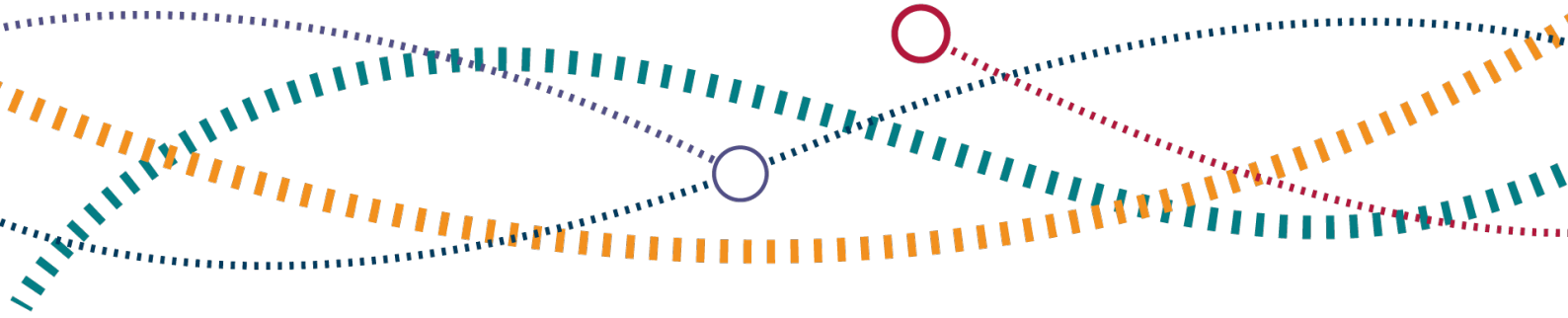
OFFICE OF RAIL AND ROAD

Assessing the costs and benefits of health and safety interventions in rail

An industry-wide review

17 March 2025



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Executive summary

Great Britain's rail industry has one of the best safety records in the world, which reflects sustained focus and investment in health and safety. As well as being safe, it is also important that the railway delivers value for money.

ORR's purpose, as the combined health and safety and economic regulator for Britain's railways, is to protect the interests of rail users, and improve the safety, value and performance of railways. We expect the industry to deliver continuous improvement in the health and safety of passengers, the workforce and the public. Expenditure on health and safety interventions forms part of this continuous improvement; if money is well spent, this can deliver better outcomes for passengers, the public, the workforce, funders and taxpayers.

We carried out this review of how the costs and benefits of health and safety interventions are assessed to evaluate how and when cost estimates are compiled, and whether reasonable practicability is systematically tested. These are important elements of the decisions made by rail businesses which have responsibilities under health and safety law to control risks "so far as is reasonably practicable" (SFAIRP). We refer to the organisations which have these responsibilities as duty holders.

We found good evidence that reasonable practicability is being tested by most duty holders prior to making a health and safety intervention, but there is room for greater consistency in how costs and benefits are assessed. We found that duty holders would welcome further support on this. There is also scope for improving engagement and collaboration in several areas, including between the parties involved in the design of trains and duty holders who will operate them.

We found that Network Rail's processes around health and safety decision making could be improved through better governance and monitoring of costs, and by applying existing good practice more consistently across the organisation. Network Rail has started work to address this through new guidance which we welcome.

Our review was primarily focused on the mainline railway. We spoke to a wide range of organisations across the industry. We would like to thank all the people we spoke to for their time and contributions. This constructive engagement enabled a cross-industry conversation to identify best practice and learning points to improve the effectiveness and efficiency of health and safety decision making. A list of the organisations we spoke to is

provided in Annex A. The **findings and recommendations** from our research can be found in chapter 3.

We also commissioned, jointly with Network Rail, an Independent Reporter (Arup) to review Network Rail's approach to assessing the costs and benefits of health and safety interventions. This focus on Network Rail reflects that it is the infrastructure manager for most of the rail network in Great Britain and is substantially funded by the UK and Scottish governments. The review considered a selection of case studies from programmes of work, some of which have involved a high level of expenditure. The **findings and recommendations** from the Independent Reporter review of Network Rail's approach can be found in chapter 4.

Table 1 below summarises all the findings and recommendations, some of which relate to the wider industry (in blue), some of which are specific to Network Rail (in orange) and one for both Network Rail and ORR (in red).

Table 1. Summary of findings and recommendations

Key findings	Recommendations
There is a lack of consistency in how reasonable practicability is tested.	**Recommendation 1)** Industry should enhance its understanding of how to test reasonable practicability. RSSB has confirmed that it is developing further training to support its guidance – 'Taking Safe Decisions' – to be rolled out to industry, including senior decision makers. We encourage industry leaders to engage with RSSB's work. ORR supports this new training and will engage with RSSB on the content prior to the launch.
	Recommendation 2) Network Rail should continue to develop and implement its approach and guidance for determining reasonable practicability, including a tool for cost-benefit analysis in line with RSSB's industry guidance. Network Rail, RSSB and ORR should ensure that the approaches to testing reasonable practicability for industry and Network Rail are aligned as far as possible.
The process to deviate from an industry standard is reasonably well understood but deviating from a standard is not always straightforward.	**No recommendation:** RSSB has already embarked on a review of the deviation process in relation to its standards framework. ORR supports this review. This work is scheduled to take place during 2025 - 2026.
Assessment of costs related to health and safety interventions is limited during the annual business	**Recommendation 3)** ORR and DfT should work together to improve DfT's awareness of priorities for health and safety. We will engage with DfT and other rail funders on how we can share

Key findings	Recommendations
planning process for train operators funded by DfT.	perspectives and provide advice to enhance their assessment of health and safety interventions.
There is opportunity to improve the identification and inclusion of solutions to manage health and safety risks with trains earlier in the design process.	**Recommendation 4)** When new trains are being considered, the party acting as the lead on procurement should ensure engagement, where possible, with the future operator to ensure that health and safety issues relating to the planned use of the train are considered and understood by all parties before the design is finalised. ORR also has a role to promote the principles of health and safety by design and clarify the limitations of the interoperability process in relation to operational safety.
	Recommendation 5) The Government's rail reform programme should consider how health and safety by design can be improved when new trains are being procured. This will realise a benefit of integrating track and train under rail reform.
Network Rail's internal process for escalating emerging health and safety risks should improve.	**Recommendation 6)** Network Rail should develop a more robust process for capturing significant health and safety compliance issues and escalating these within the organisation.
	Recommendation 7) Network Rail should consider ways to improve how regional and national approaches to address emerging risks are managed, which will allow for effective decision making at corporate level.
The progressive monitoring of costs, project outcomes and governance within Network Rail on significant health and safety initiatives should be improved.	**Recommendation 8)** For major health and safety interventions, Network Rail should improve its monitoring of cost and project outcomes to ensure that costs are controlled and test that intended benefits are realised. This should include re-evaluating reasonable practicability when there are significant changes in costs and/or the means to realise health and safety benefits.
	Recommendation 9) Network Rail should improve its governance, and documentation of decisions on major health and safety initiatives to improve transparency and to support Recommendation 8.
There is scope for improved consistency of approach in raising awareness and escalating health and safety issues between Network Rail and ORR.	**Recommendation 10)** Network Rail and ORR should explore opportunities to further strengthen existing engagement on significant health and safety issues. As individual organisations, we will ensure that when novel or complex initiatives arise, there is timely engagement to ensure that issues are being discussed through the appropriate channels. We will continue to have structured engagement with Network Rail (and in future GBR) and industry at a senior level on health and safety matters that could significantly shape future funding requirements.

We intend to provide an update on progress against these recommendations within 12 months of publishing this report.

1. Introduction

Purpose of our review

1.1 In 2024, we launched a programme of work **to review how the costs and benefits of health and safety interventions are assessed by railway duty holders,** including Network Rail and passenger and freight operators. We wanted to confirm how and when cost estimates are compiled for these purposes, and whether reasonable practicability is systematically tested. This is particularly important to ensure that the railway is delivering value for money.

1.2 Throughout this report we refer to 'duty holders'. A duty holder is the person or organisation legally responsible for managing and controlling risks under health and safety law. The principal railway duty holders are infrastructure managers, such as Network Rail, and railway undertakings, namely passenger and freight train operators.

1.3 The Health and Safety at Work etc. Act 1974 (HSWA) requires risks to be controlled 'so far as is reasonably practicable' (SFAIRP), which is essentially the same as 'as low as reasonably practicable' (ALARP). The Management of Health and Safety at Work Regulations 1999 (MHSWR) require duty holders to undertake a suitable and sufficient assessment of risks arising from their activities, to identify the hazards to employees and others (e.g. passengers), and to take action to eliminate the hazard, or if this is not possible, to control the risk of harm.

