

THE DEVELOPMENT AND USE OF MODERN ENTERPRISE SAFETY MANAGEMENT SOFTWARE IN THE BRITISH RAILWAY INDUSTRY

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INTRODUCTION

RSSB is currently building on its foundations in safety reporting, risk analysis and modelling to deliver an upgrade to both its safety reporting system and its 'close call' system. This project, known as SMIS+, is being undertaken in order to deliver a common enterprise safety management system solution for the whole of the GB rail industry. This work will deliver a single integrated platform for the whole GB railway industry to use. Enterprise safety management software allows for safety incidents to be captured as they happen through a variety of devices such as mobile phones, so that the right incidents are investigated by the right people at the right time. Events can be geographically tagged, stored with pictures and documents, and trigger automatic alerts to those who need to know. The result is a rail industry which manages its information efficiently, and uses that information to make informed decisions. The systems support and drive the implementation of effective safety management practices and safety culture.

SAFETY AND RISK MANAGEMENT

The regulatory framework in Great Britain consists of railway specific regulations (such as the Common Safety Methods for Risk Evaluation and Assessment [1], and the Common Safety Method for Monitoring [2]) and general legislation (such as the Health and Safety at Work Act). These all require that a risk-based approach should be taken to safety management. The diagram of figure 1, taken from the RSSB publication 'Taking Safe Decisions' [3] distils the various regulations into a framework of activity. The framework describes the activities of monitoring and making a change, which are embedded in the CSMs. It also describes the associated activity of analysing and selecting options: how to decide what to do when a problem or opportunity is identified.

Tools are needed which support application of this framework and build the capability to use it. Historically the analytical information needed to apply this process has been time-consuming to produce and disconnected from the behaviours of front line staff. However over time technology has closed that gap, allowing more evidence based and proactive safety management activity.

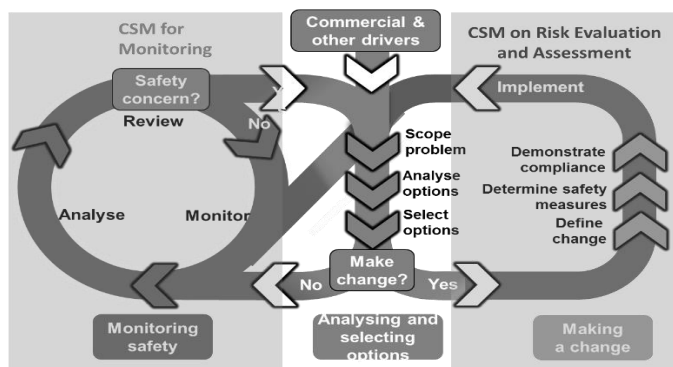


Figure 1: The 'Taking Safe Decisions' risk management framework

SMIS -THE SAFETY MANAGEMENT INFORMATION SYSTEM

RSSB maintains the Safety Management Information System (SMIS) database to record details of safety incidents reported to them by the various railway companies in Great Britain. This information is used to support RSSB's risk modelling, and also the development of industry reports such as the annual safety performance report. The information is also used directly by the various railway companies to support safety management activity in accordance with the process outlined in Figure 1.

The SMIS system has been in place for nearly 20 years, and has supported the building of a strong and open reporting culture in Great Britain where safety related information is shared between organisations and pooled for improved understanding and learning. This maturity of safety culture is essential to the effective use of the system.

CLOSE CALL

A Close Call is defined in the GB rail industry as an 'event or condition that had the potential to cause injury or damage'. Simply put, it's anything that is 'not right' and could have caused injury or damage, but didn't this time. The Close Call reporting system was launched across Network Rail, the GB railway infrastructure manager, and its Principal Contractors in 2012 as a fundamental element of its 'Transforming Safety and Wellbeing' strategy. The system is key to creating a culture that is more risk aware, open to reporting and committed to learning. Acting on this learning is crucial to building trust in the system. Since its introduction Network Rail has experienced a significant increase in the number of Close Calls it receives. Most still relate to unsafe conditions, but a rise in the reporting of unsafe behaviour is now being seen, showing that culture change is taking root. 'Close Calls' are all potential precursors to the occurrence of safety incidents in SMIS. Having separate systems for safety incidents and close calls is not cost effective, and does not support efficient safety analysis or reporting.

SMIS+: A NEW PLATFORM

RSSB, on behalf of the GB rail industry of which it is part, is embarking on a major programme of work to replace SMIS. SMIS+ will be an enhanced system founded on enterprise SMS software and provides a vehicle for exploiting opportunities presented by new data sources and analysis techniques in the risk domain.

