The Rail Industry’s Data and Risk Strategy
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction and purpose</td>
<td>1</td>
</tr>
<tr>
<td>Scope</td>
<td>2</td>
</tr>
<tr>
<td>Where we are now</td>
<td>2</td>
</tr>
<tr>
<td>Health and wellbeing</td>
<td>3</td>
</tr>
<tr>
<td>The case for improvement</td>
<td>3</td>
</tr>
<tr>
<td>Where we want to be</td>
<td>4</td>
</tr>
<tr>
<td>A vision of future safety management</td>
<td>5</td>
</tr>
<tr>
<td>How we will get there</td>
<td>7</td>
</tr>
<tr>
<td>Roadmap</td>
<td>7</td>
</tr>
<tr>
<td>Delivery mechanisms</td>
<td>7</td>
</tr>
<tr>
<td>Customers and beneficiaries</td>
<td>8</td>
</tr>
<tr>
<td>Measuring success</td>
<td>9</td>
</tr>
<tr>
<td><strong>Objectives</strong></td>
<td>10</td>
</tr>
<tr>
<td>Next generation reporting systems and risk models</td>
<td>11</td>
</tr>
<tr>
<td>Design for health and safety and change management</td>
<td>14</td>
</tr>
<tr>
<td>Exploit new technology</td>
<td>15</td>
</tr>
<tr>
<td>Develop our people</td>
<td>16</td>
</tr>
<tr>
<td>Smart supplier capability assessment and information</td>
<td>17</td>
</tr>
<tr>
<td>Improved approach to health and safety co-operation</td>
<td>17</td>
</tr>
<tr>
<td>Next generation rules and controls</td>
<td>18</td>
</tr>
<tr>
<td>Improve learning, sharing and horizon scanning</td>
<td>19</td>
</tr>
<tr>
<td>More effective assurance</td>
<td>19</td>
</tr>
</tbody>
</table>
A strategy for developing the knowledge, skills, processes, information and tools for managing risks to safety, health and wellbeing on Britain’s railway
Introduction and purpose

This strategy builds on the shared commitment in *Leading Health and Safety on Britain’s Railway* to improve our capability in health and safety management.

It identifies where industry needs to work together to exploit the new ideas and technology that will keep the GB railway at the cutting edge of risk management practice and bring about a step change in health and safety performance.

In particular, the strategy will deliver the rail industry’s vision for the *risk intelligence that a world class railway needs, efficiently provided to the right people, in the right format, and at the right time.*

Our health and safety management capability is based around our people; their knowledge and skills, the processes they follow, and the information and tools that support their decision making.

This Data and Risk Strategy is published by RSSB and its delivery will draw heavily on RSSB’s expertise and resources. RSSB is a central focus point for issues management and industry decision making, and a centre of excellence for data analysis and the understanding of risk. The ultimate purpose of the strategy aligns with RSSB’s core role in maintaining and developing industry capability so that rail companies can:

- Comply with health and safety legislation, and demonstrate they are doing so.
- Know when and when not to invest in health and safety measures.
- Have early sight of emerging health and safety issues.
- Identify, share and adopt good practice in health and safety management.
- Collaborate efficiently and effectively to improve health and safety.

The companies directly engaged in the railway all play their part, be they infrastructure managers, passenger or freight train operating companies, rolling stock leasing companies, suppliers, or infrastructure contractors.

These organisations are all represented on the Data and Risk Strategy Group (DRSG), which, will be the sounding board for delivering this strategy.

This document is also aimed at others in the industry who will be involved in specifying, delivering, reviewing, and implementing the supporting programme of work. It is intended to inform rail safety professionals and others who will benefit from its outputs, and potential partners both in and outside the GB railway.
Scope

The scope of this strategy covers knowledge, skills, processes, information and tools that support the management of risk to safety, health and wellbeing. It does not include other risks explicitly but recognises the need for an all-inclusive approach to risk management that considers areas like sustainability, performance and finance.

