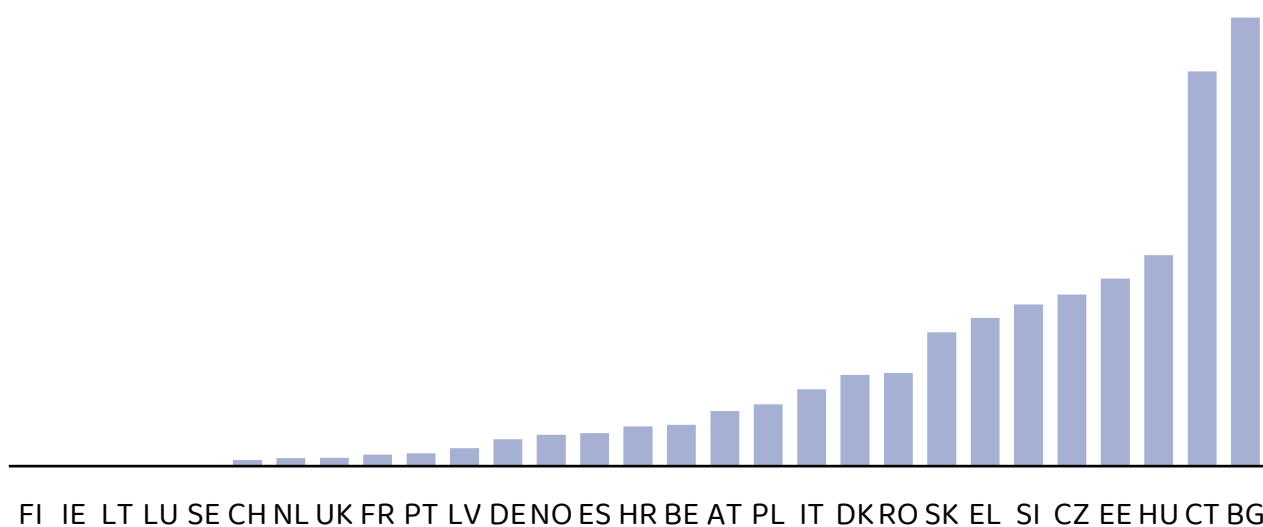
Comparison with railways in the European Union

Workforce and Passenger risk in the European Union railways

220   The European Union Agency for Railways Common Safety Indicators dataset has been extracted from the ERAIL database, which contains data on accidents between 2006 and 2018.

221   The data presented below covers the risk to workforce and passengers which is calculated from the last four years of available data. Averaging the data over four years helps to illustrate safety performance over a longer period of time and reduces the effect of any large-scale one-off events.

222   The values for risk are calculated from the number of persons killed or seriously injured[9] over the relevant time period, and normalised by train kilometres (workforce) or passenger train kilometres (passengers).