The new system will have the same fundamental purpose as SMIS had when it was introduced in 1997 – to support the industry in its management of safety management – but its additional functionality will ensure that it is better integrated into companies' safety management activities. The provision of a national system should further enable the sharing of safety information and promote efficiency by reducing or eliminating the need for rail companies to purchase separate systems to support their safety management activity.

Among the improvements envisaged for SMIS+ are that it will:

- Integrate SMIS and Close Call into a single system
- Exploit advances in mobile technology to allow staff to capture information in real time, and for managers and analysts to access timely data when and where they need it.
- Manage workflows to ensure that information is communicated and actions are escalated to the right people at the right time. This might include recommendations from accident investigations or audits, or automatic alerts when incidents occur or changes in performance are identified.
- Capture richer incident data by incorporating an event structure to allow new types of analysis and capturing information such as images, documents and geographical tags.
- Provide access to data and allow integration with data from other industry sources, such as asset databases.

- Include business intelligence functionality to allow managers to view and interact with bespoke safety dashboards and analysts to carry out sophisticated analysis.

The system will be developed in phases. Subject to industry decisions, approvals, procurement and milestones being reached on schedule, the new system could be implemented in late 2016. Future phases will focus on integrating activities such as risk assessment and hazard management – see Figure 5.

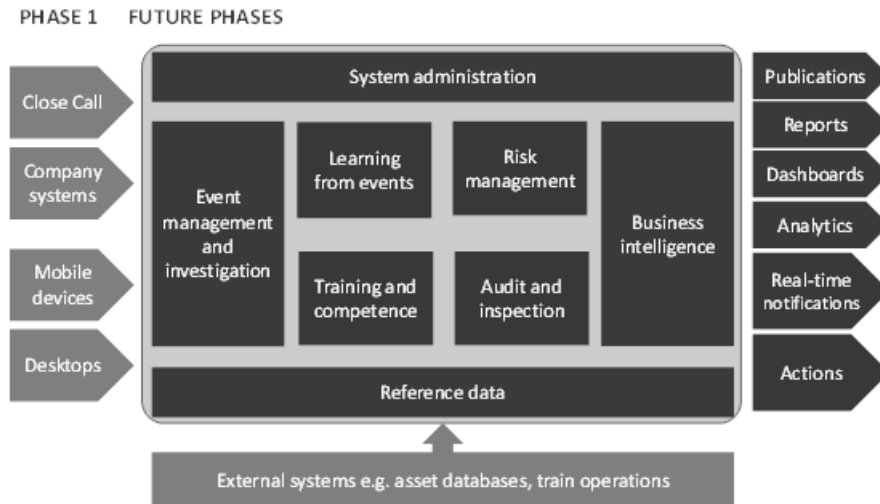


Figure 2: SMIS+ and its proposed functions and outputs.

CULTURE AND MATURITY

Successful roll out of systems to support safety data collection, analysis and management depends on having:

- consistent enough safety management processes across the scope of application, such that a common solution will work.
- sufficient understanding and practical experience of the processes embedded in the behaviours of railway workforce.
- A safety culture and behaviours which are appropriate to the level and type of functionality provided in the system.

It is RSSB's experience that the provision of technology of this type, and the development of the safety management capability and culture are self-supporting and evolve over time. The introduction of new system functions and technology can be a catalyst to improving behaviour and capability if supported by extensive and well thought out training and briefing. Conversely, behaviours can over time surpass the ability of the technology to effectively support practice leading to clear ideas from users about the need for technological enhancement. Long term commitment and investment are required and a planned approach to evolution of the system is required. At low levels of maturity mandatory reporting to meet legislative requirements can start to get companies thinking about recording and reporting safety information for example. However, at higher levels of maturity the value of information must be genuinely appreciated by those operating the railway. Reporting of information has evolved in real time as part of continuously improving safety management system and continually adapted to meet the changing needs of the organisation.

THE FUTURE VISION

The SMIS+ programme has only been possible because of the co-ordinated and collective strategic planning of RSSB and the GB railway industry. The first phase of this programme will deliver a

fundamentally more flexible platform and represents the opening phase of an ambitious strategy to transform the effectiveness of safety management activity across the GB railway. The diagram of figure 3 shows three distinct phases of activity.