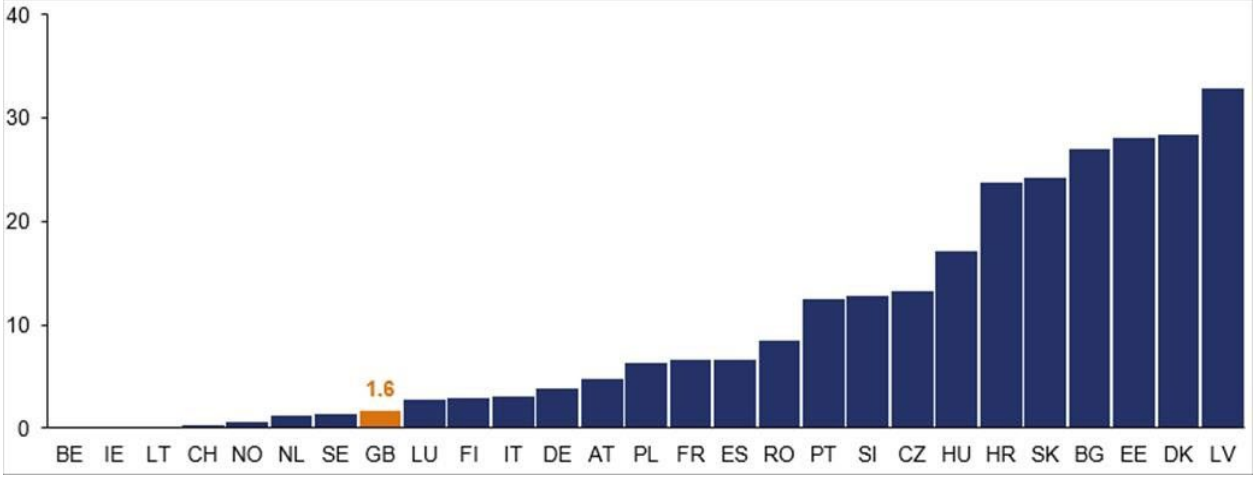
1.4 In most cases, duty holders take decisions about appropriate measures to control risk by applying established good practice and in many cases by following agreed standards. In more novel or complex situations, cost-benefit analysis can be used to support decisions on whether a health and safety intervention is reasonably practicable.

1.5 This approach means that cost is considered in health and safety decisions and there needs to be a balance struck, where the balance is in favour of taking risk controls until the costs outweigh the benefits by a grossly disproportionate amount.

Rail safety outcomes in Great Britain

1.6 For passenger safety risk, Great Britain ranks eighth compared with other European countries (as illustrated in Figure 1.1 below).

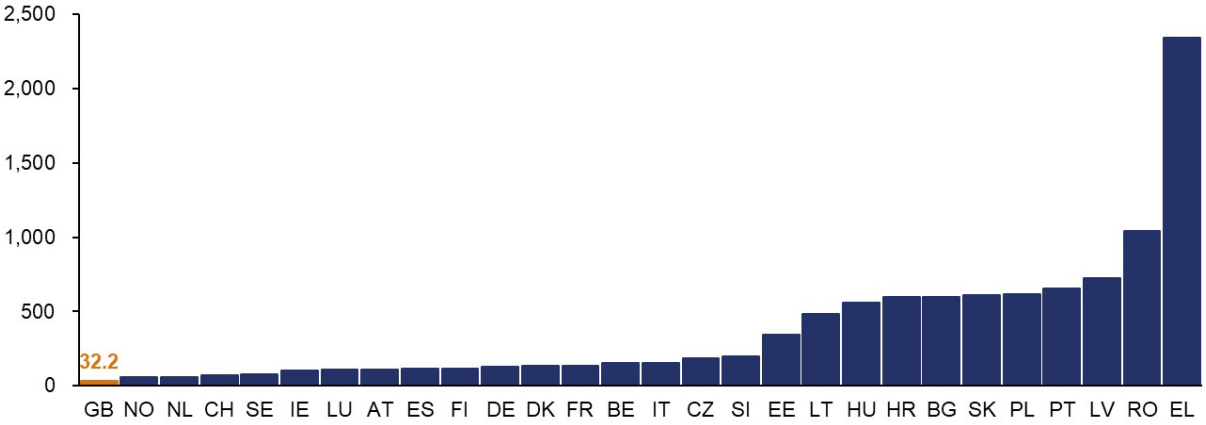
Figure 1.1 Passenger safety risk - Fatalities and weighted serious injuries (FWSI) for passengers per passenger train-km, by European country, 2019 to 2023 average



Source: ORR Common Safety Indicators 2023, Assessment of achievement of safety targets for the mainline railway in Great Britain in 2023, published 23 January 2025.

1.7 Our Common Safety Indicators 2023 publication also shows that for whole society safety risk, Great Britain ranks first compared with other European countries. Whole society safety risk reflects the collective risk to passengers, employees, level crossing users, trespassers and others.

Figure 1.2 Whole society safety risk (FWSI for whole society per train-km) by European country, 2019 to 2023 average

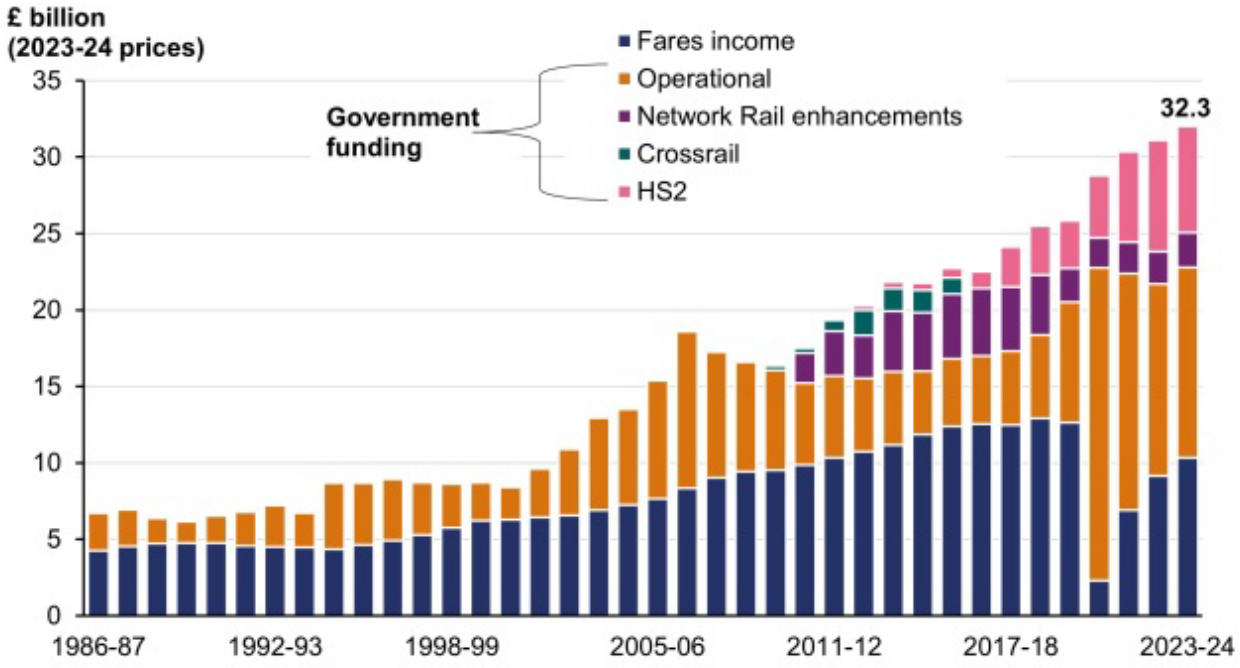


Source: ORR Common Safety Indicators 2023, Assessment of achievement of safety targets for the mainline railway in Great Britain in 2023, published 23 January 2025.

1.8 As well as being safe, it is also important that the railway delivers value for money. While current levels of government support have reduced since the peak year of the Covid-19 pandemic, they remain above any level prior to the pandemic as our Rail Industry Financials for April 2023 to March 2024 show (see Figure 1.3 below).

In 2023-24 there was £12.5 billion of government funding for the operational railway, just under half of the total income for the railway (excluding enhancement projects). Reflecting this, it is important to understand how the cost of health and safety initiatives is being assessed, particularly at a time of rising pressure on public finances.

Figure 1.3 Fares income and government funding, UK annual data, 1986 to 2024



Source: ORR Rail Industry Finance (UK) April 2023 to March 2024, published 28 November 2024.

Review scope and approach

1.9 We met with a wide range of organisations, including duty holders, to explore the testing of reasonable practicability, the use of cost-benefit analysis and associated guidance, industry standards and how risk is managed between organisations. We also reviewed what guidance is available to industry to support decision making. This included guidance produced by the Rail Safety and Standards Board (RSSB) and ORR on cost-benefit analysis, and other relevant guidance such as the Health and Safety Executive (HSE)'s expert guidance on risk which includes Reducing Risks Protecting People (R2P2).

1.10 Our intention was to establish learning points for the rail industry to support best practice in how costs and benefits are assessed in health and safety decisions. We also wanted to align with established principles of safety decision making as set out by HSE as the national regulator for workplace health and safety.

1.11 We confirmed the scope of the review with the Department for Transport (DfT) in June 2024. Our 2023-24 Annual Health and Safety report referenced this work and in September 2024 we published an update letter to industry on progress.

