Managing and measuring the safety of the railway
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Introduction

People want to be assured that the railway is safe. Railway stakeholders, including the government and the Office of Rail and Road (ORR) in particular, seek this assurance.

This document has been produced for anybody with an interest in how the railway is delivered safely for the public, passengers and the workforce. It outlines at a high level how the safety of the railway system is managed and measured in order to meet railway stakeholders’ expectations.

What do we mean by 'the railway system'?

The scope of the ‘railway system’ is defined by railway specific legislation, and it’s what you would intuitively expect it to be: railway infrastructure and vehicles, and their operation to allow the safe and uninterrupted movement of trains.

The Railway Safety and Interoperability Directives (Directives 2004/49 and 2008/57/EC) divide the railway system into ‘structural areas’ (the infrastructure, energy, control-command and signalling and rolling stock subsystems) and ‘functional areas’ (the operation and traffic management, maintenance, and telematics applications subsystems).

The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS) classifies railway systems as either mainline or non-mainline (guided transport systems such as metros, trams, light rail systems and heritage railways). The UK has four mainline railway systems; this document is only concerned with the largest of these, the ‘GB mainline network’ - effectively, that part of the mainline railway managed by Network Rail and to which
Railway Group Standards apply. However, many of the principles outlined in this document are applicable to other networks.

The safety responsibilities of railway companies extend beyond, and are not limited by, the scope of the ‘railway system’.

What safety responsibilities do railway companies have outside of the railway system?

The scope of the railway system is deliberately precise, but as noted in section 2, the safety responsibilities of railway companies extend beyond, and are not limited by, the scope of the railway system. Companies have other responsibilities, including those under the Health and Safety at Work etc Act 1974 and associated regulations for the safety of their employees (occupational health and safety) and others affected by their undertaking.

Some of these responsibilities will be closely related to the operation of the railway system. Examples include safe movement on station concourses or approaches.

Others will be further removed from the operation of the railway system – for example responsibilities for office premises away from the operational railway or for rail replacement bus services during engineering works. Where the activity forms part of the company’s undertaking, safety responsibilities still apply, whether those responsibilities are inside or outside the boundaries of the railway system.

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1 The other three are Northern Ireland Railways, High Speed 1 (otherwise known as the Channel Tunnel Rail Link) and the Channel Tunnel.
How do we measure the safety of the railway system?

Legislation requires the safety of the railway system to be measured in a tightly defined way, through the Common Safety Indicators (CSIs), allowing comparison between the safety of different railway systems across the European Union. These requirements are explained in more detail on the RSSB website where the Common Safety Method (CSM) for assessment of achievement of safety targets is explained.

However, as noted in section 2, the safety responsibilities of railway companies extend beyond, and are not limited by, the scope of the ‘railway system’. Therefore the GB mainline network seeks to have a broader measure of the safety of activities undertaken by railway companies. It collects data about the safety of the wider railway using the Safety Management Information System (SMIS). Using this data, RSSB reports on the safety of the railway, summarising it in the Annual Safety Performance Report (ASPR). The data collected by SMIS and reported through the ASPR covers the entire scope of activities within the railway system; but it also includes other activities falling within the broader safety responsibilities of railway companies, either where there is a consensus to do so, or where individual companies choose to (activities in yards, depots and sidings). See Figure 1.

The industry, through RSSB, also uses the data to maintain and update the Safety Risk Model. This provides a means to more fully understand the railway system and individual company risk and to support monitoring activity. Data collected in SMIS is also used by companies to meet data reporting requirements in the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR).
Figure 1 - Scope of railway industry risks

Boundary considered by SMIS

Boundary of risk specific to the railway system

Boundary of risk managed by rail companies

All risk
Who is responsible for the safety of the railway system?

ROGS places a responsibility on infrastructure managers (IM) (the people who manage the railway’s fixed infrastructure such as track, stations, signalling and electrification) to manage their infrastructure and operations so they are safe (so far as is reasonably practicable); and a responsibility on railway undertakings (RU) (the people who operate trains) to manage their vehicles and operations so they are safe.

IMs and RUs manage the safety of their parts of the railway system individually and in co-operation; and those obligations are then subject to regulatory oversight. Each party involved has clear accountabilities which together deliver overall safety of the railway system. Part of the way that IMs and RUs deliver their responsibilities is through placing contractual obligations on their suppliers.

The responsibilities of IMs and RUs for safety do not take away the safety responsibilities of others who have a potential impact on the safe operation of the railway system, including maintainers, manufacturers, contractors and suppliers. These safety responsibilities are generally set out in non-railway specific legislation. However, there are specific responsibilities assigned to entities in charge of maintenance (of rolling stock) within ROGS.

