Evaluation of The Railways (Safety Case) Regulations

Prepared by BOMEL Limited for the Health and Safety Executive 2004

RESEARCH REPORT 192
Evaluation of The Railways (Safety Case) Regulations

This report presents the findings of an evaluation of the impact of the Railways (Safety Case) Regulations (RSCR) conducted by BOMEL Limited. The Regulations are a key element of legislation introduced in 1994 to regulate the newly privatised railway industry, with the objective of ensuring that health and safety standards in the rail industry were maintained and, as far as possible, improved. Various data sources including a Stakeholder Workshop, an industry-wide Questionnaire, interviews and an appraisal of Safety Case documentation have been used to collect evidence and triangulate findings in relation to the impact of the RSCR in improving the quality and effectiveness of: Risk Assessment, Health and Safety Management Systems, Industry Co-operation, Change Management and Continuous Improvement, Audit and Inspection and Enforcement. An evaluation of the RSCR costs to industry and attributable benefits suggests that the RSCR represents value for money. Conclusions from the research and recommendations for future regulatory amendments are also presented. The contributions to this study made by rail companies, industry organisations and the HSE are gratefully acknowledged.

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DEFINITIONS, ABBREVIATIONS AND ACRONYMS

DEFINITIONS
Inquiries: Rail accident and incident investigations and reports
Issue Logs: List of issues raised during RSC assessment requiring close-out or redress
Operating Company: TOCs, IC, and IMCs (see below)
Parent Company: Company owning one or more Duty Holders
Railway Safety Case: Document prepared by railway operators setting out their health and safety arrangements as a condition of operation under the Railways (Safety Case) Regulations
Risk Assessment: Formal risk assessment in the context of that required by the RSCR

ABBREVIATIONS AND ACRONYMS
AEF Accident Equivalent Fatalities
ALARP As Low As Reasonably Practicable
ATOC Association of Train Operating Companies
ATP Automatic Train Protection
AWS Automatic Warning System
BOMEL BOMEL Limited
CDM Construction (Design and Management) Regulations 1994\(^1\)
CIRAS Confidential Incident Reporting and Analysis System
DfT Department for Transport
ERTMS European Rail Traffic Management System
ETCS European Train Control System
FOC Freight Operating Company
HAZIDS Hazard Identification Study
HAZOPS Hazard and Operability Study
HMRI Her Majesty’s Railway Inspectorate
HSC Health and Safety Commission
HSE Health and Safety Executive
HS(G)65 Health and Safety (Guidance) Note 65: Successful Health and Safety Management\(^2\)
HSMS Health and Safety Management System
HSWA Health and Safety at Work Act 1974\(^3\)
IC Infrastructure Controller
IMC  Infrastructure Maintenance Contractor
IO   Intermediate Objective (used in this RSCR evaluation)
IO1 – IO6 Intermediate Objective 1 to Intermediate Objective 6
ISO  International Standards Organization
KPI  Key Performance Indicator
MHSWR Management of Health and Safety at Work Regulations 1992 and 1999
MTM  Million Train Miles
NERA National Economic Research Associates
QA   Quality Assurance
RA   Risk Assessment
Railway Group Railtrack, Railway Safety and TOCs / SOCs
RIA  Regulatory Impact Assessment
RIDDO R Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995
RG   Railway Group
RGS  Railway Group Standards
RSC  Railway Safety Case
RSCR Railways (Safety Case) Regulations
RSCR 1994 Railways (Safety Case) Regulations 1994
RSCR 2000 Railways (Safety Case) Regulations 2000
RSCR 2003 Railways (Safety Case) Regulations 2003
RSCWR Railways (Safety Critical Work) Regulations 1994
RSPG Railway Safety Principles and Guidance
RSSB Rail Safety and Standards Board
S&SD Safety and Standards Directorate
SMART Specific, Measurable, Attainable, Realistic, Timescales (pertaining to SMART objectives)
SMS  Safety Management System
SOC  Station Operating Company
SPAD Signals Passed at Danger
SRA  Strategic Rail Authority
SRM  Safety Risk Model
TOC  Train Operating Company (including Freight Operating Companies)
TPWS Train Protection and Warning System
VI   Vertically Integrated (organisation)
VPF  Value of Prevented Fatality
EXECUTIVE SUMMARY

The Health and Safety Executive (HSE) commissioned BOMEL Limited, with economic support from National Economic Research Associates (NERA), to carry out research to evaluate the impact of the Railways (Safety Case) Regulations (RSCR). The evaluation considers the impact of the RSCR on rail safety and Duty Holders / stakeholders when they were first introduced in 1994 and over subsequent years through the various amendments. Whilst much of the focus is on recent practice, the work is structured to identify also the relative position pre-1994.

The aims of the evaluation were to:

• Evaluate the impact of the RSCR against the policy objectives and in terms of their effectiveness and value for money (i.e. cost to stakeholders throughout the industry versus value of benefits)

• Make recommendations to improve the effectiveness of the Regulations

• Establish a baseline and success indicators for future evaluations.

The HSE state that the Ultimate Objective of the Regulations was ‘to ensure that health and safety standards in the railway industry post-privatisation are maintained and, as far as possible, improved’. There was concern that fragmentation of the industry and the numerous operational interfaces between a range of private companies could potentially lead to a decline in safety and increase the risk of accidents / incidents. Within this framework, a global assessment of the success of the RSCR is the contribution that the Regulations have made in the prevention of deterioration in safety standards and to any overall improvements in safety on the railway network between 1994 and now (2003). Financial benefits have been measured in terms of the reduction in rail accident risk over the period (i.e. value of prevented fatalities and injuries) and have been compared to costs accrued by industry stakeholders in meeting RSCR requirements to assess ‘value for money’.

Whilst the above comparison supplies the economic picture, it is also important to understand in greater detail how the Regulations have been successful in contributing to safety. It is only by recognising the underlying causes behind successes (and failures) of requirements within the Regulations and their implementation that recommendations can be made for future regulatory improvements. This provides insight into the question of whether the money could have been utilised more effectively. Whilst trends in risk are measurable (accidents / incidents and precursors such as Signals Passed at Danger: SPADs), it is more difficult to establish a causal link between risk and the overall requirements of the RSCR. Six ‘Intermediate Objectives’ (IOs) of the Regulations were therefore identified by the HSE in order to create a linkage and to provide a basis against which to gather evidence.

The six IOs selected for evaluation are:

1. To stimulate railway operators to adopt a systematic Risk Assessment (RA) approach (particularly for risks at the interface with other operators), and to act on the findings.

2. To encourage railway operators to develop robust health and safety systems.

3. To encourage railway operators to co-operate on health and safety issues.
4. To encourage continuous improvement and effective change management in the industry.

5. To improve industry compliance with health and safety legislation by requiring Duty Holders to demonstrate adequate arrangements for audit of their health and safety system.

6. To provide (in the safety case) a useful tool to aid inspection / enforcement.

The evaluation makes use of several sources of data to examine the success (or otherwise) of each IO. These include: a Stakeholder Workshop held with a representative sample of industry professionals; a Questionnaire completed by Duty Holders; appraisal of Railway Safety Case (RSC) documentation, assessments and correspondence provided by the HSE; and a series of structured interviews held with HMRI Inspectors and key representatives from industry.

It is evident from the evaluation that the RSCR have had a positive and tangible influence on safety related practices in the railway industry. Conclusions associated with the success of each individual IO are presented in this report. These have been assimilated to provide the following overall headline conclusions as well as recommendations reflecting current and future circumstances, where appropriate.

**RSC Preparation**

For most stakeholders, a major benefit of the Regulations arises from the process of developing an RSC. Underpinning this process is the involvement of frontline workforce in safety management issues to encapsulate their knowledge and appreciation of operator-specific risks, and enhance the effectiveness of the RSC. For a number of Duty Holders, the process has identified gaps in procedural documentation and has also led to the development of new Company Standards.

**RSC Assessment Process**

Many early concerns during assessment of Safety Case submissions were associated with the lack of connection between a Duty Holder’s RA findings and the control measures in the Health and Safety Management System (HSMS). One of the significant successes of the Safety Case assessment process (particularly under the RSCR 2000 amendments) has been to stimulate the industry in the proactive use of RA to: explore specific risks within Duty Holder operations in more detail; identify and prioritise control measures; and demonstrate either the immediate implementation of ‘top’ control measures via the HSMS or scheduled implementation of the control measures within a timely, structured and committed approach. There is, however, scope for further improvement in RA and HSMS linkage.

These noted successes were dependent upon RSC assessors taking a balanced, consistent and industry-wide perspective. It is important to ensure that the HMRI assessment team maintains and develops this broad perspective in the future. Assessment should enhance the ‘check list’ approach of items included in the RSC with a more in-depth analysis.

One identified shortcoming of the Regulations reported from a number of sources is the absence of a mechanism to formally close-out issues raised in Issue Logs within an appropriate timescale. Consideration needs to be given within the assessment process to obtaining agreement between Duty Holders and assessors on a reasonable timescale for such closure.

**RSC Audit Process**

The audit process under RSCR 2000 appears to have been a ‘tick box’ compliance check. The auditor must have in-depth knowledge of the workings of the industry to ensure the implications
of non-compliance are understood and to assist positively in improving safety. In the future, care-ful consideration needs to be given to the knowledge and suitability of ‘competent bodies’, for example by checking to ensure similar standards are achieved across the industry.

The absence of a formal mechanism to enable, track and disseminate necessary updates of the RSC, following audit recommendations and actions, is a weakness of the current RSCR. Equally, the applicability of the RSC to operations reduces with successive audits if such updates are not carried out immediately.

**Relationship Between Assessment and Audit Functions**

Whilst there are recognised benefits of the audit and assessment functions being carried out by different organisations (a ‘competent body’ and the HMRI under RSCR 2003) to maximise the capture of areas requiring attention, there would appear to be little linkage. Information transfer between the two processes will enhance both activities, but any arrangement will need to accommodate the different process time cycles (yearly for audits, possibly three-yearly for assessment). The fact that the audit is now procured by the Duty Holder may assist in more directly linking it to commitments in the RSC, but this has yet to be proven.

**Material Revision Process**

The Material Revision process appears to have yielded improved focus in the industry concerning operational change and its impact on risk levels. However, whilst the process is frequently implemented for frontline / operational changes, its use for managerial / corporate restructuring is less frequent and evidence of the use of RA is more uncertain.

Changes initiated by a Duty Holder should be subject to an improved Material Revision process with more structure. For example, the process could be enhanced using a Material Revision application form covering:

(a) Description of the intended outcome (e.g. introduction of new rolling stock).

(b) Evidence of systematic consideration of a range of methods and the associated effects on risk (e.g. scenario planning could be used to consider the impact on risk and additional pros and cons of, for example, various rolling stock designs).

(c) Selection of change method based on (b).

(d) Associated risk controls and updated HSMS.

The application form could then be presented to the HSE for assessment and acceptance prior to implementing the change.

**Development Plan Content**

The introduction of the requirement for a Development Plan under the RSCR 2000 amendments potentially provides the outstanding link in the chain of continuous improvement. As presented by a number of Duty Holders, the Development Plan provides a valuable mechanism to capture and structure actions for change and inform HMRI Intervention Plans. However, the Plan also appears to have been used by others as an opportunity to defer taking actions which could be performed immediately (or in the short term).

To maximise the effectiveness of Development Plans, they should be more closely scrutinised to ensure they include the timescale and resources necessary for effective implementation of the identified activities. At present, Plans often include statements of intent and are too high level.
The effectiveness of Plans may be improved if responsibilities for completing activities were defined.

**Management Change and RSCR**
Changes to the ownership of a rail operation, initiated via franchise renewal or takeover by a Parent Company, should receive special attention since the timeframe for such changes is often tight. In the short term, it is important to ensure operational continuity and avoid unnecessary change to risk management practices, unless required as part of the ownership change. However, in the longer term, a reassessment of risk levels and practices associated with the new rail operation should be evident.

Ultimately, in any such change entailing senior management restructuring, it is vital that the newcomers take **informed** responsibility for the HSMS. Equally, the safety responsibilities during the immediate transition period need to be clearly defined. Whilst the majority of the workforce may not have altered, it is unlikely that the change will have been purely a matter of rebranding.

**Intervention Plans**
There is good evidence to indicate that the RSC and the assessment process is being used by Inspectors to target inspection / enforcement activities. The commitments made by Duty Holders as part of the RSCR (in the RSC document) have provided a legal basis for enforcement and the RSC provides the necessary linkage to railway standards and procedures.

Information from RSC assessment, audit and previous inspections must be used to inform the contents of Intervention Plans and hence inspection activity. Attempts should be made to continue and further develop the relationship between Inspector and Duty Holder to ensure that commitments in the Development Plan are being enacted and are not dormant until the next three-year review.

**Costs and Benefits**
The evaluation of RSCR costs and benefits has been judged according to two criteria:

- The costs to industry to meet RSCR requirements are not in gross disproportion to the benefits gained

- The costs do not exceed (or are similar) to the attributed monetary benefits.

On both above criteria, the **RSCR can be considered to represent ‘value for money’**.

To estimate the observed benefits, it has been necessary to isolate the role of the RSCR from other influences. Whilst it is recognised that the approach adopted is not definitive, it should be noted that no previous attempt has been made in the HSE’s Regulatory Impact Assessments (RIAs) to determine the contribution which the RSCR will make to improvements in safety.

Proposals for future changes to the RSCR that necessitate an RIA need to make more accurate predictions of future benefits, and the present evaluation could, and should, be used to provide appropriate cost and benefit information.
1 INTRODUCTION

1.1 BACKGROUND AND PURPOSE OF THE EVALUATION

In January 2003, the Health and Safety Executive (HSE) commissioned BOMEL Limited, with economic support from National Economic Research Associates (NERA), to carry out research to evaluate the impact of the Railways (Safety Case) Regulations\(^6,7\) on health and safety in the railway industry. This evaluation is one element in a wide-ranging review of railway legislation.

In 1992, the Government published a White Paper entitled ‘New Opportunities for the Railways – the Privatisation of British Rail’. The Paper presented plans for transferring British Rail’s operations to the private sector and giving new service providers access to the railway network. The Health and Safety Commission (HSC) carried out a study of health and safety implications of the proposed changes, and the resulting report produced in 1993 concluded that new regulations would be necessary in order to ensure that standards of safety were maintained. The Railways (Safety Case) Regulations (RSCR) were a key element of the three sets of legislation introduced to ensure safety in the newly privatised railway industry.

The RSCR (and the other associated legislation\(^8,10\)) were introduced in 1994 and were due for a five yearly review and evaluation in 2000. However, due to a series of train accidents and inquiries, the review was postponed. The 1994 RSCR were revised in 2000\(^7\) following the Ladbroke Grove accident and minor amendments were made in 2001\(^11\) as a result of the report into the Southall accident. In 2001, the HSC published Part 2 of Lord Cullen’s report\(^12\) into the Ladbroke Grove disaster which included a number of recommendations with implications for the RSCR. Some of these recommendations have been introduced in the amendments to the RSCR which came into force in April 2003.

The 1994 RSCR introduced (and the subsequent regulatory amendments identified above have maintained) a permissioning regime which requires all railway operators (i.e. train operators, station operators and infrastructure controllers) to prepare a Railway Safety Case (RSC) setting out their health and safety arrangements as a condition of operation.

Evaluation of Regulations post-implementation is a formal part of the regulatory process. The evaluation described in this report considers the impact of the Regulations on Duty Holders / stakeholders when they were first introduced in 1994 and over subsequent years through the various amendments. Whilst much of the focus is on recent practice, the work was structured to identify also the relative position pre-1994.

Data sources used in the evaluation are associated with operations on the Railtrack / Network Rail infrastructure. London Underground infrastructure and metropolitan railway operations (e.g. Docklands Light Railway and Tyne and Wear Metro) were excluded from this assessment. The evaluation baselines for the latter operations are different from that of the ex-British Rail infrastructure, the timeframe for privatisation (and associated concerns) is not comparable and the lack of similarity between the influences that impact both types of operation (e.g. accidents, train protection systems, the Strategic Rail Authority and different Infrastructure Controllers) means that the consideration of such influences would add undue complexity to this evaluation.
The aims of the evaluation have been to:

- Evaluate the impact of the RSCR against the policy objectives and in terms of their effectiveness and value for money (i.e. cost to stakeholders throughout the industry versus value of benefits)
- Make recommendations to improve the effectiveness of the Regulations
- Establish a baseline and success indicators for future evaluations.

A similar evaluation has been carried out\(^{(13)}\) on one of the other sets of legislation introduced in 1994, the Railways (Safety Critical Work) Regulations.

### 1.2 DESCRIPTION OF EVALUATION APPROACH AND OBJECTIVES

As outlined in Section 1.1, the RSCR were introduced in 1994 to address the potential risks arising from the fragmentation of the industry post-privatisation. The HSE state that the Ultimate Objective of the Regulations was:

- To ensure that health and safety standards in the railway industry post-privatisation are maintained and, as far as possible, improved.

Whilst trends in realised risk are measurable (accident / incidents and precursors such as Signals Passed at Danger: SPADs), it is more difficult to establish a causal link between risk and the overall requirements of the RSCR. Six ‘Intermediate Objectives’ (IOs) of the Regulations were therefore identified by the HSE in order to create a linkage and to provide a basis against which to gather evidence. The six IOs selected for the evaluation (and the rationale behind their selection in terms of the requirements in the RSCR) are:

1. **To stimulate railway operators to adopt a systematic risk assessment (RA) approach (particularly for risks at the interface with other operators), and to act on the findings.**
   
   [Schedule 1(4) requires the Duty Holder to provide particulars of risk assessments. This requirement should encourage Duty Holders to develop rigorous RA procedures that, it is assumed, contribute to the maintenance / improvement of health and safety standards.]

2. **To encourage railway operators to develop robust health and safety systems.**
   
   [Schedule 1(5) requires the Duty Holder to demonstrate a health and safety management system that is adequate to ensure compliance with relevant statutory provisions. An effective health and safety management system is central to risk control and should therefore contribute to risk reduction.]

3. **To encourage railway operators to co-operate on health and safety issues.**
   
   [Regulation 11 requires Duty Holders to co-operate with other railway operators and the assessment body, reflecting concerns about the possible deterioration of safety following the privatisation and fragmentation of the industry in 1994. Effective co-operation between railway operators is essential to ensure that risks at the interface are properly addressed and controlled and it is assumed that this will contribute to the maintenance / improvement of health and safety standards.]
4. **To encourage continuous improvement and effective change management in the industry.**

   [Schedule 1(16) of the 2000 Regulations brought in a new requirement for every safety case to include proposals for a development plan – a programme of improvements to the safety case, including timescales. It is assumed that continuous improvement is essential to keep pace with new risks, developing technology, etc. and that properly planned improvements in health and safety arrangements will contribute to the maintenance / improvement of health and safety standards.]

5. **To improve industry compliance with health and safety legislation by requiring Duty Holders to demonstrate adequate arrangements for audit of their health and safety system.**

   [Regulations include a requirement for audit (Reg 9), i.e. ‘a systematic assessment of the adequacy of the management system of the operator to achieve compliance by him with the relevant statutory provisions’. It is assumed that such an audit contributes to the maintenance / improvement of health and safety standards.]

6. **To provide (in the safety case) a useful tool to aid inspection / enforcement.**

   [This is not explicit in the Regulations, but there is an assumption that the information provided in the safety case could and should be used to target inspection and enforcement action. It is further assumed that better targeting of such action will contribute to the maintenance / improvement of health and safety standards.]

### 1.3 INFORMATION SOURCES AND BACKGROUND ASSUMPTIONS

As discussed in Section 1.1, the RSCR (which were introduced in 1994 and subsequently amended in 2000, 2001 and April 2003) have not been formally evaluated previously. The evaluation presented in this report therefore considers the impact of the Regulations since they were first introduced in 1994 up until the April 2003 amendments. Resubmissions of revised Railway Safety Cases (RSCs) under the 2000/2001 amendments were still ongoing at the time of the research study, but an initial evaluation of the costs and benefits of these changes was possible. For the April 2003 amendments, views from stakeholders were sought on their anticipated impact but quantitative evidence could not be collected to substantiate these views since the changes were introduced during the course of the study and the implementation of the changes was in its infancy.

One of the major challenges of the research is therefore in evaluating the impact of a set of regulations which have undergone considerable alteration during the evaluation period. Cost and benefits have been evaluated over two discrete RSCR regimes: the **RSCR 1994** from 1994 to 2000/2001 and the **RSCR 2000** (including 2001 minor amendments) from 2000/2001 to 2003. It should be noted that during the transitional period, costs / benefits were primarily assigned in terms of the relevant regime rather than chronologically.

To control the influences and factors in such a complex regulatory framework, it was decided that the evaluation would concentrate on rail operations under the major mainline Infrastructure Controller: IC (Railtrack / Network Rail). Information gathered and evaluation conclusions drawn are associated with the Railtrack / Network Rail infrastructure, although the evaluation is potentially relevant to other rail operations.

It is of fundamental importance that data apposite to the evaluation were gathered with sufficient triangulation and extent that robust conclusions could be drawn. The evidence base for the evaluation was obtained from the stakeholders within the industry, using the following mechanisms and sources:
• **Workshop:** a representative sample of railway industry professionals were invited to attend a targeted working session held in February 2003 to put the RSCR into a wider context and examine a range of influences on railway safety, and the interactions between these influences. Details of the Stakeholder Workshop are presented in Section 3.2.

• **Survey:** a comprehensive Questionnaire was developed and widely distributed to collect views and comprehensive data from the railway industry Duty Holders (Train Operating Companies: TOCs; Station Operating Companies: SOCs; Infrastructure Maintenance Contractors: IMCs; Freight Operating Companies: FOCs; Vertically Integrated (organisations): VIs; heritage railways; and the Infrastructure Controller: IC). The content of the Questionnaire was derived from matters arising during the Stakeholder Workshop, from preliminary review of RSCs with associated Issue Logs and from an examination of the success indicators for the six IOs (to ensure triangulation of data). The rationale behind, and development of, the Questionnaire are presented in Section 4.

• **Railway Safety Cases:** thirteen representative Railway Safety Cases (RSCs) were reviewed. These were selected to be representative of industry Duty Holders, as described in Section 5. The HSE compiled and supplied BOMEL with folders for each Duty Holder, which included Issue Logs and relevant correspondence associated with the RSC assessment process. For each Duty Holder, initial RSC submissions (and resubmissions) under the 1994 RSCR and transitional submissions under the 2000 RSCR were provided, where available and as appropriate – see Section 5.1.

• **Intervention Plans:** representative HMRI Intervention Plans were reviewed. These included the Plans for the Duty Holders whose RSCs were examined in the evaluation, plus further Plans to provide benchmarking as discussed in Section 5.

• **Audit Reports (from Railway Safety / Railtrack S&SD):** to follow issues through, and compare with those identified in the RSC assessment process, Audit Reports for the thirteen Duty Holders referred to above were reviewed - see Section 5.

• **Interviews:** to capture information from those not covered by the other methods, a number of face-to-face meetings were conducted. These were with HSE Inspectors, Network Rail / Railtrack and Railway Safety.

• **Published Reports:** published reports were used to supplement the above and / or triangulate data where insufficient alternative sources were available.

A matrix of data sources for success indicators of each IO is presented in Appendix 1 and discussed in Section 2.

**1.4 RESEARCH METHOD**

Detailed analyses of the success (or otherwise) of the RSCR have been carried out using the set of ‘Intermediate Objectives’ (IOs) which underpin the ‘Ultimate Objective’ and provide a basis against which to gather evidence (see Section 1.2). In turn, ‘success indicators’ have been derived for each IO in order to provide a measure for gauging the RSCR’s contribution to IO fulfilment. The method is illustrated in Figure 1.1.
The benefits (successes) of individual IOs have been identified in terms of contributions to risk reduction within the railway industry. To assist in the assessment of these benefits, the Influence Network (IN) approach has been adopted. The IN provides a mechanism that associates the success of the industry’s systems and structures in meeting each IO with a reduction (or otherwise) in frontline rail accident risk.

Assessments of the successes of each IO have enabled conclusions to be drawn on the impact of the RSCR as a whole and to make recommendations for further improvements of the Regulations.

Further details of the evaluation strategy and the IN approach are given in Sections 2 and 3 respectively.

1.5 COUNTERFACTUAL(S)

Identifying the impact of the RSCR requires a suitable baseline / counterfactual from which the contribution of the RSCR to safety in the industry can be gauged.

The selection of an appropriate counterfactual is perhaps one of the most difficult and contentious aspects of an impact evaluation. Within the context of the railways, other legislation governing the industry was in place prior to the introduction of the RSCR; safety procedures and risk evaluations were a central part of pre-privatisation operations; and safety awareness / culture has developed in all industries over the past ten years.

For the RSCR 1994, this evaluation has adopted the counterfactual of ‘no RSCR’ (i.e. what would have happened if the RSCR had not been introduced). It must be noted that all costs used
in the evaluation must therefore be unique to the RSCR regime and not include those of other safety improvement / control methods that have, or would have, been developed anyway. In addition, the benefits attributed to the RSCR should, ideally, be demonstrated to have actually been directly precipitated by the RSCR and would not be expected to have occurred in their absence.

For the RSCR 2000, the evaluation has adopted the counterfactual of an unchanged continuation of the RSCR 1994 regime from 2000 to 2003 (present).

The counterfactual for the overall RSCR regime is the absence of the combined benefits offered by the RSCR 1994 and 2000.

The discussion on counterfactuals is expanded in Section 2, which also identifies confounding factors, influencing variables and legislative changes during the evaluation period.

1.6 DATA ANALYSIS

The data used in the RSCR impact evaluation is held in two separate databases. The first database holds information obtained from the BOMEL assessment of RSCs, Issue Logs and other documentation. The second database contains data obtained from the Questionnaires.

The RSC database groups information pertaining to individual success indicators. The data source (reflecting HSE document references) has also been recorded for traceability.

The Questionnaire database has been generated by an automated process which extracts data from the electronic Questionnaires and presents the responses for each question number for each respondent.

For both databases, the numeric / graphed responses have been analysed using the Microsoft Excel Pivot Table facility. This has been used to calculate averages, number of responses, standard deviations, etc that are presented throughout the report. The Pivot Table facility also enables the production of charts and graphical displays of responses. Analysis methods have also taken due regard to the sample size and differences between Duty Holders.

This supporting database is part of the study deliverables and can be used by the HSE as a baseline for future evaluations.

1.7 COMPARISON OF THE OUTTURN WITH THE COUNTERFACTUAL

At privatisation in 1994, there was concern that fragmentation of the industry and the numerous operational interfaces between a range of private companies could potentially lead to a decline in safety and increase the risk of accidents / incidents. To minimise such risk, it is obviously vital that a Duty Holder both recognises the major risks associated with its own operations and those arising from its interaction with other operations / activities on the railway network. Having recognised the risks, the Duty Holder must then assess and prioritise these risks, and put in place control measures to mitigate the ‘top’ risks.

One of the significant successes of the RSC assessment process (particularly under the 2000 amendments) which was identified from the impact evaluation, has been its stimulation of the industry to use Risk Assessment (RA) proactively and consider / demonstrate the linkage of the complete risk reduction cycle to:

• Explore specific risks within the Duty Holder’s operations
• Identify and prioritise control measures

• Demonstrate either immediate implementation of ‘top’ control measures via the Health and Safety Management System (HSMS) or scheduled implementation of the control measures within a timely, structured and committed approach (e.g. a ‘Development Plan’).

Equally, for most stakeholders, a major success of the Regulations arises from the process of developing an RSC, particularly where workforce involvement is evident. For a number of Duty Holders, this process has identified gaps in procedural documentation and has also led to the development of new Railway Group Standards to fill the gaps.

More comprehensive discussions on successes of the RSCR are presented at the end of each ‘Intermediate Objective’ (IO) assessment section (Sections 8 to 13 inclusive) and in the Conclusions and Recommendations (Section 14).

1.8 COSTS TO HSE AND THE EXCHEQUER

Given the objectives of this evaluation, it is not appropriate to consider item by item costs associated with the HSE and the Exchequer. HSE costs are included, along with other stakeholder costs, in Section 1.9.

1.9 SECTORS AFFECTED, COMPLIANCE COSTS AND COSTS TO SOCIETY

Costs have been accrued by a wide range of railway industry stakeholders when implementing the requirements of the RSCR:

• The Infrastructure Controller (IC)
• Train and Station Operating Companies (TOCs / SOCs)
• Freight Operating Companies (FOCs)
• Infrastructures Maintenance Contractors (IMCs)
• Heritage railways
• Train charter companies
• The Health and Safety Executive (HSE)
• Railway Safety.

The principal source of cost data for the evaluation has been the stakeholder Questionnaire (see Section 1.3). Costs associated with RSC assessment and audit have been obtained directly from the relevant organisations (the HSE, Railway Safety / RSSB and Railtrack / Network Rail). The overall cost of the RSCR has been calculated from the following components:

• RSC submission (first under RSCR 1994, three-year review and transitional under RSCR 2000)
• RSC acceptance (document modifications and resubmissions)
• Material Revisions (evaluation, submission and acceptance)
• Audit (by Railtrack SSD / Railway Safety)
• Ongoing costs (attributable components of Parent Company involvement, safety meetings, the control of contractors and prevention of trespass / vandalism).

The cost data are presented according to whether they represent expenditure associated with the RSCR 1994 or the RSCR 2000. For the RSCR 1994 (from 1994 to 2000), the cost of the RSCR to the industry stakeholders (TOCs, IMCs, IC, HSE and Railway Safety) is estimated to have been £30.7m. Between 2001 and present (2003), costs to stakeholders are estimated to have been £20.9m to meet the extra requirements of the RSCR 2000 and ongoing requirements of the earlier regime. The total compliance cost over the evaluation period is therefore estimated to be £51.6m.

The RSCR are concerned with maintaining / improving health and safety standards, and no ‘other’ (e.g. environmental) costs are relevant to this evaluation. The costs of meeting the regulatory requirements under the permissioning regime are met directly by the industrial stakeholders identified above and there are no directly attributable additional societal costs.

Further discussion on the compilation and assessment of cost information is presented in Section 6. This includes estimates of costs for each individual ‘Intermediate Objective’.

1.10 HEALTH AND SAFETY BENEFITS AND TOTAL BENEFITS

The financial benefits of the RSCR have been measured in terms of the reduction in rail accident risk that can be attributed to the Regulations. Several indicators of risk have been selected for this evaluation but, common to all, is the conversion of risk data into a monetary figure that represents the Value of Prevented Fatality (VPF).

Preventative hardware controls that are focused on addressing specific accident precursors have measurable outcomes. There is, however, no such equivalent outcome measure for the RSCR as its purpose is associated with improvements in the management of risk and is intended to enhance safety. However, given the intended wide-ranging impact of the RSCR, an associated reduction in ‘headline’ or global indicators of rail risks (as well as a reduced level of catastrophic risk) is to be expected.

The benefits ascribable to the RSCR have therefore been estimated by considering the influence of the Regulations on accident prevention (and associated rail accident cost). Rail accident cost has been determined from Accident Equivalent Fatalities (AEF) data published by the Rail Safety and Standards Board (RSSB) and from the associated VPF figure. A percentage of the total rail accident cost has then been attributed to the RSCR by considering the role of the Regulations amongst other ‘confounding’ influences on safety.

The RSSB data distinguishes between accidents that the Railway Group considers it has ‘direct’ control over and those that are caused by other, deliberate, factors such as trespass and vandalism (‘indirect’). Benefits attributable to the Regulations over the period from 1994 to date (2003) are estimated to be approximately £85m, based on prevented equivalent fatalities for all types of rail risk (i.e. both direct plus indirect factors). If only those equivalent fatalities which are judged to be under the direct control of railway operators are considered, the benefit valuation reduces from £85m to £53m.

As identified in Section 1.9, the RSCR are concerned with maintaining / improving health and safety standards, and no ‘other’ (e.g. environmental) benefits are relevant to this evaluation.

Benefits have also been evaluated using prevented fatalities associated with significant train incidents. These are presented in Section 6, along with further discussion on the above benefit
estimates. Section 6 also includes a review of benefits associated with each individual ‘Intermediate Objective’.

1.11 WEIGHING THE BALANCE

To determine whether the RSCR have represented ‘value for money’, two criteria have been considered: firstly that the costs to the industry to meet RSCR legal requirements should not be in gross disproportion to the benefits gained; and secondly, the more stringent criterion, that costs should not exceed benefits.

From the costs and benefits outlined in Section 1.9 and 1.10, both evaluation criteria can be deemed to have been achieved and the RSCR have been evaluated as ‘value for money’.

Further discussion on the evaluation of costs and benefits is presented in Section 6.

1.12 CONCLUSIONS ON THE PROCESS AND IMPACT

As discussed in Section 1.5, it has been necessary to evaluate the success of the RSCR within a complex environment of regulatory changes, counterfactuals and other confounding variables.

The approach adopted has ensured that influences have been identified and that good evidence has been collected (using a number of complementary mechanisms and sources) to provide proper triangulation of analysed data.

The data collection activities were greatly assisted by the comprehensive Railway Safety Case (RSC) documentation compiled and supplied by HMRI, which contained assessment correspondence and Issue Logs for the selected RSCs. The assistance of HSE support staff is acknowledged. Cooperation of industry stakeholders is essential for a meaningful evaluation to be conducted and the considered contributions from across the industry have enabled interesting and instructive conclusions to be recorded. The contribution of stakeholders at the Workshop, in completing the Questionnaires and in Interviews is gratefully acknowledged.

The combined approach of the evaluation of costs and benefits against the ‘Ultimate Objective’ of the RSCR and the evaluation of success of the RSCR against ‘Intermediate Objectives’ has not only enabled ‘value for money’ to be established but has also provided insight into how and where the Regulations have been successful (to enable recommendations to be made for further industry and regulatory improvements).

1.13 UNCERTAINTIES

The absolute impact of the RSCR, as part of a wider set of parallel influences on rail safety, is not readily quantified in terms of a financial benefit. The cost of the RSCR is perhaps more easily quantified, though the availability of early-regime information and the complexity of changes that have occurred to the regulations, limit the availability of data sufficient for rigorous cost-benefit-analysis. The approach taken has been to evaluate and compare the costs in relation to observed benefits.

To estimate the observed benefits, it has been necessary to isolate the role of the RSCR from other ‘confounding’ influences. Whilst it is recognised that the approach adopted is not definitive, it should be noted that no previous attempt has been made in Regulatory Impact Assessments to determine the contribution which the RSCR will make to improvements in safety.
Stakeholders are relatively few in number and therefore a statistical challenge, but triangulation of qualitative and quantitative issues is considered to provide adequate robustness.

1.14 LESSONS AND RECOMMENDATIONS

Lessons learnt from the impact evaluation and recommendations for improvements to the RSCR are discussed in detail in Section 14.
2 EVALUATION STRATEGY

2.1 GENERAL

This section introduces the approach taken to evaluate the impact of the RSCR.

When introduced in 1994, the ‘Ultimate Objective’ of the RSCR was to ensure that health and safety standards within the railway industry were at least maintained after privatisation. There was concern that fragmentation of the industry and the numerous operational interfaces between a range of private companies could potentially lead to a decline in safety and increase the risk of accidents / incidents. Within this framework, a global assessment of the success of the RSCR is the contribution that the Regulations have made in the prevention of deterioration in safety standards and to any overall improvements in safety on the railway network between 1994 and now (2003). Financial benefits have been measured in terms of the reduction in rail accident risk over the period (i.e. value of prevented fatalities and injuries) and have been compared to costs accrued by industry stakeholders in meeting RSCR requirements to assess ‘value for money’ – see Section 6.

However, whilst the above approach supplies the economic picture, it is also important to understand in greater detail how the Regulations have been successful in contributing to safety. It is only by recognising the underlying causes behind successes (and failures) of requirements within the Regulations and their implementation that recommendations can be made for future regulatory improvements. This provides insight into the question of whether the money could have been utilised more effectively.

As discussed in Section 1.3, detailed analyses of the successes of the RSCR have been carried out using a set of ‘Intermediate Objectives’ (IOs) which underpin the ‘Ultimate Objective’ and provide a basis against which to gather evidence. In turn, ‘success indicators’ have been derived for each IO in order to provide a measure for gauging the RSCR’s contribution to IO fulfilment. IOs and associated ‘success indicators’ are outlined in Sections 2.2 and 2.3 respectively, and used in the evaluations presented in Sections 8 to 13 inclusive.

Wherever possible, evidence obtained from the data sources described in Section 1.3 and used in the evaluations has been quantified. For example, Duty Holders’ views from the Questionnaires were largely obtained on rating scales; costs obtained were in absolute (current) figures; and benefits attributable to the RSCR were allocated according to a contribution rating provided by stakeholders. Information from interviews and opinions given at the Stakeholder Workshop have been distilled to provide support and corroboration for the quantified evidence. Themes from interviews have been grouped and linked to strengthen such evidence.

Also discussed are the baseline(s) used for comparison to ascertain RSCR influence and contribution, and the myriad additional drivers associated with rail safety. In addition, the implications of the main changes to the RSCR over the evaluation period are analysed.

2.2 OBJECTIVES

The ‘Ultimate Objective’ and six selected ‘Intermediate Objectives’ (IOs) of the RSCR are presented in Section 1.2. As discussed in Section 2.1, the strategy for detailed evaluation of success (or otherwise) of the Regulations has been to collect evidence against each of the six IOs, and hence both draw conclusions on the impact of the RSCR as a whole and make recommendations for their further improvement.
The IOs are of two distinct types:

- IO1 – IO4 inclusive are associated with stimulating / encouraging an improved safety culture in the railway industry so that Duty Holders have appropriate safety management practices **in place**:
  
  IO1. To stimulate railway operators to adopt a systematic Risk Assessment (RA) approach (particularly for risks at the interface with other operators), and to act on the findings
  
  IO2. To encourage operators to develop robust health and safety systems
  
  IO3. To encourage railway operators co-operate on health and safety issues
  
  IO4. To encourage continuous improvement and effective change management in the industry.

- IO5 and IO6 are associated with assisting in the provision of a measure of the effective **implementation** of such safety procedures:
  
  IO5. To improve industry compliance with health and safety legislation by requiring Duty Holders to demonstrate adequate arrangements for audit of their health and safety systems
  
  IO6. To provide (in the Safety Case) a useful tool to aid inspection / enforcement.

It can be seen from the nature of the IOs that the RSCR is unlikely to have been the sole driver in achieving the desired improvements. Thus success in connection with the six IOs has been considered at two levels:

(i) Has the RSCR been successful in maintaining and / or contributing to improvements in each IO? (Sections 8 to 13)

(ii) Have the RSCR’s contributions to the IOs been ‘value for money’ in terms of the costs for all those affected when measured against the associated benefits achieved? (Section 6)

### 2.3 SUCCESS INDICATORS

The individual IOs are judged according to whether they are ‘encouraging’, ‘stimulating’ or ‘assisting’ improvements in safety provisions. Quantification of IO fulfilment is not feasible and, in order to measure the success (or otherwise) of IOs, quantifiable success indicators have been established for each IO. These indicators, whilst reflecting those presented by the HSE in the Project Specification (reference HSE / 4505), were derived from the following sources:

- An initial review of the content and nature of Railway Safety Cases (RSCs)
- Discussion and comments at the Stakeholder Workshop (see Sections 1.3 and 3)
- The RSCR Statutory Instruments for both RSCR 1994 and RSCR 2000
- The Influence Network approach (Section 3)
• HSE’s RSCR Regulatory Impact Assessment (RIA) 1993 and 2000 (conducted by HSE to identify the expected effectiveness of the RSCR prior to its introduction and the subsequent changes made in 2000)

• Various RSC manuals produced by HSE and Railway Safety that describe their RSC and Material Revision assessment processes (14, 15).

The success indicators and the data sources used to populate the success indicators are presented as a matrix in Appendix 1. Under IO1, for example five indicators are listed. For each indicator, the various data sources were identified to provide triangulation (i.e. at least two independent sources to corroborate evidence surrounding the IO).

The emboldened numbers in the top left hand corner of the box, for each data source listed against each indicator in Appendix 1, provided an initial assessment of the confidence that appropriate data would be available from that source. A rating of 10 indicated total certainty and a rating of 1 indicated a remote possibility. Two or three sources rated at 7-10 were considered to provide a sufficient probability of acquiring the necessary information on an indicator (as were four or five sources rated 3-6).

The non-emboldened numbers under data sources listed in Appendix 1 refer to question numbers in the Questionnaire (Appendix 3).