1.12 There were two separate strands of work for this review. **The first strand was to review the approaches used by duty holders to assess the costs and benefits of health and safety interventions**. We spoke to a wide range of organisations to understand their perspectives including:

- train operating companies (TOCs) and freight operating companies (FOCs), 22 operators in total;
- vertically integrated operators including Transport for London, Transport for Wales and Nexus;
- four rolling stock owning companies (ROSCOs);
- one train manufacturer;
- three consultancy firms specialising in risk assessments; and
- two members of the Rail Industry Association (RIA) to help us capture the supply chain's view.

We also engaged with DfT, Transport Scotland, other health and safety regulators (including the Health and Safety Executive and Office for Nuclear Regulation) and trade unions representing employees in the rail industry. The full list of organisations we met with is provided in the Annex to this report.

1.13 **The second strand was to review how Network Rail assesses the costs and benefits of health and safety interventions and whether reasonable practicability is systematically tested**. We appointed an Independent Reporter, Arup, to carry out a review of Network Rail's approach to testing reasonable practicability by looking at some agreed case studies where costs have been significant. Tracking emerging health and safety risks and Network Rail's spend on interventions is particularly key given that funding for this control period is constrained and Network Rail's risk funding is limited (see Periodic review 2023 of Network Rail: final determination).

1.14 We have also:

- reviewed available guidance on cost-benefit analysis to support health and safety related decisions and business planning (including our own guidance);
- engaged with DfT on ways in which we could strengthen our engagement in relation to health and safety matters;
- spoken to other health and safety regulators to ensure consistency and alignment on the interpretation of the legal framework; and
- looked at areas where we could improve, building on and strengthening our ways of working between our health and safety, engineering and economic teams within ORR.

1.15 Our intention was that by bringing these strands of work together, we would have a greater understanding of how duty holders approach and test reasonable practicability in health and safety decision making, and the extent to which duty holders undertake cost-benefit analysis to inform their decisions. This report shares areas of best practice and identifies some areas for improvement.

1.16 Throughout our review, we were mindful that the legal framework for health and safety decision making applies across many other business sectors beyond railways. We were keen to avoid a “made in rail” approach. We were also clear that this review was not seeking to propose changes to roles and responsibilities under the existing legal framework.

1.17 Our review did not include roads as ORR does not regulate health and safety decision making on the strategic road network. However, we do monitor National Highways’ safety key performance indicator target and report through an annual assessment of safety performance on the strategic road network.

2. Health & safety roles and responsibilities

ORR's role

2.1 As the independent health and safety regulator we oversee compliance with health and safety law and seek to apply a consistent approach to our decisions on health and safety compliance.

2.2 We seek assurance across all the sectors we regulate that duty holders are controlling risk. We do not routinely scrutinise duty holders' decisions on SFAIRP, but we monitor overall health and safety performance using data, industry risk modelling, and intelligence from our inspections, audits and investigations. We also use the Risk Management Maturity Model (RM3) which gives us a picture of the risk control and management maturity of duty holders in different sectors within the rail industry, and how they are changing over time. Where we identify that duty holders are not complying with the law, we can take enforcement action and in doing so, will follow the approach outlined in our health and safety compliance and enforcement policy statement. To support this, we have an Enforcement Management Model (EMM) for our staff to aid consistent enforcement decisions.

RSSB's role

2.3 The Rail Safety and Standards Board (RSSB) is the independent safety, standards and research body for the rail network in Great Britain. It brings together members (infrastructure managers, train operators, rolling stock leasing companies and suppliers) from across the mainline railway to support shared decisions, products and services with the aim of driving out unnecessary cost, improving business and safety performance and developing long-term strategy.

2.4 RSSB's primary objective is to support its members to achieve their objectives of improving safety and performance and value for money across the industry. It does this by providing a wide range of services to:

- help the industry understand risk;
- guide and manage the maintenance of railway standards;
- manage industry research and innovation programmes; and
- facilitate industry collaboration to drive improvement.

RAIB's role

2.5 The Rail Accident Investigation Branch (RAIB) carries out investigations into rail accidents and incidents without apportioning blame or liability with a view to enabling lessons to be learned, improving safety on railways and preventing similar accidents and incidents. RAIB makes recommendations which we consider and pass on to relevant bodies which are then required to take them into consideration and act upon them appropriately.

What we expect from duty holders

2.6 Most health and safety legislation is goal setting in nature and requires outcomes to be achieved rather than specifying what a duty holder must do. At the heart of this is a requirement that risks should be reduced **'so far as is reasonably practicable' (SFAIRP)**. Cost-benefit analysis can help inform SFAIRP decision making.

2.7 The courts have decided that risk control measures should be deemed reasonably practicable unless the cost of the measure is grossly disproportionate when compared to the risk. The interpretation of what is '***reasonably practicable'*** is provided in the judgement of the Court of Appeal in the 1949 case of Edwards v the National Coal Board:

'Reasonably practicable' is a narrower term than 'physically possible' … a computation must be made by the owner in which the quantum of risk is placed on one scale and the sacrifice involved in the measures necessary for averting the risk (whether in money, time or trouble) is placed in the other, and that, if it be shown that there is a gross disproportion between them – the risk being insignificant in relation to the sacrifice – the defendants discharge the onus on them.'

2.8 Making sure a risk has been reduced SFAIRP is about weighing the risk against factors such as the cost, time and effort needed to control it. In terms of ensuring a risk has been reduced SFAIRP, the decision is weighted in favour of health and safety because the presumption is that the duty holder should implement the risk reduction measure unless the cost of doing so would be grossly disproportionate to the benefits it would bring. The duty holder must be able to demonstrate this. The process does not follow the decision rule adopted in project appraisal of benefits outweighing costs. Rather, it is about adopting measures except where they are ruled out because they involve gross disproportion between, on the one hand, *cost, time and effort*, and on the other, *benefit*. Health and safety legislation

does not allow duty holders to offset one risk against another and each risk should be controlled SFAIRP.

2.9 Duty holders are required to:

- carry out suitable and sufficient assessments of risks to the health and safety of both employees and non-employees affected by their undertakings, and record the findings;
- identify the measures needed to deliver appropriate risk controls including, where appropriate, an estimation of the potential costs and benefits of the control measures; and
- decide whether there is gross disproportion and (if not) then:
  - develop an appropriate plan and timetable to implement the risk control measures identified; and
  - carry out regular reviews of both the assessments and control measures.

The recording, documentation and analysis at each stage should be proportionate to the risk.

2.10 HSE's guidance says that where risks are transferred from the same hazard, then this should be offset against the benefits of the measure under consideration.

2.11 When presented with a novel or complex situation, duty holders should examine what has been done through following good practice and this should establish what is reasonably practicable. Where good practice is not available, proposed solutions would need to be tested which is where cost-benefit analysis can assist.

2.12 There is no authoritative guidance on what factors should be considered when deciding whether cost is grossly disproportionate and no single algorithm which can be used to determine gross disproportion; it is a case-by-case judgement to be made by the duty holder.

2.13 Although there is no authoritative case law on what constitutes gross disproportion, HSE's submission to the 1987 Sizewell B Inquiry is regarded as providing a rule of thumb. This proposed that a factor of up to 3 (i.e. costs three times larger than benefits) is appropriate where there is risk to workers, a factor of

2 is appropriate for low risk to members of the public, and a factor up to 10 for high risk to members of the public.

2.14 We support the view that where the risk to the public is greater, for example where there is a risk of multiple fatalities from a single event (for example, a train derailment, or a collapse of a structure such as a bridge), a more significant degree of disproportion is justified.

2.15 When assessing risks and testing reasonable practicability, there is guidance duty holders can follow to support them. This includes:

- HSE's Expert Guidance on Risk Management and Reducing Risks, Protecting People (R2P2), which ORR also applies. This provides guidance on HSE's decision making process and is a useful source of information on the principles of SFAIRP decision making and the concept of the tolerability of risk. It helps to support consistent approaches by regulators who enforce the HSWA; and

- RSSB's Taking Safe Decisions guidance is designed to help duty holders in their decision making to ensure that they are managing risks on the railway SFAIRP and managing changes so that these do not unduly impact on the wider system. It comprises a suite of documentation which includes, amongst others, the use of cost-benefit analysis, how to undertake this and when it should be used.

Common Safety Method for Risk Evaluation and Assessment

2.16 Anyone proposing a 'significant' change (based on failure consequence, or if it is a novel or complex change) in relation to the mainline railway is required to follow the risk management process described in the Commission Implementing Regulation (EU) No 402/2013. This sets out a common mandatory risk management process for the rail industry when technical, operational or organisational changes are being made to the rail systems that could have an impact on safety. This Regulation became assimilated UK legislation after EU exit.

2.17 In cases where a change is determined to be significant, the risk management process of CSM REA must be carried out by the duty holder. The framework of the risk management process is based on the analysis and evaluation of hazards using one or more of the following risk acceptance principles:

- the application of codes of practice;

- a comparison with similar systems (reference systems); or
- an explicit risk estimation.