The term data in the title covers:
- Information contained within health and safety reporting systems.
- Information that has been generated for a different primary purpose but only in the context of its use as an input to decisions that affect health and safety.

Where we are now

Safety

Rail companies have clear and specific legal obligations for managing safety risk. Some of these are set out in the Common Safety Methods (CSMs) on Monitoring and Risk Evaluation and Assessment, which provide the foundation of an effective risk management framework.

There is clarity on the main points that safety legislation leaves open to interpretation. Taking Safe Decisions sets out the consensus industry position on how companies in the GB rail industry take decisions that affect safety. The Railway Management Maturity Model (RM³), which was developed by the ORR, provides a common approach to achieving excellence in safety management.

Companies in the industry have individual legal obligations but routinely work together to deliver effective safety management. The ‘duty of co-operation’ for managing interface risks is enshrined in law, but companies also collaborate more widely on the management of shared and common hazards. It is a well-established principle in the GB railway that there is no competition in safety. Instead there is a well-recognised spirit of information sharing between companies, boosted by membership-based organisations such as RSSB, the Rail Delivery Group (RDG), the Rail Supply Group (RSG), and the cross-industry groups that they manage.

This is underpinned by a strong focus on evidence-based safety decision making. The new Safety Management Intelligence System (SMIS) built on 20 years’ of methodical data collection and analysis, combined with the mature reporting culture that has developed alongside, make information sharing possible. This supports national and local safety monitoring and has enabled the development of sophisticated risk models. The network-wide Safety Risk Model (SRM) underpins much risk assessment work, the Precursor Indicator Model (PIM) indicates trends in train accident risk, and Network Rail tools such as the Signal Overrun Risk Assessment Tool (SORAT) and the All Level Crossing Risk Model (ALCRM) support a risk-based approach to asset management. These tools help the companies in the industry meet their legal obligations and target investment effectively.

The common processes, information and tools described above, and the knowledge and skills of those who use them, have served the industry well and contributed to its strong safety record: safety risk is at an historically low level and the
GB network is among the safest in Europe.

Health and wellbeing

The industry is less mature in its management of health and wellbeing. Rail companies (in common with other industries) have a legal obligation to manage occupational health risk. There is no equivalent obligation to manage employee wellbeing but doing so brings clear business benefits as well as being an ethical responsibility. Workforce health and wellbeing is as important as workforce safety, and the two often go hand-in-hand: poor physical or mental health degrades performance and imports safety risk.

The industry has produced a Railway Health and Wellbeing Roadmap, which identifies what the industry needs to do to achieve the vision that ‘GB railway is an industry where everyone takes responsibility for health and wellbeing and benefits from it’.

An important part of this is ensuring that rail companies have the right knowledge and skills, processes, information and tools to enable effective management of health and wellbeing. Although some of these enablers are in place they are generally less developed and are less consistently applied than their safety equivalents.

The case for improvement

The industry can be proud of its achievement in improving safety but cannot be complacent because:

- The rate of safety improvement has slowed over recent years.
- The railway is going through a period of change. Growth in passengers, investment in new infrastructure and the introduction of new technology (including through the Digital Railway Programme) present opportunities but also pose threats if they are not managed effectively.
- Safety needs to be delivered efficiently: there is an increasing focus on demonstrating value for money.
- Understanding and management of some areas of safety risk, such as road driving, is relatively undeveloped.
- Practical experience of applying recent legislation, such as the CSMs, is limited and open points remain. Awareness and application of agreed industry principles and processes (such as those set out in Taking Safe Decisions) is not universal.
- Monitoring activity is often reactive and most companies are not yet making widespread use of effective activity, result and precursor indicators.
- Risk management tools have often been developed independently and do not interface with each other. This creates inefficiency and difficulties comparing risk between different assets and areas of operation.
- The underlying causes of incidents are not recorded and analysed in a systematic way. The industry may miss opportunities to learn
from the past to improve its management of current or future risk.