2.4 COUNTERFACTUALS AND CONFOUNDING VARIABLES

The following section discusses the counterfactuals (i.e. what would have happened if the RSCR had not been introduced). Other legislation governing the railway industry was in place pre-1994 (and legislation has been subsequently introduced and updated); safety procedures and risk evaluations were a central part of British Rail operations (and would have developed without the RSCR); and safety awareness / culture has developed in all industries over the past ten years (driven by a recognition that safety and efficiency can be complementary if managed correctly).

The selection of an appropriate counterfactual is perhaps one of the most contentious aspects of an impact evaluation. For the RSCR 1994, the intention is to identify what was specific to the RSCR and how it differed from what might be reasonably expected to have occurred in its absence. The argument that the counterfactual of ‘no RSCR’ and the unchanged continuation of the pre-1994 status quo, post-1994, is problematic because:

• Privatisation ensures that the status quo of continued British Rail (BR) operation is not valid.

• If the RSCR had not been developed and implemented, it is likely that the industry would have developed its own independent approach to manage safety post-privatisation (e.g. an extension to the scope of Group Standards). However, from discussions with those in industry, it seems implausible that a comparable / equivalent ‘permissioning’ regime would have occurred.

This evaluation therefore uses the following counterfactual for the RSCR 1994:

A. ‘No RSCR’. Noting: the costs used in the evaluation must be unique to the RSCR regime and not include those of other safety improvement / control methods that have, or would have, been developed in parallel. In addition, the benefits attributed to the
RSCR should, ideally, be demonstrated to have actually been caused by the RSCR, and not have been likely to occur in their absence.

For the RSCR 2000, the counterfactual is:


The counterfactual for the overall RSCR regime (i.e. both regimes) is:

C. The absence of the combined benefits offered by the RSCR 1994 and 2000.

These counterfactuals are presented diagrammatically in Figure 2.1. The figure illustrates the type of profile that would be expected for RSCR success. No data has been used to generate the profile and it is only illustrative.

Figure 2.1 Illustration of RSCR counterfactuals and comparisons to be made

2.4.1 Legislation in the Railway Industry

Prior to the introduction of the RSCR, the railway industry was subject to other railway-specific and general health and safety legislation (e.g. the Health and Safety at Work Act, the Management of the Health and Safety at Work Regulations, the Construction (Design and Management) Regulations, the Factories Act, the Railways Act 1871, etc). If privatisation had not taken place, and the RSCR not been introduced in 1994, this legislation would still form part of an ongoing ‘British Rail’ Operating regime.

Figure 2.2 presents a summary of key legislation which affects the railway industry and which was introduced since the Government White Paper ‘New Opportunities for the Railways – the Privatisation of British Rail’ in 1992. The timeline indicates the RSCR 1994 and subsequent amendments in the context of other related legislation.
1. 'New Opportunities for the Railways - the Privatisation of British Rail'.
2. 'Ensuring Safety on Britain's Railways'.
3. Railways (Safety Case) Regulations (RSCR); Railways (Safety Critical Work) Regulations; & Carriage of Dangerous Goods by Rail Regulations.
5. RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 - replacing 1985 Regs).
6. Health and Safety (Consultation with Employees) Regulations.
9. Railway Safety Regulations (including Train Protection Warning Systems and Mark One rolling stock).

**Figure 2.2** Regulations governing H&S on the railways (1992 – Date)
Of particular note to this project in terms of legislation are the following:

- The requirement for involvement of employees in general health and safety issues was introduced in 1996 with the Health and Safety (Consultation with Employees) Regulations. However, the 2000 RSCR specifically stress the importance of input from the workforce in the risk assessment process and development of the HSMS. Thus, the success of the RSCR (particularly in terms of IO1 and IO2) can be gauged from evidence of considerably greater employee consultation during transitional (2000 RSCR) RSC preparation, over and above what might be expected from maturation of the 1996 regulations (i.e. a step change through the 2000 – 2002 period in specific areas rather than gradual and general improvement).

- Risk awareness is enshrined in the Health and Safety at Work Act 1974 (HSWA). The stated general purposes of the HSWA (as clarified in its application to transport systems and the public in the Railways Act 1993) include:
  - securing the proper construction and safe operation of transport systems and of any locomotives, rolling stock or other vehicles used
  - protecting the public from personal injury and the risks arising from the construction and operation of transport systems.

Risk Assessment (RA) of operations is required under the Management of Health and Safety at Work Regulations (MHSWR) 1992 and 1999 as well as under the RSCR. However, the RSCR stress the importance of RA as a fundamental management tool to identify potential hazards and mitigation / control measures to reduce risk. The RA required under the RSCR should reflect specific operational issues (not just generic railway operations), be used to prioritise control measures (which should then be reflected in the HSMS and / or the Development Plan) and be used to support / justify any ‘Material Revisions’ to hardware, operational procedures or management structure. The success of the RSCR (particularly in terms of IO1 and IO4) can be gauged, for example, by a shift from the industry-wide ‘British Rail’ risk evaluation process to one considering specific Duty Holder operating parameters and by the proactive use of risk assessment results (cascading through the HSMS into Development Plans, or similar).

- It is understood from the Stakeholder Workshop (see Section 3) that British Rail was developing its HSMS pre-privatisation. Initiatives such as ‘Organisation for Quality’ and other Change Management policies indicate that improvements to the HSMS may have occurred without the RSCR (driven also by the HSWA and Railway Group Standards). This forms a ‘confounding variable’ in evaluating the success of the RSCR (particularly under IO2). Success of the RSCR can therefore be gauged from ongoing review and updating of the HSMS; from the effectiveness of the RSC development process in identifying gaps in systems set up under the HSWA; from the assistance provided by the Regulations for ‘new players’ to the industry in establishing an effective HSMS; and from the improvements arising from the assessment and audit processes required under the RSCR.

2.4.2 Safety Procedures and Systems

Pre-privatisation, the railway industry worked to a fairly prescriptive set of internal standards and rules governing all aspects of health and safety embodied in the Railway Group Standards and the industry’s ‘Rule Book’. In 1995, further standards were added in the form of the
Railway Safety Principles and Guidance (RSPG). Post-privatisation, these standards have remained a key mechanism for maintaining safety on the railways, under the custodianship initially of Railtrack’s S&SD and subsequently (2000-2003) of Railway Safety. On 1 April 2003, the responsibility for maintaining the Group Standards passed to the newly established Rail Safety and Standards Board (RSSB).

It should be recognised that there is a broad difference between the function of standards (which identify the methods used to maintain safe operations) and of the Regulations (which put the onus on the Duty Holder to demonstrate how risks are identified, controlled and managed to ensure they are ALARP). However, the ultimate aim of both standards and the RSC are similar: to minimise risk and improve health and safety within the railway industry.

The process of developing an RSC may identify areas where new or enhanced procedures and systems are necessary, possibly requiring a new Railway Group Standard(s). The success of the RSCR in this instance can be measured in terms of the rigour and commitment (including workforce involvement) associated with the RA thought process and HSMS development, in addition to compliance with Group Standards and the basic requirements of the RSCR.

2.4.3 Risks in Rail Operations

Understandably, initial RSC submissions in 1995 relied heavily on the pre-1994 evaluations of risk levels for the whole British Rail network. Although risks associated with human factors were included, the emphasis was on hardware failure or inadequacies within the infrastructure, rolling stock, etc.

RSC assessment (as evidenced in Issue Logs or from correspondence with Inspectors) provides a mechanism for challenging the appropriateness and comprehensiveness of the risks considered by a Duty Holder. More operator-specific risks or wider consideration of human factor risks, identified during the assessment process and included in subsequent submissions of the RSC, are evidence of the particular success of the submission / review / assessment process under the RSCR.

2.4.4 Safety Culture

Views from the Stakeholder Workshop (see Section 3.2) were that the railway industry was not at the forefront in establishing an empowering safety culture, and the relatively short term franchising regime and contractorisation had a negative effect on the attitudes of the workforce within the industry.

2.5 INFLUENCING VARIABLES

One of the principal influencing variables that contribute to risk reduction are the recommendations from major accident reports (see Section 2.5.1). However, when considering the trends in measured risk reduction (i.e. accidents / incidents and precursors such as SPADs), the following are examples of other influencing variables:

- Railway industry initiatives (such as the recent campaign to clear all lineside debris capable of being used to vandalise the track)
- Changes in accident / incident recording systems or new / revised Railway Group Standards
• New technology (such as the introduction of the Train Protection Warning System (TPWS)) and / or the development of methodologies (such as Railway Safety’s Risk Model).

2.5.1 Accident Reports

Figure 2.3 presents a timeline for the principal accidents between 1992 and 2003, identifying when associated reports were published and how these relate to legislation introduced. In some instances, there is a significant period between the accident and the presentation of findings from the inquiry.

Of particular note are the following accident report findings:

• Watford South Junction (1996)
  - Railtrack to review Group Standards (particularly in terms of multi-SPAD incidents)
  - Railtrack to adopt RA methods for track layout
  - Train Protection Warning System (TPWS) to be assessed as an interim measure, prior to the implementation of Automatic Train Protection (ATP)
  - Recommendations on TPWS fed into the Railway Safety Regulations 1999 (as well as issues on Mark I rolling stock and rolling stock with hinged doors).

• Southall (1997)
  - Uff report, including recommendations on emergency escape from trains
  - Emergency escape provisions to be provided by Duty Holder under the RSCR Amendments 2001.

• Ladbroke Grove (1999)
  - Rowlands report, questions role of Railtrack’s S&SD in terms of RSC assessment / acceptance
  - Assessment procedure changed in RSCR 2000 (see Section 2.6)
  - Cullen report, questions role of Railway Safety and recommends audit of each railway operator by a ‘competent body’
  - Above Cullen recommendation introduced in RSCR 2003 amendments; other Cullen recommendations taken forward as part of the wider review of RSCR.

• Hatfield (2000)
  - Railtrack / Network Rail to review track maintenance and renewal contracts, programmes and procedures
  - Conclusions included in HSC report ‘Management of Contractors on Railways’ and competency of track maintenance personnel considered as part of RSC assessment (2002).
Figure 2.3 Recommendations from accident reports (1992 – Date)
2.6 RSC ASSESSMENT AND AUDIT

Fundamental to the impact evaluation (and recommendations for future changes to the RSCR) is the effectiveness of the RSC assessment and audit processes between 1994 and 2003 (see Figure 2.4). The changing roles and responsibilities are as follows since 1994:

- **1994 to 2000**
  - Railtrack submits RSC to HSE for acceptance
  - RSCR 1994 cascade model
  - TOCs / SOCs / IMCs submit RSCs to Railtrack S&SD for acceptance
  - Compliance audits carried out by Railtrack S&SD.

- **2000 to 2003 (April)**
  - RSCR 2000
  - TOCs / SOCs / IMCs and Railtrack / Network Rail submit RSCs to HSE for acceptance
  - Railway Safety provide an ‘independent’ assessment of submitted RSCs
  - Railtrack (using Railway Safety) obtain ‘independent’ annual audit of their own and TOC / SOC / IMC RSCs.

- **2003 onwards**
  - TOCs / SOCs / IMCs and Network Rail submit RSCs to HSE for acceptance
  - Network Rail to scrutinise RSCs
  - Each operator to procure an annual audit from a ‘competent body’.

In effect, between 1994 and 2000, there was one assessor for TOCs / SOCs / IMCs (Railtrack S&SD) and one assessor for Railtrack (HSE), with one associated set of Issue Logs for each review of each case.

However, between 2000 and April 2003, RSCs from TOCs / SOCs / IMCs were assessed by the HSE, Railway Safety and Railtrack (albeit the last from a compliance / compatibility perspective and with similarities to Railway Safety’s review), with three associated sets of Issue Logs (generated by HSE and Railway Safety) for each review.

Under the RSCR 2003 amendments, RSCs will be assessed principally by the HSE, although Network Rail will continue to scrutinise Duty Holders’ RSCs.
RAILTRACK’S SAFETY AND STANDARDS DIRECTORATE (SSD)

- CASCADE MODEL
- SSD REVIEW/ACCEPTANCE OF TOC/SOC RSCs
- AUDITS

HSE REVIEW/ACCEPTANCE OF RSCs WITH NETWORK RAIL SCRUTINY
- NO INDEPENDENT ASSESSMENTS BY RAILWAY SAFETY
- ALL OPERATORS: AUDIT BY ‘COMPETENT BODY’.

Figure 2.4 RSC assessment and audit
3 INFLUENCE NETWORK AND STAKEHOLDER WORKSHOP

3.1 INFLUENCE NETWORK

One of the key aspects of the evaluation has been to identify whether the RSCR represents ‘value for money’ (i.e. whether any benefits offered by the RSCR are deserving in terms of their associated cost). Section 6 presents an evaluation of the overall RSCR costs and benefits. The value for money aspects of the Intermediate Objectives (IOs) are also considered. Whilst IO costs have been identified in monetary terms, an equivalent monetary benefit has not been placed on individual IOs. Rather the benefits have been identified in terms of how individual IOs contribute to risk reduction.

The tool adopted to structure the assessment of these benefits and their associated costs is the Influence Network (IN) approach. The IN provides a mechanism that associates the success of the industry in meeting each IO with a reduction (or otherwise) in rail accident risk. The underlying concept is that the immediate (direct) causes of an incident need to be seen in the wider context of the way ongoing operations are organised, as well as within the pervading corporate policy influences and the wider environmental factors affecting the business. These ‘domains’ of influence are clearly interrelated and within the IN model are represented as hierarchical levels as follows:

- **Environmental level influences** - these cover global influences such as the wider political, regulatory, market and social influences which impact the policy decisions taken by Duty Holders. The IOs represent environmental level influences.

- **Policy level** - these comprise the policy and corporate level factors that determine the organisational processes including interface management, contracting and supply chain management.

- **Organisational influences** - these influence the direct ‘level’ and reflect the culture, procedures and behaviour promulgated by the organisation in operations.

- **Direct performance influences** - these directly influence the likelihood of an accident being caused in terms of human or hardware performance or external factors with an immediate bearing on safety (e.g. diminished ‘Situational Awareness’ for train drivers may contribute to SPADs).

Figure 3.1 presents a ‘generic’ IN model in which each of the layers is broken down into a set of discrete influences related to different aspects of human, hardware or external performance whether in relation to individuals or companies. The IN then enables the quality of each aspect of performance to be considered in a structured manner and then the weight of influence each factor exerts on other aspects of performance can be addressed systematically.
The generic IN is readily customised and, to evaluate the impact of the RSCR on rail accident risk, the specific policy and environmental influences affecting the railway industry have been included (e.g. Figure 3.2). Figure 3.2 indicates the principal stakeholders and aspects of railway operation enshrined in the model. The overall approach is then to examine how the RSCR provisions represented by the IOs cascade through the influences, to identify areas of significant cost and benefit and, ultimately, how they have affected accident risk.

**Figure 3.1** Generic Influence Network
**Figure 3.2** Rail industry stakeholder map

A Stakeholder Workshop was held towards the beginning of the study, attended by a representative sample of railway industry professionals (see Section 3.2). The Workshop was organised to put the RSCR evaluation into a wider context and examine the IN influences, and interactions between those influences. Figure 6.12 to Figure 6.17 (inclusive) present bespoke INs for each IO in turn and, drawing on the discussion at the Workshop, the emboldened influences indicate those that were considered to be predominantly affected by the individual IOs. Identifying the key influences at an early stage provided a more comprehensive model for structured data collection and analysis. Following the Workshop, the subsequent development of IO success indicators was strengthened (see Section 2.3) and helped to ensure that all salient factors were addressed in the Questionnaire (Section 4), the review of RSCs and the interviews (Section 5).

It is apparent throughout each IN that costs can be incurred for particular influences, and at most ‘levels’, whilst intermediate benefits may be evident for other influences. For example in Figure 3.3, IO1 (associated with the development and improvement of the RA approach) can be seen to represent a cost to a Duty Holder by necessitating an increase in the resources allocated to ‘Interface Management’ (P8), whilst intermediate benefits are seen elsewhere (e.g. in ‘Competence’ (D1)). In some cases both costs and benefits may be associated with an individual influence. The diagrammatic representation reflects the ‘net’ effect, whether predominantly cost or predominantly benefit.

Identifying the costs associated with particular influences is fundamental to the evaluation of costs and benefits of the RSCR. Some costs have been obtained from the HSE and Network Rail, though the majority of the information required has been obtained directly from Duty Holders via the Questionnaire.
Appendix 2 presents a second matrix showing which questions have been used in the Questionnaire to ‘tap’ the influences for each IO, and indicates whether these influences are primarily a source of information on ‘cost’ or ‘benefit’.

### Figure 3.3 Intermediate Objective 1 – Risk Assessment

#### 3.2 STAKEHOLDER WORKSHOP

The Stakeholder Workshop was the ‘scene-setting’ event for the RSCR impact evaluation. It assisted in ensuring that the RSCR were examined in context, taking due account of relevant sources of evidence in terms of safety and economics. The contribution of industry participants was obviously central to the success of the study and is gratefully acknowledged.

The value of the Workshop depended on being able to capture the fullest understanding of the role of the RSC in industry from 1994 to date. To fulfil this requirement, a targeted group of industry participants, from a range of organisations, who had long-term experience of the RSCR and the pre-privatisation era, was assembled. The make-up of the group helped ensure the representative picture was generated and that all ‘levels’ of the IN were covered.

BOMEL facilitated the workshop with NERA participation. In addition to the HSE, other industry attendees represented:

- Network Rail / Railtrack (2 attendees)
- Railway Safety
- Association of Train Operating Companies: ATOC
- Strategic Rail Authority: SRA
- Trade Union
- Passenger Committee
- Train Operating Companies: TOCs (3 attendees)
- Infrastructure Maintenance Contractor: IMC
The role of the Stakeholder Workshop in refining the IN to produce a comprehensive model for structured data collection / analysis is discussed in Section 3.1. However, the Workshop also:

- Provided information which was used to enhance / supplement data collected from a review of RSCs and other documentation
- Assisted in structuring the Questionnaire. A draft of the Questionnaire was sent to several Workshop attendees for review and comment prior to updating and distributing to all Duty Holders
- Facilitated industry buy-in to the evaluation and established dialogue with Duty Holders.
4 QUESTIONNAIRE DEVELOPMENT

4.1 CONTENTS

The Questionnaire was developed by BOMEL with input from NERA and several industry Stakeholders following the Workshop. The items included in the Questionnaire (see Appendix 3) were compiled to both collect necessary data to evaluate the success of IOs (and provide required triangulation, where appropriate) as discussed in Section 2.3 and cost information to conduct the evaluation of costs and benefits.

Appendix 1 provides a matrix of success indicators for the six IOs against potential data sources. Relevant questions in the Questionnaire are indicated against the appropriate success indicators in the matrix.

Appendix 2 presents a matrix showing which influences in the IN may have associated cost and benefit elements, for each IO. Relevant questions in the Questionnaire that provide a source of cost data are indicated in the matrix.

Questions were presented under the following headings:

1. Global Context
2. Implementation of RSCR
3. RSCR Audit
4. Change Management
5. Interface and Contracting
6. Health and Safety Management Systems
7. Risk Assessment
8. Training
9. Competence
10. Communications
11. Investigations
12. Company Information
13. Additional Comments on the RSCR and Improvements.

4.2 ANSWER FORMATS AND ADMINISTRATION

Following the Workshop, the draft Questionnaire was issued to several attendees for comment prior to wider distribution to Duty Holders. Overall, the Questionnaire was sent to sixty-one organisations (mainline TOCs / SOCs, heritage railways, Network Rail, VIs and IMCs).
The Questionnaire was designed for electronic distribution, completion and return (via email). This process quickened data collection and minimised the problem of errors that occur when entering data manually. Respondents were also given the option of completing the Questionnaire by hand and returning in the post; three Duty Holders responded in this way.

The responses to the questions were recorded in a number of ways:

- A five-point ‘Likert’ type ‘tick-box’ scale. The exact wording of the scales changed according to the question, though the majority of responses were captured using options ranging from ‘strongly disagree’ to ‘strongly agree’
- A simple ‘yes / no’ ‘tick-box’
- A ‘text’ field that was used where short written answers were required (less than 250 characters) (e.g. associated with costs)
- An unlimited ‘memo’ field that was used when longer answers were required.

It was recognised that the costs associated with some aspects were not easily quantifiable and, to minimise the impact upon Questionnaire respondents, every effort was made to request information in a format which was considered to be most accessible and compatible with company records (e.g. time or expenditure). However, in the guidance preamble to the Questionnaire it was made clear that, if the unit (e.g. cost per annum) did not correspond with the Duty Holder’s records, then the respondent was requested to provide any similar / equivalent information available.

Once completed Questionnaires were returned, responses were taken and used to formulate a database. Prior to data analysis, Questionnaires went through a screening process to clean up the data. This involved standardising numeric responses (e.g. £60k to £60000), and manually validating database contents against printed Questionnaires.

4.3 QUESTIONNAIRE REPRESENTATION

The Questionnaire was sent to an opportunity sample of 61 Duty Holders based on information provided by the HSE and, after follow-up, responses were received from 28 organisations. Therefore, Questionnaire data represents 46% of the targeted sample. This response rate closely resembles that of other studies examining an equivalent population. For example, a study investigating the impact of HSE charging regimes on Duty Holders reported in 2002 reported that 25 Duty Holders had replied, also representing 46% of the targeted sample.

An independent study, conducted by the Institute of Employment Studies examining the overall impact of the HSE, reviewed many evaluative studies. To ensure that their conclusions were both reliable and valid, the studies that were included in the review had to exceed a 30% response rate. This further cements the acceptability of the RSCR Questionnaire response rate as a basis for industry conclusions.

Throughout the report, averages are presented for each question in tables and figures. The average has been calculated from the sum of values for each scale, which has then been divided according to the number of responses for the particular question (i.e. the arithmetic mean). However, consideration has also been given to the distribution of the responses in terms of range, frequency and (a)symmetry to ensure that distillation of the responses to a mean for succinct presentation is representative and meaningful.
The mean values that are reported have been subject to a series of supplemental analyses to identify the nature of the distribution of Questionnaire responses. This has consisted of:

- An examination of the difference between the mean value and the rating that received the largest number of responses (i.e. the mode)

- How skewed / biased responses are to high or low ratings.

Where skewed responses have been identified, further analyses have been undertaken to examine the actual distribution of responses. Where appropriate, the findings and implications have been highlighted in the associated discussion particularly where differences are attributable to specific types of Duty Holder.

It is important to note that due to the small number of principal Duty Holders in the industry (~60), the number of responses is also small (in statistical terms) even though they have been shown to be representative. Over and above this, however, questions in the Questionnaire were challenging to answer with precision since:

- The retrospective nature of the study necessitated that respondents give their best assessment of the role of the RSCR over the previous nine years. The responses relating to the RSCR 2000 are clearer to address in this respect, although impressions of the RSCR 1994 may benefit from hindsight and a longer regime duration

- The detail required to evaluate the RSCR as reflected in the Questionnaire content may have challenged the knowledge and information systems currently available to some Duty Holder respondents.

For these reasons, beyond checking database contents with Questionnaire responses (Section 4.2), it has not been seen as necessary or appropriate to attempt to subject the data to refined statistical analysis or interpretation.
5 SELECTION OF RSC DUTY HOLDERS FOR REVIEW

5.1 SAFETY CASES AND ASSOCIATED ISSUE LOGS

As outlined in Section 1.3, one of the main sources of data for the impact evaluation has been the examination of Railway Safety Cases (RSCs). However, bearing in mind that in 2003 there are over sixty primary Duty Holders in the railway industry and that the volume of documentation / correspondence associated with each Duty Holder’s submissions / resubmission is very large, it was necessary to select a representative sample of Duty Holders for detailed review.

As identified in Section 2.6, RSCs are submitted by:

- Infrastructure Controllers (ICs)
- Train Operating Companies (TOCs)
- Station Operating Companies (SOCs)
- Freight Operating Companies (FOCs)
- Infrastructure Maintenance Contractors (IMCs)
- Heritage Railways (some)
- Vertically Integrated (VI) organisations.

This evaluation has concentrated on operations associated with the Network Rail / Railtrack controlled infrastructure (see Section 1.3) and it was therefore essential to include Network Rail / Railtrack’s RSC documentation as a data source. It was also considered important to include a range of TOCs in the selection which reflected intercity, commuter and regionally-diverse companies (with differing Parent Company influences) – this is discussed in detail below. Stations on the infrastructure network are largely operated by Network Rail / Railtrack (14 major stations) or TOCs, and SOC activities are included in the overall company RSC submission (i.e. no SOC-specific RSCs were included). One FOC and two IMCs were included for comparison of issues arising during RSC assessment with those of TOCs. The FOC selected also operates train charter and hence encompasses issues arising from such operations.

Only one heritage company was included since, although it was felt necessary to capture any specific issues associated with heritage railways, the extent of operations is limited (low speed, low mileage, etc). In addition, many heritage railways are exempt from submitting RSCs. Finally, a VI organisation with Network Rail infrastructure interfaces was included since interface management is a key issue in risk reduction. However, as discussed in Section 1.3, London Underground was not selected due to the complexity of its operations and the introduction of different influences and factors into the study.

Careful thought was therefore given to the selection to ensure the sample was representative. In an attempt to capture issues from all the major TOCs, the various mainline / regional operations and any Parent Company influences, use was also made of an HMRI Consistency Review which contains an evaluation of issues raised in a number of RSC assessments. This Consistency Review was used to both benchmark and supplement the study review. The status of Transitional RSC assessments was also considered.

Table 5.1 presents the background to the selection process of TOC RSCs. Items emboldened have had a significant influence on the selection. Eight RSCs from TOCs in the table were considered necessary as a minimum for the sample to be representative. The column on the
right hand side of the table reflects that data from the TOC has been included in the impact evaluation, whether from RSC examination, Questionnaire response or Workshop participation.

In summary, the thirteen RSCs that were agreed with HSE to be reviewed in detail were:

- Network Rail / Railtrack – IC
- ScotRail – passenger
- Connex South Eastern – passenger
- West Coast Mainline – passenger
- First Great Western – passenger
- First Great Eastern – passenger
- South West Trains – passenger
- WAGN Railway – passenger
- One freight and train charter
- Amec Rail – IMC
- Edmund Nuttall Limited – IMC
- One heritage
- One VI.

5.2 INTERVENTION PLANS

Nineteen representative HMRI Intervention Plans were selected for inclusion in the impact evaluation. These included the Plans associated with the thirteen Duty Holders identified in Section 5.1, since it is important to assess how issues from the Development Plans / Audits cascade into inspection. In addition, five other Intervention Plans were included in the evaluation to benchmark issues arising with different types of operator:

- GNER – passenger
- Midland Mainline – passenger
- Direct Rail Services (DRS) – freight
- Freightliner Limited – freight
- Amey Rail – IMC.

5.3 INTERVIEWS WITH INSPECTORS

Structured interviews with HSE Inspectors were held following the review of RSCs. The interviews were intended primarily to provide greater detail of the role of RSCs in relation to inspection and enforcement (IO6). Additionally, the process was also used to help triangulate conclusions that had come from the review of RSCs. The Inspectors were selected on the basis of being Lead Assessors for certain Duty Holders identified in Sections 5.1 and 5.2:

- Network Rail / Railtrack
- ScotRail - passenger
- One VI
- South West Trains - passenger
- Direct Rail Services (DRS) - freight
<table>
<thead>
<tr>
<th>PARENT COMPANY</th>
<th>DUTY HOLDER</th>
<th>INCLUDED IN HSE ISSUE EVALUATION</th>
<th>STATUS OF TRANSITIONAL RSC</th>
<th>COMMENTS</th>
<th>DATA INCLUDED IN IMPACT EVALUATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>(acceptance pending)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>West Coast Mainline</td>
<td>N</td>
<td>Resubmission Aug. 2002</td>
<td>Main west coast arterial link and key interfaces with ScotRail. Joint venture with Stagecoach. Issues associated with upgrade (infrastructure and trains).</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(acceptance pending)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(acceptance pending)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>First North Western</td>
<td>Y</td>
<td>Transitional Accepted</td>
<td>Regional services. Franchise expires in 2004 (as with First Great Eastern).</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sept. 2002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAGECOACH</td>
<td>First Great Western</td>
<td>Y</td>
<td><strong>Transitional</strong> Accepted</td>
<td>High speed services. Later acquisition of First Group (franchise expires in 2006). Same Parent Company but operational differences when compared to First Great Eastern.</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Oct. 2001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>South West Trains</td>
<td>N</td>
<td>Resubmission Aug. 2002</td>
<td>Largest rail franchise in UK.</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(acceptance pending)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Island Line</td>
<td>N</td>
<td>Resubmission May 2002</td>
<td>Vertically integrated Isle of Wight operation. Smallest rail franchise in UK.</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(acceptance pending)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PARENT COMPANY</td>
<td>DUTY HOLDER</td>
<td>INCLUDED IN HSE ISSUE EVALUATION</td>
<td>STATUS OF TRANSITIONAL RSC</td>
<td>COMMENTS</td>
<td>DATA INCLUDED IN IMPACT EVALUATION</td>
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<tr>
<td>----------------</td>
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</tr>
<tr>
<td>NATIONAL EXPRESS</td>
<td>c2c</td>
<td>N</td>
<td>Transitional Accepted Jan. 2002</td>
<td>South Essex commuter routes, similar to First Great Eastern. Different company/Duty Holder but comparable operational issues.</td>
<td>Y</td>
</tr>
<tr>
<td>Central Trains</td>
<td>N</td>
<td>Revised submission Sept. 2002 (acceptance pending)</td>
<td>Extensive routes in the Midlands.</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Eurostar</td>
<td>N</td>
<td>Revised submission Sept. 2002 (acceptance pending)</td>
<td>Eurostar (and Eurotunnel) excluded from Impact Assessment since a number of operational influences are different from other TOCs. Formed for a specific function and not 'inherited' from British Railways.</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Midland Mainline</td>
<td>Y</td>
<td>Transitional Accepted Sept. 2002</td>
<td>Intercity between Yorkshire, East Midlands and London. Useful comparison with West Coast Mainline.</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Stansted Express</td>
<td>N</td>
<td>-</td>
<td>Single service operation.</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Valley Lines</td>
<td>N</td>
<td>-</td>
<td>Urban and commuter network within Wales.</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>PARENT COMPANY</td>
<td>DUTY HOLDER</td>
<td>INCLUDED IN HSE ISSUE EVALUATION</td>
<td>STATUS OF TRANSITIONAL RSC</td>
<td>COMMENTS</td>
<td>DATA INCLUDED IN IMPACT EVALUATION</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>---------------------------</td>
<td>---------------------------------</td>
<td>--------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>NATIONAL EXPRESS CONTINUED…</td>
<td>WAGN Railway</td>
<td>N</td>
<td>Transitional Accepted - Dec. 2002</td>
<td>Regional services in Anglia.</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Wales and Borders Trains</td>
<td>Y</td>
<td>Transitional Accepted - Oct. 2001</td>
<td>Inherited Wales and West services and also some services formerly operated by Central Trains. Some First Group services will transfer to Wales and Borders in the future.</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Wessex Trains</td>
<td>Y</td>
<td>Transitional Accepted - Oct. 2001</td>
<td>West Country services (formerly Wales and West).</td>
<td>N</td>
</tr>
<tr>
<td>ARRIVA</td>
<td>Arriva Trains Merseyside</td>
<td>Y</td>
<td>Transitional Accepted July 2002</td>
<td>Extensive local commuter services on Merseyside.</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Arriva Trains Northern</td>
<td>N</td>
<td>-</td>
<td>Northern England and Transpennine routes.</td>
<td>N</td>
</tr>
<tr>
<td>GB RAILWAYS</td>
<td>Anglia Railways</td>
<td>Y</td>
<td>Transitional Accepted Sept. 2002</td>
<td>Subsidiary of GB Railways Group (along with GB Railfreight and Hull Trains). Principal train operator in East Anglia.</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Thameslink</td>
<td>N</td>
<td>Resubmission May 2002 (acceptance pending)</td>
<td>North-south service through London, with LUL interfaces at ten underground stations.</td>
<td>N</td>
</tr>
<tr>
<td>PARENT COMPANY</td>
<td>DUTY HOLDER</td>
<td>INCLUDED IN HSE ISSUE EVALUATION</td>
<td>STATUS OF TRANSITIONAL RSC</td>
<td>COMMENTS</td>
<td>DATA INCLUDED IN IMPACT EVALUATION</td>
</tr>
<tr>
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</tr>
<tr>
<td>CONNEX</td>
<td>Connex South Eastern</td>
<td>N</td>
<td>Transitional Accepted Nov. 2002</td>
<td>International operator. UK rail operations now concentrated in South East England (Kent). South Central operations now with Go-Ahead Group.</td>
<td>Y</td>
</tr>
<tr>
<td>LAING RAIL</td>
<td>Chiltern Railways</td>
<td>N</td>
<td>Transitional Accepted July 2002</td>
<td>Services along the M40 corridor. Established as a TOC in 1996.</td>
<td>Y</td>
</tr>
<tr>
<td>BAA</td>
<td>Heathrow Express</td>
<td>N</td>
<td>Submission Dec. 2002 (acceptance pending)</td>
<td>Single service operation.</td>
<td>N</td>
</tr>
<tr>
<td>GNER</td>
<td>Great North Eastern Railway (GNER)</td>
<td>Y</td>
<td>Transitional Accepted Aug. 2002</td>
<td>Intercity east coast mainline services linking England and Scotland. Key interfaces with ScotRail.</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Glasgow Prestwick International Airport Ltd</td>
<td>Y</td>
<td>Transitional Accepted Sept. 2002</td>
<td>Single service operation.</td>
<td>N</td>
</tr>
</tbody>
</table>
6 EVALUATION OF COSTS AND BENEFITS

6.1 INTRODUCTION

6.1.1 General

The introduction of the RSCR in 1994 and the amendments made in 2000 necessitated an increase in the industry’s expenditure on safety management. This section highlights how these costs have arisen, what they have been, whether they would have occurred anyway, and compares them to safety benefits to identify whether the RSCR have represented ‘value for money’.

The absolute impact of the RSCR, as part of a wider set of parallel influences on rail safety, is not readily quantified in terms of a financial benefit. The cost of the RSCR is perhaps more easily quantified, though the availability of early-regime information and the complexity of changes that have occurred to the regulations, limit the availability of data sufficient for rigorous cost-benefit-analysis (CBA). The approach taken here is to evaluate and compare the costs in relation to observed benefits. To determine whether the RSCR have represented ‘value for money’, two criteria have been considered:

- In line with the ALARP principle, the costs to the industry to meet RSCR legal requirements should not be in gross disproportion to the benefits gained
- The more stringent criterion that costs should not exceed benefits.

A range of data sources have been used to measure the costs and benefits including:

- Questionnaire (see Section 4 and Appendix 3)
- RSSB Annual Safety Performance Report\(^{(19)}\)
- HSE’s publication Railway Safety\(^{(20)}\)
- HSE’s original (1993) and 2000 Regulatory Impact Assessment (RIA).

Published information pertaining to trends in train incidents and rail accident risks provides an indication of the RSCR’s potential contribution to fulfilling the ‘Ultimate Objective’, which was ‘to ensure that health and safety standards in the railway industry post-privatisation are maintained and, as far as possible, improved’. However, any correlation between RSCR expenditure and a reduction in risk needs to be regarded with caution. The role of other ‘confounding’ influences (e.g. new train protection systems and other regulations) in addition to any delay between RCSR expenditure and the occurrence of visible improvements in safety, mean that establishing a causal link between the RSCR and risk is especially difficult. For this reason, it is important to consider the benefits offered by the RSCR not just in terms of risk trends but also in the successful fulfilment of the ‘Intermediate Objectives’ (IOs). The IOs, as discussed in Section 2.2, help to establish how the RSCR contributes to any improvements in headline statistics.

The structure of this section is as follows: the overall RSCR cost information is presented initially and this informs the subsequent discussion of the overall benefits offered by the RSCR. The costs and benefits of individual IOs are considered at the end of the section.
6.1.2 Counterfactuals

The selection of counterfactuals is discussed in Section 2.4. The identified counterfactual scenario of ‘no RSCR’ needs to recognise the operational framework which could have developed if the Regulations had not been implemented and does not simply represent an unchanged continuation of the status quo pre-1994 (the year of introduction of the Regulations). Hence:

- **Costs** used in the evaluation must be unique to the RSCR regime and not include those of other safety improvement / control measures that have, or would have, been developed in parallel over the evaluation period

- **Benefits** attributed to the RSCR should, wherever possible, be demonstrated to have arisen as a result of the RSCR and not to have been likely to have occurred in their absence.

The transition from the RSCR 1994 to the RSCR 2000 requires special attention. The ‘no RSCR’ counterfactual could be taken to have continued unchanged until either the introduction of RSCR 2000 or, alternatively, to the present day (2003). Whilst the RSCR 2000 necessitated some significant changes to the existing 1994 regime, there are aspects of the 1994 regime that continued throughout the 2000 to 2003 period. [Sections 7.3 and 2.6 provide a discussion of the major changes.] Therefore, the ‘no RSCR’ counterfactual continues as a basis for comparison through to the present day for all unchanged aspects (e.g. continued Material Revision submissions), whilst the changes required by the RSCR 2000 are compared with the continuation of the RSCR 1994 regime. For example, a three-year review was due for many Duty Holders at the time of the introduction of the RSCR 2000, and so the impact of RSCR 2000 needs to be judged against what might be the reasonable effect of a three-year-review under the earlier regime. Figure 2.1 presents these counterfactual issues diagrammatically.

The evaluation of costs and benefits therefore makes a distinction in the 2000 to 2003 period between the unchanged continuation of the 1994 regime and the additional impact of the RSCR 2000.

6.1.3 Evaluation Approach

Sections 6.2 and 6.3 present cost information. As identified in Section 6.1.2, the costs collated encompass all those activities carried out by stakeholders since the introduction of the RSCR which are / were directly required by the Regulations: preparation, submission / resubmission, assessment / acceptance and audit of Railway Safety Cases and ongoing support.

Sections 6.4 to 6.8 inclusive present a monetary assessment of benefits. The baseline for the evaluation of the RSCR 1994 is the safety record at privatisation (1994). As identified in Section 6.1.1, the ‘Ultimate Objective’ of the RSCR was to maintain safety standards in the newly privatised industry and hence any reduction in accidents / incidents per annum below the 1994 figures is seen as an additional ‘benefit’. Section 6.4 describes how a percentage of this total ‘benefit’ has been attributed to the provisions of the RSCR. The change in baseline for the RSCR 2000 is presented in Section 6.5.

Comparisons between costs and benefits have been made against the two criteria in Section 6.1.1 (i.e. *gross disproportion* between costs and benefits and costs *not exceeding* benefits).
6.2 COST INFORMATION

6.2.1 Assumptions for Costings

The costs presented reflect current rates, i.e. ‘net present value’ (NPV) and so have taken account of monetary changes (e.g. inflation) over the evaluation period. Cost data are therefore at a common money value of 2003.

A portion of the cost information has been generated from staff hours for activities and current (2003) hourly rates have been applied. In addition, cost information for historic activities in a number of instances has been provided in Questionnaires in present day values. Adjustment of costs to produce NPV has therefore only been necessary for a proportion of costs presented in this report and have been made on a case by case basis with recourse to Duty Holders where appropriate.

6.2.2 Cost Components

The principal source of cost data has been the Questionnaire (see Section 4 and Appendix 3). Costs associated with RSC assessment and audit have been obtained directly from the relevant organisations (the HSE, Railway Safety / RSSB and Railtrack / Network Rail). The overall cost of the RSCR, from 1993 to 2003, has been calculated from the following components:

- RSC submission (first, three-year review and transitional). This reflects the cost of producing the RSC document and would include new work on Risk Assessment (RA) and the Health and Safety Management System (HSMS) required to meet RSCR requirements. It does not include any ongoing costs of safety management which would be expected in the operation of a responsible organisation.

- RSC acceptance (first, three-year review and transitional). Following RSC submission, any costs associated with the modification and update of the document to enable acceptance have been included (including resubmissions).

- Material Revisions. This reflects the cost of submitting and gaining acceptance of Material Revisions that require an update of the RSC. This does not include any costs associated with the implementation of the change (e.g. Automatic Ticket Gates). If the Material Revision were required by the RSCR (e.g. HSMS update following RSC audit) the associated cost would be included, though evidence of such Material Revisions is minimal.

- Audit (see Section 12). Internal costs associated with the Railtrack SSD / Railway Safety audit incurred as a result of RSCR have been included. 71% of Questionnaire respondents indicated that compliance audits with British Rail standards were conducted pre-privatisation (Question 3.5A) and so it is reasonable to presume that without the RSCR a proportion of these costs would have been accrued anyway. The cost allocated to the RSCR audit has been calculated from the responses to Question 3.5C (see Section 6.10.1). Costs associated with internal audit have not been included since these will arise from the operation of an HSMS, whether or not ‘encouraged’ by the RSCR.