2.18 The risk management process in the CSM REA complements similar requirements in other health and safety legislation and applies the same principles so there is no conflict between them. Duty holders are not required to produce multiple risk assessments to meet these different legal requirements.

2.19 In cases where a change is not significant, it will fall to the duty holder making the change to consider domestic legislative requirements, such as those set out in Regulation 19 of the Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS) and Regulation 3 of the MHSWR, which require a suitable and sufficient risk assessment to be undertaken.

2.20 It is possible to adopt the approach of the risk management process of the CSM REA even when there is no legal requirement to do so (for example, when a change is not significant), in line with the organisation's safety management system. Following the CSM REA approach correctly in these circumstances is likely to mean that domestic safety legislation is complied with.

2.21 In its publication Taking Safe Decisions, RSSB suggests applying the risk management process of the CSM REA even if a change is not significant. This is to avoid the need to have duplicate risk assessment processes and may better demonstrate the control of risks SFAIRP.

When to undertake cost-benefit analysis and what to include

When to undertake cost-benefit analysis

2.22 For most day-to-day decisions, duty holders follow good practice as captured in industry standards. For novel or complex situations, cost-benefit analysis can be used to assist duty holders in making health and safety related decisions to determine whether a measure is necessary to ensure safety SFAIRP. Cost-benefit analysis should not form the sole argument for demonstrating whether risk has been reduced SFAIRP and is normally used in conjunction with qualitative risk assessment.

2.23 Guidance on the use of cost-benefit analysis is currently available from RSSB, HSE and ORR. While all of this guidance is consistent and correct, we recognise that it is potentially confusing for industry to have multiple sources of guidance and therefore we have withdrawn our cost-benefit analysis guidance. We will work with

RSSB as they update their guidance on cost-benefit analysis and will review our own remaining internal guidance.

What is included in a cost-benefit analysis?

Costs and Benefits

2.24 RSSB's Guidance on the use of cost-benefit analysis when determining whether a measure is necessary to ensure safety SFAIRP explains that when using cost-benefit analysis to test reasonable practicability, the only benefits to be included are the benefits in terms of improved health and safety. The cost-benefit analysis should include all the reduction in risk to passengers, workers and members of the public. RSSB's guidance includes examples of costs and benefits which should be included in a cost-benefit analysis in support of SFAIRP decisions. This includes performance costs and benefits and avoided direct costs which are *potentially* within the scope of a cost-benefit analysis. Duty holders are required to use judgement to decide which costs and benefits relate directly to the measure, and which are outside the scope of the cost-benefit analysis.

2.25 Risk in the railway industry is generally estimated in fatalities and weighted injuries (FWI) per year. To make a comparison with costs, the risk needs to be translated into a financial value by using the 'value of preventing a fatality' (VPF), which is a stated preference-based valuation which largely reflects willingness to pay to reduce the risk of death. This figure is endorsed for use by the DfT and is available on RSSB's website (the current VPF 2024 is £2,467,000).

Industry standards

2.26 Industry standards are in place to support the operation of a safe, high-performing and cost-efficient railway system, where all parties are performing their functions to comply with a common framework. In addition to standards which must be complied with under interoperability or health and safety legislation, industry wide standards also apply to duty holders as a requirement of their licence conditions. Companies may also set their own standards which are not required in legislation but encourage good practice. These company standards may not be explicitly safety standards but can add useful enhancements to existing legal standards. However, where company standards add unnecessary requirements, this may lead to increased costs.

2.27 Railway standards apply to the following regulatory frameworks:

- **Interoperability**: anyone applying for an authorisation to place infrastructure or trains into service must comply with all applicable standards, including National

Technical Specification Notices (NTSNs) and Railway Group Standards (RGS). Where it is not possible to comply with a standard, the project must seek an exemption from DfT for a deviation from an NTSN or from RSSB for a deviation from an RGS.

- **Safety**: All operators of transport systems are required by ROGs to have a Safety Management System (SMS) in place. For the mainline railway, the SMS must contain procedures to meet NTSNs, national safety rules and other relevant safety requirements. This includes RGSs and Railway Industry Standards (RIS). There is no formal deviation process from a RIS, but industry is encouraged to engage with RSSB when doing something different to that set out in the standard.
- **Licensing**: Conditions set out in licences issued by ORR typically require compliance with the Railway Standards Code and with all RGSs. RISs are also required to be followed unless an equally effective alternative is proposed, and any affected parties have been consulted.

2.28 Railway standards cover various categories, each addressing different aspects of railway operation:

- **Safety Standards**: These are the most critical standards, designed to prevent accidents and ensure the safety of passengers and staff. They include protocols for signalling, track integrity, train control systems, and emergency procedures. RSSB facilitates the development of safety and operational standards and promotes best practices across the industry.
- **Technical Standards**: These standards relate to the technical specifications of railway equipment and infrastructure. They include standards for track construction, rolling stock (trains), signalling systems, and electrification.
- **Operational Standards**: These guidelines govern the day-to-day operations of the railway system. They cover aspects such as train scheduling, maintenance procedures, and customer service.
- **Environmental Standards**: Standards have been developed to minimise the environmental impact of railway operations. These include guidelines on noise reduction, energy efficiency, and pollution control.

2.29 The National Infrastructure Commission (NIC) published a report in October 2024 on Costs of major infrastructure projects in the UK. This report is wider than rail

but underscores the important contribution that standards make to safe, effective and efficient infrastructure. It states "*Effective regulation and clear standards can promote efficient infrastructure delivery. Safety standards in the UK construction sector have helped to address a historically poor safety record and to minimise litigation costs. Where standards are clear they can also drive efficiency. Standardisation facilitates repeatability and ensuring that projects are 'right first time' at the construction stage by reducing the scope for unnecessary differentiation at the design stage".*

3. Review of the approach taken by train operators

Introduction

3.1 This chapter focuses on the experience of organisations involved in train operations and summarises our findings from our engagement with them. It includes case studies to help illustrate our key findings. Chapter 4 covers our separate findings from the review of Network Rail.

Testing reasonable practicability and assessing whether there is gross disproportion between costs and benefits

3.2 We asked duty holders to explain their processes for testing the reasonable practicability of making health and safety interventions. We also asked duty holders if they had any examples of interventions that required cost-benefit analysis.

3.3 There is clear evidence that reasonable practicability is tested by most duty holders prior to making a health and safety related investment decision, although not necessarily supported with quantitative cost-benefit analysis.

3.4 We found that for most health and safety related interventions, cost-benefit analysis is not required as the intervention is either a legislative requirement (for example to comply with regulations), a business-as-usual intervention or good practice is available to follow. In these circumstances, duty holders would typically make a qualitative assessment of the intervention using risk assessment, and if the expenditure is minimal or is required to achieve compliance with a standard, it just gets done. The smaller duty holders we spoke to were less likely to have undertaken cost-benefit analysis, which in some cases reflected the fact that the interventions they make are not of the scale to require this to support a decision.

3.5 Around half of the duty holders we spoke to provided one or more examples of where a quantitative cost-benefit analysis was used to inform an assessment of whether the costs were grossly disproportionate. For novel or complex cases, duty holders provided good examples of assessing the reasonable practicability of implementing significant health and safety interventions by assessing the costs and benefits.

3.6 As an illustration of how cost-benefit analysis can be used to support decisions with a bearing on health and safety, we provide an example from Greater Anglia.

Case study 1: Infrastructure options for Greater Anglia fleet upgrade

Greater Anglia explored and developed a proposal for funding infrastructure upgrades for around £20 million in relation to its fleet upgrade (such as extending platform lengths and moving signals to accommodate longer trains), which could deliver safety benefits in addition to others. In discussion with Network Rail, the costs were forecast to be much higher and take significantly longer than initially anticipated. Given that the proposed costs from Network Rail would be grossly disproportionate, Greater Anglia explored alternative options including maximising the use of automatic door selection that was being fitted to its new fleet (this is special door opening software which means that doors only open where there is a platform and other doors remain shut). These alternative interventions came in at significantly reduced cost and timescales, as well as bringing down the number of infrastructure site interventions.

3.7 We asked duty holders whether they used a general rule of thumb for a cost benefit ratio to inform gross disproportion. The picture was mixed, and few operators had a typical cost benefit ratio they applied in practice. Most duty holders we spoke to told us that each intervention must be decided on its individual merits and costs.

3.8 Among the examples provided of a specific cost benefit ratio, Transport for London (TfL) typically uses a cost to benefit ratio of 3:1; a cost greater than three times the benefit would be considered grossly disproportionate. ScotRail also used a ratio of 3:1 for gross disproportion in assessing options for addressing RAIB recommendations relating to the derailment at Carmont.

Case study 2: Using cost benefit ratios – ScotRail's implementation of RAIB recommendations relating to the derailment at Carmont

ScotRail said that it undertakes cost-benefit analysis for larger scale interventions, such as with the RAIB recommendations associated with Carmont. Cost-benefit analysis has been used to determine what actions are reasonable to take and what is grossly disproportionate and therefore unreasonable to take from a safety perspective. RSSB has also been involved in the development of the cost-benefit analysis in relation to addressing

the recommendations following Carmont. ScotRail typically uses a cost benefit ratio of approximately 3:1 which equates to a gross disproportion factor of 3.