• Data relevant to safety is not being fully exploited because the railway lacks the relevant tools and skills. This particularly applies to unstructured records (such as close calls) and information generated in large volumes by automated systems.

Management of health and wellbeing is less mature and the case for improvement is clear. The industry has made a strong commitment to improve its health and safety management capability in Leading Health and Safety on Britain’s Railway. It has a good foundation on which to build, particularly in relation to safety risk, and is well-placed to exploit the opportunities that now exist. The digital revolution has seen a proliferation of data and is producing the capabilities and tools to turn it into actionable intelligence. The GB rail industry has already made a substantial investment in the SMIS+ Programme, which has rebuilt SMIS on a modern enterprise safety management system platform. And RSSB is agreeing a new settlement with its members, with customer focus at its core. This puts the emphasis on people and, in the context of this strategy, ensuring that processes, information and tools meet their needs and that they have the knowledge and skills to use them.

Where we want to be

The fundamental aim of the Data and Risk Strategy is to develop the capability that keeps the industry at the forefront of good practice in health and safety management and ensures that its companies can fulfil the vision of risk intelligence that a world class railway needs, efficiently provided to the right people in the right format and at the right time. Its vision of the future is one where skilled workers make effective, dynamic and timely risk management decisions with support from modern information systems. They review and analyse real-time intelligence from diverse data sources and alarms of different urgencies draw attention to emerging issues. These trigger front-line action where required. Rapid tactical risk analysis follows to support a broader response, which targets other parts of the network that have similar risk control weaknesses. Investment cases are quickly produced and management makes timely decisions informed by a clear and robust analysis of cost, performance, health and safety. An example of the potential for faster and more targeted decision making is shown opposite.
A vision of future safety management

A passenger train service experiences a rough ride. This indicates something may be wrong with the infrastructure.

In the control room, the safety manager receives an alert and has already begun processing information within the Safety Management Intelligence System.

The system uses risk ‘bow tie’ models to provide a rich picture of how a threat can escalate, what barriers are in place to prevent it happening, and how these barriers are performing.

A team is deployed to inspect the infrastructure.

The safety manager analyses risk across the network using the tools and information in the system, to identify vulnerable locations and improvement options.

The board has all the information it needs to target investment and interventions to resolve the wider issues at source. Key tactical and strategic decisions are made in compressed timescales.
The elements that need to be put in place to help realise this are:

1. Common health and safety management processes that promote efficiency and provide assurance while providing the flexibility required for local application.

2. A common risk control framework mapped to means of compliance, for example requirements in industry or company standards.

3. The new Safety Management Intelligence System as the ‘one stop shop’ for shared risk management information and tools, providing:
   a) The right health and safety intelligence to the right people at the right time.
   b) Tools that support application of the common health and safety management processes.
   c) Interfaces with relevant external systems, models and tools.

4. Risk models and tools that are easy to access and use, and support the development of local and predictive risk profiles.

5. Clear and well embedded competence management arrangements to ensure that people who take health and safety related decisions have the necessary knowledge, skills, and support.

6. An influential role in the development of law, policy, and guidance, within GB and internationally, to create an environment in which good practice thrives.

The elements align with the capability improvement objectives in Leading Health and Safety on Britain’s Railway – A strategy for working together. The Objectives section lists these in full, identifies those that DRSG will have oversight of delivery for and extends or unpacks them to provide additional or supporting objectives.
How we will get there

Roadmap

The strategy is focussed on the four enablers of people, processes, information and tools and there is a need to maintain alignment across these areas.

It will be delivered via the following programmes of work, which overlap and cut across the enablers:

- **Processes and competence**, which includes provision of guidance and training.
- **Systems and information**, which includes the development of SMIS and the health and safety intelligence that it can generate.
- **Models and tools**, which includes the development and use of the Safety Risk Model and industry risk management tools.