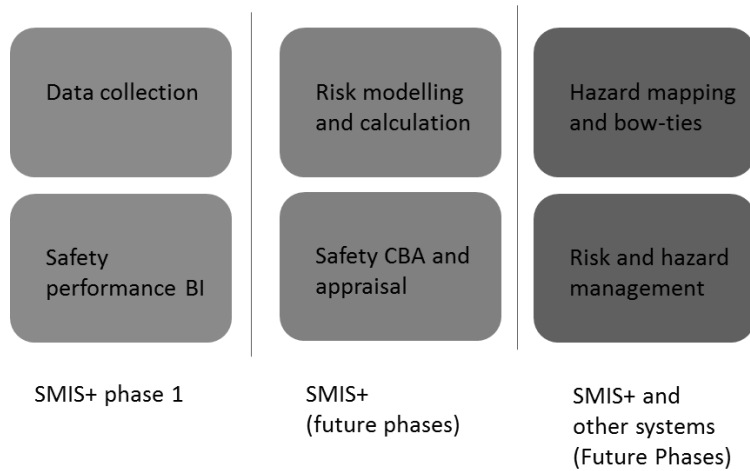


Figure 3: SMIS+ and its proposed functions and outputs.

The first phase of SMIS+ is the work described in this paper to deliver safety reporting and accident investigation functionality, and improved business intelligence. Future phases of the work are planned. The next natural phase is to consider how the tool would evolve to support quantified risk assessment, and cost benefit analysis. RSSB produces the GB rail industry ‘Safety Risk Model’ [4], and the ‘Precursor Indicator Model’, along with a range of other risk modelling and analysis tools. These could be produced more effectively and efficiently through a modern software platform. Work on the first phase of SMIS+, in particular the structuring and linking of data collected, is being undertaken in such a way as to ensure that more automated delivery of the Safety Risk Model is possible at a subsequent date. It is likely that this functionality would evolve wholly within the SMIS+ software platform. Further phases would be likely to consider more dynamic management of hazards and safety requirements, utilising or linking to requirements management functionality and ‘bow-tie’ models of hazards, threats and controls measures. The diagram of Figure 4 shows how the functionality that these future phases would deliver, map to different aspects of the ‘Taking Safe Decisions’ framework.

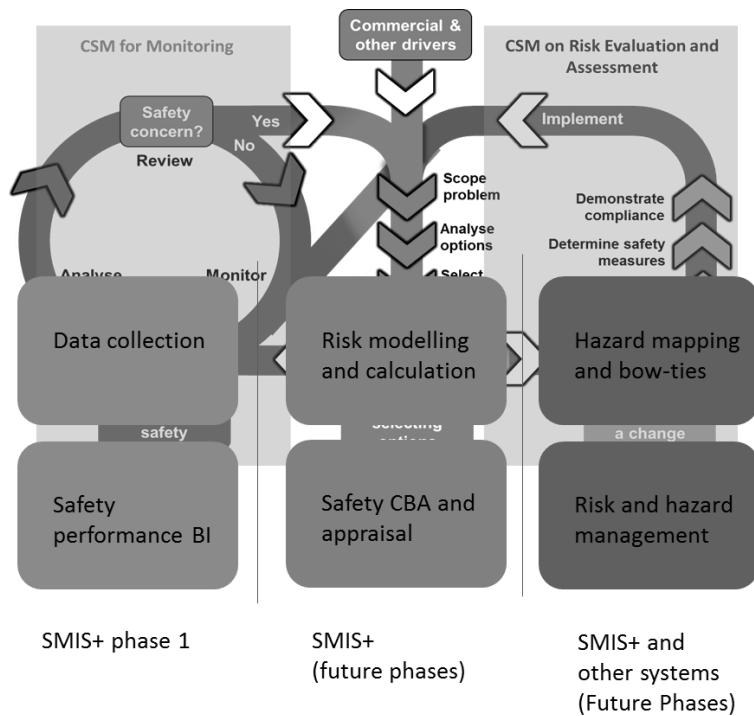


Figure 4: Mapping SMIS phases to the aspects of the risk management framework that they support.

CONCLUSION

The GB rail industry is embarking on a hugely ambitious programme of work to develop a single enterprise safety management solution for the GB railway. This system is to be rolled out to enable safety management practice that is effective while also being demonstrably compliant with the processes and regulations that railway companies are required to meet. RSSB's experience though is that these systems are about far more than technology. It is not possible to implement them effectively until the industry has a safety culture that is sufficiently mature to facilitate their adoption. Also, to roll out more complicated systems requires a large degree of consistency in behaviours and effort and significant effort in co-ordinating roll out and ongoing management.

REFERENCES

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3. Taking Safe Decisions, RSSB <http://www.rssb.co.uk/risk-analysis-and-safety-reporting/risk-analysis/taking-safe-decisions>
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