- Ongoing costs. There are a number of ongoing costs that can be attributed, in part, to the RSCR. These include: Parent Company involvement, safety meetings, the control of contractors and prevention of trespass and vandalism. A proportion of these costs
have been allocated to the RSCR regime, based on Questionnaire responses (see Section 6.10.1).

Costs for the above components have been compiled for the various Duty Holders and for other industry stakeholders including the Infrastructure Controller (IC) and the HSE – see Section 6.2.3.

Total costs attributed to the RSCR are also compared with the costs of various risk reduction measures in the rail industry (e.g. train protection system) to provide an expenditure benchmark. In addition, typical RSCR costs for an individual Duty Holder are compared with a typical Duty Holder’s turnover to put the RSCR expenditure into perspective.

6.2.3 Cost Representation

Cost data has been obtained for the following types and numbers of Duty Holder:

14 Train Operating Companies (TOCs)

4 Freight Operating Companies (FOCs)

5 Infrastructure Maintenance Contractors (IMCs)

3 heritage railways

1 train charter company

1 Infrastructure Controller (IC).

A comparison between those Duty Holders for whom cost data are available and the composition of the industry as a whole, indicates that the sample is sufficiently representative for reliable and valid conclusions to be drawn (see Section 4 for wider discussion of Questionnaire representation). Thus, it has not been considered appropriate or necessary to apply any weightings within the cost data. With the exception of the IC and heritage railways, responses to the questions in the Questionnaire have been averaged to provide a representative cost for an individual Duty Holder (see Table 6.4). The total cost of the RSCR has then been compiled by multiplying the representative Duty Holder costs by the number of Duty Holders and adding IC and HSE costs.

6.3 COSTS

6.3.1 Global Costs

The overall cost of the RSCR to the rail industry is presented in Table 6.1. The figures represent all organisations affected by the RSCR (TOCs, IMCs, the IC, Railway Safety, heritage railways and the HSE). The RSC assessment and audit cost components have been included in the cost data (the first column of Table 6.1), but are also presented alongside. Assessment and audit costs reflect those incurred by the HSE, the IC and Railway Safety and exclude Duty Holder costs (which are considered below).

The cost data is presented according to whether it represents expenditure associated with the RSCR 1994 or RSCR 2000. As discussed in Section 6.1.2, the RSCR 2000 data have been further divided to reflect ongoing costs (i.e. likely expenditure in the absence of RSCR 2000) and ‘extra’ RSCR 2000 costs. ‘Extra’ costs include the RSC submission and acceptance under
RSCR 2000, less any expenditure associated with the three-year review that was due in 2000. The preparatory costs amassed prior to 1994 in relation to defining RSCR scope have been included in the 1994 data.

### Table 6.1 Total cost of RSCR

<table>
<thead>
<tr>
<th>Cost (£m)</th>
<th>Assessment and audit cost component (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994 – 2000 (1994 RSCR)</td>
<td>30.7</td>
</tr>
<tr>
<td>2001 – 2003 (ongoing RSCR costs)</td>
<td>10.8</td>
</tr>
<tr>
<td>(extra 2000 RSCR costs)</td>
<td>10.1</td>
</tr>
<tr>
<td>Total</td>
<td>51.6</td>
</tr>
</tbody>
</table>

#### 6.3.2 Individual Duty Holder Costs

The average cost of the RSCR to a single Duty Holder is presented in Table 6.4. This data excludes cost information associated with heritage operators and the IC as a Duty Holder (i.e. as opposed to the IC’s role in the assessment and audit of other Duty Holders’ RSCs). Heritage and IC Duty Holder costs are presented in Table 6.5 and Table 6.6 respectively. Cost data has been grouped to reflect RSCR processes (e.g. RSC submission or acceptance) rather than the absolute date of expenditure. For example, cost information from all responding Duty Holders relating to the first 1994 RSCR submission of an RSC has been combined and included as expenditure in 1994/5, although the cost may have been accrued in 1995/6. This allows for clarity in understanding the cost associated with the individual requirements of the RSCR and reflects the fact that data are ‘typical’ and from an industry sample.

In summary, by this assessment and the data provided to this study, the RSCR regime has cost a typical Duty Holder approximately £643,000. It should be borne in mind that this is an average figure covering major TOCs, IMCs and FOCs (excluding the IC and heritage operators). The most significant areas of expenditure that contribute to this figure are associated with:

- The development and submission of an RSC
- Gaining acceptance of the RSC
- The three-year review.

The range of costs in these three areas is presented in Table 6.2 and the cost distribution is presented in Table 6.3.

### Table 6.2 Cost of major RSCR activities

<table>
<thead>
<tr>
<th>RSCR</th>
<th>Minimum</th>
<th>Average</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development and submission</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>£15,000</td>
<td>£75,385</td>
<td>£150,000</td>
</tr>
<tr>
<td>2000</td>
<td>£10,000</td>
<td>£83,400</td>
<td>£200,000</td>
</tr>
<tr>
<td>Gaining acceptance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>£2,000</td>
<td>£33,321</td>
<td>£150,000</td>
</tr>
<tr>
<td>2000</td>
<td>£2,000</td>
<td>£39,500</td>
<td>£150,000</td>
</tr>
<tr>
<td>Three year review</td>
<td>£4,000</td>
<td>£43,520</td>
<td>£150,000</td>
</tr>
</tbody>
</table>
The notable range of reported RSC submission and acceptance costs requires consideration; there are three likely explanations:

- Developing and gaining acceptance of an RSC is likely to cost larger Duty Holders more than smaller operators. Evidence indicates that RSC submission cost is positively related to Duty Holder turnover.
- The differing state of Duty Holders existing safety management and RA documentation may require different levels of effort to produce a suitable RSC.
- Variation surrounding respondents’ interpretation of questions in the Questionnaire that request RSCR specific costs.

The differences between reported costs can be explained on this basis.

In relation to the IC, the whole RSCR regime cost £8.1m. The most expensive activities were associated with the first submission (£5m), the three-year review (£0.5m) and the development of the 2000 RSC document (£1m). The remaining expenditure is accounted for by ongoing annual costs (see Table 6.6).

Cost information from heritage operators for submitting and gaining acceptance under the 1994 RSCR was not available from the Questionnaire. This is due to either the lack of availability of early information or the fact that the operator’s first RSC had been accepted under the RSCR 2000.
Table 6.4 Average cost of RSCR to a single Duty Holder (excluding heritage operators and the IC)

<table>
<thead>
<tr>
<th>Year</th>
<th>Submission</th>
<th>Acceptance</th>
<th>Material Revisions</th>
<th>Audit</th>
<th>Three-year review</th>
<th>Ongoing RSCR costs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>£75,385</td>
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<td>£9,013</td>
<td>£4,345</td>
<td>£43,520</td>
<td>£14,719</td>
<td>£148,785</td>
</tr>
<tr>
<td>1995</td>
<td>£83,400</td>
<td>£39,500</td>
<td>£9,013</td>
<td>£4,345</td>
<td>£3,567</td>
<td>£16,089</td>
<td>£72,731</td>
</tr>
<tr>
<td>1996</td>
<td>£148,785</td>
<td>£73,970</td>
<td>£9,013</td>
<td>£4,345</td>
<td>£3,567</td>
<td>£19,341</td>
<td>£73,970</td>
</tr>
<tr>
<td>2001</td>
<td>£168,980</td>
<td>£14,064</td>
<td>£3,567</td>
<td>£4,345</td>
<td>£3,567</td>
<td>£35,002</td>
<td>£250,309</td>
</tr>
<tr>
<td>2002</td>
<td>£42,914</td>
<td>£14,064</td>
<td>£3,567</td>
<td>£4,345</td>
<td>£3,567</td>
<td>£35,002</td>
<td>£250,309</td>
</tr>
<tr>
<td>Total</td>
<td>£136,692</td>
<td>£29,447</td>
<td>£30,817</td>
<td>£76,220</td>
<td>£33,557</td>
<td>£168,980</td>
<td>£642,589</td>
</tr>
</tbody>
</table>

Table 6.5 Average cost of RSCR to an individual heritage operator

<table>
<thead>
<tr>
<th>Year</th>
<th>Submission</th>
<th>Acceptance</th>
<th>Material Revisions</th>
<th>Audit</th>
<th>Three-year review</th>
<th>Ongoing RSCR costs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
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<td>£1,406</td>
<td>£6000</td>
<td>£343</td>
<td>£1,828</td>
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<tr>
<td>1995</td>
<td>No data</td>
<td>No data</td>
<td>£79</td>
<td>£1,406</td>
<td>£6000</td>
<td>£443</td>
<td>£1,928</td>
</tr>
<tr>
<td>1996</td>
<td>No data</td>
<td>No data</td>
<td>£79</td>
<td>£1,406</td>
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<td>£543</td>
<td>£2,028</td>
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<td>1997</td>
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<td>No data</td>
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<td>£1,406</td>
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<tr>
<td>1998</td>
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<td>1999</td>
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<td>No data</td>
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<td>£1,406</td>
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<td>2001</td>
<td>No data</td>
<td>No data</td>
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<td>£1,406</td>
<td>£6000</td>
<td>£1,269</td>
<td>£2,528</td>
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<tr>
<td>2002</td>
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<td>No data</td>
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<td>£6000</td>
<td>£1,369</td>
<td>£2,628</td>
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<tr>
<td>2003</td>
<td>No data</td>
<td>No data</td>
<td>£79</td>
<td>£1,406</td>
<td>£6000</td>
<td>£2,482</td>
<td>£2,828</td>
</tr>
<tr>
<td>Total</td>
<td>£1,828</td>
<td>£1,928</td>
<td>£2,028</td>
<td>£8,178</td>
<td>£2,228</td>
<td>£7,654</td>
<td>£36,060</td>
</tr>
</tbody>
</table>

2003 prices. Bases on cost data supplied by representative range of Duty Holders constituting around 50% of all Duty Holders (see Section 6.3 for further explanation of cost data source and basis).
Table 6.6 Cost of RSCR to Infrastructure Controller

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
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<td>Submission</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Acceptance</td>
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<td></td>
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<td>Revisions</td>
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<td>£75,000</td>
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<td>£75,000</td>
<td>£750,000</td>
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<td>£50,000</td>
<td>£50,000</td>
<td>£50,000</td>
<td>£50,000</td>
<td>£50,000</td>
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<td>Three-year</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Ongoing RSCR costs</td>
<td>£18,270</td>
<td>£18,455</td>
<td>£18,641</td>
<td>£18,830</td>
<td>£19,020</td>
<td>£19,212</td>
<td>£20,406</td>
<td>£20,602</td>
<td>£20,800</td>
<td>£21,000</td>
<td>£195,236</td>
</tr>
<tr>
<td>Total</td>
<td>£5,243,270</td>
<td>£143,455</td>
<td>£143,641</td>
<td>£144,830</td>
<td>£144,020</td>
<td>£144,212</td>
<td>£145,406</td>
<td>£145,602</td>
<td>£145,800</td>
<td>£146,000</td>
<td>£8,095,236</td>
</tr>
</tbody>
</table>

1 Costs exclude the IC’s role as TOC, FOC, IMC and heritage assessor and auditor
To provide further context to the cost data, Table 6.7 presents the average turnover of Duty Holders as recorded by Question 12.1 of the Questionnaire and the average cost of the RSCR. Figures are given for 1994 and 2000 where appropriate demonstrating the percentage of turnover reflected in RSCR costs. There is a similar pattern in the proportion of turnover spent on the RSCR for the different types of Duty Holder.

Table 6.7 Duty Holder turnover and RSCR cost

<table>
<thead>
<tr>
<th>TOC, FOC, IMC</th>
<th>IC</th>
<th>Heritage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual turnover</td>
<td>£125m</td>
<td>£154m</td>
</tr>
<tr>
<td>Annual RSCR cost</td>
<td>£136,692</td>
<td>£168,980</td>
</tr>
<tr>
<td>% cost / turnover</td>
<td>0.10%</td>
<td>0.10%</td>
</tr>
</tbody>
</table>

6.3.3 Comparison with Baseline Health and Safety Costs

The overall cost of the RSCR to industry including all cost components over time is outlined in Figure 6.1. Also included are the answers to Question 6.5 of the Questionnaire that asked about the annual cost of maintaining a HSMS: the answers indicate that this is £14.6m across the industry. The data do not provide details of the change in baseline HSMS costs over the period. The vertical axis of the chart is additive to indicate the extra cost of the RSCR. The peaks associated with 1994 submissions, three-year reviews and 2000 submissions are clearly evident. It should be noted that update of the Duty Holder’s HSMS coinciding with these peaks is solely attributable to the RSCR. This is illustrated in the responses to Question 6.1D of the Questionnaire which identified that 12 Duty Holders reported that the Management of Health and Safety at Work Regulations (MHSWR) had not changed their HSMS and six indicated that only minor changes were required over the period under consideration. (The remaining respondents did not / could not answer).

Figure 6.1 Cost of RSCR in addition to ongoing HSMS costs
6.4 MONETARY BENEFITS

6.4.1 Assumptions for Benefit Evaluation and Value of Prevented Fatality

The financial benefits of the RSCR have been measured in terms of the reduction in rail accident risk that can be attributed to the Regulations. There are several indicators of risk that have been selected for this evaluation. Common to all is the conversion of risk data into a monetary figure that represents the ‘Value of Prevented Fatality’ (VPF). This enables meaningful comparisons between costs and benefits to be made. The railway industry typically uses two values, one from the Department for Transport (DfT) and the other sometimes used by the industry to help guide decision-making. The DfT figure is based on a formula that calculates the cost of a road fatality and it currently stands at £1.30m. The industry figure, which currently stands at £3.64 million, is used if: the impact may produce an adverse response from society; or large numbers of people may be killed at one time; or when potential victims are particularly vulnerable; or the potential of the risk inspires dread.

The benefits attributable to the RSCR have been compared with the appropriate counterfactuals (see Sections 2.4 and 6.1.2).

6.4.2 Outcome Measures

The impact of preventative hardware control measures such as a Train Protection and Warning System (TPWS) that are focussed on addressing specific accident precursors (e.g. SPADS) have measurable outcomes (e.g. the number of SPADS prevented by TPWS). There is no such equivalent outcome measure for the RSCR as its purpose is associated with improvements in the management of risk and is intended to enhance safety as reflected in the IOs. The ‘value for money’ aspects of individual IOs are discussed Section 6.10. However, given the intended wide-ranging impact of the RSCR, a reduction in ‘headline’ or global indicators of rail risk is to be expected. In addition, it is reasonable to presume that the RSCR should have reduced the level of catastrophic risk. The following sections consider such outcome measures by examining the impact of the RSCR in relation to the following:

- The total number of Accident Equivalent Fatalities (AEFs), from 1994/5 to 2002/3.
- The number of AEFs, under the direct control (see Section 6.6) of the Railway Group, from 1994/5 to 2002/3.
- The number of fatalities associated with significant train incidents, drawing on data between 1985 – 2002.
- The ratio of accident cost and RSCR cost.
- Costs and benefits associated with alternative measures of improving rail safety.

6.4.3 Accident Equivalent Fatalities and Annual Accident Cost

In a number of the outcome measures outlined above, Accident Equivalent Fatalities (AEFs) are adopted and used to calculate the annual accident cost. AEF data is reported in the RSSB Annual Safety Performance Report 2002/03(19) as a ‘headline’ indicator of rail safety. It incorporates the number of injuries and fatal accidents occurring to people on the railway to produce an annual estimate of risk. This is calculated on the basis that ten major injuries or 200 minor injuries are equivalent to one fatality. The data presented in the RSSB report indicates an
overall reduction in AEF frequency over the period of the RSCR. The annual cost of accidents has been calculated from the formula:

\[
\text{Annual accident cost (£) = AEF} \times \text{MTM} \times \text{VPF}
\]

where MTM = Million Train Miles and VPF has been taken as £1.3m, see Section 6.4.1. The DfT figure is considered more appropriate for ‘equivalent’ fatalities since it does not include cost of societal risk (i.e. risk aversion) which is associated with a major accident involving multiple fatalities.

6.4.4 Influence of RSCR on Accident Prevention

Improvements in rail safety evident from headline indicators can be attributed to a number of causes, some of which have more impact than others. If the total improvement in safety is taken to be 100%, then all contributory influences must also add up to 100%. Isolating the percentage contribution of the RSCR from other ‘confounding’ influences is a difficult but necessary exercise. Question 1.1 of the Questionnaire asked respondents to rate the impact of a number of influences on safety. Based on discussion with industry stakeholders at the Workshop, the other principal safety influences were identified in addition to the RSCR 1994 and 2000. The other principal influences were:

- Railway Group Standards
- Other regulations (e.g. Railways (Safety Critical Work) Regulations, Management of Health and Safety at Work Regulations etc.)
- Changes arising from accident inquiries (e.g. TPWS)
- Current litigious environment (i.e. legal fees and time / money spent by Duty Holders on accident claims)
- Other significant influences (for Duty Holder respondents to specify).

The ‘other significant influence’ option (last item above) presented in the question was included to cater for influences considered by respondents to be significant beyond those suggested so that all influences would be included. Responses to Question 1.1 of the Questionnaire were recorded on the 5-point Likert scale (from ‘no influence’ through ‘moderate’ to ‘major influence’) to which values of 0 to 4 were assigned.

Ratings given by respondents for each influence (i.e. RSCR 1994) were then averaged across respondents and the relative contribution of the influences was assessed on a percentage basis.

Careful consideration was given to the ‘other significant influence’ option since there were only four respondents. The mean value from these was 2.75 (on the 0 – 4 scale), although this reduced to 0.5 when aggregated with the views of the majority for whom there were no ‘other’ major influences identified beyond the five listed. On this basis, 17.8% of improvements appear to be attributable to the RSCR 1994, increasing to 18.3% for the RSCR 2000. These proportions are presented in Figure 6.2.
The independence of the options listed in Question 1.1 requires consideration. Some are mechanisms which act through others (e.g. accident inquiries may lead to new regulations). Also, within the overall HSMS, each component interacts with the others (e.g. the HSMS in the RSCs draws on ‘other regulations’ and Group Standards). Therefore the boundaries between these influences are blurred and the allocation of a percentage improvement offered by the RSCR can only be an indicative measure. However, whilst these factors may not be separable, it is reasonable to argue that, despite the fact that the RSCR’s success depends partly on ‘other regulations’, the RSCR also strengthen other influences. For example, Group Standards now have a quasi-legal status which is largely attributable to the RSCR 2000. Indeed, whilst the lack of independence of these influences is challenging from the point of view of an evaluation, the interrelationship between them, from a rail safety perspective, is advantageous. Furthermore, the few answers that were received in relation to the ‘other’ option may reflect the ‘fullness’ of the options presented (i.e. RSCR, Group Standards, Other Regulations, Accident Inquiries and Litigious Environment) that were highlighted during the Stakeholder Workshop.

It is recognised that the contribution figures of 17.8% for RSCR 1994 and 18.3% for RSCR 2000 are not definitive or absolute. For example, if it were assumed that the ‘other’ factors identified by four respondents would also have been acknowledged similarly by all respondents if presented with the identified influence, then the relative contributions of the 1994 and 2000 RSCR reduce to 14.8% and 16.5% respectively. Whilst the initial figures are perhaps more ‘accurate’, it is these lower, more conservative estimates that have been adopted in the evaluation. Maintaining that 85% of safety improvements are due to other factors beyond the RSCR presents an arguably conservative estimate of RSCR impact. If the RSCR can be shown to be ‘value for money’ on such grounds, greater certainty can then be placed on the conclusions.

It is also significant that the estimate of the benefits of the RSCR is based on the assessment of Duty Holders themselves and their synthesis of the confounding factors. Despite the apparently even distribution between the principal factors shown in Figure 6.2, individual respondents ranged the contribution from 8% to 27% for the RSCR 1994 and 9% to 33% for RSCR 2000. In this context it can be seen that adopting aggregated estimates of 14.8% and 16.5% is reasonable. As discussed in Section 6.8, no previous attempt has been made in Regulatory Impact Assessments to isolate the role of the RSCR in achieving improvements in rail safety from the other complex interactions of confounding influences.
6.5 PREVENTED AEFs ATTRIBUTABLE TO RSCR

The RSSB distinguishes between accidents that the Railway Group considers it has ‘direct’ control over and those that are caused by other (deliberate) factors such as trespass and vandalism. Both datasets exclude suicides. This section considers ‘all-accident’ AEFs (i.e. both direct plus indirect factors). The data relates to operations on Railtrack / Network Rail controlled infrastructure and have been used, in its original form, to examine what contribution the RSCR has made to this improvement.

6.5.1 1994 – 2000

In keeping with the previous discussion of the counterfactuals in Section 6.1.2, the baseline (counterfactual) for this indicator is the number of AEFs that occurred in 1994/5; this was 0.64 AEFs per Million Train Miles (MTM) – see Figure 6.3. This indicator relates to the ‘Ultimate Objective’ of the RSCR which was to ensure that safety should not deteriorate at privatisation (see Section 6.1). Any subsequent improvement occurring between 1994 and 2000 has been judged against this figure using the formula:

\[
\text{Benefit (£)} = \frac{\text{Improvement Factor (Regression Line)}}{\text{MTM (1994 - 2000)}} \times \text{VPF (£1.30m)}
\]

The Regression Line (see Section 6.7) has been developed from RSSB statistics and reflects the overall improvement in AEFs. The MTM is a variable, and annual figures have been used to calculate benefits. The selected VPF is the current (2003) DfT value which has been used for the following reasons:

- The criteria for the application of the higher £3.64m per fatality figure (Section 6.4.1) does not apply to minor and major injuries which are included in the AEF data.

- Since the £1.30m figure is lower than the £3.64m industry value, it means that the calculated value of the benefits offered by the RSCR is less and provides a more conservative indication of the value of the RSCR. Hence, if ‘value for money’ can be demonstrated using the DfT figure, it will obviously be evident if the industry figure was applied.

The above formula assumes that the VPF figure can be used not just in terms of actual fatalities, but also AEFs (i.e. also for injuries). Analysis indicates that the total value of prevented AEFs for the period between 1994 and 2000 was £200m. To attribute a proportion to the RSCR, the 14.8% contribution based on responses to Question 1.1 has been used (see Section 6.4.4), resulting in 23 prevented AEFs worth £29.9m. This can be contrasted against the RSCR costs for the same period of £30.7m (Section 6.3.1). Thus, the RSCR costs are similar to benefits and so both evaluation criteria (i.e. costs equate with benefits as well as costs not being in gross disproportion to benefits) can be deemed to have been achieved. Figure 6.3 presents the number of AEFs prevented by the RSCR, per MTM.

The counterfactual used above assumed the AEFs in 1994/5 as the baseline (see Figure 6.3). However, a sensitivity analysis has also been conducted to identify how robust the conclusions are (Section 6.6.1).
6.5.2 2000 – 2003

The number of AEFs prevented by the enhancements made in the RSCR 2000 is considered here. The baseline for this analysis is the continuation of the Regression Line under the 1994 regime. Since the 2000 RSCR came into operation in late 2000, the starting point has been taken to be 2000/01 (see Figure 6.4).
Against this counterfactual, the analysis indicates that, between 2000 and 2003, the overall value of prevented AEFs was £37 million (Section 6.3.1). The RSCR contribution to this was £6m (based on the 16.5% allocated to the RSCR 2000). From Table 6.1 the cost of the RSCR 2000 (i.e. excluding RSCR 1994) over this period was £10.1m. The cost in this instance appears to exceed the benefits by £4m. However, the issue of a ‘lag effect’ is significant in this scenario since the RSCR costs are up-front and benefits (in terms of accident statistics) are potentially realised in subsequent years. In isolation, the 2000 – 2003 period is too short to evaluate costs and benefits and hence the overall costs and benefits from 1994 to date are considered below in Section 6.5.3.

### 6.5.3 Overall Permissioning Regime

Figure 6.4 combines the RSCR 2000 regime data with the RSCR 1994 regime data from Figure 6.3. It includes the number of AEFs prevented by RSCR 1994 and 2000, but excludes the ongoing contribution of RSCR 1994 during the 2000 to 2003 period. However, the true effectiveness of the overall RSCR regime from 1994 to 2003 includes the ongoing benefits offered by RSCR 1994 in the period between 2000 and 2003, in addition to any supplementary benefits offered by amendments made in 2000 and 2001. The overall improvement in railway safety over the period is presented in Figure 6.5 which highlights the portion of AEFs prevented by the RSCR between 1994 and 2003. The benefits of the RSCR have been attributed over the two regimes in accordance with Section 6.4.4. Over the total period, analysis indicates that the RSCR has saved 65 AEFs with a value of £84.7m. Contrasted against the overall cost of the RSCR of £51.6m (see Table 6.1) this indicates that, for every £1 spent on the RSCR, £1.64 worth of benefit has been achieved.

![Graph](image-url)
6.6 ‘DIRECT’ PREVENTED AEFs ATTRIBUTABLE TO RSCR

The RSSB produce a set of safety performance statistics, as identified above, that reflect ‘only those hazards judged to be under the direct control of the railway’\(^{(19)}\) which excludes malicious acts such as trespass and vandalism. The RSSB data indicate that this measure of railway safety has also seen an overall improvement between 1994 and 2003. The data selected to contribute to the evaluation has been treated in an identical manner to the all-accident data discussed in Section 6.5. Table 6.8 combines the analysis of both direct and all-accident data for RSCR prevented AEFs. It indicates that the indirect accident AEFs constitute a significant part of the all-accident figures. However, the evidence indicates that, for both direct and all-accident AEFs, the benefits of the RSCR regime as a whole outweigh the associated costs. Figure 6.6 presents the contribution that the RSCR makes to direct AEF prevention between 1994 and 2000, and the supplementary benefits offered by RSCR 2000.

![Figure 6.6](image-url)  

**Figure 6.6** The number of direct AEFs/MTM prevented by RSCR 1994 and 2000, outwith ongoing contributions from RSCR 1994.
Table 6.8  Direct and all accident RSCR prevented AEFs (1994 to 2003)

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<td>1994 RSCR</td>
<td>2000 RSCR only</td>
<td>Total RSCR *</td>
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</tr>
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<tr>
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<td>£10.1m</td>
<td>£51.6m</td>
<td>£30.7m</td>
<td>£10.1m</td>
<td>£51.6m</td>
</tr>
<tr>
<td>Benefit</td>
<td>£29.9m</td>
<td>£6.0m</td>
<td>£84.7m</td>
<td>£5.5m</td>
<td>£1.3</td>
<td>£52.9m</td>
</tr>
<tr>
<td>Prevented AEFs</td>
<td>23</td>
<td>4.6</td>
<td>65.2</td>
<td>4.3</td>
<td>1</td>
<td>40.7</td>
</tr>
</tbody>
</table>

* Note: the total figures are for the permissioning regime between 1994 and 2003, and are **not** the summation of the two preceding columns (see Section 6.5.3).
Figure 6.7 indicates the overall role of the RSCR over the period between 1994 and 2003 in relation to directly controlled accidents. The pattern mirrors that of the all-accident AEFs, with an overall improvement in AEFs and increasing RSCR importance over the 2000 to 2003 period.

6.6.1 Sensitivity Analyses

In Section 6.5.3, it was suggested that the RSCR offered a benefit value of £84.7m at a cost of £51.6m. Owing to the inherent uncertainties associated with the cost and benefit data that were recognised in Sections 6.1 and 6.4.4, the following considers the extent to which the assumed safety improvements could be reduced for costs to exceed benefits. Analysis indicates that the observed improvements in safety would have to reduce by 40% for the cost of the RSCR to equate to the benefits it offers (Figure 6.8). Therefore, the value benefits would have to reduce by a substantial amount for the costs to be in gross disproportion to the benefits. Recognising the limitations of the current data, there would have to be a considerable amount of error in cost and benefit data to challenge the conclusion that the RSCR represents ‘value for money’.
6.6.2 Summary

In summary, these analyses indicate that the costs and benefits of the RSCR between 1994 and 2000 ‘broke even’ for all-accident AEFs, whilst costs exceeded benefits for direct AEFs. The costs attributable to amendments offered by the RSCR 2000 have not yet been associated with notable net benefits for both direct and all-accident AEFs, but the ongoing contribution of the RSCR 1994 throughout the 2000 to 2003 period ensures that the RSCR regime, as a whole, represents ‘value for money’.

The findings highlight an obvious time lag between expenditure and the realisation of RSCR benefits. Specifically, the main costs associated with the RSCR are incurred with the compilation and acceptance of the Railway Safety Case (RSC) document. Whilst the process itself is beneficial, the financial value of benefits is likely to exceed costs only when the RSC is used on a continual basis and risk control measures have had time to make an impact. For this reason, the utility of the RSCR 2000 may still be realised (especially since some Duty Holders are still to have their 2000 RSCs accepted). This underpins the value of creating a usable document and ensuring its ongoing effective application.

6.7 PREVENTED FATALITIES ASSOCIATED WITH SIGNIFICANT TRAIN INCIDENTS

The concept of a Safety Case as applied to other industries (e.g. offshore) under permissioning regimes emphasises the control of major hazards and catastrophic risk as opposed to occupational risk that is common to many organisations\(^{(21)}\). Focussing on catastrophic risk is not explicit in the RSCR, though the scope for catastrophic accidents in the rail industry is
present and has also been the subject of recent HSE discussions (e.g. internal documentation entitled ‘Risk Assessment: Developments and Review: RADAR’).

The annual HSE publication ‘Railway Safety’\(^{(19)}\) includes a wide range of accident data. To give an indication of catastrophic risk, the number of significant train incidents between 1991 and 2002 (the most recent available report) has been taken from this source of information. In addition, the number of fatalities arising from train incidents in the period leading up to privatisation is included (1985/86 – 1993/94). The VPF figure used in Section 6.5 has been replaced here with the higher industry figure of £3.64m that is associated with catastrophic risk. The purpose is to identify the number and value of lives saved during the period of the RSCR. The contribution of the RSCR is then considered. To identify the cost of such accidents, the following has been applied:

\[
\text{Value of fatalities} = \text{Average number of fatalities per significant train incident} \times \text{Predicted number of significant train incidents} \times \text{Average MTM} \times \text{VPF (£3.64m)}
\]

\(1\) Average number of fatalities per significant train incident = \(\frac{\text{Annual (average) number of fatalities from train incidents 1985/86 - 1993/94}}{\text{Annual (average) number of significant train incidents}}\) = \(\frac{11.5}{150.9} = 0.08\)

\(2\) Annual (average) number of significant train incidents = \(\frac{\text{Average number of significant train incidents per annum 1991/92 - 1993/94}}{\text{Average MTM 1994/95 - 2001/02}}\) = \(0.44 \times 343 = 150.9\)

The above formula calculates the cost of fatalities during the RSCR regime period from the product of the average number of fatalities per significant train incident (0.08) and the predicted number of significant train incidents between 1994/95 and 2001/02. [The selection of the predicted number of significant train incidents is discussed below.] The average number of fatalities per significant train incident has been calculated using the number of fatalities resulting from train incidents between 1985/86 and 1993/94. This period has been selected to take into account low frequency – high consequence accidents (e.g. Clapham) and to obtain an impression of accident fatalities prior to the introduction of the RSCR (i.e. the identification of a pattern that could have continued in the absence of the RSCR). The annual number of significant train incidents (150.9) has been calculated from the average number of incidents between 1991/92 and 1993/94. This period has been selected to represent accident frequency pre RSCR.

The formula has been applied to three different scenarios (see Figure 6.9):

- The number of significant train incidents between 1991/92 and 1993/94 has been used to establish a trend (regression line) for the subsequent period between 1994 and 2002. This represents the counterfactual of ‘no RSCR’. If this scenario had occurred, it would represent an accident cost of £442m.

- A similar scenario where the 1994/5 level of train incidents is maintained through the 1994 – 2002 period would represent an accident cost of £382m.
The observed (i.e. actual) number of incidents and fatalities between 1994 and 2002. Application of the formula indicates that this profile has an associated accident cost of £320m.

As identified above, the most recent available HSE report covering the necessary data is for 2001/02. It is unlikely that the effects of the 2000 RSCR would influence this profile (given that few RSCs had been accepted under the 2000 RSCR by 2001/02). For this reason, the impact of the 2000 RSCR on this indicator has not been isolated from the effects of the 1994 RSCR. The train incident profile and the number of fatalities and associated costs for the scenarios are presented in Figure 6.9.

![Figure 6.9 Significant train incidents and cost of fatalities](image)

The ‘actual’ profile in Figure 6.9 indicates that there has been a reduction in the occurrence of significant train incidents since 1994/95. The value of the benefit can be observed from the difference between predicted and actual costs. The contribution of the RSCR is based on the argument in Section 6.4.4. Whilst it is recognised that the question in the Questionnaire used to develop the argument does not ask specifically about the contribution of the RSCR to the frequency of significant train incidents, maintaining that 85% of the improvements are due to other influences rather than the RSCR seems to be reasonable as many of the alternative influences had a major accident focus (e.g. TPWS, see Section 6.4.4). Table 6.9 indicates the value of lives saved by the RSCR for the three scenarios. Based on the analysis and choice of the ‘worst case’ counterfactual, the RSCR has ‘saved’ five lives by either preventing the number of significant train incidents and / or mitigating their consequences. For all scenarios the costs are higher than the benefits.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>RSCR cost</th>
<th>Value 1994 RSCR (predicted profile)</th>
<th>Value 1994 RSCR (maintained profile)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994 RSCR (1994 – 2002)</td>
<td>£48.9m</td>
<td>£18.7m (5.14) *</td>
<td>£9.3m (2.58) *</td>
</tr>
</tbody>
</table>

*In brackets are the number of RSCR ‘saved’ lives*
This assessment has included all RSCR costs in the comparison with the value of train incident fatalities, and the ratio of benefits to costs is lower than the assessment in Section 6.5.3. This is to be expected since the RSC covers all risk types. If the RSCR were to concentrate on major hazard safety, it may be expected to have a greater impact on major hazard risk than the 14.8% figure adopted in this evaluation. Similarly, the cost of the RSCR may reduce if only major hazards were considered (and high frequency / low consequence accidents were purely controlled by industry practice, for example through Group Standards). The data in Table 6.9 indicates that the cost of the RSCR would have to reduce by 38% for costs to equate with benefits, or the impact of the RSCR to increase significantly from 14.8% to 40% (or a combination of the two).

6.8 THE RATIO OF ACCIDENT AND RSCR COST

In 1993, the HSE produced a Regulatory Impact Assessment (RIA) document for the RSCR. The cost-benefit assessment section predicted a cost of the RSCR to 1998 of £10.8m (at 1993 rates); the cost of accidents for the same period was expected to be £1.5bn. The authors assumed that the RSCR ‘would only have to prevent a very small deterioration in safety performance for costs to be less than benefits.’ A second RIA was carried out in 2000 to outline the anticipated impact of the amendments to the existing RSCR 1994 (i.e. the RSCR 2000).

This section assesses the validity of these two RIAs in the context of the assumptions made at the time on accident reduction and presents anticipated RSCR costs (i.e. from the RIAs) with current measured RSCR costs (see Section 6.3), and compares these to accident costs.

For consistency, in comparisons between the present evaluation and the RIA, the ‘actual’ costs of the RSCR have been determined for the period under review (e.g. the five-year duration considered in the first RIA).

6.8.1 RIA 1993

Table 6.10 presents a comparison of the anticipated and measured costs and benefits of the RSCR between 1994 and 1998. The key observations from this data are:

- The cost of accidents anticipated by the HSE in 1993 (£1.5bn) was in excess of that calculated from the RSSB AEF data (£1.14bn) by £360m.
- The cost of the RSCR was underestimated as the cost for the five-year period detailed in this study was £27.9m, compared to the estimated £10.8m.

Therefore, rather than the RSCR having to prevent a reduction in accident cost of less than 1% (as implied in the RIA), a reduction of 2.4% would be required to ‘break even’. This could not be achieved as:

- Accident cost actually increased by 2.2% for the first five years of the RSCR regime. [Thus the RSCR and other measures were not effective during this period in terms of the ‘Ultimate Objective’ of at least maintaining safety standards.]
- The reduction in accident cost would need to have been at least 16% to ‘break even’ if the other confounding risk reduction influences are taken into account and an RSCR contribution of just 14.8% (Section 6.4) is assumed.
6.8.2 RIA 2000

In 2000, the HSE published a second RIA outlining the anticipated impact of the amendments to the existing RSCR 1994 (i.e. the RSCR 2000) for the period between 2000 and 2009. The cost and benefit aspects of the document identified that:

- Based on the target in the Railway Group Safety Plan (RGSP) 2000/01, a 50% reduction in accidents between 2000 and 2009 would occur.
- The RSCR was expected to cost industry between £24m and £37m.

By using the AEF accident cost, RSCR 2000 costs and the costs associated with maintaining the RSCR, it is possible to project the likely position in 2009. The information is presented in Table 6.11. The major comparisons to be made are that:

- There appears to be reasonable agreement as to the cost of accidents over the period (£1.72bn estimated in HSE’s RIA and £1.88bn predicted based on the data from the present evaluation)
- The costs associated with the RSCR are similar; HSE’s larger estimate of £37m is marginally less than the projected cost of £40.2m.

The £40.2m figure is based on actual data from 2000 to 2003 (i.e. £20.1m plus six years of ongoing uninterrupted costs, based on data from previous years which includes scope for two three-year reviews). Neither the estimates from HSE nor the predictions of the present evaluation take account of the costs associated with the 2003 and intended 2005 RSCR amendments.

In relation to the benefits estimated by HSE and those projected by the present evaluation, the following observations can be made:

- Based on HSE’s estimates, the RSCR 2000 will have to stimulate a reduction of between 1.4% and 2.15% in accident cost to ‘break even’. This coincides with the predictions based on previous experience that suggest a reduction of 2.09% is required.
- Rather than the 50% reduction in accidents used by HSE (based on RGSP 2000/01) giving a saving of £860m, an overall reduction of 5.6% in accident frequency is to be expected based on data gathered in the study worth £105m. The RSCR would have to account for approximately 40% of this cost for it to equal the benefits (as opposed to the 16.5% contribution attributed to the RSCR in Section 6.4.4).

6.8.3 RIA Approach

The original 1993 RIA appears to have underestimated the actual cost of the RSCR. Inspection of the differences shows these to be partly due to underestimating the cost to the IC of preparing and obtaining acceptance of an RSC by a factor of approximately 13.

The RIA approach to the identification of RSCR benefits has a number of weaknesses. There is no attempt to use rail accident risk statistics to identify actual benefits. The RGSP accident reduction target of 50% is an aspiration in the railway industry and is not appropriate for use as a valid predictor of actual risk in the future. Equally, there appears to be no reason why an equivalent target was not set by HSE for the RSCR.
Table 6.10  Comparison of anticipated and measured RSCR costs in comparison with accident cost (1994 –1998)

<table>
<thead>
<tr>
<th></th>
<th>Cost of RSCR (£m)</th>
<th>Cost of accidents (£m)</th>
<th>Reduction required to equate to RSCR costs</th>
<th>Overall change (RSSB data) in accident cost</th>
<th>Total accident cost increase over period (based on AEFs) (£m)</th>
<th>Factored value of AEF for RSCR contribution (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994 – 1998 BOMEL ‘actual’</td>
<td>27.9</td>
<td>1,140</td>
<td>2.44%</td>
<td>-2.19%</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>1994 – 1998 HSE’s RIA estimates</td>
<td>10.8</td>
<td>1,500</td>
<td>0.72%</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Table 6.11  Comparison of anticipated and measured RSCR costs in comparison with accident cost (2000 – 2009)

<table>
<thead>
<tr>
<th></th>
<th>Cost of RSCR (£m)</th>
<th>Cost of accidents (£m)</th>
<th>Reduction required to equate to RSCR costs</th>
<th>Overall change saving over period (actual data based on prevented AEFs) (£m)</th>
<th>Total accident cost saving over period (based on AEFs) (£m)</th>
<th>Factored value of AEF for RSCR contribution (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 – 2003 BOMEL ‘actual’</td>
<td>20.1</td>
<td>626</td>
<td>3.3%</td>
<td>5.6%</td>
<td>35</td>
<td>5.7</td>
</tr>
<tr>
<td>2000 – 2009 BOMEL predictions(^2)</td>
<td>40.2</td>
<td>1,880</td>
<td>2.1%</td>
<td>5.6%</td>
<td>105</td>
<td>17</td>
</tr>
<tr>
<td>2000 – 2009 HSE’s RIA estimates</td>
<td>24.0 - 37.0</td>
<td>1,720</td>
<td>1.40% - 2.15%</td>
<td>50%(^3)</td>
<td>860</td>
<td>140</td>
</tr>
</tbody>
</table>

\(^1\) Based on responses to Question 1.1 in the Questionnaire

\(^2\) Based on 2000 – 2003 accident data and ongoing RSCR costs

\(^3\) From HSE’s 2000 RIA and RGSP 2000/01
6.9 ALTERNATIVE APPROACHES TO ENHANCE RAIL SAFETY

The application of cost and benefit evaluation techniques to assess the utility of risk reduction methods has been applied to help guide safety decisions in the rail industry. By way of illustration and for comparison of the RSCR figures, Table 6.12 provides information concerning the costs and benefits of the Train Protection and Warning System (TPWS) (both the original anticipated cost and the current position), the European Rail Traffic Management System (ERTMS) and the RSCR (Section 6.5).