The work will follow a phased approach covering the short, medium, and long term.

DRSG will advise on priorities and help RSSB to develop and maintain a product roadmap that shows the route to delivering the objectives. The objectives represent a large volume of work that requires careful prioritisation and realistic scheduling.

Delivery mechanisms

The objectives will be met through distinct but related programmes of work, some comprising multiple projects. These will be delivered by applying established programme and project management principles. Many projects and programmes will be resourced and managed by RSSB but others may be led by member or partner organisations such as Network Rail or, via the strategic partnership with the University of Huddersfield.

The Data and Risk Strategy Group has oversight of the delivery of this strategy. DRSG is a subgroup of the System Safety Risk Group (SSRG). SSRG and its subgroups monitor system-level health and safety performance, provide mechanisms for sharing good practice, support the delivery of *Leading Health and Safety on Britain’s Railway*, and help to be the sounding board for RSSB’s work programmes.

Members of DRSG will:

- Advise on priorities, schedules and success criteria.
- Monitor progress on individual projects and programmes and against the overall roadmap.
- Review outputs, help to embed them in industry and provide feedback on their effectiveness.
- Propose new research that is needed to deliver this strategy, sponsoring project delivery and adopting relevant findings to deliver benefits.

RSSB welcomes input on the above from the wider industry.

Where work is carried out by RSSB, its Board will provide governance oversight and hold the executive to account for delivery to time, cost, and quality.
Customers and beneficiaries

The customers and beneficiaries of the Data and Risk Strategy are various and include:

- **Passengers and members of the public** who might be affected by the operation of the railway and who, along with rail staff, are the ultimate beneficiaries of improvements in the management of safety, health and wellbeing.

- **People who work in the industry**, from senior leadership to those on the front line, and the trade unions that represent them. The strategy cannot achieve anything without rail workers making effective use of the processes, information and tools that it delivers, and it needs to equip them with the knowledge and skills to do this.

- **GB rail companies**. That is, companies that make up the GB rail industry including its supply chain and the groups that represent them, such as RDG and RSG.

- **Cross-industry risk groups**. DRSG will oversee delivery of the strategy and the national and route-based groups will act as customers, clients and/or partners for different projects.

- **The government**. The Department for Transport is a major industry funder and needs to ensure value for money: the cost of any activity undertaken as part of the strategy must justify the benefits to the industry. The Office of Rail and Road regulates the industry’s health and safety management activities.

Commercial opportunities to exploit outputs from the strategy would only be pursued where they provide a net benefit to the GB railway and RSSB’s member companies.
Measuring success

Clear performance targets and metrics will be set on an objective-by-objective and project-by-project basis. Success will be measured at different levels, as illustrated by the table below. It will generally be difficult or impossible to ascribe changes in health and safety performance to a single project or objective, but the aggregate effect of the strategy should be to enable a step-change improvement in health and safety risk.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Availability of information; processes; tools; training, guidance and support.</th>
<th>Change in industry practice.</th>
<th>Improvement in health and safety management maturity.</th>
<th>Reduced health and safety risk. Improved efficiency and performance.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator type</td>
<td>Project management metrics.</td>
<td>Extent of adoption of tools, processes, and information; and its results.</td>
<td>Management maturity measures, such as RM³.</td>
<td>Health and safety performance indicators – precursors and outcomes.</td>
</tr>
<tr>
<td>Example</td>
<td>‘Easier incident reporting, including via mobile devices’.</td>
<td>Measuring the extent to which the project has delivered to time, cost, and quality.</td>
<td>Monitoring event recording via mobile devices and overall changes in reporting and data quality.</td>
<td>Monitoring changes in safety performance, such as results monitored by industry risk groups.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Monitoring organisations’ safety cultures (RM³-OC6) and proactive monitoring (RM³-MRA1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Qualitative industry feedback</td>
</tr>
</tbody>
</table>
Objectives

This section lists the objectives for the strategy and shows where these support relevant capability improvement areas in the parent strategy, *Leading Health and Safety on Britain’s Railway*. Some objectives are shared with other industry groups, such as the Road Driving Risk Group or Health and Wellbeing Policy Group.
Next generation reporting systems and risk models

Capability improvement
SMIS: an agreed set of risk management tools used consistently by all duty holders.