3.9 We also heard an example from London North Eastern Railway (LNER) of using cost-benefit analysis to identify options for responding to a RAIB recommendation.

Case study 3: LNER's use of cost-benefit analysis when considering investment in double variable rate sanders

LNER explored multiple options for enhancing its fleet of 65 Azuma AT300s in relation to the recommendations from the Salisbury collision (RAIB 12/2023). LNER undertook tests on the available options and found that two of the options were grossly disproportionate. A third option was explored and was potentially disproportionate. However, LNER said this would then be subject to further sensitivity analysis to stress test the cost-benefit analysis. LNER used a peer review by specialist advisors to decide whether to take this option forward.

3.10 We also heard an example from Nexus where engineering options were explored but were considered grossly disproportionate. Instead, decisions were made on low-cost options to mitigate the risks.

Case study 4: Example of a low-cost intervention to reduce escalator accidents

Nexus explored engineering-based options to address the risk of escalator accidents, which are the biggest causes of accidents on metro systems. A reasonable practicability test demonstrated that it would be grossly disproportionate to carry out re-engineering work on the escalators, as incidents tend to be relatively minor. Instead, Nexus spent money on an education programme to tackle specific risks associated with vulnerable people, people with luggage, and people impaired by alcohol.

3.11 We found that most duty holders have good governance arrangements in relation to health and safety decision making, with some variations between operators. Some duty holders we spoke to suggested that there was limited knowledge among senior leaders of the 'Taking Safe Decisions' guidance and how to test reasonable practicability through cost-benefit analysis.

3.12 We found that there were often factors other than health and safety compliance influencing business decisions, including the commercial implications of not acting. Minimising reputational risk often appears to be a key driver of health and safety decision making. The duty holders we met spoke about the public perception of a multiple fatality incident on the railway, resultant reputational impact and the cost of mitigating that. These factors are taken into account in decisions about what is reasonably practicable and mean that where the risk is very high, duty holders are more likely to implement measures even if the costs are significant.

Use of industry guidance

3.13 We asked duty holders about engagement with industry bodies on health and safety interventions and whether they used industry guidance to help support their decision making, with specific reference to RSSB's and ORR's guidance. RSSB membership is required on the mainline rail network as part of train operators' licence requirements. For other duty holders which do not operate on the mainline, membership of RSSB is optional.

3.14 We found that RSSB's guidance to industry (including 'Taking Safe Decisions') is used by most duty holders, ROSCOs, manufacturers and consultancy firms we spoke to, and it is considered helpful. Most duty holders referred to using 'Taking Safe Decisions' when considering how an intervention will be implemented. It also helps ROSCOs and manufacturers when determining how to implement an intervention, often in collaboration with the duty holder.

3.15 Some duty holders said they lacked the capability to undertake quantitative assessments and therefore having guidance was helpful. Many of the duty holders we spoke to are also involved in RSSB's cross-industry forums and we heard that these are useful for sharing information and best practice.

3.16 Some duty holders told us the 'Taking Safe Decisions' guidance could be more accessible as they can find it difficult to navigate. We were also told that senior leaders should be made more aware of it, particularly those responsible for approving expenditure on health and safety related interventions.

3.17 Training packages and general education were noted as some of the best ways to remove reluctance or apprehension for engaging with RSSB's guidance. It was also recognised that promotion of 'Taking Safe Decisions' would help ensure that those who join the rail industry have the relevant training to hand. This is seen as important in retaining knowledge as others leave. Overall, we heard that duty holders would welcome simpler guidance on how to conduct cost-benefit analysis.

3.18 Duty holders told us there would always be some variations in approaches taken in response to industry guidance based on individual requirements and circumstances, but having clear principles to work from is beneficial. These should ensure that there is consistency of approach across the industry.

3.19 Duty holders were generally not aware of ORR's guidance on cost-benefit analysis although one operator did reference using ORR's guidance, saying it was good to know what the regulator expects. We produced this guidance mainly to assist ORR staff in assessing whether risks on Britain's railways have been reduced SFAIRP. It was published for transparency to set out our view on what should and should not be included in a duty holder's cost-benefit analysis.

3.20 Most duty holders referenced having regular engagement with ORR inspectors, but only one duty holder mentioned using engagement with ORR for the purposes of providing assurance and a 'stress test' of conclusions reached on interventions.

Case study 5: How TfL ensures consistency of approach in safe decisions

3.21 TfL told us about an internal standard document it has developed for safety decision making, using guidance such as ORR and HSE guidance.

TfL has used its Safety Decision Making standard to look at risks at the platform train interface on its network to identify specific locations where the risk, based on engineering assessments and quantified risk assessments, is tolerable. Where safety interventions require cost-benefit analysis, TfL has carried this out to identify appropriate next steps.

3.22 Our key finding from this section is that there is a lack of consistency in how reasonable practicability is tested and we recommend:

Recommendation 1) Industry should enhance its understanding of how to test reasonable practicability. RSSB has confirmed that it is developing further training to support its guidance – 'Taking Safe Decisions' – to be rolled out to industry, including senior decision makers. We encourage industry leaders to engage with RSSB's work. ORR supports this new training and will engage with RSSB on the content prior to the launch.

Industry standards

3.23 We asked duty holders about their approach to ensuring compliance with industry standards and, where relevant, how they would go about deviating from a standard. As set out in chapter 2, there are different types of standards used by the rail industry. For the purposes of this review, we were particularly interested in standards which support the management of health and safety risk.

3.24 Duty holders generally consider standards to be helpful as they provide good practice and are seen as setting a clear minimum requirement. Standards are not routinely challenged or deviated from. We heard from duty holders, ROSCOs, and consultancy firms that the drive towards greater compliance with standards within the rail industry has improved since the introduction of CSM REA. Relevant industry sub committees (for example, RSSB's Traffic Operation and Management Sub-Committee) are viewed as helpful for the rail industry and manufacturers to ensure compliance with industry standards.

3.25 However, there was a view from some organisations that compliance with standards can detract from a more risk-based approach to health and safety decision making. There is a concern that focusing solely on the application of standards may result in a reduced focus on risk assessments and examining what the true risk is and what may – and may not – be reasonably practicable.

3.26 Two organisations said that the application of standards had led to a decrease in the rigour of risk assessments undertaken early in the design stage process. We believe that applying health and safety by design principles at the earliest stages of a project, including full use of risk identification and assessment, will reduce the likelihood of later costly mitigation. This is discussed further below.

3.27 Most duty holders considered that the process to deviate from a railway standard is reasonably well understood and that the system allows duty holders to test standards. This may be through forums, for example RSSB committees for its standards, or directly with the standard owner. However, in practice, some duty holders considered that the ability to deviate from a standard was not always straightforward, and simplifying associated processes would be viewed as a positive. The approach around the process to apply for deviations from standards was covered in our Independent Review of RSSB in 2023, which found that some stakeholders were not keen to apply for a deviation, even when they had identified a cheaper alternative. Reasons cited were perceived uncertainty around the derogation process or concern around how much time and effort it would take, particularly in terms of the perceived risk to project schedules.

3.28 RSSB has identified that work is needed in this area and has committed to reviewing the deviation process as part of its work to review the standards framework and update the Railway Standards Code and Manual. This work is now underway and will continue throughout 2025 and 2026.

3.29 Some duty holders told us that they considered it was RSSB's role to actively challenge standards, and that this would only be done in exceptional circumstances. However, some duty holders said that it was reasonable to challenge standards. They cited the fact that standards can remain without updates for significant periods of time, and that standards were not always applicable to the operations of certain duty holders.

3.30 Some duty holders told us that they would generally make decisions on whether to challenge a standard based on qualitative risk assessment. An example of this was provided by Greater Anglia. While their challenge was primarily related to performance and environmental issues, there was a safety angle in relation to the risk of overhead line equipment being brought down and stranding trains. It was a good example of where a duty holder challenged a Network Rail standard for a better outcome.

Case study 6: Challenging a Network Rail standard

Greater Anglia discovered that with the introduction of its Stadler fleet of trains, a certain configuration of units running in double formation would not comply with the standards on spacings of pantographs given the spacings were closer together than permitted in the Network Rail standard. This meant that one unit would operate using overhead line equipment while the other would be diesel powered, which would reduce the environmental benefits of running some of these trains. Greater Anglia is in the final stage of testing to challenge the standard because it believes it can evidence that the spacing of the two pantographs would not cause a performance issue and not impact safety. If successful, this will enable Greater Anglia to run both units via overhead line equipment, whatever the configuration.

3.31 Our key finding from this section is that the process to deviate from an industry standard is reasonably well understood, but deviating from a standard is not always straightforward. We are not making any recommendations on standards because several programmes are due to start or are already underway which are designed to improve the efficiency and functioning of the standards framework:

(a) RSSB has already embarked on a review of the deviation process in relation to its work on the standards framework. ORR supports this review which is taking place during 2025-26.