The anticipated cost of TPWS has been calculated from the original HSC estimations; there was however disagreement at the time as to the expected benefits, with some calculations as low as £36m. The higher value of £245m (reflecting 30 years of operation) has been included. In addition, this volume has been factored to reflect nine years of operation to compare with the RSCR. The current TPWS costs are also included whilst the benefit value has been calculated from the SRM Risk Profile Bulletin (Issue 3)\(^{(23)}\) which makes a distinction between lives saved with TPWS and without TPWS.

ERTMS is a high technology train control system which also provides Automatic Train Protection (ATP). The investment associated with ERTMS is substantial. The safety benefits offered, according to the report by the ERTMS Programme Team (EPT), are predominantly associated with a reduction in road accidents attributable to ERTMS via its ability to increase rail passenger capacity, and hence reduce the use of (more dangerous) roads. However, a review of this evidence conducted for the HSE indicates that the numbers of lives saved via the transfer from road to rail has been seriously over-estimated\(^{(22)}\).

Table 6.12 indicates that investment to fulfil the requirements of the RSCR appears to represent a cost effective risk control measure (i.e. value of costs compared with benefits) in comparison with hardware methods. However, given the likely changes associated with the RSCR, whether or not the value of RSCR benefits over a longer time period (e.g. 30 years) will be comparable with hardware methods remains unknown. Despite attempts, no similar cost data could be identified for the implementation and maintenance of Group Standards.

<table>
<thead>
<tr>
<th></th>
<th>RSCR prevention of AEF (all-accident data)</th>
<th>RSCR prevention of significant train incidents</th>
<th>TPWS Anticipated (1999)</th>
<th>TPWS Currently</th>
<th>ERTMS Anticipated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>£51.6m</td>
<td>£51.6m</td>
<td>£101m</td>
<td>£310m</td>
<td>£3.6bn</td>
</tr>
<tr>
<td>9 – year benefit</td>
<td>£84.7m</td>
<td>£29m</td>
<td>£69.3m</td>
<td>£85.2m</td>
<td></td>
</tr>
<tr>
<td>30 – year benefit</td>
<td>-</td>
<td>£245m</td>
<td>£284m</td>
<td></td>
<td>£603m(^{1})</td>
</tr>
</tbody>
</table>

\(^{1}\) Includes maximum anticipated 450 prevented road user fatalities (VPF = £1.3m)

6.10 COST AND BENEFITS FOR INTERMEDIATE OBJECTIVES

The effectiveness of individual ‘Intermediate Objectives’ (IOs) underpins the overall utility of the RSCR. The benefits as presented in this section are not examined in terms of, for example, the value of prevented AEFs. There are clearly inter-relationships between the effectiveness of IOs and, as such, the success of one depends on the presence of another and so it is difficult to apportion a financial benefit categorically. Benefits are identified in terms of how effective the IO would appear to be in reducing risk.

The IOs were developed to help identify whether the RSCR has ‘caused’ a reduction in accident risk. Sections 8 to 13 consider the effectiveness of the RSCR to stimulate, encourage and
improve the presence / fulfilment of individual IOs. This section uses the Influence Network (IN) to identify how and where the IOs have contributed to risk reduction.

### 6.10.1 Cost of IOs

The costs associated with each IO have been calculated and are presented in Table 6.13. All costs that contribute to Table 6.13 have been included in the overall costs as presented in Section 6.3. No additional costs have been included here. The IO cost information does not include the assessment and audit costs of the RSCR as it is not possible to determine accurately how much time was spent, for example, assessing Risk Assessment (RA) or auditing the Health and Safety Management System (HSMS). However, it seems reasonable that assessment and audit costs are more likely to be associated with RA and HSMS, rather than enhancing industry cooperation and promoting continuous improvement (IO3 and IO4 respectively). The costs of each IO have been calculated from the following components:

- **IO1 RA.** The overall cost to industry to develop and submit an RSC has been divided according to Question 2.7 in the Questionnaire. The question asked respondents to indicate what percentage of the total time spent in the production of the RSC was allocated to RA. In 1994 this was 28%, an average which increased to 36% in 2000. This excludes ongoing RA costs and those associated with Material Revisions. (Section 8.3 examines how frequently RA is used in Material Revisions).

- **IO2 HSMS.** This cost has been derived using the same method as for RA. Question 2.7 identified that in 1994 Duty Holders typically dedicated nearly half (47%) of the time preparing an RSC to the HSMS. This subsequently reduced to 30% for the RSCR 2000.

- **IO3 Co-operation.** The cost of Duty Holder cooperation attributed to the RSCR has been calculated from the level of Parent Company involvement and the frequency of safety meetings between companies (e.g. TOC to TOC) that are due to the RSCR. For Parent Company involvement, Question 5.3A asked how many staff days were spent, per annum, on health and safety meetings between the Parent Company and Duty Holder. The RSCR contribution to this cost was judged to be 10% following answers to Question 5.3Bb.

  The cost of attending meetings between companies was assessed with answers to Question 5.4B; a nominal 10% has been allocated to the RSCR.

- **IO4 Change Management and Continual Improvement.** The cost of this IO has been determined from the average level of expenditure associated with the level of training required to increase awareness of RSC provisions (Question 8.1G) and the costs associated with Material Revision submissions (Question 2.9).

- **IO5 Audit.** The overall cost of audit to Duty Holders requested in Question 3.3 has been included here.

- **IO6 Inspection and Enforcement.** The additional cost of the RSCR to the inspection and enforcement process cannot be identified from the information provided by the HSE. HSE costs included in Section 6.3 incorporate all HMRI inspector activities that are associated with the RSCR, and so it is not possible to isolate enforcement costs.
These costs have been identified to help make informed judgements concerning the relative value of associated IO benefits.

<table>
<thead>
<tr>
<th>IO1</th>
<th>IO2</th>
<th>IO3</th>
<th>IO4</th>
<th>IO5</th>
<th>IO6</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA</td>
<td>HSMS</td>
<td>Co-operation</td>
<td>Continuous Improvement</td>
<td>Audit</td>
<td>Enforcement</td>
</tr>
<tr>
<td>1994 - 1999</td>
<td>£2.3m</td>
<td>£3.7m</td>
<td>£1.7m</td>
<td>£3.2m</td>
<td>£1.6m</td>
</tr>
<tr>
<td>2000 - 2003</td>
<td>£1.8m</td>
<td>£1.6m</td>
<td>£1.4m</td>
<td>£1.9m</td>
<td>£1.0m</td>
</tr>
<tr>
<td>Total</td>
<td>£4.1m</td>
<td>£5.3m</td>
<td>£3.1m</td>
<td>£5.1m</td>
<td>£2.7m</td>
</tr>
</tbody>
</table>

The costs presented in Table 6.13 are higher in the 1994 RSCR regime – this is to be expected since it covers six years of operations and RSCR 2000 covered only three at the time of this review. To identify relative differences, Figure 6.10 highlights the proportional change in IO expenditure between the RSCR 1994 (1994 – 1999) and RCSR 2000 (2000 – 2003).

The data indicates that expenditure associated with IO1 (RA) has increased between the two regimes. This may be due to a move from qualitative based RA to more quantitative assessments following the introduction of the Safety Risk Model (SRM). Entwined with this also is the use of consultants to facilitate quantitative RA.

The most expensive IO was IO2 (HSMS) representing a cost to Duty Holders of £5.3m. This cost is predominantly associated with the development of RSC documentation and indicates
both the extent to which the previous pre-privatisation HSMSs required updating to meet RSCR requirements and the set-up costs for new players. The relative reduction in HSMS expenditure, evident in Figure 6.10, indicates that once the HSMS is established, it required less expenditure to meet RSCR 2000 requirements.

In relation to IO3, the costs associated with Duty Holder Co-operation have experienced a relative increase. This can be explained by a combination of Parent Company involvement in individual Duty Holder operations and also by the view, expressed at the Stakeholder Workshop, that following privatisation some Duty Holders operated a divisive ‘silo’ approach. However, in recent years, this had turned around when it became apparent that Duty Holder co-operation was necessary and effective.

A relatively stable pattern of expenditure on IO4 (Continuous Improvement and Change Management) is evident. However, the RSCR cost associated with Material Revisions contributes to this figure and the information from the Questionnaire indicates that fewer Material Revisions have been assessed in 2000 to 2003 and thus a reduction in Material Revision cost has occurred. The increased expenditure required to meet the requirements of the Development Plan and increasing RSC training costs offset reductions associated with Material Revisions and ensures that the cost of IO4 remains stable over the period.

Duty Holder expenditure in relation to IO5 (Audit) has remained unchanged in the 2000 to 2003 period from the levels observed between 1994 and 1999. This provides a useful benchmark to examine the costs of the future competent body audit.

6.10.2 IOs and Frontline Benefits

Duty Holder impressions of the ways in which the RSCR have led to improvements in various components of safety management were examined in Question 1.2 of the Questionnaire (see Figure 6.11). The components that were presented resembled the IOs. An additional item, ‘supply chain management’ was identified as an additional component following the Stakeholder Workshop. It was noted that the supply of hardware (e.g. traction equipment) often comes through many ‘channels’ and the RSCR may have, or should have, a role in the management of such procurement.

RA and HSMS IOs appear to have benefited most from the process of developing an RSC, with Audit (IO5) third. The measurement of IO3 (Duty Holder Co-operation) was deemed to be a function of two separate aspects: ‘interface management’ and ‘communications’ between Duty Holders. Figure 6.11 indicates that the interface components have been enhanced to a greater extent by the RSCR than have communications. When compared to other IOs, the RSCR appears to have had limited impact upon Duty Holder co-operation. From Questionnaire responses, IO4 (Change Management and Continuous Improvement) appears to have benefited from the RSCR. Possible mechanisms include: the Material Revision process, the annual audit, RSC assessment and the Development Plan (see also Section 11).

In relation to IO6, findings from HMRI interviews are presented in Section 13 and provide a detailed account of the ways in which the RSCR has affected HMRI inspection and enforcement activities.
It seems reasonable to conclude from the data presented in Figure 6.11 and the above discussion that the RSCR requirements have at worst offered moderate improvements to the quality and effectiveness of the IOs, but in all cases have made a contribution. To understand in greater detail the contribution that the RSCR have had upon the IOs, an in-depth assessment is presented in Sections 8 to 13 for each IO respectively.

The following discussion seeks to examine the way in which the IOs have actually improved safety. The Influence Network (IN) described in Section 3 has been used to highlight the policy, organisational and direct influences that are affected by the IOs based on information from the Stakeholder Workshop, the Questionnaire, RSC examination and Inspector interviews.

The IN has been used to identify the nature of the contribution that the IOs have made to risk reduction. To establish this, the following three criteria have been applied:

1. The number of IN influences identified as having benefited from an IO
2. The extent to which an IO cascades through the IN and ultimately contributes to risk reduction
3. The effectiveness / impact of an influence upon risk (i.e. how useful individual benefits are).

**Figure 6.11  Positive RSCR contribution to several aspects of Health and Safety**
6.10.3 IO1 – RA

The findings from the Stakeholder Workshop and the examination of RSCs indicate that RA provides benefits to 10 influences, identifiable in Figure 6.12. Most of these benefits are experienced at the direct level (five), then organisational level (four) and one at the policy level. This indicates that the RSCR requirement for RA cascades from the environmental to the direct level to produce ‘frontline’ benefits. One of the main ways in which RA can enhance safety is by giving an opportunity for Duty Holders to understand and exercise some degree of control over risk in relation to hardware operation, external influences and by improving workforce competence.

At the organisational level, for example, RA can influence the development of procedures if gaps are found (O3) and can be used in planning and prioritisation of risk control measures (O4) and areas for ‘inspection and maintenance’.

At the direct level, RA should enhance frontline understanding of risk and therefore ‘situational awareness’ should improve. This also covers an awareness of actions and behaviours in terms of safety and includes the provision of information for the workforce to make accurate judgements. RA should improve the targeting of inspection and audit of safety critical elements (with links to be made to IO5 and IO6). RA also benefits the ‘safe operation of equipment’ via an increased understanding of the risk associated with its operation.

6.10.4 IO2 – HSMS

As shown in Figure 6.13, the HSMS was identified to benefit nine influences, with four at both the direct and organisational levels and one at the policy level. Given the close interrelationship between RA and HSMS, these findings coincide with IO1. At the policy level, the influence associated with the HSMS is ‘company safety culture’. The advent of an HSMS to structure
risk control and assist decision-making is likely to have improved manager and workforce understanding of safety issues and should underpin other operational activities. Moving to the organisational level, the development of a HSMS and the identification of associated safety responsibilities (via job descriptions) appear to have benefited the selection process and has contributed to an improved level of competence at the direct level. Following effective RA, it is to be expected that improvements in ‘communication’, ‘recruitment and selection’, ‘inspection and maintenance’ and ‘procedures’ will occur and these are evident in the HSMS model.

Figure 6.13 Intermediate Objective 2 – Health and Safety Management Systems

6.10.5 IO3 – Duty Holder Co-operation

The IN model for Duty Holder Cooperation (Figure 6.14) identifies that there are three benefits at the policy level, two at the organisational level and four at the direct level. The fragmentation of the industry at privatisation and the associated loss of contact between railway industry personnel was highlighted at the Stakeholder Workshop, though this was tempered by a recent resurgence in Duty Holder co-operation, principally at the policy level with benefits in ‘safety culture’, ‘safety management’ becoming apparent. These improvements are to be observed in the day-to-day activities, at organisational level in terms of improved planning of collaborative-based work and jointly developed procedures.
Figure 6.14 Intermediate Objective 3 – Duty Holder Cooperation

6.10.6 IO4 – Change Management and Continuous Improvement

The IN model presented in Figure 6.15 outlines six influences on safety that benefit from IO4. These are: ‘contracting strategy’ and ‘organisational structure’ at the policy level, ‘equipment purchasing’ at the organisational level, and ‘competence’, ‘information and advice’ and ‘availability of human resources’ at the direct level.
6.10.7 IO5 – Audit

The benefits initiated by the audit process are to be seen mainly at the organisational level (see Figure 6.16), since this is the subject of the audit. Improvements are likely to be seen in improved ‘procedures’, ‘planning’, ‘HSMS’ and ‘inspection and maintenance’ since these are aspects of a Duty Holder’s operations which are likely to be particularly targeted for auditing. Whilst it is implicit in the IN approach, benefits have not been identified at the direct level in this model since the audit is generally associated with the demonstration of adequate management systems as opposed to their frontline application.

![Diagram of RAIL ACCIDENT RISK]

**Figure 6.16** Intermediate Objective 5 – HSMS Audit

6.10.8 IO6 – Inspection and Enforcement

In contrast to the audit, HMRI inspection and enforcement activities are focussed at the direct level. Benefits are likely to be particularly evident in the following influences: ‘competence’, ‘compliance’, ‘quality of inspection’, ‘safe operation of equipment’, ‘work environment’ and ‘external factors’. At the organisational level, ‘management and supervision’ and ‘HSMS’ should improve as a result of the inspection process. Inspection and enforcement offer these improvements by encouraging Duty Holders to give extra consideration to activities that are to be inspected. Once poor performance has been identified, enforcement action (if considered necessary) ensures that a Duty Holder improves such performance.
6.10.9 Summary of IO Costs and Benefits

As identified at the start of Section 6.10, no attempt has been made to attribute a monetary benefit to each IO. Previous evaluations and the discussion in Section 6.4.4 indicate the uncertainties in attributing a benefit value to the RSCR as a whole, without then attempting to proportion such benefit to the individual indicators. However, the IN analysis has provided insight into the influences of each IO at direct, organisational and policy levels. The extent of influences at each level affected by each IO and the transfer of influence from the IO via the various levels to directly affect rail accident risk (the ‘cascade effect’) are a measure of the IOs’ impact and effectiveness.

Table 6.14 presents summary data for IO costs and benefits. For IO1 (RA) the ratings given in Figure 6.11 and the IN analysis indicate that it is the most beneficial IO of the RSCR, whilst being the third most expensive. IO2 (HSMS), the most expensive IO, offers nearly as many benefits as IO1. The close inter-relationship between RA and HSMS indicates that these are the most powerful mechanisms directly attributable to the RSCR. The linkage between RA and HSMS is discussed in detail in Section 8.2. IO3 (Co-operation) appears to have been effective in contributing to risk reduction as its requirements have cascaded through to reduce accident risk (mainly via interface management), and being the fourth most expensive, seems to represent reasonable value.
Table 6.14 Summary of IO costs and benefits

<table>
<thead>
<tr>
<th>IO</th>
<th>Total Cost (£m)</th>
<th>Number of Benefits</th>
<th>Cascade Pattern</th>
<th>RSCR Contribution&lt;sup&gt;(1)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO1</td>
<td>4.1</td>
<td>10</td>
<td>Direct 5</td>
<td>Organisation 4 Policy 1</td>
</tr>
<tr>
<td>IO2</td>
<td>5.3</td>
<td>9</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>IO3</td>
<td>3.1</td>
<td>9</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>IO4</td>
<td>5.1</td>
<td>6</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>IO5</td>
<td>2.7</td>
<td>5</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>IO6</td>
<td>-</td>
<td>7</td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>

<sup>(1)</sup> see Figure 6.11
<sup>(2)</sup> Based on average of Question 1.2 D&E.

6.11 SUMMARY OF COSTS AND BENEFITS

The evaluation carried out in this section have been judged according to whether:

- The costs to industry to meet RSCR requirements are not in gross disproportion to the benefits gained.
- The costs do not exceed (or are similar) to the attributed monetary benefits.

Overall, on both above criteria, the RSCR can be considered to represent ‘value for money’.

In summary, the conclusions on costs and benefits attributable to the Regulations are:

- For a Duty Holder, the cost of developing and submitting a Safety Case is by far the largest single cost element associated with the Regulations (although the accumulated cost associated with ongoing safety management, Material Revisions, audits, etc. is also significant for most Duty Holders). The upfront costs of implementing the requirements of the Regulations (whether at first introduction in 1994 or at subsequent major regulatory changes) should be seen as an investment for longer term realisation of benefits in terms of accident / incident reduction.

- Due to the time lag before benefits in reduced levels of risk are seen, the most realistic perspective of costs and benefits is that over the total permissioning regime since privatisation (1994 – date), rather than over discrete phases of that regime. The risk reduction contributions of the 2000 amendments are only just starting to be realised and will be potentially seen over the next 2-3 years.

- The cumulative cost of the Regulations to all stakeholders within the railway industry is estimated to be approximately £52 million since 1994. Benefits attributable to the Regulations over the same period are approximately £85 million, based on prevented equivalent fatalities for all types of rail risk (as provided by the Rail Safety and Standards Board). If only equivalent fatalities are considered which are judged to be under the direct control of railway operators (i.e. excluding risks arising from malicious acts), the benefit valuation reduces from £85 million to £53 million – still giving a nominal net benefit.

- The role of the Regulations in achieving improvements in rail safety has been isolated from other influences in order to attribute the financial benefit from the Regulations. Whilst this is difficult due to complex interactions of confounding influences (and was not attempted in previous railway Regulatory Impact Assessments), it is estimated
based on Duty Holder views that the Regulations are ‘responsible’ for approximately 15% of the overall safety improvement on the Railtrack / Network Rail controlled infrastructure.

- Costs and benefits of individual ‘Intermediate Objectives’ (IOs) have been considered. Costs are discussed for IOs in relative rather than absolute terms. Benefits are assessed in terms of the influence of each IO on overall rail accident risk. Within this context, stimulating Risk Assessment (IO1) and encouraging robust Health and Safety Management Systems (IO2) appear to be the most cost effective aspects of the Regulations.
7 INDUSTRY PERCEPTION OF RSCR AND INTRODUCTION TO INTERMEDIATE OBJECTIVE ASSESSMENTS

7.1 INDUSTRY PERCEPTION OF THE RSCR

As discussed in Section 1.2, six ‘Intermediate Objectives’ (IOs) and associated success indicators were selected for evaluation of the RSCR. However, from discussions at the Stakeholder Workshop (Section 3) and the ‘Global Context’ and general questions in the Questionnaire, some broad industry perceptions of the RSCR have been identified which provide a useful overview prior to looking at each IO in detail.

Sections 2.4 and 2.5 discuss the counterfactual and confounding variables. Within the context that Railway Safety has reported evidence against a number of indicators that safety in the railway industry has improved over the last 10 years, the initial question in the Questionnaire (Appendix 3) asks what positive influence the RSCR 1994, RSCR 2000, other regulations, Railway Group Standards, accident inquiries / report and a litigious environment have had. The answers were rated on a 1 to 5 scale, with 1 representing no influence and 5 representing a major positive influence.

The extent and distribution of completed Questionnaires is discussed in Section 4.3. It is concluded that the 28 organisations are representative of the rail industry as a whole, reflecting both the diversity and significance of Duty Holder operations. As such, no weightings have been considered necessary when determining averages from answers in the Questionnaires and ratings given by the various Duty Holders have been treated equally. The impact of the RSCR on the different types of Duty Holders is examined throughout Sections 8 to 13. Figure 7.1 indicates the pattern of responses to Question 1.1. Whilst respondents report an improvement in the impact of the RSCR over time, the most important driver for safety improvements was considered to be changes arising from accident inquiries, followed by the role of other regulations. However, with the exception of a ‘current litigious environment’, all drivers scored between 3 and 4 (i.e. more than moderate influence). The inclusion of ‘current litigious environment’ in the counterfactuals arose from comments at the Stakeholder Workshop where it was stated that Duty Holders were currently diverting considerable resources to tackling claims over slips, trips, etc and that more rigorous safety management, with higher expenditure on safety, was considered to be a good investment to counteract such claims.
The ‘other’ category of Question 1.1 merits attention since its rating is relatively high. Only four Duty Holders gave a rating for this category, though seven provided written information. Duty Holders cited company initiatives, trackside fatalities and cultural changes as major drivers.

To appreciate the variation in respondents’ answers to Question 1.1, one standard deviation above and below the mean for each question option is presented (as a vertical line) in Figure 7.1. This range indicates the ratings given by 68% of respondents. Mostly the responses are, on the 1 to 5 scale, one rating above or below the mean average. This indicates that the impact of safety drivers depends, in part, on the individual Duty Holder / respondent. Expressing the standard deviation depends on results being normally distributed; subsequent analysis indicates that this is the case for the influences presented in Figure 7.1.

Given that many activities, processes and procedures (Risk Assessment (RA), HSMS, etc) were already in existence before the introduction of the RSCR as discussed in Section 2.4, the next question in the Questionnaire was targeted at ascertaining whether particular aspects of the RSCR and the preparation of an RSC were considered to have contributed positively to the quality and effectiveness of those activities, processes and procedures. Figure 7.2 presents the results from the responses to Question 1.2. Again most scores ranged between 3 and 4 in the 1 to 5 ratings range (with 1 representing no contribution and 5 representing substantial contribution). The process of preparation, submission, assessment / acceptance and audit of the RSC appears to have created the greatest improvements in the RA and HSMS. This supports the conclusions from the evaluation of costs and benefits presented in Section 6.10. An observation made strongly at the Workshop was that the RSCR have been beneficial in making operators look again at their management systems and procedures. The discipline of going through the formal process of developing an RSC had helped to identify gaps, omissions and weaknesses.
Figure 7.2  Positive RSCR contribution to several aspects of Health and Safety

One of the main purposes of the RSCR when introduced in 1994 was to cover interface issues in the fragmented and newly privatised railway industry. Question 2.1 in the Questionnaire sought industry opinion about the degree to which each of the following aspects provided by the RSCR was helpful, at this period of significant change within the railway industry:

- A framework to allow TOCs / SOCs to review their HSMS in the light of the new franchised regime
- A mechanism to create interface linkages between TOCs / SOCs and the Infrastructure Controller to reduce potential risk from the fragmentation of the industry
- A tool to assist operators to review risk and risk control measures in a more structured way through a systematic risk assessment approach
- A compliance function through Railtrack’s Safety and Standards Directorate’s annual audits
- An opportunity to write down systems and processes for the first time.

The results are presented in Figure 7.3. The five point rating based on the statement that the RSCR ‘were helpful’ range from 1 (strongly disagree) to 5 (strongly agree) with 3 being neutral. The highest scores are again associated with RA, HSMS, and as a compliance function via the annual audit. Interface linkages appears to have had less impact on safety, offering only a moderate contribution. The option titled ‘opportunity to write down systems and processes for the first time’ has a relatively low mean average of 3.17 (compared with the other options), although the distribution of responses is skewed towards high values; indeed the mode average was five (and six Duty Holders gave this rating).
Following-up the issue of the importance of the RSCR in terms of RA, the final general questions in the Questionnaire (Question 1.3) asked industry opinion on the relative effectiveness of the RA (in the RSC) in stimulating the identification of how / where risks occur in comparison to:

- Accident incident inquires
- Routine performance monitoring (e.g. SPADs)
- The Safety Risk Model of Railway Safety / RSSB(23)

Figure 7.4 presents the results. Ratings for influences are fairly similar, though accident inquiries and performance monitoring are considered to contribute more than the RSCR and Railway Safety’s Safety Risk Model contributes least. It appears that Duty Holders see industry’s response to events as a slightly greater influence on risk understanding than attempts to enhance understanding prior to accidents / incidents.
**Figure 7.4** The extent to which RSCR, in relation to other influences, contributes to understanding of where risk occurs.

This general perception of the RSCR by the railway industry informs discussion of the assessment of individual IOs, conclusions and recommendations.

### 7.2 THE RSC STRUCTURE

The structure of the RSC should enable Duty Holders to identify hazards and risks, identify associated control measures, prioritise those control measures and either immediately implement the ‘top’ control measures via the HSMS or schedule implementation of the control measures with a timely, structured and committed approach. With the introduction of the requirement for a Development Plan in the RSCR 2000, this continual improvement process was theoretically complete. A flow diagram illustrating the process is given in Figure 7.5.
Identification of 'Top Tier' events and hazards.
Identification of associated control measures.

Prioritisation of control measures (value for money).

Immediate implementation of top control measures.

Future measures for risk control prioritised in an implementation plan/schedule.

Planned schedule and resources to implement residual control measures.

Figure 7.5 Linkage between RA, control, HSMS and Development Plan

Many issues in early Issue Logs (see Section 7.3) were associated with a lack of connection between the RA and the HSMS. The RA was often generic and the use of RA was not proactively driving control measures and safety improvements. Thus one of the major indicators of the success of the RSCR would be a demonstration that Duty Holders have, with time, improved the linkages in Figure 7.5. This is reflected in a number of the success indicators in the assessment of the individual IOs.
7.3 APPROACH TO INTERMEDIATE OBJECTIVES (IO) ASSESSMENT

Sections 8 to 13 (inclusive) present the assessments against IO1 to IO6 respectively (see Section 1.2).

The various sources of evidence for each IO and the associated success indicators have been considered in turn. Where there is scope for a success indicator to receive corroborating evidence from more than one source, the most robust information sources have been considered primarily with supporting evidence presented subsequently to provide triangulation. When the data for the success indicators have been compiled, it is then combined to make an informed judgement as to the success, or otherwise, of the associated IO. This approach maximises the opportunity for relevant information to be included, triangulated and structured in a systematic format.

When referring to the review of RSCs, it is important to note that, as well as the RSC documents themselves, the RSC folders provided by the HSE included copies of Issue Logs (or equivalent as discussed below); correspondence relating to the submission, assessment and acceptance process; and consultants’ reports (e.g. associated with submission of ‘Material Revisions’).

An Issue Log referred to in this Report (and particularly in the assessment of IOs in Sections 8 to 13) is the listing of issues from the assessment of an RSC which require closure or redress by the Duty Holder. It should be noted that the term ‘Issue Log’ has also been used for lists of issues associated with the earliest RSC submissions before the defined term was officially in use. These earlier listings were entitled ‘Problem Reports’ or ‘Railway Safety Questions’, or were just part of the general correspondence.

The RSC submissions, over the period from 1994 to date, have been generally grouped under four submission ‘phases’ in the IO assessments:

- Initial submission: the first submission under the RSCR 1994 which, for ex-British Rail operations, were generally submitted in 1994 – 1996.

- Three-year resubmissions: the resubmission which ideally was three years after acceptance of the initial submission but which, in some instances, was subject to a lengthy acceptance period (sometimes ‘evolving’ into the first attempt at the RSCR 2000 RSC).


- Most recent (2000 Regs): the most recent submitted or accepted RSC under the RSCR 2000, reflecting changes arising during the transitional assessment process.

It should be noted that the above ‘phases’ are more concerned with the assessment / audit regime at the time of submission than the precise year that the submission took place. These regimes are discussed in Section 2.6.

For each IO, conclusions are drawn at the end of each section (Sections 8 to 13 inclusive) and Section 14 presents combined conclusions for the RSCR as a whole.
8 INTERMEDIATE OBJECTIVE 1 – RISK ASSESSMENT

To stimulate railway operators to develop and improve Risk Assessment techniques (particularly for risks at the interface with other operators).

8.1 IO CONTEXT

As discussed in Section 2.4, the regulatory requirement for Risk Assessment (RA) was not first introduced in the RSCR 1994. Risk awareness is enshrined in the Health and Safety at Work Act 1974 and RA is required under the Management of Health and Safety at Work (MHSW) Regulations (1992 and 1999).

Schedule 1(6) of the RSCR 1994 requires the Duty Holder to provide ‘a statement of the significant findings of the Risk Assessment the Duty Holder has made pursuant to regulation 3 of the Management of the Health and Safety at Work Regulations 1992 and particulars of the arrangements he has made pursuant to regulation 4(1) thereof’.

Schedule 1(4) of the RSCR 2000 expands on the particulars of RA carried out by the Duty Holder which are to be included in the RSC. Particulars should include:

(a) a statement of the assessment process undertaken, the methods of any calculation used and any assumptions made;

(b) a statement of the significant findings of the Risk Assessment including the measures in place and any further measures the Duty Holder intends to take to comply with the relevant statutory provisions; and

(c) particulars of the arrangements the Duty Holder has made for the effective planning, organisation, control, monitoring and review of the measures identified above.’

It is recognised that the use of RA has generally increased over the past ten years in many industries. With the requirements for RA to be performed under the MHSW Regulations and a natural maturation of RA usage, the specific role and success of the RSCR in ‘developing and improving’ a ‘systematic’ RA approach within the railway industry needs to be measured (i.e. over and above what would otherwise be taking place).

Within the railway industry, one of the unique features of the RSCR is the RSC assessment and acceptance process. This is part of the overall strategy to secure compliance (and continuing compliance) by railway operators with health and safety legislation. One of its main purposes is to give confidence that a railway operator has the ability, commitment and resources to properly assess and effectively control risks affecting the health and safety of staff, contractors, passengers and the public. The assessment criteria in the HMRI Railway Safety Case Assessment Manual\(^{(14)}\) were reviewed against guidance published in both the Railway Group Guidance Note\(^{(24)}\) on ‘Preparation of Risk Assessments within RSCs’ and HSE publication\(^{(25)}\) entitled ‘Reducing Risks, Protecting People’.

The Assessment Manual\(^{(14)}\) indicates what the regulator requires of the RA in the RSC. Some key features are:

- The hazardous event identification process should include consideration of special hazards such as tunnels, bridges, below ground stations, etc which are appropriate to the Duty Holder’s operation.
The approach adopted for RA needs to reflect the **scope and variety of hazardous events** involved in a Duty Holder’s activities.

A systematic approach is necessary to ensure that all risk is assessed, **improvements are prioritised** and effective control and mitigation measures implemented, maintained and improved.

Risks must be demonstrated to be reduced to a level that is ‘as low as reasonably practicable’ (ALARP). In addition, demonstration of **ongoing risk review** processes, risk reduction measures employed since acceptance of the last RSC and planned future initiatives should be highlighted.

The completion of the RA process (as illustrated in a flowchart in HMRI Railway Safety Case Assessment Manual(14)) forms the **starting point** for risk control and safety management.

Thus, what the RSCR are encouraging / stimulating is to use RA as an active and ongoing tool in safety management for an operator’s specific activities.

The success indicators for IO1 in the following sub-sections reflect the above. A reduction in the number of RA issues in Issue Logs arising from assessments does not necessarily indicate a better understanding of RA. A greater use of RA and a greater rigour in its application could lead to more RA issues raised (but improvements in the quality and effectiveness of the RA process).

### 8.2 SUCCESS INDICATOR 1.1 – GENERIC TO SPECIFIC

*The nature and number of issues raised in RSC assessment show a shift from application of generic Risk Assessment (RA) to consideration of specific operator risk.*

Increased specificity in RA Issue Logs reflects the need for greater detail in the RAs conducted by a Duty Holder, which should in turn enhance understanding of the level and location of risk associated with a Duty Holder’s operation. An increase in the number of issues associated with specific RA could be taken to indicate a reduction of RA specificity. However, as the RSCR process has matured and guidance on the assessment of RSCs has been published, assessors are more likely to seek greater detail in the RSC, and this would be reflected with an increase in specific RA issues raised. Several sources of information were reviewed, to provide triangulation: RSC documentation and correspondence (including Issue Logs) from HMRI, Railway Safety and Network Rail as well as assessment guidance from HMRI and Railway Safety (25, 14 and 26).

Issue Logs covering the sections of RSCs dealing with RA were reviewed for initial, three-year and transitional (2000 Regulations) submissions and the nature of the issues being raised were classified as generic, specific or minor according to the following definitions:

- ‘Generic’: Issues associated with the implementation of an RA applicable to a typical Duty Holder or routine procedure for RA.
- ‘Specific’: Issues relating to individual Duty Holder’s operations or focused application of RA technique.
‘Minor’: non-critical, clarification and documentation issues (further detail). ‘Minor’ does not indicate the level of effort involved in supplying such information.

Figure 8.1 presents the number of issues raised, and whether issues were generic, specific or minor, for reviewed TOC, IMC and heritage RSCs for each submission phase. The chart indicates that there has been a substantial increase in the overall number of issues raised between the first and transitional submissions. Most pronounced increases can be observed for generic and specific issues, whilst the number of minor issues have also increased albeit to a lesser extent.

Figure 8.1 Classification of the TOC, IMC and heritage RA issues as ‘Generic’, ‘Specific’ and ‘Minor’ across the three submission phases

The total number of issues associated with RA rises from 15 for initial submissions, to 41 for three-year reviews and 255 for transitional submissions. However, it must be borne in mind that during the transitional (2000 RSCR) phase, both HMRI and Railway Safety were assessing RSCs and producing Issue Logs (see Section 2.6). For direct comparison, Figure 8.2 presents the number of issues raised by Railtrack S&SD or Railway Safety, without including HMRI issues, and the increase is still evident.
The availability of issues on RA from initial submissions (RSCR 1994) is limited and, despite attempts to gather early data, insufficient information was obtained. It should be noted therefore that the first submissions are not included in Figure 8.2 since the sample size is too small to identify trends.

Figure 8.3 presents the specific, generic and minor issues raised during assessment of the IC’s RSC. These represent HMRI issues for all the submissions made and also Railway Safety issues for the RSCR 2000 submission. The chart indicates that, for the first and 2000 Regulation submissions, there was a similar balance of generic, specific and minor issues being raised. However, HMRI raised 26 specific issues for the first submission, more than the combined total of specific issues raised by HMRI and Railway Safety in 2000, although one of HMRI’s own concluding remarks of the IC’s RA was:

‘[…] (i) The coverage of risk and control or improvement measures is almost entirely at the ‘strategic’ level, with little or no indication of how this relates to individual zones […]’

Available correspondence and Issue Log information was reviewed for the three-year resubmission, though the assessment process appears to have differed as the submitted RSC required substantial change prior to HSE acceptance. Therefore, whilst few formal issues may have been raised, this does not indicate the severity of HMRI’s concerns with the RSC. Associated documentation from HMRI highlighted that over 300 changes were made to the IC’s RSC for the three-year submission with the apparent intention of enabling substantial changes to be made to the organisation without further consulting HMRI.
Figure 8.3 Classification of the Infrastructure Controller’s RA issues as ‘Generic’, ‘Specific’ and ‘Minor’ across the three submission phases

The increase in the number of issues associated with RA for TOCs and IMCs apparent in Figure 8.1 and Figure 8.2 could potentially be due to improvements in RSC assessment rigour over the three regime periods and therefore issues that previously may have remained undetected (e.g. in 1994 to 1996) were beginning to be identified. This position can be substantiated by reviewing the selected RSCs to establish whether, over time, there have been improvements in the:

- Rigour of hazard identification
- Quality of RA method and evaluation
- Effectiveness of linkage to HSMS.

In order to fulfil this requirement, the sample of RSCs selected for review was assessed by BOMEL for each of these success criteria according to the three point scales presented under each figure (Figure 8.4, Figure 8.5 and Figure 8.6). In addition to the three submission phases considered (i.e. initial submission, three-year resubmission and first transitional submission), the most recent RSC submissions are included for ‘quality’ comparison.

Figure 8.4, Figure 8.5 and Figure 8.6 for RA rigour, quality and linkage respectively indicate the same trend:

- A small improvement between the initial submission and the three-year resubmission. Under the same assessment regime, some degree of ‘continual improvement’ would be anticipated.
- A ‘deterioration’ at the first transitional submission.
- A substantial improvement between the first transitional and most recent submissions under the RSCR 2000.
The above trend supports the notion that the increased number of RA issues is associated with a drive under the RSCR 2000 to improve the effectiveness of RA in the railway industry. The RA section in first transitional submissions was often similar to that submitted under the RSCR 1994, but was considered by assessors (HMRI and Railway Safety) to be inadequate.

These improvements in the application of RA are likely to have been assisted by several publications inspired by the RSCR: HMRI’s Assessment Manual (initially in 2000, and updated in 2001 and 2002[14]) and Railway Safety’s Guidance on Assessment (initially in 1999 and updated in 2001[27]). In June 2002, Railway Safety also published a Guidance Note[24] specifically on the preparation of RAs within RSCs. These publications were highlighted at the Workshop to have assisted Duty Holders in understanding what assessors were ‘looking for’ in RSC submissions and have therefore strengthened the quality of RA.

The improvements in RA between the first and most recent submission also indicate that more comprehensive effort was deployed to ‘close’ the RA issues raised. In keeping with this, there is evidence from the review of selected RSCs that some Duty Holders used consultants to facilitate workshops and enhance the RA process between the first and most recent submissions. An additional driver, underlying improvements in RA, is the enhanced understanding that is derived from having gone through the process of risk identification oneself as opposed to the imposition of a set of risk controls identified by others.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Rigour of hazard identification for specific operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Poor</td>
<td>Generic risks and controls (industry wide)</td>
</tr>
<tr>
<td>2. Medium</td>
<td>Generic risks supplemented by Duty Holder specific hazards</td>
</tr>
<tr>
<td>3. Excellent</td>
<td>Risks generated / expanded from employee workshop, etc.</td>
</tr>
</tbody>
</table>

**Figure 8.4** Rigour of hazard identification
**Figure 8.5** Quality of RA and risk evaluation
Figure 8.6 Effectiveness of RA linkage to HSMS

To provide greater insight into the nature of each assessing organisation’s contribution to the volume and specificity of RA Issue Logs, Figure 8.7 presents the data for HMRI, Railway Safety and Railtrack / Network Rail for the first submission under the RSCR 2000.
Figure 8.7  Contribution of each assessor to RA Issues for the first submission under the RSCR 2000

It is evident from Figure 8.7 that HMRI have raised a substantially greater number of issues, compared with Railtrack and Railway Safety. However, this appraisal does not indicate the level of effort required by Duty Holders to close each ‘issue’. Equally, the approach to recording issues can vary from assessor to assessor, with some rolling a number of similar issues into one noted issue in the Issue Log, whilst others list similar issues separately. Some discretion has therefore been used to decide what constitutes an ‘issue’.

Summary of Success Indicator 1.1
The greater number of issues raised in Issue Logs for RSCR 2000 submissions is considered to represent greater rigour of assessment both in terms of deeper interrogation of the RA in the RSC and in terms of the number of different organisations (with different skills, requirements and perspectives) carrying out the reviews. The potential effectiveness of the RAs presented in the most recent RSC submissions has been found to be considerably improved over the earlier submissions, and represent a step-change which would not have occurred without the RSCR.