Supporting objectives
- Health and safety intelligence that is easy to access and use, and which drives local and national decisions.
- A ‘go to’ industry-wide risk management tool kit that can be accessed via a single platform – the Safety Management Intelligence System (SMIS) – comprising modular components that share common information.
- Risk management tools are maintained and supported, and regularly reviewed to ensure they continue to meet industry needs.
- A common language for comparing and communicating risk associated with different events or assets, incorporating new event risk scoring methodologies and extending the use of Network Rail’s Common Risk Matrix for Safety.

Capability improvement
Comprehensive data for all safety events, risks and precursors.

Supporting objectives
- Easier incident reporting into SMIS, including via mobile devices.
- Improved data quality including location information.
- Improved reporting, analysis and modelling in low maturity risk areas, such as road driving.
- No need for duplicate reporting: SMIS meets all stakeholder reporting and business intelligence requirements and/or interfaces with existing company reporting systems.
- Extended reporting scope, for example to capture consistent data on risk from railway construction work and on (freight) customer-owned infrastructure.
- Rich event data recorded in and accessed from SMIS, including geo-spatial information, images and video.
• Development of better activity, result and precursor indicators to complement accident indicators and improve understanding of national and local safety risk.

• Intelligence provides early visibility of emerging health and safety issues.

• Automatic alerting to bring to the attention of decision makers new and emerging risks, adverse trends and pertinent events.

• Close Call System fully integrated within SMIS.

• Improved reporting of close calls across the industry.

**Capability improvement**

Capability to capture, analyse and understand health events, risk, and precursors.

**Supporting objectives**

• Common definitions and reporting standards for health and wellbeing data.

• Health and wellbeing data recorded in and reported on through SMIS.

• More consistent reporting and better data quality for health and wellbeing.

• National and local health and wellbeing performance monitoring (covering activities, results, precursors and health episodes) to support risk management.

• Routine sharing and publication of health and wellbeing data.

**Capability improvement**

Next generation of safety risk model and first generation of health risk model.

**Supporting objectives**

• The SRM and associated tools are accessible and easy to use.

• The SRM and its Risk Profiling Tool support local decision making and ‘what if?’ analysis.

• Closer alignment between SRM structure and risk management activity.

• The SRM responds quickly to genuine changes in the risk profile.

• Risk models and tools are efficient to maintain and update.

• New models and tools support the assessment of health and wellbeing risk.
Capability improvement

New benchmarking capability between duty holders and other sectors.

Supporting objectives

- Better data on risk exposure (‘normalisers’) and other risk-influencing factors to support benchmarking and other analysis.
- Risk intelligence and risk profiling information that is tailored to specific companies, sectors (such as freight), rail projects and Network Rail routes, including a route-based Precursor Indicator Model.
- Engagement with other sectors to understand and compare data on safety, health and wellbeing.
Design for health and safety and change management

Capability improvement

Good practice guidance and material for use within and between rail companies to maximise health and safety performance during design, delivery, and when managing change.

Case studies to demonstrate excellent change management and design performance

Supporting objectives

- Clear, complete, coherent and easy-to-use risk management guidance is available on the RSSB website and supported by worked examples and other material.
- Key messages are communicated effectively to different audiences. Risk management principles are embedded in guidance and training on change management to promote good practice, including health and safety by design.
- A more consistent approach to the production of industry guidance between RSSB, ORR and other organisations.
- Decision support tools help users apply agreed industry decision taking principles, for example by analysing costs and benefits based on an understanding of risk control effectiveness.