(b) DfT expects to review the legal framework for standards to ensure it is appropriate for the future rail sector model and would expect to consult on any changes in due course.

(c) We also note that Network Rail has developed a risk-based approach to challenging its existing standards with a view to generating efficiencies in operating and maintenance costs. We continue to encourage Network Rail to realise these opportunities, estimated at £156 million in the national efficiency plans for 2024-29 (Delivering an Efficient Railway) as part of delivering the CP7 efficiency challenge set in the 2023 periodic review.

Health and safety expenditure

3.32 We asked duty holders to provide a breakdown of what they had spent on health and safety interventions in the previous financial year and how this compared to prior financial years. Around half of duty holders provided us with an overall expenditure figure. Expenditure varied among those duty holders, with the variation explained by more than just size of operation alone.

3.33 Some duty holders were able to provide us with supporting detail on their health and safety interventions related expenditure, with this split between operational and capital expenditure. Typically, their spend profile was relatively flat across years, unless there had been exceptional 'one-off' items. Larger duty holders were generally able to provide us with a clearer picture on expenditure than the smaller duty holders we spoke to, which could perhaps reflect larger duty holders having more financial resource and a clearer subdivision of their budgets.

3.34 While there was a good understanding of what was spent on specific interventions, some duty holders said it is difficult to extract the costs directly relating to health and safety. This is because many interventions have a broader purpose than health and safety, such as performance and asset management.

3.35 We have found that expenditure directly related to health and safety is not being recorded consistently by duty holders. This means it is difficult to provide a level of health and safety related expenditure with any degree of certainty. Further, recognising that many interventions deliver wider benefits than health and safety, we consider that duty holders can improve their understanding by recording and

analysing the benefits that interventions deliver. We think that greater experience or capability in understanding cost drivers would be valuable and welcomed by many duty holders.

3.36 As part of our review, we asked DfT about the extent to which it assessed health and safety related costs included in the business plans of TOCs which it currently funds. DfT explained that it expects evidence from TOCs that funding requirements are consistent with a good and efficient operator. DfT added that it is for the TOC to comply with all relevant licensing and regulations, while it relies on ORR to monitor and enforce health and safety related matters as required.

3.37 For these reasons, when assessing TOC annual business plans, DfT's focus is primarily on other important areas such as performance, revenue, capacity and connectivity. DfT has said that it would welcome support from ORR in understanding planned expenditure on health and safety, for example, where the duty holder states that expenditure is required in response to an ORR intervention.

3.38 For the duty holders who are expected to become part of Great British Railways (GBR) through rail reform, there is an opportunity to be consistent in how health and safety expenditure is reported.

3.39 As part of this review, we also spoke to Transport Scotland, funder of the railway in Scotland. While not specific to the assessment of train operator annual business plans, Transport Scotland said that it would welcome more regular and strategic dialogue with ORR on health and safety risks, be they related to train operations or Network Rail in Scotland.

3.40 Our key finding for this section is that the assessment of costs related to health and safety interventions is limited during the annual business planning process for train operators funded by DfT, and we make the following recommendation:

Recommendation 3) ORR and DfT should work together to improve DfT's awareness of priorities for health and safety. We will engage with DfT and other rail funders on how we can **share perspectives and provide advice** to enhance their assessment of health and safety interventions.

Engagement and Collaboration

3.41 We asked duty holders whether they consider the whole railway system when making health and safety decisions, for example, to what extent do TOCs consider

implications for the infrastructure or other operators. Duty holders considered there was opportunity for more collaborative thinking within the industry, particularly in the areas of finding engineering and safety solutions to operational issues. They noted mixed levels of engagement with Network Rail and room for improved interactions. This is discussed further in chapter 4.

3.42 We heard that TOCs were not always involved in the specification of new trains or brought in early enough at the design or risk assessment stage. This point was also made by the ROSCOs we spoke to who stressed the importance of operators being involved in the specification and design of new trains, as they will have the knowledge of local operations.

3.43 If opportunities are missed to address operational health and safety requirements at the design or risk assessment stage, then this can lead to operators having to address those issues retrospectively. This also entails putting in place additional operational measures until such issues are resolved. Both potentially result in a more costly and less effective risk control.

3.44 We heard a good example from Greater Anglia which illustrated the benefit of early TOC involvement in the manufacture of new trains and resulted in safety features being incorporated early.

Case study 7: Incorporating health and safety by design in new trains at the outset

Greater Anglia's new trains were not initially designed to include new trap and drag detection technology, as the door specification was designed prior to the introduction of this technology. However, Greater Anglia challenged the manufacturer to fit it during the build process rather than retrospectively where the costs to deliver the safety benefits would have been significantly greater.

3.45 There have been previous examples of missed opportunities to design out risks which resulted in issues once trains were in service. For example, in 2021, our Annual Report of Health and Safety on Britain's Railways, highlighted an issue with over-speeding on the East Coast Main Line. This involved two operators using Hitachi AT300 trains. In one instance the driver had allowed the train to reach 148mph. The maximum line speed was 125mph. We found that the trains, while fitted with an electronic speed limiter which needed to be set by the driver, did not have a maximum speed restriction programmed in the software. To

address this issue, the change had to be progressed by Hitachi. Until those changes were made, the operators had to introduce several mitigation measures to reduce the risk, including urgent safety notices and additional staff briefings around speed limiters.

3.46 Operators are not legally required to be involved in the design specification for trains, and the interoperability process is often taken forward by the party procuring the trains, with a focus on generic designs that are broadly suited to a range of applications. While interoperability requirements for trains include essential requirements for safety, this ensures a common baseline for safe trains but may not address all aspects of the train's intended use. ROGs require operators to undertake suitable and sufficient risk assessment prior to the introduction of new trains, but this may happen too late to influence the design. This creates the possibility that some risks assessed and identified by operators are not taken fully into account early enough. This could potentially result in the need for changes to the train at a later stage which would be an additional cost. This could also mean that risk controls that were reasonably practicable to incorporate into the initial design become significantly more expensive when required to be implemented later.

3.47 The National Audit Office (NAO) published a report in 2014 on Procuring new trains, which examined DfT's processes for procuring new trains for the Intercity Express and Thameslink programmes. It found that better strategic planning of infrastructure and train needs could have prevented the significant changes which occurred to the Intercity Express programme.

Engagement and sharing of best practice

3.48 We asked duty holders to explain how they share best practice with other operators, within owning groups or other relevant parties.

3.49 Good examples of engagement with industry bodies were provided by many duty holders, ROSCOs and other organisations, including within TOC owning groups, industry steering groups, Network Rail, the Great British Railways Transition Team (GBRTT), the Rail Delivery Group (RDG) and Rail Partners.

3.50 Duty holders also referenced good engagement through joint safety groups with Network Rail, particularly at a local, regional and route level. They also referenced dedicated multi-party groups to focus on specific topics, such as risk management for extreme weather. Duty holders and ROSCOs also highlighted that RAIB

reports and recommendations are important in the context of sharing learning from incidents and considering how recommendations could be adopted.

3.51 Some duty holders gave the example of positive engagement and exploring best practice beyond the rail industry, for example with airports that face similar issues with escalators. We heard from individuals, who have experience in other transport modes or sectors, who told us that the rail industry is more engaged than others in testing reasonable practicability, undertaking cost-benefit analysis and liaising with health and safety inspectors. Great Western Railway highlighted to us the benefit of the specialist guidance that RSSB can provide to duty holders, compared to other transport sectors where an equivalent body does not exist. We consider that collaboration on approaches to risk management and establishing what is best practice is an area of strength in the rail industry.

Effective change management

3.52 We asked duty holders to explain the approach taken to change management and the transfer of risk from themselves to the party best placed to manage the risk.

3.53 There were differences in how duty holders handle the transfer of risk. We heard good examples of duty holders working together (for example, on new stations) to ensure that risks are mitigated before these are transferred. However, we also heard examples where issues were identified late or after the risk had been transferred which made dealing with the intervention more difficult and potentially at extra cost.

Case study 8: Roll out of tactile paving

In its investigation into the fatal accident at Eden Park in February 2020, RAIB addressed a recommendation to the Department for Transport and Network Rail to develop and progress a time-bound programme to install tactile surfaces at stations where justified by safety benefits, in consultation with train operators. South Western Railway considered that better consultation and guidance provided by Network Rail could have reduced the post implementation costs of the rollout. South Western Railway said that guidance should have been clear when tactiles should or should not be installed at stations, as well as the threshold for when it was acceptable for tactiles to be 'staggered'. Given it had some locations which subsequently required modifications, it considered this would have helped reduce the overall post implementation cost of the programme.

3.54 Collaboration was illustrated in specific areas, for example, LNER said that it, along with other train operators owned by DfT Operator Limited, has been undertaking joint assurance exercises with Network Rail to enable a true whole system consideration of risk, control, and assurance for the first time.

3.55 Among other examples given, West Midlands Trains experienced some issues with the introduction of new trains which did not fit in between signals and therefore could create a future Signal Passed at Danger (SPAD) risk. West Midlands Trains worked with Network Rail and other operators to resolve this issue, which included moving a signal to accommodate the new train in a platform.