8.3  SUCCESS INDICATOR 1.2 – RA AND MATERIAL REVISIONS

An increasing use of RA in ‘Material Revision’ submissions.

Changing the nature of an organisation’s structure or its operations can have a significant effect upon accident risk, therefore it is important to understand and control new risks through the process of RA. The Railway Safety Guidance Note on Material Revisions(28) recommends that ‘suitable and sufficient assessments of the risks associated with the change and the implications for other hazards and control measures’ are conducted and contained in the proposal. The principal source of data used to investigate this indicator has been an analysis of Material Revision submissions made by Duty Holders selected for review. Responses to Question 4.2 in the Questionnaire have also been analysed.
The data presented in Figure 8.8 indicate, for the reviewed RSCs, the number of Material Revisions that were submitted, the number of associated RAs that were conducted and the number of RA reports that were submitted for review. Of the reviewed Duty Holders, only 11 Material Revisions have been submitted since the 2000 Regulations came into force, therefore the majority of the findings represent the 1994 regime.

Figure 8.8  Material Revision submission and RA frequency and submission for the RSCR 1994 the RSCR 2000 regimes

The total number of Material Revisions submitted by the reviewed Duty Holders under the RSCR 1994 regime was 91. Of these, 61 had conducted a RA and 58 had submitted the RA to the assessing body. Therefore, the available evidence indicates that approximately 36% of Material Revisions were accepted without RA. Figure 8.9 presents the same data according to the submission year to examine trends in the use of RA in Material Revisions.
Figure 8.9 Material Revision submission and RA frequency and submission for the period 1995 to 2002

Figure 8.10 presents the proportion of Material Revisions that were subjected to RA (for which there is evidence) between 1995 and 2002.

The direction of the results does not indicate a continual improvement in the number of RAs conducted; rather there is an initial decline from 1995 to 1997 and then an improvement from 1998 to 1999 and another decline from 2000 to present. The Material Revision submissions were then divided according to whether the change involved ‘frontline / operational’ or
‘management / corporate restructuring’ to identify whether the application of RA varied according to the type of Material Revision. The findings are presented in Figure 8.11 (TOCs / SOCs, IMC and heritage) and Figure 8.12 (IC).

![Figure 8.11](image)

**Figure 8.11** The proportion and type of Material Revisions subjected to RA (excluding Infrastructure Controller)

From Figure 8.11, it is apparent that the majority of RAs have been conducted when the revision is associated with frontline / operational change (77%) as opposed to managerial / corporate change (50%). Such findings are not consistent with Railway Safety’s Guidance Note\(^{(28)}\) which states that ‘significant changes to the responsibilities, competence requirements or position / level in the organisation of professional heads / informed buyers’ constitutes a Material Revision. The same document also recommends that a suitable and sufficient RA of the change be conducted.

Figure 8.12 presents equivalent information in relation to the IC. The data highlights the tendency for the IC to make material changes to its management structure without associated RA. Whether or not changes at operational level are, in reality, receiving RA is contentious given that 44% of frontline / operational changes are associated with automatic ticket gates and supporting RA evidence is provided by the associated TOC and not the IC.

In the main, reviewed RAs conducted for management / corporate change have tended to conclude that levels of risk **would not worsen** after implementation. There was minimal evidence of attempts to link such change to a reduction in risk (or optimum risk reduction measures) and so the management / corporate restructuring that occurs has been for reasons other than to improve safety specifically.
In addition to the frequency of RA usage in the context of Material Revisions, the appropriateness / nature of its use over time (1994 to date) has also been explored. Figure 8.13 presents data based on detailed assessment by BOMEL of 84 Material Revisions. The average rating for the Material Revision in each year is plotted with the number of cases examine in each year is indicates above the bar. The five point scale under the figure ranges from no RA conducted (ratings 1-2) to the use of RA to evaluate options prior to programme selection and implementation. No clear evidence of a significant shift to a proactive use of RA (ratings 4-5) is present.
<table>
<thead>
<tr>
<th>Rating</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Material Revision submitted after change, therefore no RA</td>
</tr>
<tr>
<td>2</td>
<td>No RA conducted</td>
</tr>
<tr>
<td>3</td>
<td>RA conducted to justify decision-making and not guide it</td>
</tr>
<tr>
<td>4</td>
<td>Evidence that RA was used to guide how change should be implemented, though did not guide the decision making process</td>
</tr>
<tr>
<td>5</td>
<td>RA used to evaluate various options / scenarios prior to programme selection and implementation</td>
</tr>
</tbody>
</table>

**Figure 8.13** Suitability of RA usage in relation to Material Revision submissions

To help reinforce the findings presented in Figure 8.13, Question 4.2 in the Questionnaire asked whether RA had been used to evaluate the expected impact of change prior to implementation in relation to two types of frontline change. Figure 8.14 presents the findings which indicate that respondents reported a considerable increase in RA usage, prior to change, for both staffing levels and equipment change. These findings suggest that Duty Holders believe that RA is being used appropriately. However, if RA had been applied appropriately, presumably it would have been included in the Material Revision submission. The extent of RA usage appears to have been overemphasised by respondents.
Summary of Success Indicator 1.2

Generally, RA has been shown to be a part of the management process, particularly when introducing frontline / operational change. However, there is some evidence of RA being used after change has taken place (i.e. a confirmatory rather than proactive role). Overall, the evidence indicates improvements, though it is difficult to confirm a significant trend in the use of RA over the period from 1994 to date. However, there is a perception in the industry expressed at the Stakeholder Workshop that such a trend exists.

8.4 SUCCESS INDICATOR 1.3 – USAGE OF RA DATA / INFORMATION

Active use of RA and associated risk control measures in planning and prioritisation of expenditure for improved safety. Risk and change management: evidence that RA is being used as a tool to assist decision making, and not just carried out to meet regulatory (e.g. MHSWR 1999 or RSCR 2000) requirements.

Implicit in the RSCR and RSC assessment guidelines (14 and 27) is the relationship between RA, prioritisation of control measures and the HSMS as discussed in Section 7.2. RA is not an isolated and ‘one-off’ activity, but is the starting point for risk control and safety management (see Section 8.1). The robustness of HSMSs is assessed under IO2. However, the linkages between RA and the overall management system have been considered here.

Data sources for this review have been the selected RSCs (including HSMS and Development Plans). There is obviously some overlap with Success Indicator 1.2.

The immediate outcome of RA is to identify ‘top tier’ events and hazards, with associated control measures. From this, control measures need to be prioritised and evidence of prioritised hazards and controls is not always obvious from RSC submissions. Within a typical RSC, one section presents RA and its conclusions, another presents the HSMS and a third (in those submitted under the RSCR 2000) outlines the Development Plan.
One indicator of proactive and effective use of RA is evidence (i.e. an ‘audit trail’) that risk control measures, first identified and hopefully prioritised in the RA section, cascade through the RSC as described in Section 7.2.

To examine whether there is evidence that control measures had been formally prioritised, the sample of RSCs selected for review was assessed for indications of good practice according to the five point scale presented under Figure 8.15. The evaluation considers four submission phases (i.e. initial, three-year, first transitional and most recent RSC). The figure indicates general improvements over time, with the most recent RSCs demonstrating some linkage between RA control measures and safety improvements (albeit that timescale / resources for achieving such improvements tend to be vague).

![Bar Chart](chart.png)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Safety objectives but no safety improvements (for RSC enhancement or safety measure implementation)</td>
</tr>
<tr>
<td>2</td>
<td>Some improvements identified but not prioritised</td>
</tr>
<tr>
<td>3</td>
<td>Improvements shortlisted but timeframes / resources are vague</td>
</tr>
<tr>
<td>4</td>
<td>Some linkage between RA control measures and safety improvements with timescales</td>
</tr>
<tr>
<td>5</td>
<td>RA used actively to prioritise safety improvements and timescales (with possible resources) presented</td>
</tr>
</tbody>
</table>

**Figure 8.15** The extent to which there is effective prioritisation of safety measures

Finally, the sample of RSCs selected for review was assessed in terms of the stated use / commitment to deploy RA in the future as indicated in the Development Plans of the latest RSC submissions. Figure 8.16 shows the results for different types of Duty Holder, using the five point scale presented under the chart. All state a reasonable commitment to use RA in future.
<table>
<thead>
<tr>
<th>Rating</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No change, continuation of current procedures (and no indication of use of RA)</td>
</tr>
<tr>
<td>2</td>
<td>Aspiration for potential change</td>
</tr>
<tr>
<td>3</td>
<td>Modest change (e.g. improved data analysis / collection)</td>
</tr>
<tr>
<td>4</td>
<td>Commitment to apply RA (e.g. ALARP principles to produce Top Event Risk Model)</td>
</tr>
<tr>
<td>5</td>
<td>Using RA to understand how to overcome specific Duty Holder issues.</td>
</tr>
</tbody>
</table>

**Figure 8.16  Evidence of commitment to use RA from issues in Development Plans**

**Summary of Success Indicator 1.3**

Under the RSCR 1994 regime and the first transitional submission, little or no evidence exists in the RSCs that safety improvement measures had even been prioritised, let alone timescales and resources identified for their implementation. The most recent RSC submissions demonstrate a marked improvement, although some information on implementation commitment is still vague.

**8.5 SUCCESS INDICATOR 1.4 – INVOLVEMENT OF CONSULTANTS**

*Less use of outside consultants without close company involvement.*

For RA and risk control measures to be effective, the workforce within the Duty Holder’s organisation must take ‘ownership’ of the RA process and results. Outside consultants can add to the effectiveness of the RA by using their expertise to facilitate workshops and enabling broad involvement of the workforce. However, if the Duty Holder commissions the consultant to carry out the RA in isolation, away from those who will need to implement its conclusions, a barrier is potentially created and the RA loses effectiveness.

Data sources for this review have been the selected RSCs and Question 7.2 in the Questionnaire. From the RSCs, there is evidence of the use of consultants to assist in the preparation of the RSC document. These contributions have been rated according to a three point scale; the rating scale and findings are presented in Figure 8.17.
Figure 8.17 Duty Holder usage of consultants in RSC preparation

Figure 8.17 indicates that for TOCs and IMCs, the way in which consultants were used has been awarded the highest rating (three), whilst for FOCs and Vertically Integrated (VI) operations a rating of two was appropriate. This demonstrates that there is no evidence of consultants writing RSCs in isolation. However, it is recognised that the RSC document is unlikely to report that it has been written in isolation, and so it is difficult to conclude that RA was procured with sufficient Duty Holder workforce involvement.

8.6 SUCCESS INDICATOR 1.5 – ISSUE LOGS / ISSUES ASSOCIATED WITH INTERFACE RISK

*A reduction of the number of RA interface issues raised in Issue Logs.*

It was observed from the IC’s initial RSC submission that interface risk issues were anticipated to be particularly important given that operator franchises had not been awarded at that point. Figure 8.18 indicates a steady reduction in the number of issues in Issue Logs associated with interface risk over the three submission periods. This may indicate the success of the industry in tackling these interface requirements; alternatively, the anticipation of increased risk from interface management may not have been as significant as anticipated at privatisation. However, Question 2.2 in the Questionnaire asked Duty Holders: ‘what do you consider were the most significant implications for safety arising from privatisation’. Some 50% of respondents volunteered ‘interface risk’ as the most significant implication. The next question in the Questionnaire asked ‘are these factors still prominent’ and, of the ‘interface’ answers, 80% said yes.
Intermediate Objective 3 (IO3) recognises that effective cooperation between railway operators is essential to ensure that risks at the interface are properly addressed. However, whilst it is important not to become too complacent it would appear that measures are in hand to control such risk (as indicated in the reduction of issues in Issue Logs in Figure 8.18).

![Figure 8.18 Percentage of issues associated with interface risk](image)

One of the main purposes of the RSCR when introduced in 1994 was to cover interface issues in the fragmented and newly privatised railway industry. Concerns about interface risk have reduced in prominence over the years (though this should not be taken to indicate that interface risk is no longer a significant issue) and, at the same time, the overall purpose and scope of the RSC has expanded.

8.7 CONCLUSIONS FOR IO1

One of the main purposes of the RSCR when introduced in 1994 was to cover interface issues in the fragmented and newly privatised railway industry. However, whilst there is evidence that concerns about interface risks remain, their control has improved over time and the requirements of the RSC have subsequently expanded to cover other aspects of risk management in greater depth.

Whilst the regulatory requirement for RA was not introduced first in the RSCR 1994, there are indications of a greater use of RA as a proactive management tool after 1994 than pre-privatisation.

The potential effectiveness of the RA included in the latest submissions of RSCs appears to be significantly greater than in previous RSC submissions. [Effectiveness in this context has been measured in terms of the rigour of hazard identification (and particularly specific hazards for the specific operations, rather than just generic issues), the systematic nature of the RA approach and the linkage of risk control measures with the HSMS.]

Under the RSCR 1994 regime and first transitional submissions under the RSCR 2000 regime, little or no evidence exists in the RSCs that safety measures have been prioritised (and even less
that timescales and resources have been identified for their implementation). The most recent submitted / accepted RSCs present evidence to demonstrate a greater use of RA to prioritise safety improvements.

The nature of correspondence during the transitional RSC period provides evidence that the trend from the consideration of RA as a ‘one-off’ exercise to recognition of RA as a management tool has been assisted by the assessment and acceptance process under the RSCR 2000 regime.

However, there is also evidence of the need for further improvement in the use of RA in change management. In a number of instances, there are indications that RA was conducted after change has taken place (i.e. used in confirmatory rather than proactive role).

Greater application of RA to better appreciate the impact of management / corporate restructuring on accident risk is required. ‘Updating’ old RAs and concluding that risk levels have not changed precludes the identification of new risks.
9 INTERMEDIATE OBJECTIVE 2 - HSMS

To encourage railway operators to develop robust health and safety systems

9.1 IO CONTEXT

As discussed in Section 2.4, the development of HSMSs by Duty Holders is likely to have taken place without the requirements of the RSCR (driven by the HSWA and Railway Group Standards). However, the RSCR have potentially changed / enhanced the effectiveness of HSMSs by the emphasis on the process of their development.

Schedule 1(7) of the RSCR 1994 requires the Duty Holder to provide ‘particulars to demonstrate that the management system of the Duty Holder is adequate to ensure that the relevant statutory provisions will (in respect of matters within his control) be complied with in relation to the operation he intends to undertake’. Other schedules cover related topics of competency, communication (in-house and to other operators), consultation on health and safety matters with employees, accident / incident investigation and operational procedures. Regulation 9(11) specifically requires that safety representatives are consulted on the preparation of Safety Cases.

Schedule 1(5) of the RSCR 2000 brings a number of the above topics together, identifying the particulars to be provided in a Safety Case should include:

(a) a statement of the Duty Holder’s general policy with respect to the health and safety of persons affected by the operation he undertakes and of the health and safety objectives he intends to achieve in relation to it;

(b) particulars to demonstrate that the Duty Holder has an adequate organisation for carrying out the policy referred to above and adequate arrangements for ensuring the competence of his employees as respects health and safety;

(c) particulars of the arrangements that the Duty Holder has established for implementing the policy referred to above, for setting health and safety objectives and for measuring health and safety performance; and

(d) particulars of the arrangements that the Duty Holder has established for the carrying out of audits, for the making of audit reports and for the review of health and safety performance.

The requirements for employee consultation are also expanded in the RSCR 2000, with Regulation 14(8) stating that an employer who prepares or revises a Safety Case shall consult:

(a) safety representatives (within the meaning of regulation 2(1) of the Safety Representatives and Safety Committees Regulations 1997); and

(b) such other employees as he is required to consult by virtue of regulation 3 of the Health and Safety (Consultation with Employees) Regulations 1996.

The RSCR therefore brings together the importance of employee consultation in the development of the HSMS and the unique assessment / acceptance process, both of which test the robustness of the management system. Organisations in some industries can completely contract-out the task of establishing an HSMS to specialists with knowledge of British
Standards / ISO requirements, but this loses one of the important features in the HSMS development: identifying procedural and other gaps in current practice (see Section 2.4). The active involvement of the workforce in preparing an RSC is essential because they usually know what happens in practice and why. Workforce involvement can lead to the discovery of more efficient and safer ways of doing things. Furthermore, their involvement allows them to see how their individual efforts fit into the strategy for managing health and safety.

The recent HMRI RSC Assessment Manual\textsuperscript{(14)} indicates common weaknesses in HSMSs:

- The linkage between hazards / risks and the methods in the HSMS by which the risks are controlled is frequently not clear
- Lack of clarity and inconsistency in the use of terms can make the HSMS difficult to implement
- Safety culture and human factors: these are areas which are often neglected in an organisation’s approach to health and safety.

Safety leadership and a positive safety culture are identified as important in successful HSMSs. Evidence that a Duty Holder has taken measures to develop and maintain a positive safety culture includes, for example, how directors and senior managers participate in:

- Monitoring activities, both active and reactive
- Audits
- Meetings of health and safety committees
- Safety briefings.

Success indicators for IO2 in the following sub-sections reflect the above issues.
9.2 SUCCESS INDICATOR 2.1 – ASSISTANCE IN DEVELOPING HSMS

Assistance to private companies (new and existing) in developing an HSMS.

Figure 9.1 presents responses to Question 6.1 in the Questionnaire that asked ‘following industry privatisation in 1994, please indicate the degree to which your organisation’s HSMS changed (or is likely to change) following the introduction of RSCR in 1994, 2000 and 2003’. It is apparent that, for the 2000 submissions, more substantial modifications were necessary in comparison to the first submitted RSCs. Expectations for the future appear to indicate that modifications will be required, albeit to a lesser extent; this may be indicative of increasing maturity of Duty Holders’ HSMSs.

![Graph showing the degree of change in HSMS from 1994 to 2003](image)

**Figure 9.1** The degree to which Duty Holders HSMS changed in 1994, 2000 and is likely to change in 2003

Question 6.6A asked ‘have the 2000 RSCR necessitated a significant re-write of the HSMS?’. The average response rating (again on a scale of 1 to 5, where 1 = strongly disagree and 5 = strongly agree) is 2.9. This is in agreement with Figure 9.1. However, the distribution of responses evident in Figure 9.2 indicates that respondent’s views were split.
Figure 9.2  Distribution of Duty Holder’s responses relating to updates of HSMS following RSCR 2000

Figure 9.3 presents the same dataset according to Duty Holder type (e.g. TOC, IMC etc), and also groups the ratings into three sets: 1 plus 2, 3, and 4 plus 5. This reveals that the disparity comes from TOC respondents where there is evidence of at least a ‘substantial re-write’ for the majority, whilst others report a ‘modest re-write’; there were no ‘neutral’ responses. There was no evidence to suggest that the level of HSMS re-write was related to the date of franchise issue since most respondents’ franchises had been granted over a short period (mainly 1996 and 1997).

Figure 9.3  HSMS change following RSCR 2000 as reported by Duty Holders
Question 6.7 requested respondents to indicate ‘to what extent did the following aspects of the HSMS change in the 2000 RSCR’ for the aspects of the HSMS identified in Figure 9.4.

**Figure 9.4** The extent to which the various aspects of the HSMS changed for the 2000 RSCR

Figure 9.4 indicates that the greatest change in the HSMS is the demonstration of linkage between Risk Assessment (RA) and the HSMS. As discussed in Section 9.1, this was identified by the HSE as one of the major weaknesses in HSMSs and is highlighted in the HMRI RSC Assessment Manual\(^\text{14}\) as an area of particular attention for Inspectors. The assessment process appears to have had an impact on Duty Holders to at least revisit their RSCs and demonstrate that the linkage exists (or possibly alter the HSMS to reflect risk control measures arising from RA). The second most significant area of change shown in Figure 9.4 is competency assurance – this is specifically introduced in the RSCR 2000 under Schedule 1(5)(b) – see Section 9.1.

The above indicates change in the HSMS following the introduction of the RSCR 2000 which encompassed changes to RSC assessment procedure. Figure 9.5, which presents the answers to Question 6.12, indicates respondents’ views on the impact of the RSCR assessment process at three submission phases (initial, three-year resubmission and transitional) in improving the quality of the HSMS relative to the counterfactual (i.e. ‘no RSCR’). If it was the assessment process that had driven the improvements, it would have been expected from Figure 9.1 and Figure 9.4 that the transitional (2000 RSCR) regime would be identified as having the greatest impact but it is shown in Figure 9.5 to have the least. This indicates that respondents believe it is greater corporate / internal safety awareness in 2000 that has driven improvements / alterations rather than the RSC assessment process.
Figure 9.5 The extent to which the RSCR assessment process improved HSMS

Question 6.3 asked Duty Holders: ‘please indicate whether you agree that the RSCR provided an important catalyst for companies new to the railway industry to develop a suitable HSMS’. On a scale of 1 to 5 (with 1 = strongly disagree and 5 = strongly agree), the average Rating was 4.3 indicating the important role that the provisions of the RSCR has for ‘new players’. This view was also expressed at the Stakeholder Workshop where it was considered that the impact of the RSCR depends on whether the Duty Holder has been part of the railway sector for a considerable time (i.e. with origins back to British Rail) or has joined the railway industry within the last few years (with parentage possibly from a different industry sector). Again the greatest impact was considered to be for ‘new players’.

From the figures and discussion above, it is obvious that there is diverse opinion both on the influences changing the HSMS under the RSCR 2000 and the associated level of change. To add detail to the discussion, it is useful to consider individual views expressed by respondents to the Questionnaire. Question 6.1B asked respondents to indicate what they thought the main changes in their HSMS have been and when they occurred. A sample of usable responses is presented in Table 9.1. Also presented are the associated answers to Question 6.1C that sought to identify whether the RSCR had made any additional contributions to the HSMS, over and above those required by other regulations. The full text to both questions is presented in Table 9.1.
Table 9.1 HSMS change and the role of RSCR

<table>
<thead>
<tr>
<th>Question 6.1 B</th>
<th>Question 6.1 C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please outline what you think the main changes in your HSMS have been and when they occurred.</td>
<td>Although in compliance with the Health and Safety at Work Act and Management of Health and Safety at Work Regulations 1992 (MHSW), were gaps subsequently found in the provisions of a management system for health and safety when implementing the RSCR.</td>
</tr>
</tbody>
</table>

- Risk Assessment process overhauled in 2002 - No major gaps, but the initial scope of RSC was very small
- Improved structure using HS(G)65. More consistent through implementation of RGSs - No
- Competence Management. During 2001 - Yes
- At introduction of various new or revised regulations or legislation - -
- The main was the change from possession only to open line in 1998, and then major growth until 2002 -
- More specific now - No
- To comply with 2000 Regs, we have had to include much more detail about responsibilities for individual elements. To comply with 2003, we shall have to re-write (at least) the "Audit" section - No
- Driver management 1996, competence systems 1996, increased inclusion of health issues 2000, changed risk management processes 1997 and 2001, station management arrangements inc. ticket gates 2000 - Yes, because we did not have a full enough understanding of our risks. In the original RSC acceptance panel we were asked what was our biggest risk; this had not been included in the draft RSC. It was guessed as SPADs although when the Risk Assessments were carried out this was found to be untrue even for catastrophic risk (vehicle defects are higher)

1. 1994 Writing it all down for the first time - Yes, but relatively minor
2. 1997 3 yearly revision incorporating better processes, improved change controls -
3. 2000 much improved Risk Assessment section, better control of change and contractors -
4. 2002 further Risk Assessment improvements and links to controls -
5. 2003 simple updating to audit processes. -

- Main change was adoption of HS(G) 65 style system in 1994 - Yes
- More relevant, realistic and achievable - No. Regulations have always been the minimum standard applied by this Company. Company standards are generally more onerous
- Yes, but this was a reflection of new owners/managers taking a more proactive role in safety management.

1. 1994 major formalising of SMS - Yes - e.g. audit of certain parts of SMS. Also level of detail in some areas
2. 2002 adoption of Safety Risk Model - Yes

Initial introduction of the RSC in 1994:

Yes
Question 6.1 B (cont)

Please outline what you think the main changes in your HSMS have been and when they occurred.

- Competence management systems-1994 onwards, internal audit and checks systems
  - No
- HSE meetings/visits/competence systems/audits.
  - No
- As part of the development of the triennial review of the three RSCs we identified that they were of very poor quality, as were the associated SMSs. The decision was taken at that time (and in conjunction with the 2000 Regs) to re-write three new RSCs and replace the existing three 'safety management systems' with one professional and robust SMS across the three TOCs.
  - Yes

Responses to Question 6.1B, identify a wide-ranging number of drivers that have influenced changes to the HSMS. Examples include: RSCR, audit findings, adoption of Safety Risk Model, competence management and control of contractors. There is also evidence from Question 6.1C that the process of developing the RSCR was beneficial, over and above other regulations, in terms of identifying gaps in the HSMS for some Duty Holders. This is to be expected. There is also a sizeable number of respondents indicating that the RSCR process identified no gaps in the HSMS; suggesting that either the RSCR has minimal impact or that current HSMS are/were sufficiently well developed.

An additional contribution that the RSCR could have made to the structure of the HSMS is via the development of new Group Standards; this was the subject of Question 6.16. The question read: ‘has the process of producing RSCs assisted in identifying and developing new procedures that have led to new Group Standards?’. Responses were recorded in a 'yes / no' tick-box format and are presented in Figure 9.6.

![Figure 9.6](image)

**Figure 9.6** Number of Duty Holders reporting that the development of the RSC has led to new Group Standards
Figure 9.6 identifies that a fairly small number of respondents (five) report new Group Standards that have resulted from the RSCR. The follow-up query, Question 6.16B, asked for some examples. These were:

- Automatic ticket gates
- Company Standards (not Group Standards):
  - Procedure for the management of contractors
  - Procedure for the acceptance of other TOCs onto the infrastructure
  - Accident and incident procedure enhancement
  - Alcohol and drugs policy
  - Standards for operational RA
- Generally no, but Group Standard 6509 [Guidance on Assessment by Railway Safety of Train and Station Operators’ Railway Safety Cases] was an exception
- Train driving codes of practise, drugs and alcohol, freight train loading.

Since the development of new Group Standards was not an intended outcome of the RSCR, any enhancements that result from the RSCR could be regarded as a ‘bonus’ improvement.

**Summary of Success Indicator 2.1**

Whilst the 1994 RSCR was, for many operators, the initial driver to formally document their HSMS, the 2000 RSCR appears to have necessitated a significant re-write (and enhancement) of the HSMS documentation. The most significant changes were reported to be in the demonstration of linkage between Risk Assessment and the HSMS, and in the competency of staff.

A general view from the Workshop and Questionnaire responses is that a number of companies were assisted in the development of an HSMS by the provisions of the RSCR, although the strong (unsubstantiated) feeling was that ‘new players’ had benefited most.

The specific aspect of the RSCR that has had the greatest impact on changes to HSMSs has not been clearly identified, although the RSC assessment process has been noted as only a moderate driver.

**9.3 SUCCESS INDICATOR 2.2 – INCREASED ATTEMPTS TO ENSURE COMPETENCE**

*Trend in the allocation of resources for assessment / reassessment of individuals and teams, training and recruitment to ensure frontline competence.*

Question 6.14 in the Questionnaire asked ‘to what extent are training and management systems identified within your HSMS to ensure competence during periods of change or abnormal operations?’. Responses were recorded on the 1 to 5 scale (where 1 = small extent, 3 = moderate extent and 5 = large extent). The average response was 3.3. This is a disappointing response, given the requirements concerning competence in the RSCR 2000 (as discussed under success indicator 2.1) and the rating in Figure 9.4 showing changes in the HSMS related to competence assurance.
The Development Plans in the most recently submitted RSCs have also been appraised in relation to enhancing employee safety competence. Figure 9.7 presents the results of the appraisal for different groups of operators. The definition of ratings are included under the figure; also included are the total number of Development Plan commitments reviewed.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Changes to enhance workforce safety competence could happen immediately</td>
</tr>
<tr>
<td>2</td>
<td>Weak justification/ reticence to improve competence</td>
</tr>
<tr>
<td>3</td>
<td>Reasonable evidence indicating commitment to improve competence</td>
</tr>
<tr>
<td>4</td>
<td>Acceptable to have in Development Plan as immediate improvements are not possible</td>
</tr>
</tbody>
</table>

Figure 9.7  Duty Holders intention to enhance workforce safety competence evident in Development Plan

Apart from the IC, the evidence of commitment to competency enhancement was fairly weak and justification for deferral of action into the Development Plan rather than implementing it immediately was judged to be borderline. The TOC Development Plans emphasised the need to include training for escape from trains (following the Uff report\(^{29}\) on the Southall accident and the RSCR 2001 amendments). The heritage operator received the lowest rating. However, given the reliance on voluntary labour and the difference in the nature of operations, available resources are quite different from those of a mainline TOC operator.

9.4  SUCCESS INDICATOR 2.3 – IMPROVED CONTROL OF CONTRACTORS

For the control of contractors: evidence of more frequent contact and monitoring of safety performance (audit).

The selected RSCs were appraised for evidence of more frequent liaison meetings, briefings and / or safety performance audits of contractors / subcontractors. The average frequency of safety audits of contractors is given in Figure 9.8. The reviewed heritage railway operations made no
reference to audit and, in the context of reliance on voluntary labour, this may be understandable although the safety implications might need to be considered.

![Graph showing frequency of contractor audit evident in RSCs]

**Figure 9.8** Frequency of contractor audit evident in RSCs

Responses to Question 5.5 in the Questionnaire have been used to identify whether there have been any changes in the level of resources required to manage the contracted workforce. The question asked how many staff days are / were taken to select and control contractors in: 1995, 2000 and 2003. The maximum, average and minimum number of days per-annum are presented in Figure 9.9. Inspection of Figure 9.9 indicates that there has been an overall increase in the number of days allocated for the control contractors between 1995 and 2003. However, the vast difference in reported staff days for contractor control activities is difficult to explain. The maximum figures in 2000 and 2003 were supplied by a TOC and the minimum line has been compiled from responses from IMCs. This is a curious finding given that IMCs are likely to use contractors to a larger extent than TOCs. It is important to note that only eight respondents answered this question and, of these, only five provided data for all three time-points. The conclusion that the need or commitment to control contractors has been increased with time (1995 – 2003) must therefore be treated with caution.
Figure 9.9 Number of days per-annum used to control contractors.

The RSCs were also reviewed for evidence of improvement in the clarity and definition (quality) of the contractor safety audit process. Figure 9.10 presents the results, with the definition of ratings given under the figure.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control of contractors is piecemeal and ad-hoc. Generic statements for all contractors</td>
</tr>
<tr>
<td>2</td>
<td>No evidence of systematic/ planned audit, again ad-hoc. For TOCs, the infrastructure controller interface is separated from other contractors</td>
</tr>
<tr>
<td>3</td>
<td>Evidence that contractor’s HSMS is compatible with Duty Holder</td>
</tr>
<tr>
<td>4</td>
<td>As 3, and individual contractors provide method statements to Duty Holder which provide the basis for planned audit</td>
</tr>
</tbody>
</table>

Figure 9.10 Quality of contractor audit evident from RSC
Submissions under the RSCR 2000 show some improvement in quality and this may be linked to the recommendations of the Cullen report\textsuperscript{(12)} and the HSC document on the ‘Use of Contractors in the Maintenance of the Mainline Railway Infrastructure’ published in 2002. The improvement, however, is minimal.

### 9.5 SUCCESS INDICATOR 2.4 –METHODS USED TO CONTROL CONTRACTORS

Changes to methods adopted to control contractors

To understand the techniques that Duty Holders use to manage contractors, responses to Question 6.8 in the Questionnaire have been analysed. The question asked: ‘is the HSMS of the Duty Holder imposed as the guiding safety system for contractor / subcontractors and / or is the contractor’s in-house HSMS audited by the Duty Holder for acceptability’. Answers were recorded as a written response and have been subsequently split according to the following categories:

- Duty Holder’s HSMS imposed on contractor
- Duty Holder audit of contractor’s HSMS
- Both (i.e. a combination of audit and adoption of Duty Holder’s HSMS).

![Figure 9.11 Methods for the management of contractor’s HSMS](image)

Eight respondents reported that they audited their contractor’s HSMS and another eight also used this audit in combination with an imposition of their own HSMS. Two respondents audited contractor’s HSMS solely against their own HSMS. The following considers how the similar relationship between Duty Holders and suppliers is managed.

Question 6.9 in the Questionnaire requested information about the control of safety down the supply chain. Responses were recorded as either ‘yes’ or ‘no’ and Figure 9.12 presents the findings. It can be seen that 90% of respondents stated that all three control approaches identified (Method Statements, direct observations and systematic audit) are adopted by Duty Holders.
Figure 9.12  Methods of controlling health and safety down the supply chain
Evidence that any preventative measures from incident investigations are fed-back and appropriate revisions to the HSMS implemented

Whilst the Railway Group provides a forum to collect information and produce statistics on incidents, any associated preventative measures should be assessed and incorporated as appropriate by Duty Holders in their operations. The RA and HSMS provide the mechanism for implementing such measures effectively.

The RSCs have been assessed for evidence of a desire to learn from industry events and the results are presented in Figure 9.13. Using the rating categories under the figure, a substantial improvement in the safety management process is indicated from the initial RSC submissions post-privatisation to now.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No feedback. RSC emphasis is on procedures for reporting</td>
</tr>
<tr>
<td>2</td>
<td>Reaction to compliance with other regulations (not RSCR) e.g. TPWS from Railway Safety Regulations 1999. Statements that findings may result in updated rules and procedures</td>
</tr>
<tr>
<td>3</td>
<td>Safety statistics are fed into RA / HSMS</td>
</tr>
<tr>
<td>4</td>
<td>Proactive response to industry events, possibly evident in Development Plan</td>
</tr>
</tbody>
</table>

Figure 9.13  Findings from incident investigations that are fed back to HSMS over the three regime periods
9.7 SUCCESS INDICATOR 2.6 – EMERGENCY RESPONSE AND ESCAPE TRAINING

The trend in the resources allocated to emergency response and escape training/exercises.

The data used to assess this success indicator comes from the Questionnaire. The frequency of ‘live’ emergency exercises organised by the Duty Holder was examined in Question 8.3 and responses ranged from 0 to 4 exercises per annum. Some (two) respondents volunteered that these were ‘table top’ exercises.

Training required for escape from trains was examined in Question 8.4 which asked ‘has additional training of drivers and / or other staff been necessary to provide suitable arrangements for escape from trains (as opposed to organised evacuation)?’ Answers were recorded in a ‘yes’ or ‘no’ format and are presented in Figure 9.14 which indicates that approximately 60% of respondents have provided their crews with training related to escape from trains.

Figure 9.14 Proportion and number of Duty Holders that provided additional training of drivers / other staff for escape from trains.
9.8 SUCCESS INDICATOR 2.7 – PROACTIVE APPROACH TO SAFETY

Individual employees should observe a proactive approach to safety in day-to-day activities.

The notion of ‘safety culture’ at an employee level is deemed to be indicative of increased involvement and proactivity. Following the Clapham and Kings Cross rail disaster investigations, the concept of safety culture in the rail industry was brought to the fore. More recently, Lord Cullen’s inquiry into the Ladbroke Grove rail accident in 1999\(^{(12)}\) identified that safety was dependent, in part, upon effective leadership. The inquiry heard that, following privatisation and the associated fragmentation of the industry, safety leadership had suffered.

For a Duty Holder’s HSMS to be fully effective, every employee of the Duty Holder must be aware of his / her role and responsibilities. Figure 9.15, compiled from Question 6.11 in the Questionnaire, indicates the degree to which the basic principles associated with HSMS are understood throughout a Duty Holder’s organisation and across the railway industry. The question asked whether the respondent agreed ‘that the basic principles are accepted industry-wide’ with a scale of 1 to 5 (1 = strongly disagree, 3 = neutral and 5 = strongly agree). The results indicate a much greater understanding of the HSMS now than in 1994.

![Figure 9.15](image-url)

Figure 9.15 The degree to which the basic principles associated with HSMS are accepted industry-wide for the years 1994 and 2003

The improvements in HSMS understanding, as reported by respondents, coincides with the responses received in relation to Question 6.10 which asked: ‘to what extent has the safety culture improved at the employee level since 1994?’ Responses gauged on a 1 – 5 scale are presented in Figure 9.16. The spread of responses highlights an overall improvement.
Figure 9.16 Extent to which employee safety culture has improved since 1994

Whilst respondents report an improvement, this should not be taken as a definitive indication of actual safety culture enhancements. A recent statement made by the chair of the Health and Safety Commission (Bill Callaghan) maintains that, whilst much has been achieved, more is required:

_The rail industry continues its work to improve safety and I acknowledge that overall the industry has made significant progress. But I remain concerned that Lord Cullen’s core message on safety culture is not yet penetrating down through the whole industry._\(^{[30]}\)

The lack of reliable data to indicate levels of safety culture in the rail industry has been recognised by researchers\(^{[31]}\), and the impact of the RSCR on improvements is very hard to assess.

## 9.9 CONCLUSIONS FOR IO2

Whilst safety management systems would have been developed without the requirements of the RSCR, there is evidence that the introduction of the need to submit an RSC has had an influence on improving the quality and effectiveness of HSMS post-privatisation. There is also evidence that further, and possibly more significant, changes to the HSMS arose with the introduction of the RSCR 2000.

The improvements in the HSMSs following privatisation and the introduction of the RSCR is perhaps well expressed in the assessor’s comments on the IC’s first RSC:

_This document is certainly a clearer description of the structure and responsibilities for safety of its various parts than we ever received from BRB (British Rail Board); so it should be, since its production is now a statutory requirement. But I have found that the closer the action gets to ground level, the weaker the document becomes, as we have hitherto found with virtually all the high level good intentions expressed by BRB._  
(Document reference: 1/37)
The role of the RSCR in development of an effective HSMS appears to be most significant for ‘new players’ (organisations entering the railway industry within the last few years whose experience is predominantly in other industrial sectors).

The RSCR 2000 appears to have had greatest impact in terms of the demonstration of linkage between Risk Assessment (RA) and the HSMS, and potentially the need to alter the HSMS to accommodate risk control measures arising from RA. However, since 1994, a greater understanding of the safety management process appears to have grown with the need for the HSMS to be ‘live’ (e.g. responding to risks highlighted from incidents / events and their associated preventative measures). It has been shown that this understanding of the basic principles of the HSMS has improved industry-wide, though there is still evidence of instances of poor linkage between RA findings and provisions made in the HSMS to control these risks.

The second most significant area of change in the HSMS is indicated to be competency assurance (which was specially introduced as a requirement of the RSC under RSCR 2000). However, evidence of commitment to competency enhancement (e.g. training) was fairly weak and the justification for deferral of associated actions (i.e. inclusion in Development Plans) was borderline.

Evidence was available that increased resources are now being allocated by Duty Holders to control contractors, and obtain compatibility between Duty Holders’ and contractors’ HSMSs. However, evidence of improvements in the clarity / quality of contractor safety audits appears to be minimal. Management processes (Method Statements, direct observation and systematic audit) are reported to be in place for Duty Holders to control health and safety provisions down the supply chain, but the effective implementation of such processes for complex and extensive chains is not always evident.
10 INTERMEDIATE OBJECTIVE 3 – DUTY HOLDER CO-OPERATION

To encourage railway operators to co-operate on health and safety issues.

10.1 IO CONTEXT

One of the major concerns in 1994 was the potential deterioration of safety levels following the privatisation and fragmentation of the industry. As a ‘snapshot’, the Cullen report in 2000 refers to 26 passenger TOCs (owned by a total of 11 parent companies), 2 principal freight TOCs (FOCs), 7 IMCs, 6 track renewal companies and 2,000 subcontractors working on the Railtrack network. Effective co-operation between railway operators is therefore essential to ensure that risks at the interface are properly addressed and controlled.

Regulation 8 of the RSCR 1994 requires that other railway operators (whose operations interact with the Duty Holder submitting the RSC) and employers of personnel carrying out work on premises / plant owned or controlled by the Duty Holder must co-operate to ensure compliance with the Regulations.

Regulation 11 of the RSCR 2000 includes similar requirements but expands the need to co-operate in terms of assessment and audit:

(a) co-operate so far as is necessary with a railway operator (in this regulation referred to a “the Duty Holder”) to enable him to comply with the provisions of these Regulations; and

(b) co-operate so far as is necessary with an assessment body to enable it to make any recommendation pursuant to regulations 4 or 5 and to carry out any audit referred to in regulation 9.

The above requirements are phrased around co-operation to achieve compliance with the Regulations: this is difficult to evaluate and measure apart from reviewing correspondence during the preparation of RSCs and interface issues in Issue Logs (both of which form part of this IO evaluation). The specifics of interface issues associated with Risk Assessment (RA) identified in Issue Logs is covered under IO1. The success indicators presented below therefore contain some which seek evidence of general industry co-operation on safety matters (meetings, briefing sessions, etc). The essence of the RSCR in 1994 was to foster such interface dialogue in the face of privatisation and potential fragmentation.