The overall safety of the railway system is therefore an emergent property of the railway. It ultimately depends on everyone fulfilling their individual responsibilities and co-operating to make this possible.
What is the role of co-operation?

IMs and RUs are required to manage their parts of the railway system individually and in co-operation to ensure they are safe.

ROGS and the CSM for risk evaluation and assessment (CSM RA), recognise that, in order to deliver their safety responsibilities, IMs and RUs will often require the co-operation of others. Both regulations therefore contain an explicit duty to co-operate where an IM/RU is taking action to achieve the safe operation of their part of the railway system. This cooperation takes place at the strategic level; for example, in planning to manage interface risks, and at the tactical, local, and day to day level, where real time mechanisms are in place to manage hazards and prevent accidents.

Additionally the CSM for monitoring contains an explicit requirement for the exchange of information between RUs and IMs in order to enable them to take action to achieve the safe operation of the railway.

Further information about the legislative framework and CSMs can be found on the RSSB website.
What does the industry do to deliver its safety responsibilities efficiently and effectively?

The railway industry works collaboratively in order to deliver each individual company’s responsibilities and business objectives in an effective and efficient way. A good example of this is the framework of industry safety groups, facilitated by RSSB. Details are available on the RSSB website. As IMs’ and RUs’ activities are so integrated, they deliver their safety responsibilities more efficiently and effectively through collaboration in certain areas, for example:

- Having common elements to their safety management systems (SMSs)
- Having common reporting systems
- Using common safety methods, techniques and tools
- Having common standards
- Meeting together to identify needs and opportunities
- Sharing learning from operational experience
- Developing a strategic approach to improving the safety of the railway

RSSB has a pivotal role in facilitating industry collaboration in these areas, in particular, through the work of the cross-industry safety groups.
What is the role of safety culture and leadership?

The safety of the railway depends on the behaviours and attitudes of everyone employed within it. These behaviours and attitudes are shaped by those that lead at all levels within each company and across the industry. A mature safety culture is characterised by shared perceptions of the importance of safe operation and methods of working, and hazards and risks being proactively managed.

Good leaders, at every level of the industry, remain vigilant rather than complacent. They demonstrate clear commitment to the safety of the railway, promote the right values, attitudes and behaviours, within their own organisations and in collaboration with others, and take responsibility for driving continuous improvement in safety performance across the railway.

The industry chooses to collaborate at a strategic level to better understand and manage risks, individually and collectively, and all leaders should make themselves aware of this and how they can become involved.
What different processes, disciplines and approaches are applied to the management of safety?

As changes to the railway progress through the different stages of design, construction and ultimately operation and maintenance, different, overlapping, safety disciplines and perspectives apply, and different regulations must be complied with. As safety is delivered across the railway by a range of different people, in different organisations and through a range of different disciplines, there is scope for confusion. Two key disciplines, which are distinct but may be confused, are Occupational Health and Safety and System Safety.

‘System safety’ approaches are applied to the management of change to the railway. The approaches consist of a risk management strategy based on identification and analysis of hazards and application of safety measures using a systems-based approach. The aim is to gain assurance that a system behaves in a safe manner and is safe to operate. The CSM RA extends the concept of ‘system safety’ from its background in engineering change to operational and organisational changes to the railway system. This approach is mandated for all significant changes within the scope of the CSM RA, and the general principles apply to the management of any change.

Occupational health and safety is the management of safety, health and welfare of people engaged in work or employment.

A company’s ‘safety management system’ will include its tools, techniques and controls relevant to both of these perspectives. SMIS contains incidents that are useful to understand and manage, both occupational health and safety and system safety.

The industry document ‘Taking Safe Decisions’ provides a high-level, industry consensus view of how safety risk of all types is controlled to an acceptable level on the GB railway. The document is fully aligned with relevant railway
specific regulatory requirements, and refers to supporting documentation and information. This document provides a starting place for anyone wishing to understand in more detail, how the safety of the railway is delivered.

What is the role of the ORR in the safety of the railway system?

While not directly responsible for either managing risks or for safety performance, the ORR has a significant role in the industry’s safety assurance processes.

- Certifying and authorising safety management systems
- Monitoring and developing the safety regulatory framework
- Supervising (checking on the effectiveness of) IMs and RUs on the use of their SMSs

The ORR issues safety certificates to railway undertakings and safety authorisations to infrastructure managers on the basis that risks will be controlled in line with their SMSs. The Railway Safety Directive (2004/49/EC) requires the ORR to ‘monitor, promote, and where appropriate, enforce and develop the safety regulatory framework’. The CSM on supervision requires it to ‘oversee compliance with the legal requirement for a railway undertaking or infrastructure manager to use a safety management system to ensure the control of all risks associated with their activities (including the supply of maintenance and material and the use of contractors)’.