3.56 We also heard a good example of collaboration in relation to the Wagon Condition Programme, which is a cross-freight industry group with RSSB and Network Rail, which examined the costs of wagon derailments and their impacts on safety.

Case study 9: Wagon Condition Programme's risk review

In 2024, the Wagon Condition Programme, part of the Freight Safe Programme (a joint initiative between the UK FOCs, Network Rail and supported by RSSB) undertook a risk assessment to quantify the risks of wagon condition on the GB mainline rail network. The risk assessment was undertaken following several serious derailments.

The risk assessment determined that a representative data set for significant derailment should be drawn over a 10-year period and out of 59 incidents, 14 were related to wagon condition. The work used this data, as well as established and proven industry risk models, to calculate a monetary value for the risk. This was done by taking the estimated network wide risk from wagon-related freight train derailments, which had a fatalities and weighted injuries (FWI) of 0.11 and multiplying it by the value of preventing a fatality (VPF) which in 2023 was £2,431,000, which generated a VPF of £272,000 per incident, indicating a relatively low safety benefit.

However, the work looked beyond the immediate safety risk in considering the business case for avoiding wagon-condition caused derailments by looking at the business impacts of both derailments and precursor events that could lead to derailments. The work identified that if a complete elimination of wagon condition caused derailments could be achieved, a whole industry saving of £8.1 million per annum could be generated, with the safety element being only 3% of the total. £8.1 million was considered a worthwhile benefit and within this cost framework, there were likely to be beneficial mitigations for derailment prevention.

3.57 The creation of GBR should also mean that there is more joined up decision making across train and infrastructure safety decisions within that organisation. Reflecting on this, some duty holders considered greater integration could help with gaining a better understanding of the costs and benefits of health and safety interventions.

3.58 We think that opportunities should be taken with rail reform for closer working between train operators, Network Rail and funders, which provides an important opportunity to address operational safety issues during the design of new trains. However, the creation of GBR will take time, and is not a reason to defer enhancing collaboration and improving change management wherever this is possible within existing industry structures.

3.59 We also note that while GBR will bring together Network Rail and 14 passenger operators, which are funded directly by the Secretary of State for Transport, many operators will continue to sit outside of GBR. One-third of passenger journeys will be with non-GBR operators. This includes those funded by other public bodies, such as by Scottish Ministers, Transport for Wales, Transport for London and commercial operators including open access passenger services. Therefore, continued cross-industry working and cross-organisation collaboration will remain vital.

3.60 Our key finding for this section is that there is opportunity to improve the identification and inclusion of solutions to manage health and safety risks with trains earlier in the design process, and we make the following recommendations:

Recommendation 4) When new trains are being considered, the party acting as the lead on procurement should ensure engagement, where possible, with the future operator to ensure that **health and safety issues relating to the planned use of the train are considered and understood by all parties before the design is finalised**. ORR also has a role to promote the principles of health and safety by design and clarify the limitations of the interoperability process in relation to operational safety.

Recommendation 5) The Government's rail reform programme should **consider how health and safety by design can be improved when new trains are being procured**. This will realise a benefit of integrating track and train under rail reform.

4. Review of Network Rail's approach

4.1 This chapter focuses on our findings and recommendations relevant to Network Rail. These draw on the review by the Independent Reporter of Network Rail's approach to assessing the costs and benefits of safety interventions.

4.2 The independent review looked at a number of case studies agreed between us and Network Rail. The case studies were:

- Electrical Safety Delivery (ESD) – which is a programme to deliver a step-change in compliance for the rail industry to reduce workforce electrical safety risk to as low as reasonably practicable, enable improvements to track worker safety and provide productivity benefits;
- Level Crossings – this case study reviewed a number of level crossing risk assessments, including passive level crossings (Broad Oak, Bosley and Widmeads);
- Track Worker Safety – which is a programme of initiatives implemented by Network Rail to improve Track Worker Safety in response to two ORR Improvement Notices issued to Network Rail on 8 July 2019;
- Public safety (Dawlish Sea Wall) – this case study reviewed decision making regarding public safety on the Network Rail owned sea wall walkway which runs between Dawlish Warren and Teignmouth, part of the South West Coast Path; and
- Network Rail's response to RAIB recommendations following the fatality at a passive level crossing at Tibberton in Worcestershire.

4.3 These case studies were chosen as they were recent examples of novel or complex interventions and which required a material amount of expenditure. We wanted to understand whether Network Rail had considered:

- compliance (with legislation or standards);
- health and safety management improvement beyond compliance;
- performance, capacity or other business objectives or a blend of these; and

- the extent to which effective project management was used to control costs and ensure that intended benefits were realised.

4.4 The scope of the review also looked at aspects of ORR's approach including:

- the application of ORR's Enforcement Management Model (EMM); and
- our processes for monitoring costs associated with Network Rail's health and safety interventions.

4.5 The review specifically assessed:

- Network Rail's decision making, and how reasonable practicability, and gross disproportion were tested, including Network Rail's governance around this.
- Network Rail's approach to considering what is good practice and in novel or complex situations how it worked from first principles to consider options with quantified costs and benefits.
- How issues were escalated within Network Rail and what engagement it had (if any) with ORR.
- How other benefits (performance, capacity, efficiency), were explored, assessed, optimised and prioritised.
- The timing/duration before decisions were re-examined.
- How Network Rail takes account of the impact on the wider rail industry and how the company manages risk transfer to other parties such as TOCs or FOCs.
- Interaction with ORR and, where applicable, other bodies including Railway Safety and Standards Board (RSSB) and Rail Accident Investigation Branch (RAIB) prior to and following an intervention.
- What costs were included and whether they were directly related to the safety issue in question.
- Whether there are regional and national approaches to testing reasonable practicability and the use of cost-benefit analysis.
- How projects were managed to ensure costs were controlled, change was managed and intended benefits were realised.

4.6 The independent review has been published alongside our own report. This summarises the context of each case study and sets out the detailed findings in relation to each of the case studies as well as recommendations for Network Rail and ORR.

Network Rail's decision making on major safety programmes

4.7 The independent review found that there were elements of Network Rail's approach to decision making on major health and safety programmes which represented good practice when determining what is reasonably practicable, but there was variation.

4.8 There was evidence of a structured and mature approach to level crossing risk assessment (including explicit risk estimation based on quantitative and qualitative assessment). When reviewing the approach for Dawlish Sea Wall, the review also found evidence of good practice in terms of risk elimination, and that reasonable practicability was well understood. There were similar findings for the RAIB Tibberton case study.

4.9 The review found room for improvement in the case study for Track Worker Safety, particularly around Network Rail's approach to risk assessment and determining what is reasonably practicable. It was not clear from discussions how good practice, or what was reasonably practicable, were assessed.

4.10 The review found evidence that Network Rail considered options with quantified costs and benefits within the case studies, but again there was variation. For example:

(a) The development of options for controlling risk was embedded in the level crossing risk assessment process, with each level crossing being subject to risk estimation to determine what is reasonably practicable. The review found evidence of Network Rail using the All-Level Crossings Risk Model risk quantification, which is populated with RSSB Safety Risk Model incident data. This is supported by qualitative expert judgement which helps capture other hazards and factors not accounted for in the quantitative assessment.

(b) The Dawlish Sea Wall case study also followed first principles with risk estimation.

(c) The use of a risk-based, structured approach was not evident from the Track Worker Safety case study.

4.11 Network Rail is developing guidance ('SFAIRP – A practical guide to support safety-related decision making') which will help to establish a more consistent approach across the company on the approach to testing reasonable practicability.

Was each case study supported by clear assessments of costs and intended benefits?

4.12 It is important that Network Rail can account for the costs and intended outcomes of health and safety interventions and demonstrate that it is securing compliance with its legal obligations as well as value for money for passengers, freight users and taxpayers who fund the railway.

4.13 The independent review found examples of risk assessments and evaluation, in some cases supported by clear assessments of costs and benefits, but there was no common approach to how costs and benefits were assessed across each of the case studies.

4.14 For level crossings there was evidence of use of a cost-benefit analysis tool, with case studies showing the range of costs and benefits considered. Similarly, on the Dawlish Sea Wall and Electrical Safety Delivery case studies, the review found evidence of an assessment of costs and benefits.

4.15 In contrast, for the Track Worker Safety case study, Network Rail developed plans for implementation of the ORR improvement notices but these were not supported by an assessment of the costs and benefits. Network Rail considered that there were other benefits beyond safety from its Track Worker Safety programme, but these were also not specifically valued or documented. We also heard verbal accounts from duty holders about operational challenges in the context of changes implemented for lineside working.

4.16 Based on the case studies reviewed, the independent reporter found no consistent view within Network Rail on gross disproportion factors to support health and safety related decision making other than in relation to level crossings. Nevertheless, the review did note that Network Rail has recently commissioned a report to ensure consistency in gross disproportion factors and this will feed into a new cost-benefit analysis tool being developed by Network Rail.