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[9] Definitions used by the European Union Agency for Railways may differ from those we use internally in the UK.
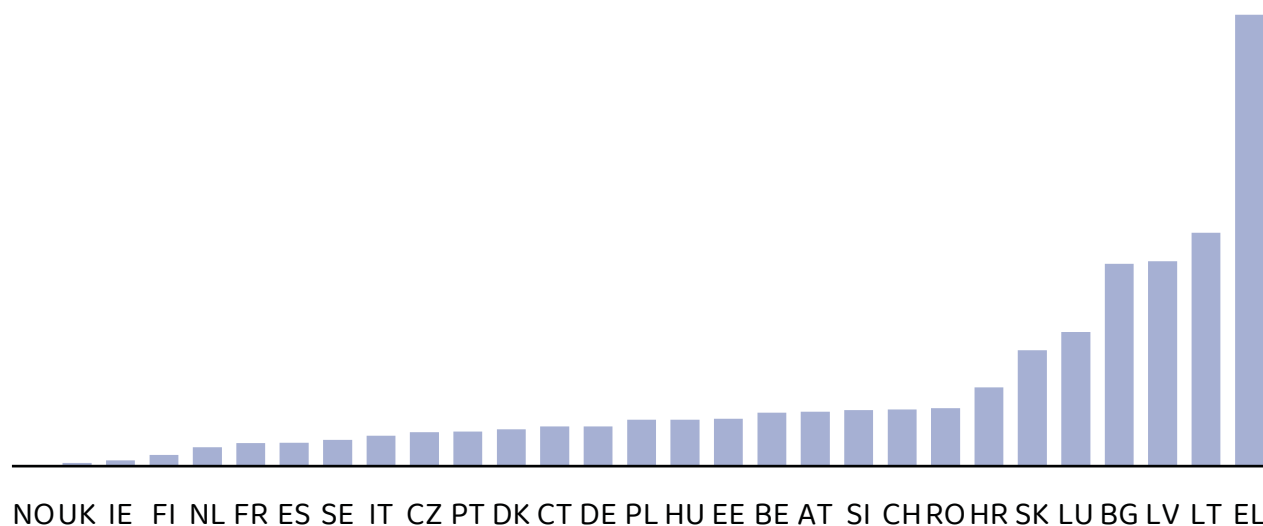
Passenger risk (2015-2018 four year average)

FI IE LT LU SE CH NL UK FR PT LV DE NO ES HR BE AT PL IT DK RO SK EL SI CZ EE HU CT BG

Source: European Union Agency for Railways

223   The UK is eighth in terms of passenger safety risk but performs considerably better than the EU average and very favourably in comparison to other Member States with large railway networks.
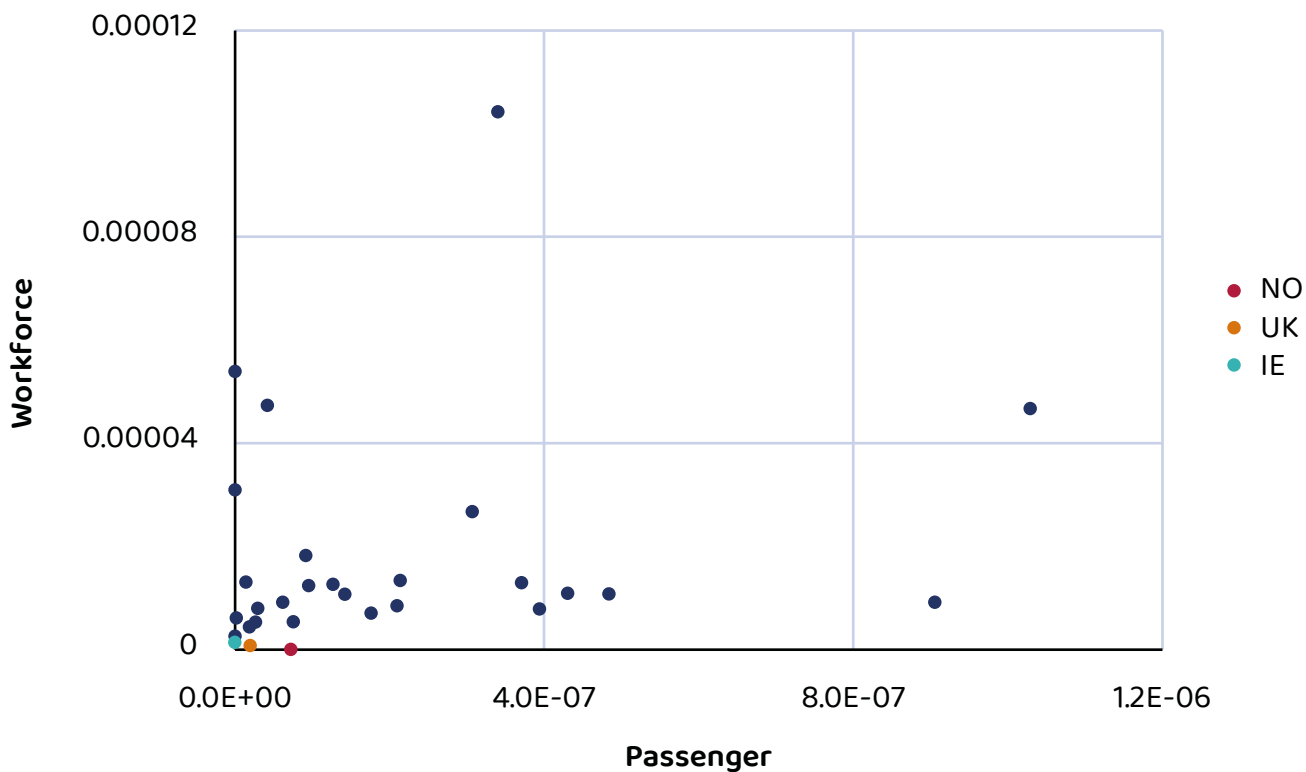
Workforce risk (2015-2018 four year average)