10.2 SUCCESS INDICATOR 3.1 – COMMUNICATING RA FINDINGS

RA and RSC preparation. Adequate systems must exist to communicate findings of RA to other affected Duty Holders; this should include the provision of feedback.

The RSCR does not specify a particular way for Duty Holders to communicate relevant findings from RA to parties that may be affected. Question 5.1A in the Questionnaire asked respondents to indicate whether information arising from operator specific RA that would be relevant to other operators is communicated to them and, if so, how it is communicated. A selection of responses is presented in Table 10.1, which indicates that Duty Holders do communicate RA findings, though the mechanisms that are deployed to achieve this are varied. The next logical step would be for recipients to provide feedback to the sender reflecting what actions, if any, are to be taken. This was the subject of Question 5.1B; the findings are presented alongside
answers to Question 5.1A in Table 10.1. Inspection of the answers demonstrates that feedback is received in the majority of cases, and it appears that the most effective method of communication is face-to-face meetings. However, feedback does not always occur, which indicates that either there are no interface problems with the RA or the communication method has not been effective.

### Table 10.1 Communication of RA to other Duty Holders

<table>
<thead>
<tr>
<th>Question 5.1A</th>
<th>Question 5.1B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Please outline how, if at all, information arising from operator specific Risk Assessment that would be relevant to other operators is communicated to them:</strong></td>
<td>If such communication occurs, is considered feedback received from the recipients?</td>
</tr>
<tr>
<td>All risk assessments shared with other operators in a working relationship</td>
<td>Yes</td>
</tr>
<tr>
<td>We would prepare a paper for circulation via the Railway Group. In extreme cases Urgent Operating Advices are one form of promulgation</td>
<td>N/a</td>
</tr>
<tr>
<td>Verbal, correspondence, inclusion in Risk Assessment process</td>
<td>Depends on the risks identified and the requirement for feedback from the affected organisation. The industry works to the same standards - sometimes the HSE seems to be unaware of this</td>
</tr>
<tr>
<td>It is not. It would be communicated to suppliers of plant and drivers as part of our legal responsibilities</td>
<td></td>
</tr>
<tr>
<td>Via the contract</td>
<td>Yes</td>
</tr>
<tr>
<td>We use the same consultants as many other operators who do share views</td>
<td></td>
</tr>
<tr>
<td>It depends on what it is! For example, see Group Standard GE/RT 8250 &amp; GO/RT3350 and other reporting requirements described in the Rule Book. There are also regular inter-company special interest group meetings</td>
<td>Ditto</td>
</tr>
<tr>
<td>By method statement</td>
<td>Yes (generally)</td>
</tr>
<tr>
<td>1. Through owning groups [Parent Companies] 2. With geographically close TOCs with whom we have close links and are regularly communicating on safety matters</td>
<td>They tend to be by discussion rather than posting a copy of a Risk Assessment report; thus there is considerable feedback / discussion</td>
</tr>
<tr>
<td>Train Operating Company Safety Group</td>
<td>Yes</td>
</tr>
<tr>
<td>Involvement of IC representatives in assessments</td>
<td>Yes, within the workshop</td>
</tr>
<tr>
<td>As we are the only ‘Rack’ passenger railway in the UK, there is no communication. However, there is dialogue with Swiss counterparts</td>
<td>Rarely</td>
</tr>
<tr>
<td>Involvement in Risk Assessment. By post/e-mail</td>
<td>By circulation of our RSC</td>
</tr>
<tr>
<td>By Liaison/User Group meetings</td>
<td>Discussion at the meeting</td>
</tr>
<tr>
<td>‘Regular’ operators hold our RSC and we theirs. ‘Occasional’ operators are required to be briefed</td>
<td>So far, yes, and in a very helpful form</td>
</tr>
</tbody>
</table>
**Question 5.1A (cont)**

Please outline how, if at all, information arising from operator specific Risk Assessment that would be relevant to other operators is communicated to them:

<table>
<thead>
<tr>
<th>Pre-work briefings</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publication in our RSC, publication of regional hazard directories and, through mechanisms specified in certain group and company standards e.g. for SPADs and gauging</td>
<td>Occasionally</td>
</tr>
<tr>
<td>There is no formal process for this across the industry that can achieve this</td>
<td></td>
</tr>
<tr>
<td>This is a poorly addressed area by the industry. We copy the relevant bodies with finding which directly affect them</td>
<td>Dialogue may take place at local interface meetings</td>
</tr>
</tbody>
</table>

The last two responses imply that the communication of findings has some problematic aspects. It appears that the range of methods used to impart findings (e.g. distributing the RSC, engaging in workshops, and using consultants) indicates the absence of a formal and structured process. This only presents a problem if the affected Duty Holder does not understand what interface risks there are and how their operations are affected. The variety of methods that are used may achieve such understanding, though there is no certainty that this is the case.

The reliance on reading an RSC or complying with specific standards does not ensure that Duty Holder A understands what Duty Holder B might need to, or is trying to, communicate to them. Methods such as joint RA workshops and face-to-face meetings are more likely to ensure that such mutual understanding exists. The recipient of RA findings is then in a position to respond and act accordingly.

A parallel issue associated with the above relates to Duty Holders sharing audit reports. Following an interview with the IC, it appears that requests from Duty Holders to see other operators’ audit reports is very low. The IC reported that, of the 30 large TOCs, two attended a Network Rail audit presentation. This suggests that Duty Holders either cannot attend or do not see the value of attending. The interview also highlighted that TOC to TOC communications relating to audit were reported to be poor unless any problems, associated with the audit, had arisen.

**10.3 SUCCESS INDICATOR 3.2 – JOINT HAZARD IDENTIFICATION AT INTERFACES**

*Joint HAZIDS / HAZOPS – evidence of continuous improvement in understanding potential hazards at interfaces.*

The extent to which hazards are collectively identified at interfaces was the subject of Questions 5.2 and 7.4 in the Questionnaire. Question 5.2 asked respondents to indicate how frequently joint (e.g. TOC to TOC) Hazard Identification Studies and Hazard and Operability Studies (HAZIDS / HAZOPS) are conducted to ensure interface risks are fully identified; responses to this question are presented in Figure 10.1.
The pattern of responses indicates that, at best, 28% of Duty Holders conduct joint HAZIDS/HAZOPS annually, the IC reported monthly participation, whilst the majority never participate in such studies. Although other influences may prevent attendance at joint HAZIDS/HAZOPS, it appears that the RSCR has not inspired such co-operation. To provide further insight, Question 7.4 asked ‘to what extent are the workforce involved in HAZIDS / HAZOPS and the identification of risk’. The responses were recorded on the 1 to 5 scale (where 1 = small extent and 5 = large extent), and are presented in Figure 10.2. The average rating was 3.5, indicating ‘moderate’ involvement.
Following communications with a Trade Union member representing the rail industry workforce, this finding could not be corroborated: ‘very few staff seem aware of any Risk Assessments, let alone actually attending a workshop on the subject.’ The level of workforce involvement in RA required by the RSCR would appear to require clarification. A small sample of the workforce that is represented in RA may have the potential to identify a wide range of risks. However, a likely mechanism underlying the effectiveness of workforce involvement is that it encourages those affected by risks to increase their own appreciation of risk and how their behaviours may increase or decrease the safety of their work environment. Therefore, the positive impact of workforce involvement is likely to increase as more are involved.

Irrespective of whether workforce involvement is presently high or low, the low frequency of joint HAZIDS / HAZOPS means that the value of frontline contribution to interface risk understanding cannot be realised.

### 10.4 SUCCESS INDICATOR 3.3 – LINKAGE BETWEEN RSC AND GROUP OBJECTIVES

*Risk control measures and Safety Objectives in RSCs indicate a closer linkage with Group Objectives.*

The Railway Group produces an annual Safety Plan\(^{(32)}\). The first national Railway Safety Plan was produced by the British Railways Board (BRB) in 1991, and a plan has been published each year since then. Each Railway Group member should ‘develop a supporting, action-orientated plan setting out how they will deliver their commitment to achieving the Railway Group Safety Plan objectives’\(^{(32)}\).

The RSC should set down the Duty Holder’s Safety Policy and Objectives (and how these objectives will be achieved). In the HMRI RSC Assessment Criteria\(^{(14)}\), it states that ‘for Duty
Holders who are members of the Railway Group, reference should be made to the Railway Group Safety Plan, and how objectives in the Plan are incorporated into the Duty Holder’s and the company’s health and safety objectives’. This linkage indicates both that safety targets are not to be considered in isolation and that there is a clarity in the Duty Holder’s approach to safety.

Figure 10.3 has been compiled from a review of the selected RSCs at three submission phases (initial, three-year resubmission and the most recent RSC). It can be seen that in the majority (75% - 100%) of submissions the Duty Holder’s Safety Objectives are related to Group Objectives and this has been the situation since the initial submissions post-privatisation.

![Figure 10.3](image)

**Figure 10.3** Does the RSC relate its own Safety Objectives to Group Plan objectives / BRB objectives to indicate industry ‘co-operation’? (Yes/No classification)

As outlined above, the RSC should also contain information on how objectives will be achieved – this should cover both Group objectives as well as specific operational objectives. Figure 10.4 (also based on a review of the selected RSCs) indicates that there is little evidence of how objectives will be met. The average rating, using the definitions under the figure, has not changed significantly over the RSCR regime period (1994 to date).
Rating Definition

1 No description of HOW Railway Group objectives are met
2 Some evidence of HOW Railway Group objectives are fulfilled, though objectives are treated globally and not individually
3 Each individual Railway Group objective is identified and their achievement is clearly outlined

Figure 10.4 Does the Safety Case specify how Group objectives are being met?

For the most recent submissions, the selected RSCs have been inspected for evidence of Railway Group objectives being encapsulated in the Development Plan. The RSCs have been considered under the type of operation (i.e. IMCs, TOCs, or IC) as shown in Figure 10.5. The ratings, as defined under the figure, indicate that the IC and IMCs latest submissions contain reasonable linkage to Group objectives. However, it should be highlighted that, in the case of the IC, the improvement in this indicator between first submission under the RSCR 2000 and the most recent submission is considerable. The RSC assessment process appears to have had a significant impact on good documentation of the linkage.
SUCCESS INDICATOR 3.4 – REASONABLE REQUESTS: NUMBER AND SEVERITY

Number and severity of issues raised in ‘Reasonable Requests’ is an indication of cooperation and the ability of the industry to resolve health and safety matters on a day-to-day basis.

Regulation 4 (1)(c) of the RSCR 2000 places a responsibility on Duty Holders to comply with any ‘Reasonable Requests’ the IC may make regarding any aspect of the Duty Holder’s activities which affects, or is likely to affect, the IC’s own safety duties. Information provided by the IC indicates that following the introduction of the RSCR 2000 (31st December 2000) there have been five such Reasonable Requests. None of these have required the IC to notify the HSE of any action needed to achieve compliance with the Reasonable Request as required by Regulation 13 (1)(b). According to the IC:

[this] ‘reflects the high level of co-operation with other RSC Duty Holders and the consequent ability of the industry to resolve issues through the normal course of day to day business […] Railtrack is of the opinion that similar provisions should be retained in any future version of the Regulations because, when used sparingly, they strengthen considerably the IC’s escalation policy for discharging its duties under the Regulations.’
The minimal number of Reasonable Requests does, as identified in the quote, indicate that Duty Holders co-operate to the extent that Reasonable Requests are used as a ‘last resort’. The potential application of a Reasonable Request may act as an incentive for Duty Holders to work towards resolving problems and issues.

10.6 SUCCESS INDICATOR 3.5 – DRIVERS AND FREQUENCY OF TOC TO TOC SAFETY MEETINGS

Nature and volume of safety meetings arranged for TOC / TOCs.

In relation to formal commitments made by Duty Holders for organisational and inter-organisational communication, Figure 10.6 presents the results for Question 10.2 which asked: ‘to what extent do each of the following regulations and standards require comprehensive documentation of methods and frequencies for organisational and inter-organisational communications?’ Response options were: RSCR 1994, RSCR 2000, Group Standards, and Management of Health and Safety at Work Regulations (MHSWR). Figure 10.6 presents the findings.

Figure 10.6 Extent to which various regulations and standards require documentation of methods and frequencies for inter-organisational communication

The information indicates that there have been some improvements in the role of the RSCR between 1994 and 2000, though the moderate rating for 2000 is equivalent to Group Standards and the MHSWR. However, the mode average for RSCR 2000 is five which indicates that, for some, the RSCR 2000 has improved communication to a large extent. The implication for the RSCR is that its contribution to structuring communication is comparable to other drivers in industry.
10.7 SUCCESS INDICATOR 3.6 – PARENT COMPANY COMMITMENT TO HEALTH AND SAFETY

Greater awareness on part of Parent Companies in terms of frequency/commitment to safety meetings of inter-company co-operation and co-ordination in health and safety. Trend towards group strategic planning rather than reactive agenda.

One area where co-operation regarding health and safety could be expected is that between a Parent Company and its TOCs. The nature of such contact could serve both to enhance safety (e.g. via sharing of good practice), or diminish it (e.g. via blanket transference of RSCs between Duty Holders). The extent of Parent Company contribution to the safety strategy of individual operating companies is examined in Question 5.3B in the Questionnaire, the findings of which are presented in Figure 10.7.

**Figure 10.7** The extent and nature of Parent Company contribution to safety strategy

The principal observation to be made from Figure 10.7 is that the Parent Company does not take much more than a ‘moderate’ role in the safety strategy of the individual operators. The average rating (3.2) for option ‘a’ indicates that Duty Holders report that Parent Companies instigate a moderate level of contact and safety updates, which indicates the sharing of good practice. Of particular note is the reported lack of engagement in the development of an RSC (which may indicate that RSCs are not being misappropriated amongst Duty Holders). However, following additional inspection of the RSCs, it was observed that some Duty Holders have submitted virtually identical RSCs, reflecting a Parent Company template. The implications of this policy are discussed below.

Whilst such an approach to RSC production could offer benefits through the sharing of good practice, the application of such an approach may undermine the understanding of risk and risk management if the RSC has been developed without workforce and frontline management input.
As an example, following the introduction of the RSCR 2000, the first submission made by one Duty Holder under review closely resembled its accepted RSCR 1994 version. Following assessment of the new document it was not initially accepted. Five months after the initial submission and four months after HMRI’s initial screening had been sent to the Duty Holder, a second submission was made and its contents had changed considerably. Correspondence between the Duty Holder and HMRI indicated that another TOC’s RSC had been adapted into the Parent Company format and this had been used to shape the resubmission of the Duty Holder in question. Given that the timescale for redrafting an RSC was fairly short, the extent to which the adoption of the RSC template could reflect the true nature of the Duty Holder’s risk profile and HSMS is questionable.

A comparison between this RSC and that of a third Duty Holder also being reviewed, both under the same Parent Company, again indicated near identical RSCs (though there were some notable differences). It was noted that RA findings presented in each RSC varied according to the output of an RA workshop organised for each individual Duty Holder.

The RA workshop(s) identified above were facilitated by a consultant who used a generic set of risks (listed in Railtrack’s RSC) that were adapted to reflect those of the TOC according to both Duty Holder specific accident data and contributions made at the RA workshop. The RSC indicates that various managers and union representatives attended the workshop and, following an interview with the relevant HMRI Inspector, there also appears to have been some involvement of the workforce, although the content / format of the RSC does not allude to this. The description of the HSMS in the RSC for both Duty Holders is virtually identical, despite the risks being different. Indeed, the Development Plans for the two operators were also nearly identical. The relevant HMRI Inspector highlighted the differences between the Duty Holders (in terms of the geographical area on which they operate, the scale of the operation and the communities served) to argue that the RSCs could not, in reality, be the same. From an assessment point of view, the RSCs were reasonable documents, though it was evident that the RSCs were not reflective of the Duty Holders’ HSMS, nor their developmental requirements. According to the HMRI Inspector, whilst the Duty Holders had been willing to co-operate with HMRI and to examine the risks associated with their own operations, the Parent Company’s input had inhibited this process from occurring.

In this instance, it appears that rather than the Parent Company encouraging the spread of good practice, their involvement has served to simplify and standardise the RSC to gain acceptance. The consequence of this may reduce relevance and ownership of the document. The value of an RSC lies in part in the process of its development as well as in its subsequent usage as a safety document. What is important is that the RSC provides evidence of an understanding of risk and risk management, by those that are responsible for safety. The approach highlighted above seems to undermine the realisation of this.
10.8 SUCCESS INDICATOR 3.7 – INDUSTRY WORKING GROUPS

*Overall increased number and breadth of industry working groups.*

The increased attendance of representatives at industry working groups is seen to be indicative of improved co-operation amongst Duty Holders. Question 5.4 in the Questionnaire examined the prevalence of attendance at a range of working groups, including those related to SPADs and Trespass and Vandalism. The results are presented in Figure 10.8.

![Figure 10.8 Frequency of attendance at different types of working groups](image)

The results indicate that SPAD and incident / accident Safety Liaison Meetings are attended most frequently – every quarter. Emergency Planning and Zone Adhesion Meetings are attended twice annually, the least frequent. For all working groups, the frequency of attendance ranged in the Questionnaire responses from the lowest rating (i.e. never) to the highest (i.e. monthly).

10.9 SUCCESS INDICATOR 3.8 – JOINT ACCIDENT INQUIRIES

*General industry commitment to jointly understand the underlying causes of accidents / incidents.*

The RSCR requires Duty Holders to establish adequate arrangements for accident investigation including engagement with other operators. Whether or not such arrangements have improved since privatisation was the subject of Question 11.2 in the Questionnaire. The first part of the question (part A) asked: ‘post-incident, are combined investigations initiated, bringing together affected TOCs, IMCs and the IC?’. Respondents wrote their answers which have been classified simply as a ‘yes / no’ response. The follow-up question (part B) asked: ‘if so, did this happen immediately post-privatisation?’. Responses were again classified as ‘yes / no’. Both questions are presented in Figure 10.9.
From Figure 10.9 it is clear that following incidents, combined investigations are generally held that bring together Duty Holders. When compared to the immediate post-privatisation era the responses indicate that the current level of involvement is slightly greater than in 1994. However, whilst the RSCR stipulates that joint investigations are to occur, it is likely that such involvement would have occurred anyway if the circumstances demanded it.

Any increase in expenditure on accident investigation associated with the RSCR was the subject of Question 11.1B which asked how much accident investigation had cost in 1995, 2000 and now (2003). Five Duty Holders provided the detail required by the question; findings are presented in Figure 10.10 and all indicate an increase in expenditure.
10.10 CONCLUSIONS FOR IO3

Whilst the RSCR refers to co-operation between railway operators to achieve compliance with the Regulations, evidence has been sought of more general industry co-operation on safety matters (i.e. the essence of the RSCR in 1994).

Duty Holders’ Safety Objectives in RSC submissions are fairly well aligned with Railway Group Safety Plan Objectives (and appear to have been from 1994 to date), but there is little evidence in RSCs of the details of how these objectives will be met. Recent RSCR submissions show evidence of the Railway Group Objectives being reflected in the Development Plans (with considerable improvements in this respect between the first submission under RSCR 2000 and the most recent). The alignment between Group and individual Duty Holder objectives is an indication of co-operation in that safety targets are not being considered in isolation.

It would appear that attendance at safety meetings and working groups is fairly good and relatively frequent in the railway industry. However, there is little evidence of Duty Holders carrying out joint Risk Assessment exercises to identity specific interface risks and there is limited evidence of input from the frontline workforce. Findings from Risk Assessments appear to be communicated to other operators by a number of mechanisms, although there is no formal process for achieving this across the industry. Face-to-face meetings are considered to be the most effective method of communication. Purely distributing documentation (e.g. a copy of the RSC) to another Duty Holder may not fully explain the risks.
The impact of Parent Companies upon the RSC has often improved the content of the RSC document, by sharing an exemplar version amongst the Duty Holders. However, the extent to which these documents reflect the individual operations of Duty Holders may be limited. It is questionable whether operational procedures would / could change over a short time to match a ‘common’ HSMS presented in such standardised RSCs. It is obviously vital that the HSMS in the RSC fully reflects safety practices being adopted by the Duty Holder.
11 INTERMEDIATE OBJECTIVE 4 – CONTINUOUS IMPROVEMENT AND CHANGE MANAGEMENT

To encourage continuous improvement and effective change management in the industry.

11.1 IO CONTEXT

Schedule 1(16) of the RSCR 2000 brought in a new requirement for every RSC to include proposals for a Development Plan. The schedule states that the RSC should contain ‘the Duty Holder’s proposals for improvements to his Safety Case and to the health and safety measures referred to in it, together with his proposed timescales for the making of such improvements’.

The implication of this requirement is that continuous improvement is essential to keep pace with new risks and developing technology, and that properly planned improvements in health and safety arrangements will contribute to the improvement of health and safety standards.

The HMRI RSC Assessment Manual\(^{(14)}\) states that, when an issue has been raised during the assessment process, it can be resolved:

- ‘when HSE has a written response which is sufficient to allay the concern expressed and to show that the arrangements proposed by the Duty Holder will meet the requirements of the Regulations’;
- ‘by it being placed into the Duty Holder’s Development Plan, providing the Duty Holder can demonstrate legal compliance, until the prioritised additional control measures have been put in place’;
- if also considered necessary by the assessors, by ‘explicit inclusion in the Intervention Plan’.

Correctly used by a Duty Holder, the RSC (and particularly the Development Plan) can provide a valuable mechanism to capture and structure actions for continuous improvement. Incorrectly used, the Development Plan may be considered as a potential ‘dump’, providing an excuse to avoid / defer tackling the issues.

To help set the scene, Question 4.1 in the Questionnaire asked whether the RSC defines and assists the Change Management process. The findings are presented in Figure 11.1.
Figure 11.1 Extent to which the RSC defines and assists Change Management

The response scale for Question 4.1 ranged from 1 (RSC offers little or no assistance) to 5 (RSC provides clear guidance). The spread of results indicates a tendency towards high ratings. With a mean value of 3.7, from the perspective of the Duty Holder, the RSC appears to provide a good level of assistance to the Change Management process.

11.2 SUCCESS INDICATOR 4.1 – MATERIAL REVISIONS TO REDUCE RISK

Ongoing Material Revisions associated with risk control measures (e.g. TPWS) indicate active continuous improvement.

In accordance with the Railway Safety Regulations 1999, the Train Protection and Warning System (TPWS) is to be fitted as an interim measure to mitigate the potential consequences of a SPAD. The TPWS programme is to be completed by the end of 2003. A number (two) of RSC Development Plans reviewed expressed the intention to accelerate the programme (i.e. improvement beyond the basic requirement). The RSCR procedures, likely to require a ‘Material Revision’ for such implementation, provide assistance in monitoring the success of such intended improvements in addition to any subsequent internal / external audits and inspections.

The Questionnaire asked respondents to indicate whether the RSCR Material Revision process provided a useful independent control in Change Management to ensure safety is not compromised (Question 4.3). The distribution of responses is presented in Figure 11.2.
Figure 11.2 Extent to which the Material Revision process provides a useful control in Change Management

The distribution of responses indicates that, on balance, the Material Revision process is considered to provide a useful independent control. However, four Duty Holders (the IC, two TOCs and one FOC) gave the lowest rating. This disparity suggests that, for the majority, the Material Revision process that encompasses assessment by Railway Safety, Railtrack and HSE is a useful process, whilst a minority believe the process offers minimal benefits.

11.3 SUCCESS INDICATOR 4.2 – ACTIONS ASSOCIATED WITH RISK CONTROL

Evidence of the relationship between prioritised risk control measures and Duty Holder actions.

This success indicator looks at two significant examples of issues, identified during RSC assessment, which resulted in new commitments made in the accepted RSC Development Plans. The first example relates to an issue raised by HMRI in relation to the IC’s RSC. The content of the issue raised was associated with an appendix relating Railway Group Standards and company standards:

‘The appendix has been created to demonstrate the link between Railway Group Standards (RGS) and company standards. There is no confirmation that there are sufficient suitable RGSs to meet the range of risks inherent in operating the railway in all aspects and that company standards comprehensively cover all components of RGS. [The Duty Holder is then requested:] by use of a matrix or other suitable system, that Railtrack, by use of RGS and / or company standards, covers the range of risks inherent in operating the railway and that the company standards implement all components of RGS. If this process identifies any gaps, then as part of the Development Plan an action plan, should be included which addresses these gaps.’

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This highlights the need for the IC to demonstrate that risk control measures are in place or actions are in place for their implementation. The response from the IC was via the RSC (Version 2) Development Plan and reads:

‘Network Rail will develop control measures to map Company Standards against risks and relate these to other documentation. This will include:

• In 2002, make clear recommendations and provide a detailed, quantified business case to support the use of a relational database. This database will link risks identified through the RSC and Network Rail’s Safety Risk Framework, to mitigation measures (Standards). It will also link Standards through the hierarchical levels and identify accountabilities of posts within Network Rail

• Implement the database by March 2003

• Establish a robust link between Standards development and the financial review process by March 2003. This will provide the opportunity for Network Rail to cost the change of Standards at the consultation stage

• Ensure that a robust Compliance Management System (CMS) is available to all Business Units and HQ in 2002

• Develop robust KPIs and complete staff training for CMS in 2002. This will be followed up six months later by a review of the design, implementation and use of the CMS.’

This highlights how the assessment process has strengthened commitment to risk control measures.

The second example relates to a TOC’s first submission under RSCR 2000. An issue raised by Railtrack and Railway Safety in a joint Issue Log highlights that the Duty Holder had not reduced risk levels to ‘As Low As Reasonably Practical’ (ALARP). The Duty Holder formally stated that the Development Plan would be used as a mechanism to tackle the issue. The amended Development Plan makes reference to a fundamental re-working of the current RA findings, making use of Railway Safety’s Safety Risk Model. These examples indicate how the assessment process identifies gaps in the RSC and the long-term resolution of issues can be achieved via the Development Plan.

Without the Development Plan, the only formal mechanism that could be used to ‘close’ the issues would be a demand from assessors for the issue to be addressed prior to RSC acceptance. This may have postponed the application of aspects of the RSC document that were ‘acceptable’.

11.4 SUCCESS INDICATOR 4.3 – APPROPRIATE USAGE OF DEVELOPMENT PLAN

Closure of outstanding issues: the proportion of issues not resolved / closed following assessment that are integrated into the Development Plan.

As outlined in Section 11.1, the HMRI RSC Assessment Manual indicates that the Development Plan may be used to address outstanding issues raised during the assessment process. However, this should not just provide a mechanism to defer action. Figure 11.3 presents an assessment of changes or improvements in risk control measures identified in Development Plans in the
selected RSCs. It is estimated that 59% of activities represent long-term continuous improvement. For the other 41%, it is either not evident why the activities could not have been performed in the short term or there is limited justification for the issue being included in the Plan. Examples of issues that perhaps should not have been included in the Development Plan are:

• Acknowledgement that the RSC has a relatively high level of duplication, the details of which should be grouped under alternative headings

• Distribution of electronic copy of RSC to Heads of Departments

• Emergency Planning - revise company standards.

![Chart showing the acceptability of actions included in Development Plan](chart.png)

**Figure 11.3** Acceptability of actions included in Development Plan

**11.5 SUCCESS INDICATOR 4.4 – CONTENT OF DEVELOPMENT PLAN**

*Improvements in control measures and the management system: actions now incorporated in a Development Plan were previously scattered throughout the RSC. Evidence of specific Plan objectives with specified timescales indicates a positive intent for continuous improvement.*

As with all objectives, the actions in a Development Plan should be clearly defined, present timescales and resources required for their implementation and be achievable. The SMART principle has been applied in the assessment of Development Plans in the selected RSCs:

• **Specific** in the context of an objective being related to a quantifiable measure

• **Measurable** in that the process must be simple to record in terms of its performance, in addition to having a reliable and valid measure of the objective

• **Achievable** requires the members associated with the system to be challenged by the work and have goals that are attainable

• **Relevant** relates the goals or targets being set to the employee’s position / authority

• **Time-based** in that the task must have a start (for ongoing projects) and a completion date for project / short-term work.
Figure 11.4 presents an assessment of the average ratings for the selected RSCs against the five SMART criteria. A definition of the three rating categories is given under the figure. In each case, the version of the Duty Holder’s RSC reviewed has been the latest under the RSCR 2000. It can be seen that the actions presented in the Development Plans are considered to be moderately well defined, with the highest ratings for specificity and relevance – timescales and the measurement of achieving objectives were rated slightly lower.

![SMART Criteria Graph]

<table>
<thead>
<tr>
<th>Rating</th>
<th>'Specific'</th>
<th>'Measurable'</th>
<th>'Achievable'</th>
<th>'Relevant'</th>
<th>'Time-based'</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Generic</td>
<td>Measurement</td>
<td>Objective is too hard / easy to achieve. Does not represent a challenge. Could be easily fulfilled</td>
<td>Objective is beyond the scope of either the Duty Holder or his specified employees</td>
<td>No timescale commitment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>not possible or approach lacks reliability and/or validity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Simplified. Measurement possible</td>
<td>Modest effort required to fulfil objective</td>
<td>Moderate relevance to Duty Holder and perhaps more strategic in focus</td>
<td></td>
<td>Either start date or completion date (for project/ short-term work). Excessive time periods. No review process</td>
</tr>
<tr>
<td></td>
<td>Objectives exist, but goals are confused / vague</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Specific. Measurement possible</td>
<td>Clear linkage possible between behaviours and end objective, control / scope for the control of superfluous influences</td>
<td>Optimal effort required, stretches without creating excessive pressure on parties involved</td>
<td>Highly relevant to those for whom the objective is intended</td>
<td>Start/ finish dates where appropriate. Commitment to specified reviews for continual work</td>
</tr>
<tr>
<td></td>
<td>Objectives are well specified and relate to an actual behaviour/ action</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

**Figure 11.4** ‘Smartness’ of Development Plans
To explore the impact of the RSCR assessment process on the clarity of actions in Development Plans, the same criteria were used for assessment of the IC’s first and latest / accepted RSC submissions under RSCR 2000. Figure 11.5 presents the average ratings of all SMART criteria for the Plans and it is clear that the assessment and acceptance process has had a significant positive contribution to achieving SMART objectives (see also success indicator 4.2).

![Figure 11.5 Improvement of IC Development Plan between first and accepted submissions](image)

11.6 SUCCESS INDICATOR 4.5 – DEVELOPMENT PLAN MANAGEMENT

*Implementation of actions to the timeframes specified in the Development Plan to assess the Management of the Development Plan.*

It is too early for Duty Holders to provide representative evidence surrounding their progress on the implementation of commitments made in the Development Plan. However, HMRI inspectors do appear to be monitoring the implementation process. In the Inspectors Intervention Plan (Section 13.2) which outlines what topics the inspections focus on, there is evidence that the contents of the Development Plan are featured / will feature once the RSC is accepted. This success indicator will provide valuable information on the realisation of commitments made in the Development Plan in future years. The relationship between the RSC and the Intervention Plan is considered in IO6 (Section 13).

11.7 SUCCESS INDICATOR 4.6 – TRAINING IMPROVEMENTS

*Increased expenditure on training and more extensive / targeted training.*

Question 8.1 in the Questionnaire requested Duty Holders to indicate how much had been spent on various training topics. Question 8.2 asked respondents whether this expenditure represented a significant increase from that of 1995 and, if so, to what extent. Three Duty Holders reported no increase, nine indicated that there had been some increases, and the remainder did not know or did not answer. Of those that reported an increase, responses were as follows:
• Yes, more external courses (e.g. Accident Investigation and Strategic Management courses)

• There is a significant increase in training in the company since 1995

• The majority [increases in the majority of areas]

• Yes, to a great extent. In 1995 much greater weight was given to time-served experience. Now we are training real skills

• Increase of £1m on driver training costs

• Yes, estimate 100% increase

• Yes, major increase

• Yes, no training completed in 1995.

These responses indicate that there have been some substantial increases in training expenditure. The absence of data for several Duty Holders reflects that perhaps some companies did not exist in 1995, the respondent did not work for the company at the time or the information is not readily available to the respondent. The RSCR encourages the development of robust HSMS and competency standards and has probably had a strong influence on training commitments, although from the responses and other sources it is not possible to identify the precise contribution of the RSCR.

11.8 SUCCESS INDICATOR 4.7 – RESOURCES ALLOCATED TO SAFETY MANAGEMENT

(Resources allocated to: HSMS maintenance and monitoring, control of contractors, safety meetings, Parent Company involvement and training. Overall expenditure.)

The evaluation of costs and benefits identified RSCR attributable costs for several safety management topics (Section 6). Figure 11.6 outlines what this expenditure has been for a typical TOC Duty Holder for the period between 1994 and 2003. The trend does indicate an increase in the levels of expenditure associated with safety management. Expenditure has remained fairly constant for safety meetings, although there are notable increases in expenditure on training and the control of contractors.
11.9  CONCLUSIONS FOR IO4

Overall, the responses from Duty Holders indicated that the RSC provides a good level of assistance in the Change Management Process, and that the Material Revision process in the RSCR provides a useful independent change control.

Used correctly by a Duty Holder, the Development Plan (as required by the RSCR 2000) can provide a valuable mechanism to capture and structure actions for change and continuous improvement. Whilst there was evidence of suitable use of Development Plans in the majority of cases, the justification for 41% of activities included in Development Plans was weak and it was not evident why the activities could not have been performed in the short term. Closer scrutiny of the content of Development Plans by assessors would therefore seem necessary to ensure that they are being used effectively to manage change.

As with all objectives, the actions in Development Plans should be clearly defined, present timescales and resources required for their implementation and be achievable. Generally the Plans scored moderately well on all criteria, but timescales and measurement (of achieving objectives) were the weakest aspects of the submissions.

Responses from Duty Holders indicated a substantial increase since 1995 on training expenditure as well as in resources allocated for safety management.
12 INTERMEDIATE OBJECTIVE 5 – HSMS AUDIT

To improve industry compliance with health and safety legislation by requiring Duty Holders to demonstrate adequate arrangements for audit of their health and safety systems.

12.1 IO CONTEXT

Whilst IO1 to IO4 inclusive are associated with ensuring that safety management procedures are in place, IO5 and IO6 are associated with the effective implementation of such safety procedures.

As detailed in Section 2, the audit procedure changed between the RSCR 1994 and the RSCR 2000 (and has now changed again following RSCR amendments which came into force in April 2003). Under RSCR 1994, compliance audits were carried out by Railtrack S&SD. Under RSCR 2000, Railtrack as IC was required to obtain ‘independent’ annual audits of their own and TOCs / SOCs / IMCs RSCs – this audit role was performed by Railway Safety. Regulation 9 of the RSCR 2000 states that:

‘The infrastructure controller shall procure an assessment body to undertake at intervals of not more than 12 months an audit of—

(a) those operations of the infrastructure controller arising from control of railway infrastructure and stations; and

(b) those operations of any other person operating trains or stations in relation to railway infrastructure in the control of the infrastructure controller,

and obtain from that body a report or reports of such audit.’

In this regulation –

‘(a) “audit” means a systematic assessment of the adequacy of the management system of the railway operator to achieve compliance by him with the relevant statutory provisions in relation to the operations undertaken by him;

(b) “management system” means the organisation and arrangements established by the railway operator for managing his undertaking.’

From April 2003, each operator is required to procure an annual audit from a ‘competent body’. However, in view of the introduction of the RSCR 2003 amendments being so recent, no evidence of the application of the new Regulations is available for this evaluation, although opinions on the implications of the changes have been solicited from the Questionnaire, the Stakeholder Workshop and structured interviews.

Within the success indicators, evidence is being sought that the audit process has assisted in improving the safety management system over time (i.e. assisted in continuous improvement of the HSMS) and in the delivery of improved safety.
12.2 SUCCESS INDICATOR 5.1 – ACTION PLAN ISSUE CLOSURE

The trend in the level of close-out of issues in action plans.

Following an audit, it is usual to compile the actions and produce an action plan. Part of the subsequent annual compliance audit involves reviewing these actions and identifying if there are any still outstanding or whether they have been closed-out. An effective audit process will ensure that few actions remain outstanding from year-to-year and, for these, there needs to be solid justification.

Railway Safety audit reports for the reviewed RSCs were examined to identify, over time, changes in the nature of audit compliance. The audit contains multiple questions that are common to all reviewed Duty Holders and are fairly consistent over time. As part of the audit, the Duty Holder was judged to be compliant or non-compliant against each question. The number of compliant / non-compliant questions for three sample Duty Holders are presented in Figures 12.1, 12.2 and 12.3 respectively. Where figures are presented, the data are complete. Omissions in annual audit information are due to either company re-structuring and the associated non-comparability of data or the lack of availability of early audit reports.

![Figure 12.1](image_url)  
**Figure 12.1** Duty Holder 1, Audit compliance between 1998 – 2000
Figure 12.2  Duty Holder 2, Audit compliance between 2000 – 2002

Figure 12.3  Duty Holder 3, Audit compliance between 1999 - 2002

The data presented in Figures 12.1, 12.2 and 12.3 indicate that, over the time periods, there is limited evidence of improvement in the closure of issues raised in action plans. Over the years
reviewed, Duty Holders 1 and 3 demonstrate an overall reduction in compliance, whilst Duty Holder 2 has improved overall, despite 2001 out-performing 2002. To understand the nature of compliance in greater depth, all questions from seven of the most recent available audit reports were examined in relation to four possible outcomes:

1. An improvement (previously non-compliant, now compliant)
2. A worsening (previously compliant, now non-compliant)
3. Poor (non-compliant in both years)
4. Good (compliant in both years).

The findings are presented in Figure 12.4 and indicate that, over the two-year period investigated, 48% of equivalent questions were found to be compliant in both years. Over the same period, there was also an increase in the level of compliance for some questions (39 new compliances), whilst this improvement can be offset by an increase in the number of non-compliances (40 new non-compliances). Therefore, Duty Holders are not maintaining the successes of previous audits. The level of non-compliance for equivalent questions over both years is 22%. This is fairly high and should be of concern to the industry as there appears to have been insufficient action taken to drive continual improvement.

![Figure 12.4](image-url)

**Figure 12.4** Nature of Duty Holder compliance according to the two most recent audits

Action plans are developed by a Duty Holder. It would be expected that, within the action plan, both corrective actions and timeframes would be identified clearly. This may be the case, but the fact that 12 months later the situation has not changed significantly indicates a lack of effective follow-up.
12.3 SUCCESS INDICATOR 5.2 – HSMS MODIFICATION

*Trend in the number of required revisions to an operator’s HSMS over time*

Question 3.2A in the Questionnaire asked ‘what proportion of conclusions / recommendations from action plans arising from audits have led to significant change in your company’s HSMS?’ The findings are presented in Figure 12.5.

![Figure 12.5](chart.png)

**Figure 12.5** The proportion of conclusions from action plans that led to significant changes in the Duty Holder’s HSMS

Whilst a number of actions may have little or no impact on the HSMS, there is a significant linkage between the audit process and changes to the HSMS (around 30% with little change over time). Figure 12.6 presents answers to Question 3.2B which asked: ‘what proportion of these HSMS changes, if any, resulted in an updated RSC (e.g. Material Revision)?’ It appears that a maximum of 10% of significant changes arising from audit result in a Material Revision submission.
Figure 12.6 The proportion of HSMS changes that resulted in a Material Revision

Figure 12.7 presents the findings and analyses associated with Question 3.7C which asked: ‘if actions concerning the HSMS are identified in an audit, typically is the HSMS updated: immediately, annually or when resubmitting the RSC’. The majority (68%) of responses indicate an immediate update of the HSMS. A further 18% are updated annually and the remaining 14% are updated at RSC resubmission. This raises an important issue. Whilst it is recognised that Non-Material changes to an RSC can automatically be made, any significant changes do constitute Material Revisions. As identified above (Figure 12.6) respondents report that, over the whole RSCR period, around 90% of significant HSMS changes resulting from the audit do not result in a Material Revision. The HSMS is likely to be updated immediately and is unlikely to result in a Material Revision. However, there is no available evidence to indicate that Duty Holders do actually update the RSC document immediately for the majority of audit findings. Therefore, it can be assumed that the applicability of the RSC document is reduced as its contents may become outdated. Following additional annual audits the relevance of the RSC diminishes further and challenges the ‘live’ status of the document. At present the RSC may only be updated at the end of the three-year period, and there is no formal process or mechanism, even at the three-year review, that ensures the RSC is to be updated to reflect the findings of previous audits.
To put the above argument into perspective, and in comparison to the linkage between the audit process and changes to the HSMS discussed in success indicator 5.1, Figure 12.8 presents the number of issues in Issue Logs associated with the HSMS. Whilst the number of issues are slightly distorted in some instances by missing data and ‘new players’, the difference between issues raised in the initial RSC submissions and those in the most recent RSC submissions is dramatic. It would appear that the assessment / acceptance process under RSCR 2000 currently has a far greater influence on safety management documentation than does the audit process.