Capability improvement

A ‘taking healthy decisions’ framework.

Supporting objectives

- Industry consensus on how to take decisions relating to health and wellbeing, including clarification of any open points in relation to companies’ legal obligations.
- Agreed approach for quantifying health and wellbeing risk to support cost-benefit analysis.
- A model for assessing maturity in health and wellbeing risk management (potentially within RM3).
Exploit new technology

Supporting objectives

- Common data architectures and protocols facilitate information sharing between SMIS and other industry information systems, such as Network Rail asset databases (aligning with the Information theme in the Rail Technical Strategy).
- Modern analysis techniques applied to large and diverse datasets, including real-time data feeds and unstructured text, provide actionable intelligence on health and safety risk.
- Automated collection, processing and sharing of data on safety, health and wellbeing, for example from train-borne recording systems or through the use of smart technology on watches and other personal devices.
- Raised awareness of and competence in managing cyber risk, including embedding Cyber Security Strategy for Protecting Britain’s Railway.
Develop our people

Supporting objectives

• Guidance and training to support different users of SMIS and industry risk models and tools.
• Strong industry analysis capability underpins the widespread use of the new SMIS for local monitoring and decision support.
• Training and competence in incident investigation and human factors supports the identification of underlying causes.
• New guidance and training develops competence in assessing and managing cyber security risk.
• Taking Safe Decisions principles embedded in the industry and promoted through the work of cross-industry risk groups.
• Relevant stakeholders are aware of and, where relevant, contribute to the development of this Data and Risk Strategy and the work streams that will deliver it.
Smart supplier capability assessment and information

Supporting objective

• Information, processes, tool, guidance and training support the assessment of safety, health and wellbeing risk within the developing supplier assurance framework.

Improved approach to health and safety co-operation

Capability improvement

Resources and tools to enable and support the health and safety cooperation framework and risk management approach.

Supporting objective

• Information, processes, tool, guidance and training support the assessment of safety, health and wellbeing risk by cross-industry groups and support joint safety improvement planning activity.
Next generation rules and controls

Capability improvement
Improved duty holder control framework linked directly to risk management. Alignment with, and awareness of, the Business Critical Rules framework being implemented to deliver the above within Network Rail.

Supporting objectives
- Generic hazard lists and supporting material help make company risk management processes more effective and efficient.
- Agreed approach to the development, use and sharing of bow ties within SMIS, combining top-down (generic industry bow ties) and bottom-up (local bow ties within specific ’system definitions’) approaches.
- Systematic approach for mapping between requirements in standards and the hazards or threats they control, for example a framework for linking between SMIS and RSSB’s Requirements Management Database.

Capability improvement
Identification of future data needs and strategy to improve risk management.

Supporting objectives
- SMIS data structures support the alignment of safety monitoring and risk assessment activity with risk controls.
- GB rail’s approach to risk management promoted across sectors and internationally to influence legislation, policy and practice.
Improving learning, sharing, and horizon scanning

Supporting objectives
- Robust accident investigation process embedded in SMIS and used consistently across industry.
- Underlying incident causes systematically identified and recorded within the SMIS investigations workflow and analysed to refine understanding of risk factors.
- New processes and tools for sharing information within communities of good practice.
- Integration of safety-critical failure reporting (such as NIR online) into SMIS.

More effective assurance

Capability improvement
Risk management tools improve understanding of interface health and safety risks and assurance requirements.

Supporting objective
- Information, processes, tool, guidance and training support the management of interface safety, health and wellbeing risk.

Capability improvement
Guidance and training for leaders on: the rail industry assurance model; duty holder assurance programmes; assurance processes, tools, and techniques.

Supporting objectives
- Guidance and training on safety assurance updated and promoted.
- Good practice in the management of high-integrity software-based systems for railway applications established and promoted.