NO UK IE FI NL FR ES SE IT CZ PT DK CT DE PL HU EE BE AT SI CH RO HR SK LU BG LV LT EL

Source: European Union Agency for Railways

224   The UK is second best performing in terms of workforce safety risk.

Combined passenger and workforce risk (2015-18 four year averages)

225   The UK is second best performing (behind only Ireland and Norway, who have reported only two serious injury and one fatality between them over a four-year period) in terms of combined passenger and workforce risk over the last four years.

Section 3 – Roles of key industry bodies

Rail Accident Investigation Branch

226   The Rail Accident Investigation Branch (RAIB) is the independent investigation body for accidents and incidents on UK mainline, metro, tram and heritage railways.

227   The stated aim of RAIB is to independently investigate accidents to improve railway safety, and inform the industry and the public. RAIB is not a prosecuting body and does not apportion blame or liability in its reports.

228   Where it identifies an opportunity to improve railway safety, RAIB will make a recommendation. As the National Safety Authority (NSA), it is our responsibility to pass RAIB recommendations to the industry bodies we think are best placed to address them. Since RAIB was established in 2006 they have made approximately 1500 recommendations.

Our relationship with RAIB

229   We have a good working relationship with RAIB, helping us share our understanding of incidents, the key learning from them and areas where we share concerns.

230   In 2019/20 we completed work to revise the England and Wales version of the 2006 Memorandum of Understanding (MOU) between ORR, RAIB and the BTP to make it a more concise document based around the central principles of effective coordination and cooperation between the parties. In 2020/21 we will do the same with the Scottish version of the MOU.

231   An ORR inspector has recently returned from a six month secondment with RAIB, following a successful secondment of a RAIB inspector into ORR during 2017/18. The secondments have enhanced the understanding of each organisation's role, legal framework and investigation techniques.

Reporting to RAIB

232   We have a statutory obligation to report to RAIB on the action being taken by a duty holder to address each recommendation within 12 months of publication of a RAIB report. We also provide periodic updates on outstanding recommendations to RAIB.

233   In 2019/20 we received 17 reports, which included a total of 51 new recommendations.

234   During the year we responded to RAIB on 104 recommendations; 70 were reported as being implemented; 16 as implementation ongoing; 17 as progressing. No recommendations were reported as having had an insufficient response and one was directed at another public body outside our jurisdiction.

235   In their 2019 Annual Report, RAIB identified just one instance where they were concerned that a duty holder response did not sufficiently address the recommendation.

236   There are two recommendations on ORR that have not yet been reported as implemented, both of which are related to changing our level crossing guidance to reflect any changes to signage requirements following legislative changes by DfT. Following DfT's decision not to pursue reform of level crossings legislation, we nevertheless intend to improve our guidance and processes around the existing regulations in 2020/21, which is expected to address these two recommendations.

Safety Digests

237   As well as full investigation reports, RAIB also publishes Safety Digests. Safety Digests are a useful alternative to full RAIB reports as they are produced more quickly after an incident and are focused on identifying safety learning rather than making recommendations. Safety Digests cover many of the same topics as RAIB's full reports, such as the six areas of concern they have focused on in their summary of learning documents. In 2019/20 RAIB issued 11 Safety Digests.