**Figure 12.7** The update of the HSMS and the RSCR following the annual audit

**Figure 12.8** Issues concerning changes to the HSMS raised in Issue Logs
Complete information for the three time periods was available for two Duty Holders and is presented in Figure 12.9. A similar pattern in the results to that of Figure 12.8 is evident, although the increase over time is more gradual.

![Figure 12.9 Issues concerning changes to the HSMS raised for two Duty Holders (where data is available for all three submissions)](image)

**12.4 SUCCESS INDICATOR 5.3 – AUDITOR THOROUGHNESS**

*An increase in auditor thoroughness.*

Within the audit process, the auditor must not only have sufficient knowledge and time to ‘probe’ to sufficient depth, but must be able to communicate with the audited to obtain a true understanding of his / her operations to be able to structure corrective actions positively and productively.

From the ratings in Figure 12.10, produced from the responses to Question 3.4 in the Questionnaire, communication between the Duty Holder and Auditor between 1994 and 1999 remained fairly constant and then improved somewhat between 2000 and 2003. Within the ratings, 3 represents no change, 5 represents a significant improvement in communication and 1 represents a significant deterioration.
Developing and maintaining a good rapport between the Auditor and Duty Holder should enhance audit effectiveness, and Question 3.8 requested views on the new structure (post-April 2003) for audit by a ‘competent body’. The data is presented in Figure 12.11. The question asked if respondents agreed that the new audit arrangements would: ‘improve the quality / effectiveness of the audit; lead to varying quality across the industry; or have other significant impacts on the audit’. A rating of 1 represents strong disagreement, 3 represents neutral effect and 5 represents strong agreement. Figure 12.11 indicates that the industry has concerns that the 2003 arrangements for audit by a ‘competent body’ will lead to varying quality across the industry. There is also a net challenge to the assumption that full independence will improve the quality / effectiveness of audit. However, these views were based on anticipation ahead of any experience of the new regime.

**Figure 12.10** Improvements in the communication between Duty Holder and Auditor

![Improvements in the communication between Duty Holder and Auditor](chart.png)
Where respondents have identified ‘other significant impacts’, these are analysed in Figure 12.12. The responses have been classified according to whether the comment indicates that arrangements will improve or weaken the audit, or whether the comment was neutral. Some 64% of respondents anticipated a weakening of the audit process, 18% expected certain improvements, whilst 18% made neutral comments.
Example responses for the way that the audit may weaken in future include:

- A lack of comparability between different Duty Holder’s audit performance
- A reduction in exchange of good practice
- Applicability of audit for different operators
- Debate and argument that may ensue whilst auditors gain understanding of the industry
- The true independence of auditors
- Uncertainty on the standard(s) applied by the ‘competent body’
- Remove the ability of RSSB to measure the effectiveness of Group Standards
- Destroy one of the strengths of the current system, which allows the Railway Safety Audit Team to give clear direction on areas of good practice based on sound knowledge of auditing all Duty Holders.

In contrast, expected improvements include:

- Enhanced quality as the audit will be linked directly to commitments made in the RSC
- Reduced confrontation between Duty Holder and IC compliance department.

12.5 CONCLUSIONS FOR IO5

The examination of audit reports under the RSCR 1994 and RSCR 2000 regimes highlights that there is limited evidence of continual improvement between audits given that the number of ‘new’ compliances is offset by a similar number of non-compliances. A substantial number of audit subjects were found to be non-compliant in two consecutive audits.

Two-thirds of respondents report that the HSMS is updated immediately after the audit report is produced. However, only 10% of these HSMS changes result in an updated RSC. As a consequence there is potential that the version of the HSMS in the RSC is not the same as that used in current practice by the Duty Holder, and the applicability of the RSC to operations reduces over time (as more changes are made to the HSMS). The RSC may only be updated at the end of the three-year submission period, and there is no formal process or mechanism (even at the three-year review) that ensures the RSC is updated to reflect the findings of an annual audit.

This issue is reflected by one of the positive comments on the implications of the RSCR 2003 arrangements for audit: the ‘operator procured’ audit by a ‘competent body’ should enhance quality as ‘the audit will be linked directly to commitments made in the RSC’. [It should be borne in mind, as discussed below, that this is a minority view.]

From limited data, it appears that there have been some improvements in the communication between Duty Holder and Auditor over the period 1997 to April 2003. However, the industry appears to have serious concerns over the new audit arrangements and the majority view (65%
of respondents) was that they will weaken the audit process. The following summarises the main challenges:

- A mechanism needs to be established to allow audit recommendations to be captured in the RSC. The RSC needs to reflect the latest HSMS
- Year-on-year improvements need to be monitored to ensure continuous improvement
- A requirement for Duty Holder closure of audit actions needs to be introduced
- An optimisation of RSC audit by using all available intelligence (e.g. RSC assessment).

Overall, from the evidence, it would appear that the assessment and acceptance process under RSCR 2000 has had a far greater influence on safety management documentation than the associated audit process.
13 INTERMEDIATE OBJECTIVE 6 – ENFORCEMENT TOOL

To provide (in the Safety Case) a useful tool to aid inspection / enforcement.

13.1 IO CONTEXT

Whilst there is no explicit reference in the RSCR that information provided in the RSC could / should be used to target inspection and enforcement action, there is an assumption that such linkage may lead to better targeting and contribute to the maintenance / improvement of key health and safety standards. The success indicators are seeking evidence of such linkage.

13.2 SUCCESS INDICATOR 6.1 – RSC ASSESSMENT AND INTERVENTION PLANS

The extent to which issues from RSC assessment are reflected in the Intervention Plans.

The Intervention Plan outlines how HMRI Inspectors are to use their resources to ensure that areas of highest risk are targeted for inspection. More detail on the scope of such Plans is presented in the HMRI RSC Assessment Manual[14]. The Intervention Plan is intended to be a ‘rolling programme’ that is updated as necessary to reflect inspection findings, assessment issues and Material Revisions. It came into operation in 2002 and so relatively few Plans have been subjected to any updates. Following the RSCR 2000, and the requirement for HSE to assess and accept all Duty Holder RSCs, the HMRI Lead Inspector associated with a Duty Holder also became their Lead Assessor (in most instances). The rationale underpinning this success indicator is that the RSC assessment process provides valuable intelligence to target future inspections, via the Intervention Plan. The HMRI RSC Assessment Manual[14] provides a list of inputs that contribute to the inspection topics, one of which is the findings from the assessment of the RSC (see also Figure 13.2).

The Intervention Plan contents consists of:

1. Core Verification Elements. These are topics that HMRI specifies for inspection of all Duty Holders and is currently made up from three topic areas: RA, accident investigation and emergency preparedness.

2. Mandatory Elements. These vary according to the type of operator. For example, Inspectors for TOCs should focus on: driver management, train despatch and violence to staff. Inspectors for FOCs are to address: driver management, management of rolling stock maintenance and the management of dangerous goods.

3. Issues related to RSC Assessment. Following assessment and acceptance, Inspectors may wish to pursue areas that may not have been closed in a satisfactory manner. Such areas may appear in the Development Plan.

4. Previous Duty Holder performance based on preceding inspections.

5. HSC(E) Sector Objectives and Strategic Themes. These inspection topics are those that are also examined by the HSE Inspectorate in other industries. At present this includes slips, trips and falls.

Intervention Plans were reviewed and the number of days, per-annum, that Inspectors have dedicated for each topic for the year 2003/4 is presented in Figure 13.1.
Figure 13.1 Days to be expended by HMRI for each inspection area

The information in Figure 13.1 indicates that the Core Verification and Mandatory Elements receive the majority of time available to Inspectors, and the time spent by Inspectors on issues from RSC assessment is considerably less. However, the mechanism to feed issues into the Intervention Plan arising from RSC assessment is evident. For example, Intervention Plans tend to include a table that links the inspection topics to RSCR clauses. More significantly, there is also evidence that the RSC assessment process is strengthening the inspections associated with the Core Verification and Mandatory Elements. For example, one Inspector has linked the relevant issues from assessment Issue Logs to the Core Verification and Mandatory Elements which serves to focus the inspection better on the specific aspects of the Duty Holder’s operation. In addition, the impact of the RSC assessment process as presented in Figure 13.1 is lower than would be anticipated in future, as some Inspectors are waiting for the latest RSCs submitted under the 2000 Regulations to be accepted before updating the Intervention Plan.

From discussions with Inspectors, the dual role of assessment and inspection has offered benefits, though it has also diminished time / resources available for inspection activities. The increased focus on assessment, at the expense of inspection, may, however, have assisted in targeting the remaining resources to improve inspection effectiveness. It is also worth noting that RSC assessments typically occur every three years (plus Material Revisions) and so future inspections should not be restricted by assessment activities to such a large extent on a continuous basis.

Whilst presenting a resourcing problem, the role of HMRI as both Assessor and Inspector offers an important advantage over the alternative assessment roles held by Railway Safety and Railtrack in the earlier regime. The continuity of contact between a Duty Holder and HMRI in the assessment and inspection roles helps to ensure that the knowledge acquired in assessment can help inspection and visa-versa (see also Figure 12.10 for supporting evidence). Evidence from Inspectors indicated that the content of the Railway Safety or Railtrack RSC Issue Logs was rarely used to formulate the Intervention Plans. The assessment organisations appear not to have combined their assessment / Issue Log feedback to Duty Holders.
The specification of various topics for inspection (i.e. the Core Verification Elements, Mandatory Elements and HSC(E) priorities) offers an opportunity to make comparisons across the industry. However, whilst the approach may take account of salient topics (e.g. RA, accident investigation, emergency preparedness), the selection of topics may not reflect areas of highest risk evident in the individual Duty Holder’s RA. The devotion of limited inspection resources to such areas may not necessarily represent best ‘value for money’ in terms of risk reduction impact.

### 13.3 SUCCESS INDICATOR 6.2 – THE USAGE OF AUDIT REPORTS IN INTERVENTION PLANS

*The extent to which issues from the annual audit have been, and will be, used to assist the inspection / enforcement process (via the Intervention Plan).*

The annual audit, by Railtrack between 1994 – 1999, Railway Safety 2000 – 2003 and the ‘independent competent body’ from 2003 onwards, has the potential to inform the inspection process by providing additional ‘free’ information that is independent and specific to the Duty Holder. Figure 13.2 presents an illustrative diagram of the assessment, audit, Intervention Plan and Duty Holder processes associated with an RSC.

**Figure 13.2** The role of the annual audit, RSC submission and the Intervention Plan

Whilst there appears to be a mechanism that enables information from the assessment to be fed into the Intervention Plan (success indicator 6.1) there is no equivalent formal process that allows for actions arising from the audit to contribute to the content of the Intervention Plan. Whether the audit actually provides such input was a subject in the Inspector interviews, and a range of answers was received.

In relation to the IC, the annual audit has, historically, been ‘skim read’ by HMRI because of a ‘lack of resources’ which has prohibited the structured inclusion of topics into the Intervention Plan. One of the consequences of this was that a particular aspect of the IC’s operations could be subject to an internal audit, external audit and an inspection without the activities being coordinated. Future arrangements for the Independent Competent Body audit and the Intervention Plan indicate that effort would be made to ‘dovetail’ the two to minimise the duplication of efforts and maximise the benefits from effective use of resources.
Some Inspectors responsible for TOCs and FOCs indicated that the annual audit was not used to feed into the Intervention Plan, whilst others seemed to welcome any intelligence that was available. The formal closure of non-conformances was not deemed to be the responsibility of HMRI. To quote one Inspector: ‘the issue, not the procedure for closure, has been taken on’.

The use of the audit findings to contribute to the inspection appears to be patchy and depends upon the individual Inspector. Whether or not issues warrant incorporation into the Intervention Plan does require some judgement from the Inspector; clearly familiarity with the findings from audit would help underpin this judgement.

13.4 SUCCESS INDICATOR 6.3 – RELATIONSHIP BETWEEN DEVELOPMENT AND INTERVENTION PLANS

The extent to which there is commonality between areas that the industry is addressing via the Development Plan and the topics that form part of HMRI’s Intervention Plans.

The Development Plan outlines commitments made by the Duty Holder to maintain and improve railway safety. Similarly, the Intervention Plan outlines areas that Inspectors are to focus their efforts on to enhance inspection and enforcement to improve the safety record of a Duty Holder. Ideally, the areas that Duty Holders and Inspectors are targeting should show strong similarity and any discrepancies should be addressed. To examine this indicator, the Influence Network (IN) technique was used (Section 3.1).

The IN was used to structure the discussion at the Stakeholder Workshop (Section 3.2) and has been tailored to suit the requirements of this study (Figure 13.3). The IN seeks to examine the underlying influences that could contribute to risk reduction. In order to model these influences, the IN has adopted a hierarchy below the direct causal level as follows:

- **Direct performance influences** - these directly influence the likelihood of an accident being caused in terms of human or hardware performance or external factors with an immediate bearing on safety (e.g. diminished ‘Situational Awareness’ for train drivers may contribute to SPADs).

- **Organisational influences** - these influence the direct ‘level’ and reflect the culture, procedures and behaviour encouraged by the organisation in operations.

- **Policy level** - these comprise the policy and corporate level factors that determine the organisational processes including interface management, contracting and supply chain management.

- **Environmental level influences** - these cover more global influences such as the wider political, regulatory, market and social influences which impact the policy decisions taken by Duty Holders. The IOs represent environmental level influences.

Figure 13.3 presents the IN that has been developed for use in the rail industry.
Figure 13.3 Influence Network for the rail industry

Data have been extracted and included only if Development Plan and Intervention Plan documents for the same Duty Holder could be identified to enable valid comparisons. This resulted in documentation from five TOCs and one IC, VI, IMC and FOC. The classification of Development and Intervention Plan topics was made according to the similarity between the topic and the definition of the influence as illustrated in Appendix 4. This classification process was corroborated by another rater and this ensured that the reliability of the data was maximised. However, it is important to appreciate that some topics do overlap more than one influence. In such cases, the topic has been classified under the most appropriate influence and the quantification is indicative as opposed to definitive. Some example classifications are provided in Table 13.1.

Table 13.1 Example influences on risk targeted by Development and Intervention Plans

<table>
<thead>
<tr>
<th>Influence</th>
<th>Development Plan Example</th>
<th>Intervention Plan Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence (D1)</td>
<td>Develop simulator for driver assessment competence</td>
<td>Hand signaller competence</td>
</tr>
<tr>
<td>Work Environment (D13)</td>
<td>Review fencing surveys and implement improvement programmes</td>
<td>Red zone prohibition</td>
</tr>
<tr>
<td>Incident Management and Feedback (O5)</td>
<td>Investigating the underlying causes of accidents and incidents</td>
<td>To verify arrangements to report and conduct accident and incident investigations</td>
</tr>
<tr>
<td>HSMS (O8)</td>
<td>Risk Assessment update to reflect Railway Safety reports and update of HSMS</td>
<td>To verify the adequacy of Duty Holder’s HSMS</td>
</tr>
<tr>
<td>Contracting Strategy (P1)</td>
<td>Need to review H&amp;S objectives of contractors</td>
<td>To ensure that effective systems are in place for the management of contractors</td>
</tr>
<tr>
<td>Safety Management (P5)</td>
<td>Development of Safety Risk Framework - prioritisation, funding and allocation of resources</td>
<td>Safety Case review process</td>
</tr>
<tr>
<td>Societal (E5)</td>
<td>Input to national curriculum to prevent trespass</td>
<td>No examples</td>
</tr>
</tbody>
</table>
The number of Development and Intervention Plan topics relating to the influences is shown in Figure 13.4. Under each influence is the difference between the two Plans; a negative number indicates that the Intervention Plan will focus more on a particular influence than the Development Plan. A positive number indicates that the influence is targeted more by the Duty Holder than Inspector.

Figure 13.4 Number of RSC Development and HMRI Intervention Plan topics for each influence

Figure 13.4 indicates that, for the most part, there is good similarity between topics in the Development and Intervention Plans. The main imbalances lie in the ‘HSMS’ and ‘Equipment Purchasing’ influences. The HSMS is targeted more by Inspectors than Duty Holders; this is perhaps due to the intention to focus efforts on safety management at the organisational level to ensure that these improvements precipitate direct level improvements. To give an example, one Intervention Plan emphasised that it would focus on ‘emergency / dangerous goods management’ – improving performance in this aspect of the HSMS should initiate improvements in the ‘safe operation of equipment’.

Equipment Purchasing is evidently an area of focus for Duty Holders. The type of equipment purchased includes: TPWS, Automatic Ticket Gates (ATGs), rolling stock, special purpose vehicles, radio networks and on-train video inspection. The Intervention Plan tends not make reference to the purchase of such equipment. Depending on how critical these purchases are in terms of safety, the choice of equipment for purchase could become a more prominent topic in the Intervention Plan.

As part of the interviews with the HMRI, one Inspector described how a Duty Holder wanted to enact the various commitments made in the Development Plan. Rather than wait until the Development / Intervention Plan deadline, a close working relationship had been developed where both sides agreed to a three-monthly review to judge progress. This helped ensure that no unexpected problems would arise later on and encouraged the Duty Holder to put resources into monitoring Development Plan progress.
### 13.5 SUCCESS INDICATOR 6.4 – ENFORCEMENT

The effectiveness of the enforcement strategy.

Question 2.4 in the Questionnaire asked Duty Holders whether they considered there had been an increase in enforcement frequency and severity since 1994; responses were recorded as ‘yes’ or ‘no’. The results in Figure 13.5 indicate that a significant majority of respondents believe there has been an increase in enforcement frequency, whereas only around 50% believe that severity has increased.

![Figure 13.5](image)

**Figure 13.5** HMRI’s role in enforcement frequency and severity increases since 1994

Those that answered ‘yes’ (i.e. HMRI had increased enforcement frequency and severity) were then requested to indicate whether this enforcement had created a barrier between themselves and HMRI. The average for this question was 2.3 (in a range of 1 representing ‘no barrier’ and 5 representing a ‘large barrier’). This indicated that a small barrier had been created, but did not represent a significant problem for the majority, since only two respondents provided the highest rating.

The interviews held with Inspectors considered the role that the RSC had in this increase in enforcement frequency. One of the enforcement opportunities provided by the RSCR is via Railway Group Standards. A commitment made in the RSC to abide by a particular Group Standard (which may be translated into a line / Company Standard), that is not subsequently honoured, provides an opportunity to serve an Improvement Notice. The RSC provides a ‘handle’ for enforcement action since it gives a linkage to a particular Group or Company Standard. A legally binding commitment made to work to a set standard / procedure which can be checked to assess compliance (or non-compliance) can result in enforcement action.

As identified in success indicator 6.1, the Intervention Plan is a recent innovation. The inspection process prior to the RSCR 2000 was more focussed on inspection topics that were selected independently from the content of the RSC. According to one Inspector, the ‘old (1994) regime did not have much linkage between the RSC and inspection topics’.

An examination of 20 Intervention Plans indicates that, whilst the RSC is being used to develop the
Plan, other regulations (such as Railway (Safety Critical Work) Regulations 1994 and Management of Health and Safety at Work Regulations) also feature. The Intervention Plan, necessitated by the RSCR, has also been used to ensure that Duty Holders are complying with other regulatory requirements.

13.6 CONCLUSIONS FOR IO6

There is good evidence to indicate that the RSC and the assessment process is being used by Inspectors to target inspection / enforcement activities. The commitments made by Duty Holders as part of the RSCR (in the RSC document) have provided a legal basis for enforcement and the RSC provides the necessary linkage to railway standards and procedures.

In future, the balance between Mandatory / Core and specific elements included in Intervention Plans needs to be considered. There needs to be greater emphasis on Duty Holder specific issues to optimise the use of limited resources available for inspection activities.

The role of audit reports in relation to Intervention Plans requires some consideration as there is limited reflection of audit findings in the Plans. Whilst there appears to be a mechanism that enables information from assessment to be fed into the Intervention Plan, there is no equivalent formal process that allows for actions arising from the audit to contribute to the Plan. A useful opportunity to inform the inspection process is currently not being taken (although future arrangements may make provision to ‘dovetail’ audit and inspection activities to minimise duplication of effort).

The comparison between Development and Intervention Plans identified that Inspectors are less focussed on arrangements for hardware purchasing than Duty Holders. There is scope for increased risk to be introduced into the rail network via new equipment, and this topic may still needs to feature more prominently in Intervention Plans in the future.
14 CONCLUSIONS AND RECOMMENDATIONS

14.1 PREAMBLE

Conclusions associated with the success of each individual IO have been presented at the end of
the appropriate assessment section (i.e. Sections 8 to 13 inclusive for IO1 to IO6 respectively).
This section presents overall conclusions from the study in relation to the nature of impact of
the RSCR, based on an assimilation of the IO findings and in relation to ‘value for money’. Impor-
tantly, the responses from industry have confirmed the view that the RSCR have been a
significant influence on the improvement in railway industry safety.

14.2 RSC PREPARATION

**Headline Conclusion:** for most stakeholders, a major benefit of the Regulations arises from the
process of developing an RSC, particularly if workforce involvement has been widespread. For
a number of Duty Holders, this process has identified gaps in procedural documentation and
has also led to the development of new Company Standards.

**Discussion:** a common theme that has emerged from the study suggests that the production
of the RSC as a document has been an effective and worthwhile activity. The formal process of
carrying out rigorous and bespoke hazard identification, systematic Risk Assessment (RA) and
effective mapping of risk control measures with the provisions of the Health and Safety
Management System (HSMS) has targeted the review of existing management systems and
procedures, and identified potential weaknesses and omissions.

**Recommendation:** the process of developing an RSC should be recognised as an opportunity to
increase the involvement of the frontline workforce in safety management issues to encapsulate
their knowledge and appreciation of operator-specific risks, and enhance the effectiveness of the
RSC.

14.3 RSC ASSESSMENT PROCESS

**Headline Conclusion:** many early concerns during assessment of Safety Case submissions were
associated with the lack of connection between a Duty Holder’s RA findings and the control
measures in the HSMS. One of the significant successes of the Safety Case assessment process
(particularly under the RSCR 2000 amendments) has been to stimulate the industry in the
proactive use of RA: to explore specific risks within Duty Holder operations in more detail;
identify and prioritise control measures; and demonstrate either the immediate implementation
of ‘top’ control measures via the HSMS or scheduled implementation of the control measures
within a timely, structured and committed approach. There is, however, scope for further
improvement in RA and HSMS linkage.

**Discussion:** the quality and potential effectiveness of the RA and HSMS presented in the most
recent submissions of RSCs have considerably improved from those in the first submissions
under the RSCR 2000 (and those in submissions under the RSCR 1994). This appears to be due
to the rigour of the assessment process under the RSCR 2000 regime.

Under RSCR 2000, RSCs were reviewed and Issue Logs produced by HMRI, Railway Safety
and Railtrack. The three assessing organisations have different skills, requirements and
perspectives. It is unclear whether the step-change in quality / effectiveness stated above arose
from the diversity of assessment perspectives or the rigour of the assessments (with a higher
aspiration than that of previous regimes). Whichever the case, this improvement must not be jeopardised in any future changes to the assessment process.

There are areas, however, where the current assessment process may need to be enhanced. Firstly, assessments of RSCs should be consistent – a single RSC document should have the same issues identified irrespective of which HMRI assessor examines the document. Secondly, it is important that balance of assessors knowledge, skills and abilities include (and maintain) the range of stakeholder perspectives recognised as successful under the RSCR 2000 regime. To add greatest value to the assessment process, the assessor must be fully aware of operational practices (including safety measures developed by the industry such as Group Standards) so that a constructive dialogue can take place. Improvements will arise from informed discussion and understanding between the parties. Thirdly, clearer guidance on the process of how to assess RSCs as opposed to what to assess may be needed (i.e. a balance between a ‘check list’ approach and systematic in-depth analysis to unearth underlying problems in safety management).

A timescale for the Duty Holder to close issues needs to be introduced where reasonable periods are given for closure, based upon agreement between Lead Assessors and Duty Holders. The development of guidance that outlines example issues and the associated expected timescales is recommended.

A protracted assessment process should not be used as a reason for the Duty Holder to defer the implementation of items in the Development Plan (unless it is the content of the Development Plan which is under scrutiny).

**Recommendation:** the composition of the HMRI assessment team is important to ensure balance, consistency and an industry-wide perspective. Assessment should enhance the ‘check list’ approach of items included in the RSC with a more in-depth analysis. Duty Holders and HMRI assessors should agree timescales for the closure of issues in the Issue Log.

14.4 **RSC AUDIT PROCESS**

**Headline Conclusion:** the audit process under RSCR 2000 appears to have been a ‘tick box’ compliance check. The auditor must have in-depth knowledge of the workings of the industry to ensure the implications of non-compliance are understood and to assist positively in improving safety. The absence of a suitable mechanism to enable, track and disseminate necessary updates of the RSC, following audit recommendations and actions, is a weakness of the current RSCR. Equally, the applicability of the RSC to operations reduces with successive audits if such updates are not carried out immediately.

**Discussion:** the RSCR 2000 audits have not yielded evidence of continuous improvement. Rather, there appear to be issues that are repeatedly identified as non-compliant in successive audits. The failure to respond adequately to non-compliant issues is a point that should be addressed in future ‘competent body’ audits.

Added to the lack of ‘close out’ of audit topics, the new regime of audit by a ‘competent body’ raises a number of additional concerns, including the potential for:

- lack of consistency between auditors
- reduction in the exchange of good practice
uncertainty about the standards applied by the ‘competent bodies’ and their knowledge of the railway industry.

Recommendation: careful consideration needs to be given to the knowledge and suitability of ‘competent bodies’, for example by checking to ensure similar standards are achieved across the industry. To optimise the effectiveness / outcome of the audit, a formal mechanism to enable, track and disseminate necessary updates of the RSC, following audit recommendations and actions, needs to be established.

14.5 RELATIONSHIP BETWEEN ASSESSMENT AND AUDIT FUNCTIONS

Headline Conclusion: whilst there are recognised benefits of the audit and assessment functions being carried out by different organisations (a ‘competent body’ and the HMRI under RSCR 2003) to maximise the capture of areas requiring attention, there would appear to be little linkage between the two processes. The fact that the audit is now procured by the Duty Holder may assist in more directly linking it to commitments in the RSC, but this has yet to be proven.

Discussion: the function of the audit is to challenge a Duty Holder’s compliance with its RSC, with other regulations (Management of Health and Safety at Work Regulations, etc), with the Railway Group Safety Plan and Standards, and with the Infrastructure Controller’s RSC. It is carried out annually.

The assessment and acceptance process is part of an overall strategy to secure compliance by railway operators with health and safety legislation. The RSC must demonstrate that the Duty Holder’s company has an HSMS in place that is suitable for the activities of its operations.

Recommendation: there needs to be a mechanism to capture issues from both the audit and assessment processes, and a ‘continuous improvement’ procedure to accommodate the different process cycles (yearly for audits, possibly three-yearly for assessment).

14.6 MATERIAL REVISION PROCESS

Headline Conclusion: the Material Revision process appears to have yielded improved focus in the industry concerning operational change and its impact on risk levels. However, whilst the process is frequently implemented for frontline / operational changes, its use for managerial / corporate restructuring is less frequent and the use of RA is more uncertain. Evidence indicates that the Material Revision process is a mechanism that is rarely used to update the RSC following audit.

Discussion: the Material Revision process was designed as a way to update the RSC when a Duty Holder intended to change its operations, rather than to make changes to the RSC following intervention or audit. The absence of evidence that indicates that the RSC is updated reflects a weakness of the RSCR since the RSC may become outdated over time.

Recommendation: changes to an RSC required by an external body (e.g. auditor, HMRI Inspector) should be made as a requirement of topic / issue closure. Changes initiated by a Duty Holder should be subject to an improved Material Revision process with more structure. For example, the process could be enhanced using a Material Revision application form covering:

(a) Description of the intended outcome (e.g. introduction of new rolling stock).
Evidence of systematic consideration of a range of methods and the associated effects on risk (e.g. scenario planning could be used to consider the impact on risk and additional pros and cons of, for example, various rolling stock designs).

Selection of change method based on (b).

Associated risk controls and updated HSMS.

The application form could then be presented to the HSE for assessment and acceptance prior to implementing the change.

14.7 DEVELOPMENT PLAN CONTENT

**Headline Conclusion:** The introduction of the requirement for a Development Plan under the RSCR 2000 amendments potentially provides the outstanding link in the chain of continuous improvement. As presented by a number of Duty Holders, the Development Plan provides a valuable mechanism to capture and structure actions for change and inform HMRI Intervention Plans. However, the Plan also appears to have been used by others as an opportunity to defer taking actions which could be performed immediately (or in the short term).

**Discussion:** From inspection of Duty Holders’ RSCs submitted under the RSCR 2000 there was clear evidence in a number of instances that safety improvements included in the Development Plan had arisen directly from the process of RSC production, and the linkage of topics in the Plan to RA and HSMS was demonstrated. However, this is not always the case and the origins of items in some Development Plans is unclear. The commitment to specific and relevant goals was evident from the majority of Plans, although the reluctance to commit to a timescale to implement the topics indicates that some improvements may not be realised.

**Recommendations:** To maximise the effectiveness of Development Plans they should be more closely scrutinised to ensure they include the timescale and resources necessary for effective implementation of the identified activities. At present, Plans often include statements of intent and are too high level. The effectiveness of Plans may be improved if responsibilities for completing activities were defined.

14.8 MANAGEMENT CHANGE AND RSCR

**Headline Conclusion:** Changes to the ownership of a rail operation, initiated via franchise renewal or takeover by a Parent Company, should receive special attention since the timeframe for such changes is often tight. In the short term, it is important to ensure operational continuity and avoid unnecessary change to risk management practices, unless required as part of the ownership change. However, in the longer term, a reassessment of risk levels and practices associated with the new rail operation should be evident.

**Discussion:** Two parallel issues have emerged from the review. The first surrounds the scope for ‘lifting’ an RSC document from one operator and applying it, with little amendment, to another. The second relates to the requirement, following senior management restructuring, for newcomers to take informed responsibility for the HSMS. The safety responsibilities during the immediate transition need to be clearly defined. The result in both instances is a diminished understanding and ownership of the RSC (compared to the pre-change position). This also cements the value of going through the process of developing a Safety Case.

**Recommendation:** The change of ownership / equivalent management restructuring within the railway industry requires much greater consideration in relation to risk levels. Ultimately, in
any such change entailing senior management restructuring, it is vital that the newcomers take informed responsibility for the HSMS. Equally, the safety responsibilities during the immediate transition period need to be clearly defined. Whilst the majority of the workforce may not have altered, it is unlikely that the change will have been purely a matter of rebranding.

14.9 INTERVENTION PLANS

**Headline Conclusion:** there is good evidence to indicate that the RSC and the assessment process is being used by Inspectors to target inspection / enforcement activities. The commitments made by Duty Holders as part of the RSCR (in the RSC document) have provided a legal basis for enforcement and the RSC provides the necessary linkage to railway standards and procedures.

**Discussion:** In future, the balance between Mandatory / Core and Specific Elements included in Intervention Plans needs to be considered. There needs to be greater emphasis on Duty Holder specific issues to optimise the use of limited resources available for inspection activities.

The role of audit reports in relation to Intervention Plans requires some consideration as there is limited reflection of audit findings in the Plans. Whilst there appears to be a mechanism that enables information from assessments to be fed into the Intervention Plan, there is no equivalent formal process that allows for actions arising from the audit to contribute to the Plan. A useful opportunity to inform the inspection process is currently not being taken (although future arrangements may make provision to ‘dovetail’ audit and inspection activities to minimise duplication of effort).

The comparison between Development and Intervention Plans identified that Inspectors are less focussed on arrangements for hardware purchasing than Duty Holders. There is scope for increased risk to be introduced into the rail network via new equipment, and this topic still needs to feature more prominently in Intervention Plans of the future.

**Recommendation:** information from RSC assessment, audit and previous inspections must be used to inform the contents of Intervention Plans and hence inspection activity. Attempts should be made to continue and further develop the relationship between Inspector and Duty Holder to ensure that commitments in the Development Plan are being enacted and are not dormant until the next three-year review.

14.10 COSTS AND BENEFITS

**Headline Conclusion:** The evaluation of RSCR costs and benefits has been judged according to two criteria:

- The costs to industry to meet RSCR requirements are not in gross disproportion to the benefits gained
- The costs do not exceed (or are similar) to the attributed monetary benefits.

On both above criteria, the RSCR can be considered to represent ‘value for money’.

**Discussion:** In summary, the conclusions on costs and benefits attributable to the Regulations are:

- For a Duty Holder, the cost of developing and submitting a Safety Case is by far the largest single cost element associated with the Regulations (although the accumulated

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cost associated with ongoing safety management, Material Revisions, audits, etc. is also significant for most Duty Holders). The upfront costs of implementing the requirements of the Regulations (whether at first introduction in 1994 or at subsequent major regulatory changes) should be seen as an investment for longer term realisation of benefits in terms of accident / incident reduction.

- Due to the time lag before benefits in levels of risk are seen, the most realistic perspective of costs and benefits is that over the total permissioning regime since privatisation (1994 – date), rather than over discrete phases of that regime. The risk reduction contributions of the 2000 amendments are only just starting to be realised and will be potentially seen over the next 2-3 years.

- The cumulative cost of the Regulations to all stakeholders within the railway industry is estimated, based on study methodology and industry inputs, to be approximately £52 million since 1994. Benefits attributable to the Regulations over the same period are approximately £85 million, based on prevented equivalent fatalities for all types of rail risk (as provided by the Rail Safety and Standards Board: RSSB). If only equivalent fatalities are considered which are judged to be under the direct control of railway operators (i.e. excluding risks arising from malicious acts), the benefit valuation reduces from £85 million to £53 million – still giving a nominal net benefit.

- The role of the Regulations in achieving improvements in rail safety has been isolated from other influences in order to attribute the financial benefit from the Regulations. Whilst this is difficult due to complex interactions of confounding influences (and was not attempted in previous railway Regulatory Impact Assessments), it is estimated that the Regulations are ‘responsible’ for approximately 15% of the overall safety improvement on the Railtrack / Network Rail controlled infrastructure.

- Costs and benefits of individual ‘Intermediate Objectives’ (IOs) have been considered. Costs are discussed for IOs in relative rather than absolute terms. Benefits are assessed in terms of the influence of each IO on overall rail accident risk. Within this context, stimulating Risk Assessment (IO1) and encouraging robust Health and Safety Management Systems (IO2) are identified as the most cost effective aspects of the Regulations.

**Recommendation:** The continued analysis of RSSB Accident Equivalent Fatality data in forthcoming years should be able to identify improvements brought about by RSCR 2000, following an anticipated delay in associated risk reduction. Proposals for future changes to the RSCR that necessitate a Regulatory Impact Assessment (RIA) need to make more accurate predictions of future benefits that can be attributed to the Regulations. Using accident / risk data is a more accurate way to determine future benefits than industry targets. The present evaluation could, and should, be used to provide cost and benefit information to inform future changes to the RSCR.
15 REFERENCES


APPENDIX 1

INTERMEDIATE OBJECTIVE SUCCESS INDICATORS
DESCRIPTION OF MATRIX

Appendix 1 presents the data sources used to populate the success indicators. Under IO1, for example, seven indicators are listed. For each indicator, the various data sources were identified (to provide triangulation: i.e. at least two independent sources to corroborate evidence surrounding the IO). Where blank cells exist, it is believed that the data source does not provide information that is relevant to the success indicator.

The emboldened numbers in the top left hand corner of the box for each data source listed against each indicator in provided an initial assessment of the confidence that appropriate data would be available from the source. A rating of 10 indicated total certainty and a rating of 1 indicated a remote possibility. Two or three sources rated at 7-10 were considered to provide a sufficient probability of acquiring the necessary information on an indicator (as are four or five sources rated 3-6).

The non-emboldened numbers under data sources refer to question numbers in the Questionnaire – see Section 4.
## APPENDIX 1 – SUCCESS INDICATORS

### INTERMEDIATE GOALS & INDICATORS

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<thead>
<tr>
<th>DATA SOURCES</th>
<th>Project</th>
<th>HMRI</th>
<th>Industry</th>
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<tbody>
<tr>
<td>Workshop</td>
<td>Questionnaire</td>
<td>Safety Cases</td>
<td>Issue Logs</td>
</tr>
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1. **To stimulate railway operators to develop and improve risk assessment techniques (particularly for risks at the interface with other operators).**

1.1 The nature and number of issues raised show a shift from application of generic RA to consideration of specific operator risk.

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<td>7</td>
<td>Prioritised risk &amp; specifics in HSMS</td>
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<td>Increases in ALARP</td>
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<td>Over reliance on SRM – used appropriately?</td>
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1.2 An increasing use of RA in ‘Material Revision’ submissions.

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<tr>
<td></td>
<td>Project</td>
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<td></td>
<td>Workshop</td>
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<tr>
<td>1.3  Active use of RA and associated risk control measures in planning and prioritisation of expenditure for improved safety.</td>
<td>7</td>
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<tr>
<td>Risk and Change Management: evidence that RA is being used as a tool to assist decision making, and not just carried out to meet regulatory (MHSWR 1999 or RSCR 2000) requirements.</td>
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<tr>
<td>1.4  Less use of outside consultants without close company involvement.</td>
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<td>1.5  A reduction of the number of interface issues raised in issue logs.</td>
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<tr>
<td>2.  To encourage railway operators to develop robust health and safety systems (HSMS)</td>
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<tr>
<td>2.1  Assistance to private companies (new and existing) in developing an HSMS.</td>
<td>6.1 A, C, 6.2, 6.3, 6.6A, 6.7, 6.16B</td>
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## INTERMEDIATE OBJECTIVES & INDICATORS

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<th>Objective</th>
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<th>Material Revisions</th>
<th>Audits</th>
<th>Intervention Plans</th>
<th>Reasonable Requests</th>
<th>Company Information</th>
<th>Railway Safety</th>
<th>Trade Union</th>
<th>Railway Group, Network Rail and Railtrack</th>
<th>Published Reports / Research</th>
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<tbody>
<tr>
<td>2.2 Trend in the allocation of resources for assessment/reassessment of individuals and teams, training and recruitment to ensure frontline competence.</td>
<td>8</td>
<td>6.14.</td>
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<td>2.3 For the control of contractors: evidence of more frequent liaison meetings, briefings and monitoring of safety performance (audit).</td>
<td>3</td>
<td>7 9.2 5.5</td>
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<td>4</td>
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<tr>
<td>2.4 Changes to resources and methods adopted to control contractors</td>
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<td>6.9a, b, c, d 6.8</td>
<td>7 6.9a, b, c, d 6.8</td>
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<td>7</td>
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<td>6</td>
<td>4</td>
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<tr>
<td>2.5 Evidence that any preventative measures from incident investigations are fed back and appropriate revisions to the HSMS implemented</td>
<td>7</td>
<td>RSC review Development Plan (timeframe), (Links to 3.12 and TPWS)</td>
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<td>2.6 The trend in the resources allocated to emergency response and escape training/exercises.</td>
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<td>8.3 8.4</td>
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<td>2.7 Individual employees – should observe a proactive approach to safety in day-to-day activities.</td>
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<td>6.10 6.11</td>
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<tr>
<td>3. To encourage Railway Operators (RO) to cooperate on health and safety issues</td>
<td>6</td>
<td>6.10 6.11</td>
<td>5</td>
<td>5</td>
<td>5</td>
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### DATA SOURCES

- **Project**
- **HMRI**
- **Industry**
- **Railway Group, Network Rail and Railtrack**
- **Published Reports / Research**
<table>
<thead>
<tr>
<th>INTERMEDIATE OBJECTIVES &amp; INDICATORS</th>
<th>DATA SOURCES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project</strong></td>
<td><strong>HMRI</strong></td>
</tr>
<tr>
<td>3.1 RSC and RA preparation. The extent of industry participation at briefing sessions, active use of the SRM and operator feedback.</td>
<td>4</td>
</tr>
<tr>
<td>3.2 Joint HAZIDs/ HAZOPs – evidence of continuous improvement in understanding potential hazards at interfaces.</td>
<td>4</td>
</tr>
<tr>
<td>3.3 Risk control measures and Development Plans in RSCs indicate a closer correlation with Group Objectives.</td>
<td>8</td>
</tr>
<tr>
<td>3.4 Number and severity of issues raised in ‘Reasonable Requests’ is an indication of cooperation and the ability of the industry to resolve H&amp;S matters on a day-to-day basis.</td>
<td></td>
</tr>
<tr>
<td>3.5 Nature and volume of safety meetings for TOC/FOCs arranged through ATOC</td>
<td></td>
</tr>
<tr>
<td>3.6 Greater awareness on part of Parent Companies in terms of frequency/commitment to safety meetings of inter-company co-operation and co-ordination in health and safety. Trend towards group strategic planning rather than reactive agenda.</td>
<td>6</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>INTERMEDIATE OBJECTIVES &amp; INDICATORS</th>
<th>DATA SOURCES</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Project</td>
</tr>
<tr>
<td>Workshop</td>
<td>Questionnaire</td>
</tr>
<tr>
<td>3.7 Overall increased number and breadth of industry working groups</td>
<td>6</td>
</tr>
<tr>
<td>3.8 General industry commitment to implement control measures to reduce future risk following Inquiry recommendations.</td>
<td>Yes</td>
</tr>
<tr>
<td>4. To encourage continuous improvement and effective change management in the industry</td>
<td>Q4.1</td>
</tr>
<tr>
<td>4.1 Ongoing Material Revisions associated with risk control measures (e.g. TPWS) indicate active continuous improvement.</td>
<td>6</td>
</tr>
</tbody>
</table>

3 ATOC and TOC contribution to: -SPAD -Emergency planning -Zone adhesion -Trespass working groups
7 Working Group publications. Internet.
4.2 Evidence of the relationship between prioritised risk control measures and Duty Holder actions:

9 RA & HSMS Development Plan, linkage/relationship.

4.3 Closure of outstanding issues: the percentage of issues not resolved/closed during the assessment that are integrated into the development plan.