The ORR:

- Has developed a supervision strategy and has supervision plans in place.
- Collects and analyses information from relevant sources.
- Makes proposals to government to overcome any deficiencies identified in the safety regulatory framework.

If it was found that the safety of the railway system was moving in an adverse direction the ORR would need to determine whether this was a result of a flaw in the regulatory system itself (requiring state intervention) or whether this was as a result of a failure of one or more IMs or RUs to meet their safety responsibilities, possibly requiring enforcement action.
What is the role of RSSB?

The railway is a complex system with multiple interfaces delivered by many different organisations. RSSB brings these different organisations together to make collective decisions. It helps the rail industry carry out research, understand risk, set standards and improve performance. And it provides a constant point of reference in a changing environment.

RSSB supports rail in the areas of safety, standards, knowledge, innovation and a wide range of cross-industry schemes requiring our knowledge and independence. Its work involves close collaboration, but as technical experts they are also able to step back and provide an informed view.

And because RSSB can see both the big picture and the detail, it’s able to furnish the industry with the information and tools it needs to continuously improve.

RSSB is an expert body with a wide compass of knowledge, skills and experience. It’s owned by the industry but is non profit-making and independent of any commercial interests. It spans the whole system, including in its membership infrastructure companies, train and freight operators, rolling stock owners and suppliers to the industry.
Resources

There are many sources of information and guidance on the topics covered by this document. A few of these are described below.

RSSB is working to systematise and update this information and guidance, so the resources described below are a snapshot in time, and will gradually change as this work progresses. RSSB’s website will be updated as and when new and revised information and guidance becomes available.

- **Taking Safe Decisions** sets out the industry consensus view of how safety is taken into account when taking decisions. It describes the principles that companies apply to protect people’s safety, satisfy the law, respect the interests of stakeholders and meet commercial objectives.

- **RSSB’s Safety Management System Principles – moving beyond compliance** considers what is appropriate beyond a minimum interpretation of legal compliance and prompts thought and discussion within organisations with regard to how their individual SMS can work more effectively in practice.

- **RSSB’s Safety Assurance guidance** is aimed at industry Heads of Safety and applies a safety assurance model, based on the basic Plan - Do - Check - Act safety management system model. This guidance should assist the industry in improving safety assurance, particularly at the interface, and should lead to improved safety management and business effectiveness.

- **RSSB’s Measuring Safety Performance** helps rail companies identify the safety performance indicators (SPIs) most appropriate to their operations and ensures their continued effectiveness. It is based on established good practice and research undertaken by the industry.

- **Guidance Notes on the CSM on Risk Evaluation and Assessment – a series of six Guidance Notes** supports the management of change to the mainline railway system and is aimed at those who are required apply the CSM RA process in their work.

- **RSSB’S Accident Investigation guidance** is for people involved in accident investigations within railway companies. Its 3 parts are aimed at senior managers, safety managers and those who investigate. It covers the end-to-end management of accident investigations.
RSSB’s Annual Safety Performance Report reviews the rail industry’s safety performance over the financial year, its associated High Level Output Specification (HLOS), and the Railway Strategic Safety Plan (SSP).

RSSB’s Learning from Operational Experience Annual Report contributes to the rail industry’s learning from operational experience by summarising some of the learning points and trends arising from investigations and other sources of information.

RSSB’s Securing Supplier Assurance aims to provide a shared and consistent explanation of what supplier assurance is, the principles that underpin it, and how companies go about securing it. It is aimed at everyone in today’s rail industry who has an interest in procuring on behalf of, and in supplying to, SMS holders as well as managing ongoing relationships within the supply chain.

Standards and the rail industry is an introductory RSSB leaflet about standards applicable to the mainline railway in Great Britain (GB). Further leaflets describe in greater detail many of the subjects outlined in this leaflet.

The ORR website gives access to guides covering a range railway safety management issues.

The following existing resources were under redevelopment from mid-2015:

- SMIS and Close Call will be integrated and greatly enhanced to allow the industry to gain greater intelligence from a much larger number of incidents compared to those presently recorded in SMIS and will provide highly visible safety intelligence to up to 2000 companies.

- RSSB’s Duty of Cooperation guide includes references to cooperative mechanisms, collaboration and the structures of industry joint safety meetings. It was issued in 2009 and is due for updating.