Sandilands investigation

238   The investigation into the overturning of a tram at Sandilands junction on the Croydon Tramlink network on 9 November 2016 was one of the most significant undertaken by RAIB since it was established.

239   The investigation report was published on 7 December 2017 and made 15 recommendations upon the tram industry and ORR. In line with our legal obligations, we reported progress against these recommendations within 12 months of the report's publication (on 4 December 2018).

240   We have since provided two significant updates to RAIB on industry progress to implement the recommendations and continued to monitor progress. To date, both of the recommendations placed on ORR have been reported as implemented, as have seven of the 13 recommendations addressed to London Trams/Tram Operations Ltd which owns and operates the Croydon network. The seven recommendations directed to all tram owners, operators and infrastructure managers in the UK are being progressed and we note the positive collaboration that has taken place to address those that require cross-industry action, culminating in the establishment of the Light Rail Safety & Standards Board (LRSSB).

RAIB summary of learning documents

241   Alongside their 2019 Annual Report, RAIB issued six 'Summary of Learning' documents covering the key learning in areas where RAIB has done the greatest number of investigations. RAIB sets out the purpose of these documents as being to provide a repository of some of the most important areas of learning identified in its investigations to date, cross-referenced to relevant reports and notes that many of the issues raised have already been the subject of actions by duty holders when responding to RAIB recommendations, or are in the process of being addressed.

242   The summary of learning documents cover:

- Design and operation of user worked level crossings

- Protection of track workers from moving trains

- Managing risk at the platform-train interface

- The safe management of abnormal train-operating events which put passengers and crews at risk

- Freight train derailments

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

Design and operation of user worked level crossings

243   We share RAIB's concerns about user worked crossings and is working to facilitate safety improvements, particularly at those crossings where the user relies on telephoning the signaller to obtain permission to cross. Further, during our periodic review in 2018 we challenged Network Rail because we believed that there was more it could reasonably practicably do to improve level crossing safety during CP6. As a result, in addition to increased funds for renewals, Network Rail has dedicated £25 million in CP6 to providing active warning systems at its highest priority passive crossings, including some user-worked ones.

244   We share RAIB's perception of the risks associated with User Worked Crossings. We have been working for several years to ensure Network Rail develops and implements its Strategy for Level Crossings, which has a suite of measures for passive and telephone crossings. It is also why, during PR18, we ensured that there was funding for overlay protection and warning at the highest priority crossings, including UWC telephone crossings in long signal sections.

245   Signage reform is being led by DfT.

Protection of track workers from moving trains

246   The learning document identifies the broad failings of systems of work that rely on individuals getting it right; failings in those areas should be addressed by improved planning and automatic warning and protection. We issued Improvement Notices against Network Rail in 2019 focussed in these areas.

Managing the risk at the platform-train interface

247   We share RAIB's concerns regarding this important issue, noting the platform-train interface presents a number of hazards in addition to trap and drag, including risk associated with train dispatch and stepping distances.

248   We support measures being taken by industry to utilise technology to help drivers identify hazardous incidents, particularly during Driver Controlled Operations of doors (DCO), as well as better use of mirrors and monitors.

249   We also encourage industry to consider measures to reduce risk at the PTI, such as yellow lines and tactile edges.

The safe management of abnormal train-operating events which put passengers and crews at risk

250   RAIB identify from a number of incidents they have investigated the need for Network Rail and train operators to be better at identifying when a significant operational incident is developing (such as multiple stranded trains); being able to manage those incidents and supporting drivers and train crew.

Freight train derailments

251   In identifying the key factors that contribute to freight train derailment, RAIB acknowledge the positive impact of the Cross-Industry Freight Derailment Prevention Group. In the last 18 months the group has made considerable progress in the implementation of practical risk controls. For example:

Loading

- Container weighing trials: Trials to assess the feasibility of fitting container weighing equipment to gantry cranes and reach stackers

- Wheel Impact Load Detection (WILD) Data 1 – data shared with industry to identify problem flows and take remedial action. Furthermore, the fitting of Radio Frequency Identification (RFID) tags to freight rolling stock will allow identification of individual vehicles.