Yes
9 Development Plan
9 Outstanding issues.

4.4 Improvements in Control Measures and the Management System: actions now incorporated in a Development Plan were previously scattered throughout the RSC. Evidence of specific plan objectives with specified timescales indicates a positive intent for continuous improvement.

7 Are development plans SMART?
7 Measurable Specific targets.

4.5 Implementation of actions to the timeframes specified in the Development Plan to assess the Management of the development plan.

2 Intervention audit reports (output from inspectors)

www.ritc.org.uk

4.6 Increased expenditure on training and more extensive/targeted training.

6 Q8.1
Q8.1
Q8.2

4 Annual Reports
4 Statistics on training

4.7 Resources allocated to: HSMS maintenance and monitoring, control of contractors, safety meetings, Parent Company involvement and training. Overall expenditure.

6 Q5.5abc
Q6.15abc
Q6.5
Q6.6

6 Attendance at Safety Working Groups over time.
<table>
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<tr>
<th>INTERMEDIATE OBJECTIVES &amp; INDICATORS</th>
<th>DATA SOURCES</th>
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</thead>
<tbody>
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<td>Project</td>
<td>HMRI</td>
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<tr>
<td>Workshop</td>
<td>Questionnaire</td>
</tr>
</tbody>
</table>

5. To improve industry compliance with health and safety legislation by requiring Duty Holders to demonstrate adequate arrangements for audit of health and safety management system

5.1 The trend in the level of close-out of issues in Action Plans. 8 Annual Audits.

5.2 Trend in the number of required revisions to an operator’s HSMS over time. Q3.7C Q3.2B 9 Issues associated with HSMS

5.3 An increase in auditor thoroughness Q3.8 Q3.4 8 Annual Audit Reports

6. To provide (in the safety case) a useful tool to aid inspection/enforcement

6.1 The extent to which issues from RSC assessment are reflected in the Intervention Plans. 10 Development plan 10 Outstanding issues 8 Audit Report 10

6.2 The extent to which issues from the annual audit have been, and will be, used to assist the inspection/ enforcement process (via the Intervention Plan). 10 Development plan 10 Outstanding issues 10 Closure of intermediates 8 Audit Report 10

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<table>
<thead>
<tr>
<th>INTERMEDIATE OBJECTIVES &amp; INDICATORS</th>
<th>DATA SOURCES</th>
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<td></td>
<td>Project</td>
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<tr>
<td>Workshop</td>
<td>Questionnaire</td>
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<tr>
<td>6.3 The extent to which there is commonality between areas that the industry is addressing via the Development Plan and the topics that form part of HMRIs Intervention Plans.</td>
<td>10 Development plan 10 Outstanding issues 10 Closure of intermediates 8 Audit Report</td>
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<tr>
<td>6.4 The effectiveness of the enforcement strategy.</td>
<td>Q2.4</td>
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APPENDIX 2

EVALUATION OF COSTS AND BENEFITS
<table>
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<tr>
<th>INFLUENCE NETWORK</th>
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<tr>
<td><strong>INFLUENCES &amp; ACCIDENT PRECURSORS</strong></td>
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<tr>
<td>1. Accident Precursors</td>
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<td>Train Operation (e.g. Speeding)</td>
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<td>Level Crossing (e.g. misuse)</td>
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<td>Rolling Stock Failure</td>
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<td>Track Failure</td>
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<td>2. Direct Level (Workforce)</td>
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<td>D1 - Competence</td>
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<td>D2 - Motivation / Morale</td>
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<td>D3 - Teamworking</td>
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<td>D4 - Situational Awareness / Risk Perception</td>
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<td>D5 - Fatigue / Alertness</td>
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<td>D6 - Health</td>
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<td>D7 - Communications</td>
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<tr>
<td>D8 - Information / Advice</td>
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<tr>
<td>D9 - Compliance</td>
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<tr>
<td>D10 - Availability of Suitable Human Resources</td>
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<td>D11 – Quality of Inspection</td>
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<td>D12 – Safe Operation of Equipment</td>
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<tr>
<td>D13 - Work Environment</td>
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<td>D14 - External Factors</td>
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<td>3. Organisational Level (Operational Management)</td>
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<td>O1 - Recruitment and Selection</td>
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## INFLUENCE NETWORK

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<th>CONTINUOUS IMPROVEMENT</th>
<th>AUDIT</th>
<th>ENFORCEMENT</th>
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<td>O2 - Training</td>
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<td>8.1E</td>
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<td>O3 – Procedures</td>
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<td>O4 - Planning</td>
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<td>O5 - Incident Management + Feedback</td>
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<td>O6 - Management / Supervision</td>
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<td>Costs ascertainable from re-submission of safety case and questionnaire</td>
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<tr>
<td>O7 - Communications</td>
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<td>O10 - Inspection + Maintenance</td>
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### 4. Policy Level (Corporate Management)

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<td>Allocate resources for attendance + overhead cost.-</td>
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### INFLUENCE NETWORK

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<th>HSMS</th>
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<th>CONTINUOUS IMPROVEMENT</th>
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<th>ENFORCE -MENT</th>
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#### 5. Environmental Level (External Influences)

| E1 - Political Influence | -  | -    | -           | -                      | -     | -            |
| E2 – Railway Safety/S&SD   | -  | -    | -           | -                      | -     | -            |
| E3 - HSE Regulatory Influence | - | -    | -           | -                      | -     | -            |
| E4 - Market Influence      | -  | -    | -           | -                      | -     | -            |
| E5 - Societal Influence    | -  | -    | -           | -                      | -     | -            |
| E6 - SRA                   | -  | -    | -           | -                      | -     | -            |
| E7 - ORR                   | -  | -    | -           | -                      | -     | -            |
| E8 – Objective             | 2.7| 2.7  | 2.7         | 2.7                    | 2.7   | 2.7          |
APPENDIX 3

UNCOMPLETED QUESTIONNAIRE
THE RAILWAYS (SAFETY CASE) REGULATIONS
INDUSTRY QUESTIONNAIRE

QUESTIONNAIRE GUIDANCE

This Questionnaire is designed to provide information to help the evaluation, for the HSE, of the Railways (Safety Case) Regulations (RSCR) 1994, 2000 and associated amendments. The specific objectives are to evaluate the costs and benefits of the Regulations over time, to develop recommendations for improving their effectiveness, and to establish a baseline and success indicators for future evaluations. Questions are structured to address the following:

1. Global Context
2. Implementation of RSCR
3. RSCR Audit
4. Change Management
5. Interface and Contracting
6. Health and Safety Management Systems
7. Risk Assessment
8. Training
9. Competence
10. Communications
11. Investigations
12. Company Information
13. Additional Comments on the RSCR and Improvements

We have asked for information in the format that we anticipate to be the most accessible. If the unit (e.g. cost per-annum) does not correspond with your records, please provide us with any similar information that you do have (e.g. days expended per-annum). For past expenditure, please provide costs as accrued at the time (i.e. do not include price inflation). The term ‘staff-days’ is used in places as a general measure of the days and number of people involved in the activity whether or not they are direct employees.

The information that you supply will be held confidentially and any openly available report will not identify individual contributors.

A list of definitions, and of the abbreviations and acronyms used, is attached at the end of the Questionnaire in Section 14.

Except where the context is obviously wider, please respond in terms of your own operational organisation, which might be, for example, a TOC or an IMC. (If there is scope for ambiguity about the boundaries of the organisation for this purpose please explain below, against your Company Name).

The Questionnaire is designed for electronic completion. Answers are recorded in several different formats and are generally self-explanatory, requiring a check / cross, comment or number. The tab key is best used to move between questions that require answers in text / numeric form, whilst the mouse is most suited when a check / cross is required. Microsoft Word does not enable the spelling and grammar facility in this format, though text can be pasted from other sources.
Some questions may not be applicable to your operations: in such circumstances please put ‘N/A’. When no reasonable answer can be provided, please put ‘N/K’.

We would also actively encourage additional comments on the RSCR that you wish to make at the end of the Questionnaire in Section 13.

Once completed, please could you save the file, giving it your company’s own name (e.g. Network Rail.doc). The Questionnaire can then be returned via email, as an attachment, to johnwilliams@bomelconsult.com

Alternatively, we can also accept printed copies that have been completed by hand, please return to:

Dr John Williams
BOMEL Limited
Ledger House
Forest Green Road
Fifield
Maidenhead
Berkshire
SL6 2NR

Please complete the following information about you and your company:

COMPANY NAME: ____________________________________________________________
YOUR NAME: ______________________________________________________________
YOUR JOB TITLE: ____________________________________________________________
TELEPHONE: ________________________________________________________________
EMAIL: ______________________________________________________________________
## 1. GLOBAL CONTEXT

### 1.1 Evidence from Railway Safety demonstrates that for some indicators, safety in the rail industry has improved in the last 10 years. Please indicate what positive impact the following influences have had on these observed improvements:

<table>
<thead>
<tr>
<th>Influence</th>
<th>No influence</th>
<th>Moderate influence</th>
<th>Major influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. RSCR in the period: 1994 – 1999</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2000 – 2003</td>
<td></td>
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</tr>
<tr>
<td>b. Railway Group Standards</td>
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<td></td>
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</tr>
<tr>
<td>c. Other regulations (Railways (Safety Critical Work) Regs, Management of Health and Safety Regs etc)</td>
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</tr>
<tr>
<td>d. Changes arising from accident inquiries (e.g. TPWS from Watford South Junction)</td>
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</tr>
<tr>
<td>e. Current litigious environment (i.e. time/money spent on slips/trips as well as more serious injury)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Other (please specify)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 1.2 Please indicate whether the process of developing an RSC has enhanced for you the quality and effectiveness in the following areas over and above that which would prevail without the RSCR, but with the other influences (e.g. other regulatory requirements and group standards)

<table>
<thead>
<tr>
<th>Area</th>
<th>No additional RSC contribution</th>
<th>Moderate RSC impacts</th>
<th>RSCs offer substantial benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Risk Assessment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. HSMS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Audit Systems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Interface Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Communications between Duty Holders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Change Management (e.g. organisational change, new signalling equipment etc)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. Supply Chain Management</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1.3 Please indicate the degree to which the following have stimulated questioning of how/where risks occur:

<table>
<thead>
<tr>
<th></th>
<th>Small extent</th>
<th>Moderate</th>
<th>Large extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Accidents/ Incident inquiries</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. RSCR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Routine performance monitoring (e.g. SPADS)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Safety Risk Model</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 2. IMPLEMENTATION OF RSCR

### 2.1 Considering the 1994 RSCR when initially implemented, please indicate the degree to which you agree that they were helpful in providing:

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>A framework to allow TOCs/SOCs to review their HSMS in the light of the new franchised regime</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>A mechanism to create interface linkages between TOCs/SOCs and the Infrastructure Controller to reduce potential risk from the fragmentation of the industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>A tool to assist operators to review risk and risk control measures in a more structured way through a systematic risk assessment approach</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>A compliance function through Railtrack's Safety and Standards Directorate's annual audits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td>An opportunity to write down systems and processes for the first time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f.</td>
<td>Other (please specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 2.2

A. What do you consider were the most significant implications for safety arising from privatisation?

________________________________________

________________________________________

________________________________________

B. Are these factors still prominent?

________________________________________

________________________________________

________________________________________

C. Have any new risks emerged?

________________________________________

________________________________________
2.3 To what extent, if any, did the role and focus of HMRI change at privatisation?

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>No change</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Pre-1994, the Inspectorate largely concentrated on safety issues concerning hardware</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Post 1994, there has been an increased emphasis on soft/human issues (competencies, training etc)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.4 A. Considering the role of HMRI since 1994, has there been an increase in enforcement?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. frequency:</td>
<td></td>
</tr>
<tr>
<td>b. severity:</td>
<td></td>
</tr>
</tbody>
</table>

B. If your answer to a or b (above) is YES, to what extent has this enforcement created a barrier (e.g. reduced communication, mistrust) between the Duty Holder and HMRI?

<table>
<thead>
<tr>
<th>No barrier</th>
<th>Moderate</th>
<th>Large extent</th>
</tr>
</thead>
</table>

2.5 What do you believe has driven the various amendments in the RSCR?

<table>
<thead>
<tr>
<th>No influence (or negative influence)</th>
<th>Moderate positive effect</th>
<th>Significant positive influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Accident/incident inquiries and reports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. The need to fully decouple the safety assessment / audit role from the IC (i.e. from S&amp;SD to HMRI/Railway Safety to HMRI/‘competent body’)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Lessons learnt from the implementation of RSCR, dialogue with industry and continual improvement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Other (please specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.6 A. What was the typical cost for you as a Duty Holder in preparing and submitting a RSC, over and above the costs you would expect to have incurred in the absence of the RSCR, but with realistic application of all other safety regulations?

<table>
<thead>
<tr>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Under the 1994 RSCR</td>
</tr>
<tr>
<td>b. Under the 2000 RSCR amendments</td>
</tr>
</tbody>
</table>
B. What was the typical cost for you as a Duty Holder in gaining acceptance (including any resubmission(s)) of a RSC, after the initial submission?

a. Under the 1994 RSCR £

b. Under the 2000 RSCR amendments £

2.7 Please indicate what percentage of the total time spent in the production of the RSC was allocated to:

<table>
<thead>
<tr>
<th></th>
<th>1994</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Risk Assessment</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>b. HSMS</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>c. Development Plan (transitional cases)</td>
<td>N/A</td>
<td>%</td>
</tr>
<tr>
<td>d. Other Activities</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

2.8 What typically was the cost for you as Duty Holder, either financially or in terms of staff-hours, for preparation and handling of the 3-year resubmission under the 1994 RSCR? £ Total hours

2.9 A. Since the introduction of the RSCR, approximately how many ‘Material Revisions’ have you submitted under the 1994 Regulations (excluding the 3-year resubmissions)?

B. Have any ‘Material Revisions’ been submitted under the 2000 RSCR and if so, how many?

C. What is the approximate range of in-house costs associated with each ‘Material Revision’?

Maximum: £ Minimum: £

D. What is the approximate range of external costs (i.e. assessment and specialist support) associated with each ‘Material Revision’?

Maximum: £ Minimum: £
E. How well are circumstances necessary for the submission of ‘Material Revisions’ understood from the RSCR and supporting documentation (e.g. L52 Guidance on Regulations)?

<table>
<thead>
<tr>
<th>Unclar</th>
<th>Reas. Understood</th>
<th>Well Understood</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F. How are minor changes not considered to require a ‘Material Revision’ collected to ensure that the cumulative effects are not significant?

2.10 Following RSC submission, please indicate how detailed the assessment process has, in your view, been for the:

<table>
<thead>
<tr>
<th>Limited detail</th>
<th>Moderate detail</th>
<th>Highly detailed</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 1st submission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. 3 year resubmission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Transitional RSC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Material Revisions (typically)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.11 A. Please indicate whether you agree or disagree that one of the 2003 RSCR amendments (removal of the duty on the IC to procure RSC assessment, i.e. removal of Railway Safety in the RSC assessment process) will improve the quality/ effectiveness of the RSCR assessment in future:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. Other comments on the 2003 amendments:
3. **RSCR AUDIT**

3.1 A. To what extent has the annual audit (Railtrack S&SD/ Railway Safety) assessing compliance with RSCR, other regulations and Railway Group Standards also measured the **effectiveness** of HSMS in the period?

<table>
<thead>
<tr>
<th>Period</th>
<th>Small extent</th>
<th>Moderate</th>
<th>Large extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994 to 1996</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997 to 1999</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000 to 2003</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. Has the effectiveness of your HSMS changed over the years since privatisation as a result of the audit?

<table>
<thead>
<tr>
<th>Change</th>
<th>No Change</th>
<th>Moderate improvement</th>
<th>Significant improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C. To what extent would the same level of enhancement (and increased effectiveness) of the HSMS have been achieved in the absence of the RSCR (e.g. by ongoing internal review)?

<table>
<thead>
<tr>
<th>Achievement</th>
<th>Not at all</th>
<th>To a moderate degree</th>
<th>Largely or wholly</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.2 A. Typically, what proportion of the conclusions/recommendations from action plans arising from audits have led to significant change in your company's HSMS?

<table>
<thead>
<tr>
<th>Period</th>
<th>0%</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994 to 1996</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997 to 1999</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000 to 2003</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. What proportion of these HSMS changes, if any, resulted in an updated RSC (e.g. 'Material Revision')?

<table>
<thead>
<tr>
<th>Period</th>
<th>0%</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994 to 1996</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997 to 1999</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000 to 2003</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.3 Typically what costs are involved in the (Railtrack S&SD / Railway Safety) annual audit process?

a. From you as Duty Holder (auditee)
£ ____________________

b. From the auditor (if known)
£ ____________________ or staff days/audit ____________________

3.4 Has communication between your company as auditee and the auditor improved or deteriorated in the following periods?

<table>
<thead>
<tr>
<th>Period</th>
<th>Significantly deteriorated</th>
<th>No change</th>
<th>Significantly improved</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 1994 – 1999</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>b. 2000 – 2003</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

3.5 A. Were compliance audits (with British Rail Standards) carried out pre-1994?

YES □ NO □ (If no, please go to Q 3.6)

B. If YES, was the HSMS part of such an audit?

YES □ NO □ (If no, please go to Q 3.6)

C. If YES, were the resources required to undertake such an audit…?

<table>
<thead>
<tr>
<th>Resources Required</th>
<th>Much less than today</th>
<th>About the same</th>
<th>Much more than today</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

3.6 A. To what extent are issues arising from audits shared across the industry to improve compliance in the following periods?

<table>
<thead>
<tr>
<th>Period</th>
<th>Little</th>
<th>Moderate</th>
<th>Large</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. In 1994 to 1996</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>b. In 1997 to 1999</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>c. In 2000 to 2003</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

B. How are such issues communicated?

________________________________________

________________________________________
3.7 A. What other regular safety audits (including any internal audits) are carried out in your organisation and what are the associated costs per annum?


B. Where issues for action are identified in the Railtrack S&SD / Railway Safety annual audit and other regular safety audits, are these collated into one overall Duty Holder action plan, how and in what form?


C. If actions concerning the HSMS are identified in an audit, typically is the HSMS updated?

- a. Immediately
- b. Annually
- c. When resubmitting the RSC.


3.8 Please indicate whether you agree or disagree that the proposed 2003 RSCR amendments (i.e. audit by a 'competent body') will:

- a. Improve the quality/ effectiveness of the audit by being fully independent
- b. Lead to varying quality across the industry
- c. Have other significant impacts (please specify)
4. CHANGE MANAGEMENT

4.1 Please indicate whether your RSC defines and assists the Change Management process:

RSC offers little or no assistance  RSC offers modest assistance  RSC provides clear guidance

4.2 When undergoing change, has Risk Assessment been adopted to evaluate impact in the following change areas prior to implementation?

Low RA usage  Moderate usage  High RA usage

a. Staffing levels and organisation (e.g. downsizing)
   pre 1994  2003
b. Equipment (e.g. infrastructure, rolling stock)
   pre 1994  2003

4.3 To what extent does the RSCR ‘Material Revision’ process provide a useful independent control in Change Management to ensure safety is not compromised?

Small extent  Moderate  Large extent

4.4 What (approximate) percentage of changes to the HSMS, organisation or hardware require resubmission of the RSC as ‘Material Revisions’?

0%  25%  50%  75%  100%

4.5 A. Does the level of detail in the RSCR process?

Not at all  Somewhat  Frequently

a. Assist in identifying the effects of change
b. Constrain the ability to change

B. Do you consider the level of detail required in current RSCs to be onerous?

YES  NO
C. If YES, in which areas do you think improvements could be made?

4.6 Recognising the prescriptive nature of some Group Standards, how much flexibility (or constraint) is there to implement new / improved safety features identified during Risk Assessment?

<table>
<thead>
<tr>
<th>No flexibility</th>
<th>Some flexibility</th>
<th>Full flexibility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. **INTERFACE AND CONTRACTING**

5.1 A. Please outline how, if at all, information arising from operator specific Risk Assessment that would be relevant to other operators is communicated to them:

B. If such communication occurs, is considered feedback received from the recipients?

5.2 How frequently are joint HAZOPS / HAZIDS (e.g. TOC to TOC) organised to ensure interface risks are fully identified?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Never</th>
<th>Annually</th>
<th>Twice annually</th>
<th>Quarterly</th>
<th>Monthly</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.3 A. On average, how many of your company’s staff-days per-annum are associated with health and safety meetings between parent company and operating company (Duty Holder)?

B. Please indicate the contribution that the parent company makes to the safety strategy of the individual operating companies:

<table>
<thead>
<tr>
<th>Contribution</th>
<th>Minimal</th>
<th>Moderate</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Regular contact and safety updates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Engagement in the development of the RSC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Standardising safety policies across operators</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.4 How frequently do representatives from your organisation attend the following working groups?

<table>
<thead>
<tr>
<th>Working Group</th>
<th>Never</th>
<th>Annually</th>
<th>Twice annually</th>
<th>Quarterly</th>
<th>Monthly</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. SPAD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Emergency Planning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Zone Adhesion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Trespass and Vandalism</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Incident/accident Safety Liaison Meetings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. TOC Safety Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. Other (please specify)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
B. If possible, can you indicate how many staff-days per annum are expended in connection with such meetings?

5.5 How many staff-days per annum (managers and frontline staff) are taken to select and control the contracting companies and workforce not directly employed by you as Duty Holder?

   a. In 1995 ______________________ days per annum
   b. In 2000 ______________________ days per annum
   c. Now ______________________ days per annum

5.6 A. What is your annual expenditure on upgrade and maintenance of items to combat trespass and vandalism (e.g. fences)?

   a. In 1995 £ ______________________
   b. In 2000 £ ______________________
   c. Now £ ______________________

   B. To what extent is this expenditure due to the outcome of Risk Assessment as opposed to other forms of identification (e.g. routine maintenance)?

   Small extent  Moderate  Large extent
   [ ]     [ ]     [ ]     [ ]     [ ]

5.7 A. In establishing the compatibility of Development Plans between TOCs and TOC to Infrastructure Controller, what additional costs are involved and, typically, where do these costs accrue?

   __________________________________________ 

   B. If incompatibility is found between Development Plans in the RSC, how is the issue resolved?

   __________________________________________ 

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6. **HEALTH AND SAFETY MANAGEMENT SYSTEMS**

6.1 A. Following industry privatisation in 1994, please indicate the degree to which your organisation’s HSMS changed (or is likely to change) following the introduction of RSCR in:

<table>
<thead>
<tr>
<th>Year</th>
<th>The ex-British Rail Management System remained in use, largely unchanged</th>
<th>Some modifications were necessary</th>
<th>Significant changes had to be made</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 1994</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>b. 2000</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>c. 2003 and the future</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

B. Please outline what you think the main changes in your HSMS have been and when they occurred:

_____________________________________________________________________________

_____________________________________________________________________________

C. Although in compliance with the Health and Safety at Work Act and Management of Health and Safety at Work Regulations 1992 (MHSW), were gaps subsequently found in the provisions of a management system for health and safety when implementing the RSCR?

_____________________________________________________________________________

_____________________________________________________________________________

D. What changes, if any, did the replacement 1999 MHSW Regulations have on your HSMS?

_____________________________________________________________________________

6.2 What total costs were incurred in the enhancement of existing safety management systems (pre-privatisation) to meet the 1994 RSCR?  

£  _______________________________________________________________________

6.3 Please indicate whether you agree that the RSCR provided an important catalyst for companies new to the railway industry to develop a suitable HSMS:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

6.4 A. Are all key skills and competencies in the HSMS organisational structure provided in-house?

YES □ NO □
B. If NO, what key roles are outsourced?

---

6.5 Having established a HSMS, what resources (staff-days per annum) are typically required to maintain, monitor and improve it (including submission of ‘Material Revisions’)?

---

6.6 A. Have the 2000 RSCR necessitated a significant re-write of the HSMS:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

B. How many staff-days were expended on updating the HSMS aspects to meet the 2000 RSCR transitional requirements?

---

C. In support of the 2000 HSMS, was a more detailed Risk Assessment required, and if so, how many additional hours were spent on this?

---

6.7 To what extent did the following aspects of the HSMS change in the 2000 RSCR?

<table>
<thead>
<tr>
<th>Minimal change</th>
<th>Modest change</th>
<th>Major change</th>
</tr>
</thead>
</table>
a. Competence assurance of all staff
b. Control of contractors
c. Emergency procedures
d. Linkage between Risk Assessment (with associated risk controls) and HSMS
e. Supply Chain Management
f. Other (please specify)

---

6.8 A. Is the HSMS of the Duty Holder imposed as the guiding safety system for contractor/subcontractors and/or is the contractor’s in-house HSMS audited by the Duty Holder for acceptability?
B. Is the HSE guidance on ‘Successful Health and Safety Management’ (HS(G)65) taken as the basis for acceptability of contractors' HSMS?

C. Are compatibility checks with Duty Holder’s HSMS carried out?

6.9 How is the control of health and safety maintained down the supply chain?

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.10 A. Whilst the RSC defines the managerial roles and responsibilities for safety, it is recognised that the whole workforce have their own roles and responsibilities. Where are these defined (e.g. Job Descriptions)?

B. To what extent has the safety culture improved at the employee level since 1994?

6.11 A. Please indicate whether you agree that the basic principles associated with the structure and implementation of a HSMS are now accepted industry-wide.

B. To what extent were they accepted in 1994?
C. If employee safety culture has improved (i.e. enhanced employee attitudes, values and beliefs surrounding safety), how has this improvement been detected?

6.12 To what extent has the RSCR assessment process assisted in improving the quality of your HSMS, relative to the processes you would have expected in the absence of the RSCR for:

<table>
<thead>
<tr>
<th></th>
<th>Small extent</th>
<th>Moderate</th>
<th>Large extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 1st submission</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. 3 year resubmission</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Transitional RSC</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.13 A. To what extent are the workforce (e.g. safety representatives) involved in the development of the HSMS aspect of a RSC?

<table>
<thead>
<tr>
<th></th>
<th>Small extent</th>
<th>Moderate</th>
<th>Large extent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. What workforce (i.e. frontline) staff-days per-annum are allocated to this activity?

C. Please give examples, if any, where the involvement of the workforce in the development of a HSMS is productive in identifying any procedural enhancements required:

6.14 To what extent are training and management systems identified within your HSMS to ensure competence during periods of change or abnormal operations?

<table>
<thead>
<tr>
<th></th>
<th>Small extent</th>
<th>Moderate</th>
<th>Large extent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.15 What was/is your company’s typical safety team annual expenditure on managing safety (i.e. the activities of the safety team including meetings for SPAD management, Safety Focus Groups etc.)?

<table>
<thead>
<tr>
<th>Year</th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>Now</td>
<td></td>
</tr>
</tbody>
</table>
6.16  A. Has the process of producing RSCs assisted in identifying and developing new procedures that have led to new Group Standards?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. If YES, please list some examples:

________________________________________________________________________
7. **RISK ASSESSMENT**

7.1 A. Is Risk Assessment used as a fundamental tool to prioritise and plan the implementation of safety improvements?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. If risk control measures were identified (during Risk Assessment) which could not be immediately implemented, where were plans for their implementation presented in the RSC prior to the 2000 RSCR (Development Plan)?

7.2 In carrying out Risk Assessment, please indicate the distribution of work between outside consultants and in-house resources for the following periods:

<table>
<thead>
<tr>
<th>100% Consultants</th>
<th>Both about equally</th>
<th>100% In-house</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| a. 1994 – 1999   |                    |               |
| b. 2000 – 2003   |                    |               |

7.3 Typically, how many staff-days are spent, per-annum, carrying out Risk Assessment to support?

a. Organisational Change (e.g. company restructuring) ____________ Days
b. Equipment Introduction (e.g. new rolling stock) ____________ Days

7.4 A. To what extent are the workforce (e.g. safety representatives) involved in HAZOPs/HAZIDs and identification of risk (and risk control measures)?

<table>
<thead>
<tr>
<th>Small extent</th>
<th>Moderate</th>
<th>Large extent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. What frontline workforce staff-days per-annum are allocated to this activity?

_____________________________

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8. **TRAINING**

8.1 Is training carried out in the following areas and what is the typical current annual expenditure for each?

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Management Competency</td>
<td>[ ]</td>
<td>£__________________</td>
</tr>
<tr>
<td>b. Driver/Operative competency</td>
<td>[ ]</td>
<td>£__________________</td>
</tr>
<tr>
<td>c. Root cause analysis</td>
<td>[ ]</td>
<td>£__________________</td>
</tr>
<tr>
<td>d. Risk Assessment</td>
<td>[ ]</td>
<td>£__________________</td>
</tr>
<tr>
<td>e. Company HSMS and procedures</td>
<td>[ ]</td>
<td>£__________________</td>
</tr>
<tr>
<td>f. Awareness of RSC provisions (briefings)</td>
<td>[ ]</td>
<td>£__________________</td>
</tr>
<tr>
<td>g. Other</td>
<td></td>
<td>£__________________</td>
</tr>
</tbody>
</table>

8.2 Does this total expenditure on training represent a significant increase from that of 1995 and, if so, to what extent?

________________________

8.3 A. What is the frequency of ‘live’ emergency exercises organised by you as Duty Holders (over and above the annual Network Rail exercises)?

________________________per annum

B. What is/was the cost £__________________ per annum

8.4 A. Has additional training of drivers and/or other staff been necessary to provide suitable arrangements for escape from trains (as opposed to organised evacuation)?

|          |  
|----------|----------
| NO       | [ ]      |
| YES      | [ ]      |

B. What is/was the cost £__________________ per annum
9. COMPETENCE

9.1 Are the competency criteria that your company uses to select employees?

- Industry wide standards
- Company specific
- Other (please specify)?

9.2 What procedures and processes are used for ensuring the competence of sub-contracted labour (e.g. track maintenance employees)?

9.3 A. Please list any new selection procedures that your organisation has introduced since privatisation and indicate who these are for (e.g. assessment centres to select train managers).

B. What is the additional annual cost of such schemes?
10. COMMUNICATIONS

10.1 A. How are conclusions and recommendations from incident investigations disseminated to drivers, track maintenance crews etc?

B. Has this process changed since the introduction of RSCR?

10.2 To what extent do each of the following regulations and standards require comprehensive documentation of methods and frequencies for organisational and inter-organisational communications?

<table>
<thead>
<tr>
<th></th>
<th>Small extent</th>
<th>Moderate</th>
<th>Large extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. RSCR in:</td>
<td>1994</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>b. Railway Group Standards</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>c. Management of Health &amp; Safety at Work</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>d. Other (please specify)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

10.3 Are the 2000 RSCR providing a tool that enhances communications; if so, between whom and in what way?
11. **INVESTIGATIONS**

11.1 A. Are investigations handled:  

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Using in-house resources maintained to implement any necessary investigation processes?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>b. Using retained resources to evaluate/act on the results from any investigation obtained from external agencies?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>c. Other (please specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. The RSCR require Duty Holders to establish adequate arrangements for investigating accidents / incidents, their causes and participating in investigations carried out by other operators. What was/is the typical annual expenditure to maintain such arrangements?

<table>
<thead>
<tr>
<th></th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 1995</td>
<td></td>
</tr>
<tr>
<td>b. 2000</td>
<td></td>
</tr>
<tr>
<td>c. Now</td>
<td></td>
</tr>
</tbody>
</table>

11.2 A. Post-incident, are combined investigations initiated, bringing together affected TOCs, IMCs and the IC?

B. If so, did this happen immediately post-privatisation?

11.3 Please indicate which of the following has provided the most effective forum for reporting and sharing information on incidents:

<table>
<thead>
<tr>
<th></th>
<th>No impact</th>
<th>Modest effect</th>
<th>Highly effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. CIRAS</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>b. Railway Group</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>c. Safety liaison meetings with IC</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>d. ATOC (and other associations)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>e. Other (please specify)?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
12. COMPANY INFORMATION

12.1 To put the above costs into context, please could you indicate your organisation’s:

A. Annual turnover:
   a. In 1995 £
   b. In 2000 £
   c. Most recent £

B. Total number of direct employees (i.e. not including subcontractors):
   a. In 1995 
   b. In 2000 
   c. At present 

C. Total number of contracted workforce (i.e. not directly employed):
   a. In 1995 
   b. In 2000 
   c. At present 

D. Type of operation
   a. Intercity
   b. Suburban
   c. Rural
   d. Freight
   e. Other

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13. ADDITIONAL COMMENTS ON THE RSCR AND HOW THEY MIGHT BE IMPROVED
14. **DEFINITIONS, ABBREVIATIONS AND ACRONYMS**

14.1 Definitions

Inquiries: Rail accident and incident investigations and reports.

Operating company: TOCs, IC, and IMCs (see 14.2)

Parent company: Company owning one or more Duty Holders

Risk Assessment: In the context of that required by the RSCR

14.2 Abbreviations and Acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATOC</td>
<td>Association of Train Operating Companies</td>
</tr>
<tr>
<td>CIRAS</td>
<td>Confidential Incident Reporting and Analysis System</td>
</tr>
<tr>
<td>HAZIDS</td>
<td>Hazard Identification Study</td>
</tr>
<tr>
<td>HAZOPS</td>
<td>Hazard and Operability Study</td>
</tr>
<tr>
<td>HMRI</td>
<td>Her Majesty’s Railway Inspectorate</td>
</tr>
<tr>
<td>HSMS</td>
<td>Health and Safety Management System</td>
</tr>
<tr>
<td>IC</td>
<td>Infrastructure Controller</td>
</tr>
<tr>
<td>IMC</td>
<td>Infrastructure Maintenance Contractor</td>
</tr>
<tr>
<td>MHSW</td>
<td>Management of Health and Safety at Work Regulations 1992 and 1999</td>
</tr>
<tr>
<td>RA</td>
<td>Risk Assessment</td>
</tr>
<tr>
<td>RSC</td>
<td>Railway Safety Case</td>
</tr>
<tr>
<td>RSCR</td>
<td>Railways (Safety Case) Regulations</td>
</tr>
<tr>
<td>1994 RSCR</td>
<td>Railways (Safety Case) Regulations 1994</td>
</tr>
<tr>
<td>2000 RSCR</td>
<td>Railways (Safety Case) Regulations 2000</td>
</tr>
<tr>
<td>S&amp;SD</td>
<td>Safety and Standards Directorate</td>
</tr>
<tr>
<td>SMS</td>
<td>Safety Management System</td>
</tr>
<tr>
<td>SOC</td>
<td>Station Operating Company</td>
</tr>
<tr>
<td>SPADS</td>
<td>Signals Passed at Danger</td>
</tr>
<tr>
<td>TOC</td>
<td>Train Operating Company (including Freight Operating Companies)</td>
</tr>
<tr>
<td>TPWS</td>
<td>Train Protection and Warning System</td>
</tr>
</tbody>
</table>
APPENDIX 4

INFLUENCE NETWORK DEFINITIONS
| D1 | Competence | The skills, knowledge and abilities required to perform particular tasks safely |
| D2 | Motivation / Morale | Workers incentive to work towards business, personal and common goals |
| D3 | Teamworking | The extent to which individuals work in teams and look out for each other's interests |
| D4 | Situational Awareness | The extent to which workers are aware of the hazards and risks associated with working on a construction site |
| D5 | Fatigue | The degree to which performance is degraded, for example, through sleep deprivation, or excessive / insufficient mental or physical activity, or drugs / alcohol |
| D6 | Health | The well being of body and mind of the workforce |
| D7 | Communications | The extent to which the frequency and clarity of communications are appropriate for ensuring effective task and team work |
| D8 | Information / Advice | The extent to which people can access information that is accurate, timely, relevant and usable |
| D9 | Compliance | The extent to which people comply with rules, procedures or regulations |
| D10 | Availability of Suitable Human Resources | The relationship of supply to need for suitable human resources. Relates to the appropriate mix and number of workers in terms of experience, knowledge and qualifications |
| D11 | Quality of Inspections | The extent to which the control of internal environmental factors, such as tidiness and may prevent accidents |
| D12 | Safe Operation of Equipment | The extent to which OPERATIONAL equipment and materials are available, conform to best practice, meet the usability needs of the operator and are inspected and maintained |
| D13 | Work Environment | The extent to which the control of environmental factors affect workplace activity may prevent accidents |
| D14 | External Factors | The extent to which SAFETY equipment / PPE is available, conforms to best practice, meets the usability needs of the worker and is inspected and maintained |
ORGANISATIONAL LEVEL INFLUENCES

O1 Recruitment and Selection - The system that facilitates the employment of people that are suited to the job demands

O2 Training - The system that ensures the skills of the workforce are matched to their job demands

O3 Procedures - The system that ensures that the method of conducting tasks and/or operations is explicit and practical

O4 Planning - The system that designs and structures work activities

O5 Incident Management + Feedback - The system of incident management that ensures high quality information is available for decision-making when and where it is required, including the collection, analysis and feedback of incident and near-miss data

O6 Management / Supervision - The system that ensures human resources are adequately managed/supervised

O7 Communications - The system that ensures that appropriate information is communicated clearly to its intended recipients

O8 HSMS - The management system which encompasses day to day safety management.

O9 Equipment Purchasing - The system that ensures that the appropriate range of equipment is available

O10 Inspection + Maintenance - The system that ensures equipment and materials are maintained in good working order

O11 Pay + Conditions - The remuneration package and benefits in the context of working hours and conditions and welfare facilities

O12 Design – The process of design to ensure the buildability of new structures and operability of safety devices of existing structures during maintenance, repair and refurbishment.

POLICY LEVEL INFLUENCES

P1 Contracting Strategy - The extent to which health and safety is considered in contractual arrangements and the implications

P2 Ownership + Control - The extent to which ownership and control are taken over sustained safety performance

P3 Company Safety Culture - Culture within an organisation consists of assumptions about the way work should be performed; what is and what is not acceptable; what behaviour and actions should be encouraged and discouraged and which risks should be given most resources
P4 **Organisational Structure** - The extent to which there is definition of safety responsibility within and between organisations

P5 **Safety Management** - The management system which encompasses safety policies, the definition of roles and responsibilities for safety, the implementation of measures to promote safety and the evaluation of safety performance

P6 **Workforce Involvement** - This extent to which there is inclusion of the workforce by management. It also concerns the extent to which there is the opportunity for workers to affiliate with associations active in defending and promoting their welfare

P7 **Profitability** - The extent to which the owner is subject to competition over market share and constrained as to the price that they can charge

P8 **Interface Management** - The nature and extent to which companies communicate and interact on safety matters

**ENVIRONMENTAL LEVEL INFLUENCES**

E1 **Political Influence** - The profile of and practices within Government related to safety in the industry

E2 **Railway Safety / RSSB** - The impact in relation to the provision of leadership in the development of long-term safety strategy and policy

E3 **HSE** – The extent to which the railway regulator impacts Duty Holder activities

E4 **Market Influence** - The commercial and economic context affecting the industry

E4 **Societal Influence** - Aspects of the community and society at large, which bear upon organisations and workers

E5 **Strategic Rail Authority (SRA)** - The impact of planning of the rail system and franchise issue / renewal of train company contracts.

E6 **Office of the Rail Regulator (ORR)** - Whose purpose is to achieve the continuous improvement of a safe, well-maintained, efficient and financially viable railway