4.17 From this section, our key finding is a lack of consistency in how reasonable practicability is tested and we make the following recommendation:

Recommendation 2) Network Rail should continue to **develop and implement its approach and guidance for determining reasonable practicability**, including a tool for cost-benefit analysis in line with RSSB's industry guidance. Network Rail, RSSB and ORR should ensure that the approaches to testing reasonable practicability for industry and Network Rail are aligned as far as possible.

How issues are escalated within Network Rail

4.18 The devolution of Network Rail routes was noted as posing a challenge for engagement between Network Rail and ORR, requiring multiple people at Network Rail to be involved.

4.19 Devolution also featured in our conversations with other duty holders. There were mixed views on the impact of Network Rail's devolution. Many duty holders were positive about it, noting the benefits from alliancing arrangements, more local engagement and joint safety forums, but others spoke about instances where devolution had a negative impact on the strong working relationships they previously had with Network Rail's central safety teams. One trade union commented that escalation mechanisms within Network Rail could be made clearer.

4.20 The independent review noted Network Rail's Technical Authority plays a central role in areas such as the national level crossing safety team. However, there were some differences in approach in other areas, such as engagement with Track Worker Safety and Electrical Safety Delivery. Reflecting the issues identified, the Independent Reporter has made recommendations designed to enhance how health and safety risks are tracked, monitored and how progress is communicated within Network Rail. We agree with these recommendations.

4.21 The Independent Reporter also found some evidence of Network Rail having national approaches and processes to determining reasonable practicability (particularly for reducing risk at level crossings) with some variation in outputs at a regional level. Regional variation was noted in the approach to determining reasonable practicability in the Electrical Safety Delivery case study. The review noted that Network Rail currently does not have overarching guidance to ensure consistency.

4.22 For the Track Worker Safety case study there was evidence of national strategies but some variation in how each of the regions implemented the programme. The review also found evidence of issues being identified by ORR but Network Rail not

necessarily acting on those concerns, which highlights issues around escalation of issues related to health and safety within Network Rail.

4.23 The key finding for this section is that Network Rail's internal process for escalating emerging health and safety risks should improve and we make the following recommendations:

Recommendation 6) Network Rail should develop a more robust process for capturing significant health and safety compliance issues and escalating these within the organisation.

Recommendation 7) Network Rail should consider ways to **improve how regional and national approaches to address emerging risks are managed**, which will allow for effective decision making at corporate level.

Governance and project management to monitor and control costs and ensure intended benefits are realised

4.24 The Independent Reporter found some evidence of established methods and processes in place for governance and testing of SFAIRP but there was a mixed picture across each of the case studies.

4.25 Positively, the review found that the national level crossing risk assessments standards, guidance documents, Technical Authority function and resource, collectively provided good governance and there was evidence of sharing of good practice through several forums.

4.26 In other case studies, the review found only limited evidence of measures in place for the governance and testing of SFAIRP. For example, in the Dawlish Sea Wall case study the Independent Reporter found that there was a clear assessment of how SFAIRP was determined but it was unclear how this was linked to the national Technical Authority, or a standardised or monitored approach. There was no clear evidence of governance of the steps to demonstrate SFAIRP in the Track Worker Safety case study.

4.27 The review found some evidence that Network Rail had arrangements for monitoring and controlling costs of projects to ensure intended benefits were realised but noted that there was room for improvement.

4.28 For the Level Crossing and Tibberton case studies, effective project management was found to be in place. Risk assessments were periodically reviewed and after certain trigger points, such as an incident, Network Rail sought to understand whether decisions needed to be reassessed.

4.29 For the Track Worker Safety and Electrical Safety Delivery programmes, there was evidence of internal Network Rail governance with external review (by ORR and other parties). There was also evidence of monitoring of progress at a regional level as well as evidence of consideration of unit costs. However, for both programmes, the review found that there was limited evidence of monitoring costs against original forecasts. While the review did find some evidence of monitoring costs at a higher level, it considered that Network Rail could have done more to monitor costs at a more detailed level and evaluate how long the intervention took compared to what was expected.

4.30 The review noted that the new Network Rail internal guidance referenced above ('SFAIRP – A practical guide to support safety-related decision making') will aim to provide more clarity on the required governance arrangements to monitor delivery and implementation of health and safety initiatives. This should help Network Rail improve consistency in this area.

4.31 From our monitoring of National Highways, we have found that the company has a process for capturing and managing benefits. National Highways undertakes post opening project evaluations (POPEs), to compare the expected impacts of a project with the outturn impacts after construction has been completed. We published work on this in 2024. Network Rail has a system called Project Acceleration in a Controlled Environment (PACE) which is designed to assess the benefits of a project post evaluation. We think this could help improve Network Rail's recording and assessment of the benefits of major health and safety interventions and would represent good practice.

4.32 Our key finding for this section is that the progressive monitoring of costs, project outcomes and governance within Network Rail on significant health and safety initiatives should be improved, and we make the following recommendations:

Recommendation 8) For major health and safety interventions, Network Rail should **improve its monitoring of cost and project outcomes** to ensure that costs are controlled and test that intended benefits are realised**.** This should include re-evaluating reasonable practicability when there are significant changes in costs and/or the means to realise health and safety benefits.

Recommendation 9) Network Rail should **improve its governance,** and documentation of decisions on major health and safety initiatives to improve transparency and to support Recommendation 8**.**

Engagement with ORR and other industry bodies on health and safety risks and priorities

4.33 Overall, the Independent Reporter found that Network Rail's engagement with ORR and other relevant bodies such as RSSB and RAIB was positive based on the case studies reviewed. It highlighted scope for improvement in the consistency of engagement by both Network Rail and ORR in relation to the escalation of health and safety related issues.

4.34 The review highlights the importance of a collaborative approach with other industry stakeholders, particularly for more novel or contentious issues. It also found that there are opportunities to improve understanding of the costs of health and safety interventions among other organisations. The review recommended that RSSB could help with raising awareness of cost-benefit analysis and testing of gross disproportion and SFAIRP. We agree and as noted in chapter 3, this can be delivered through RSSB's training.

4.35 In the level crossing case study, the review found there was evidence of strong engagement with ORR and RAIB, where structured responses to enforcement action and other recommendations had been effective. Network Rail's use of RSSB's data (for level crossings) was also positive. For Electrical Safety Delivery, there was evidence of a joint strategy agreed between Network Rail and ORR based on SFAIRP principles. This was regularly updated and reported to internal Network Rail governance processes and shared with ORR.

4.36 For the Track Worker Safety case study, the independent review reported that Network Rail thought it was addressing compliance concerns through its Near Miss Reduction Programme and was unaware that ORR was considering enforcement. This was despite ORR carrying out a national inspection of track

worker safety which concluded with a report to Network Rail in May 2019, and several meetings before then, before the improvement notices were served in July 2019.

4.37 It is important that we work with Network Rail to address these issues, and we are committed to doing so. In addition to working level engagement, the engagement at senior levels has been strengthened between our organisations for health and safety issues. Both Network Rail and ORR agree that we should explore opportunities to further strengthen this and improve linkages. This will be important ahead of future funding reviews as we need to work not just with Network Rail and funders but also wider industry, given the creation of GBR should allow for a more holistic consideration of track and train.

4.38 Our key finding for this last section is that there is scope for improved consistency of approach in raising awareness and escalating health and safety issues between Network Rail and ORR. In response, we make the following recommendation:

Recommendation 10) Network Rail and ORR should explore opportunities to further strengthen existing engagement on significant health and safety issues. As individual organisations, we will ensure that when novel or complex initiatives arise, there is timely engagement to ensure that issues are being discussed through the appropriate channels. We will continue to have structured engagement with Network Rail (and in future GBR) and industry at a senior level on health and safety matters that could significantly shape future funding requirements.

Annex A: Duty holders and organisations we met

Duty holder / Stakeholder
Angel Trains
Arriva Rail London (London Overground)
Balfour Beatty
CAF Rolling Stock UK Limited
Chiltern Railways
Colas Rail
Department for Transport
Deutsche Bahn (DB) Cargo
Direct Rail Services (DRS)
Eversholt Rail
First Rail Holdings (FRH)
Freightliner
GB Railfreight (GBRf)
Govia Thameslink Railway (GTR)
Greater Anglia
Great Western Railway (GWR)
Health and Safety Executive (HSE)
Keolis Amey Docklands Limited (DLR)
London North Eastern Railway (LNER)
National Union of Rail, Maritime and Transport Workers (RMT)
Network Rail
Nexus Rail (Tyne & Wear Metro)
Northern Rail
Office for Nuclear Regulation
Porterbrook
Rail Accident Investigation Branch (RAIB)
Rail Safety and Standards Board (RSSB)
Railway Industry Association (RIA)
RiskTec
RockRail
Scotland's Railway (ScotRail)
Shakerley Consulting Limited

Sotera Risk Solutions
Southeastern
Southwestern Railways (SWR)
TransPennine Express (TPE)
Transport for London (TfL)
Transport for Wales (TfW)
Transport Salaried Staffs' Association (TSSA)
Transport Scotland
Unite
Volker Rail
West Midlands Trains (WMR and LNWR)

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