- Bulk Loading Guidance

Track

- Review of track twist base length: Two separate reviews, undertaken by Network Rail and the University of Huddersfield to assess whether track twist should be measured using a revised base length that takes into the design characteristics of modern freight vehicles (the current measurement uses dimensions from 10' two axle wagons)- the results of both reviews were inconclusive.

Automated inspection of track geometry on freight only lines

Two workstreams:

- Installation of monitoring equipment to freight locomotives- FOCs have agreed in principle, waiting for NR to source and install equipment;

- Renewal of the Multi-Purpose Vehicles monitoring fleet, with a view to using spare capacity to inspect freight only lines

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

252 RAIB have identified areas of concern around vehicle brakes being correctly adjusted and properly maintained; machine operators being competent to operate particular machines and following the correct procedures for doing so; and conversion of vehicles designed to operate on the road being suitable for use on railways.

Section 4 – Our enforcement activities

253   In most cases, 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. But, occasionally, we use our formal powers to ensure compliance with the law or to deal with immediate risk. Mostly, we use enforcement notices to stop an activity involving serious risk, or to rectify serious gaps in duty holders' risk control. Our enforcement policy statement[10] sets out how we ensure rigour and consistency in our enforcement decisions by using our enforcement management model.

Improvement notices in 2019/20

254   We served 20 Improvement Notices in 2019/20, compared to 18 in 2018/19. The reasons for our notices, included:

- Failure to provide adequate information or instruction to contractors working on electrical distribution equipment

- Not undertaking suitable and sufficient assessment of risks to persons from vehicles

- Lack of check rail on tight radius curves where a derailed train could impinge on a passenger line

- Not implementing preventative and protective measures necessary for the protection of workers working on or near the line

- Not ensuring that suitable equipment is provided for preventing a person working on the transport system from being struck by a train

- Failure to make an assessment of the risk from unauthorised access to infrastructure

- Failure to ensure that lifting operations using a fork lift truck have been planned, supervised and carried out in a safe manner

- Lack of arrangements to control risk of electric shock from live conductors within a depot

- Lack of testing and commissioning of electrical systems

- Inadequate procedures for the prevention of people at work being struck by moving vehicles

- Failure to make suitable and sufficient Train Dispatch Risk Assessments

- Failure to ensure the safety of employees and non-employees boarding and alighting trains

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[10] https://orr.gov.uk/__data/assets/pdf_file/0016/5650/health-and-safety-compliance-and-enforcement-policy-statement-2016.pdf

        Published 14/07/2020

- Lack of suitable and sufficient risk assessment of workshops and control of substances

- Failure to provide information, instruction and training to ensure employees can plan, prepare and operate trains comprising of un-braked vehicles.

Prohibition notices in 2019/20

255   We issued four prohibition notices in 2019/20 compared to three in 2018/19. The reasons for these notices included:

- Failure to carry out suitable and sufficient risk assessment and implement findings of risk assessments

- Inability to demonstrate staff competence

- No records of permanent way inspections or control of risk of derailment

- Inadequate provision of positions of safety

Prosecutions in 2019/20

256   In England & Wales we completed three prosecutions in 2019/20. This compared with six prosecutions in 2018/19. There were no prosecutions by Crown Office and Procurator Fiscal Service in Scotland in 2019/20.

257   The prosecution of Renown Consultants Limited was a landmark case as it was the first time we have prosecuted in relation to failures in fatigue management.

Summary overview of our concluded 2019/20 prosecutions:

England and Wales		
Defendant(s)	**Incident**	**Fine**
Govia Thameslink Railway Limited	On 07/08/2016 a passenger aboard the Gatwick Express train suffered a serious head injury which tragically led to his death. The passenger's head came to be outside of a cess-side droplight window on the train, where it was struck by a signal gantry. The risk created by droplight windows had not been assessed by GTR and the control measures in place were inadequate.	£1 Million
DB Cargo (UK) Limited	Between 01/06/2015 and 02/06/2017 DB Cargo failed to manage the risk of trespass at their Bescot Yard site. This failure resulted in an incident in June 2017 where three children entered Bescot Yard Freight Terminal through a pre-existing hole in a fence and received electric shocks from 25,000 volt overhead line equipment.	£1.2 Million
Renown Consultants Limited	On 19/06/2013 two men died in a road traffic accident after completing a night shift working on the railway. Renown was routinely failing to follow its own fatigue management procedures or comply with working time limits for safety critical work and had not conducted a suitable and sufficient risk assessment of the driver's fatigue.	£450,000 (£300,000 costs)

Annex 1 – Glossary

Abbreviation	Definition
CP5/6	Control period 5 (1 April 2014 - 31 March 2019) and control period 6 (1 April 2019 - 31 March 2024): the usually five year period in which we review and set track access charges and Network Rail's funding and output levels.
CSM	Common Safety Method(s). A series of European railway regulations that are directly applicable to Mainline Railway operations.
DfT	Department for Transport.
FOC	Freight Operating Company.
FWI	Fatality and Weighted Injury index: the common way of measuring harm to people on Britain's mainline railways. The fatalities and weighted injury ratio used is: one fatality = 10 specified (major) injuries = 100 minor injuries (where the injured person is taken directly to hospital).
HAVS	Hand Arm Vibration Syndrome.
Mainline Railway	A railway is a 'mainline railway' unless: a) we determine that it falls within one or more of these categories: · metros and other light rail systems; · networks that are functionally separate from the rest of the mainline railway system and intended only for the operation of local, urban or suburban passenger services, as well as transport undertakings operating solely on these networks; · heritage, museum or tourist railways that operate on their own networks; or b) we determine that heritage vehicles that operate on the mainline railway and comply with national safety rules are deemed not to operate on the mainline railway; or c) it is privately owned infrastructure that exists solely for use by the infrastructure owner for its own freight operations. Weighting
NSA	National Safety Authority in the European Union.
OH	Occupational health.

Abbreviation	Definition
OLR	Operator of Last Resort – A company created by the Department for Transport to meet requirements of Section 30 of the Railways Act 1993 which places a duty on the Secretary of State for Transport to intervene and provide continuity of rail services.
ORR	Office of Rail and Road, as of 1 April 2015: the economic regulator of Britain's mainline railway and health and safety regulator on all Britain's railways. It also monitors England's Strategic highways network. It was previously the Office of Rail Regulation.
PDSW	Planning and Delivering Safe Work – A Network Rail programme.
PIM	Precursor Indicator Model: models accident precursor trends on Britain's mainline railway.
PR18	Periodic Review 2018: The 2018 periodic review of Network Rail (relating to CP6)
PTI	Platform-train interface: the gaps both in terms of width and height between a station platform and a train. It also includes risks from electrocution and falls from platforms without trains being present.
RM3	Railway Management Maturity Model: the tool we use to assess an organisation's ability to achieve excellence in controlling health and safety risks.
RSSB	Rail Safety and Standards Board: a body by and for the mainline industry, involved in understanding and modelling risk (see SRM and PIM), guiding standards, managing research and development and industry collaboration.
SMIS	Safety management information system: the system managed by RSSB that Britain's mainline railways uses to report safety information.
SPAD	Signal Passed at Danger: where a train passes a red signal without permission and runs the risk of compromising safety.
SRM	Safety Risk Model: models the long-term risk trends on Britain's mainline railways and is recalibrated periodically to take account of the harm caused by incidents.
TfL	Transport for London.
TOC	Train Operating Company.
WSF	Wrong Side Failure : a failure that results in a less-safe or unsafe state (as opposed to a right side failure where a failure still results in a safe state).

OGL