Investigation Guidance
PART 2 Development of policy and management arrangements

Guidance and examples of good practices in accident investigation in Britain’s railway industry

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**Appendix A - Safety Culture**

**Appendix B - Roles of various investigation bodies**

Glossary
Accident investigation is at the heart of the industry’s learning from operational experience and the commitment to continuous improvement in its safety performance.

This three-part guide on accident investigation gives valuable guidance on the investigation process from start to finish and beyond, into the important area of learning and applying the lessons learned.

By following this guidance transport operators should improve the quality and consistency of investigations and the resulting reports. Improved accident investigation by transport operators, followed by the implementation of the associated recommendations, will assist in improving safety management across the industry.

The industry consultation in the production of this RSSB facilitated guidance is a welcome example of cross industry cooperation.

We support this guidance and encourage the industry to apply its content through its procedures, the management of investigations and the training of staff who conduct these investigations.

Ian Prosser
ORR

Competent investigation of both accidents and incidents that is sufficiently searching to establish not only the immediate cause but also the underlying causes is absolutely fundamental to improving safety. Those conducting the investigation must have the ‘sponsorship’ and authority of those at the top of their organisations to avoid potential conflict in the way the investigation is conducted, the scope of their findings and the implementation of the recommendations. I commend industry initiatives that further these aims.

Carolyn Griffiths
RAIB

The development of this updated guidance document and the supporting training package was approved by the System Safety Risk Group and was steered and assisted by a group of nominated industry representatives:

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DB Schenker  Carolyn Duerden
Southeastern  Colin Clifton
Wessex Alliance  Justin Willets
RSSB  John Abbott, Ian Moreton and Andy Bain
Introduction

Good accident investigation consistently and accurately identifies immediate and underlying causes after thorough analysis and produces objective and appropriate recommendations.

This three part guidance covers the key aspects of investigation, but also other important related issues of accident management, including the provision of necessary systems and resources, response management, reporting, recommendation management and the learning of lessons, leading to continuous improvement. The key elements of an investigation are described in detail: remit, evidence gathering, interviewing techniques, analysis of immediate and underlying causes and recommendations.

The process for managing accidents is illustrated below, including cross-reference to the relevant module number in the digital training programme and the section (S) of the guidance.

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<th>Management of Accidents Part 2</th>
<th>Investigating Part 3</th>
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<td>The importance of a good investigation (S 1)</td>
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<td>Actions on site (S 3)</td>
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This update of the guidance expands on the principle of proportionality when deciding on the scale of the investigation. Section 4.2. in Part 2 describes this new approach in detail. This update is also supported by a new digital training programme as described below.

## Signposts - Digital training programme

This free training programme is available via the RSSB website or by contacting the Safety management Systems team at sms.programmes@rssb.co.uk. It can be used in a classroom environment with a tutor or individually on a computer. It is split into 10 modules lasting a total of 4 hours. This programme is closely based on the guidance and widespread use of it should raise the quality of accident investigations and so reduce future loss as a result of accidents.

The guidance is built on an understanding of risk management and the integration of both human factors principles and a positive safety culture, with the aim of continuous improvement in the application and performance of safety management. It emphasises the need for cooperation in the achievement of good accident investigation and improved safety management.

Good accident investigation consistently and accurately identifies immediate and underlying causes after thorough analysis and produces objective and appropriate recommendations. These should then be effectively implemented and the necessary lessons learned, leading to fewer accidents and continuous improvement, both within each transport operator’s activities and across the industry.

## 1 Principles and use of guidance

This document aims to provide user friendly guidance to help organisations develop and **apply effective policies** on conducting good investigations and learn lessons from these investigations.

### 1.1 Background

The benefits of good accident investigation and the commitment to continuous improvement in safety are understood by the railway industry. This suite of documents has been produced in response to the industry’s request for practical support to assist in the achievement of better accident investigation.

### 1.2 Purpose, audience and status of this guidance

This document, Part 2 of the suite of three, aims to provide user friendly guidance to help organisations develop and **apply effective policies** on conducting good investigations and learn lessons from these investigations. It is aimed principally at safety managers and those directly responsible for writing accident investigation policies / procedures, but will also be of interest to those in related management roles, eg those who:

- Appoint investigators
- Agree the investigation scale, remit and the report
- Manage reporting such as SMIS inputs
- Manage recommendation implementation and tracking process
The associated two documents are aimed at senior managers and investigators respectively, as follows:

- **Part 1, The role of the senior manager** provides senior managers with a high level overview of the need for good accident investigation and the important role they play in ensuring effective processes are in place
- **Part 3, Practical support for accident investigators** provides investigators with guidance, including examples of good practices checklists

The contents of this guidance are not mandatory though references are made to legal and Railway Group Standard (RGS) requirements. Transport operators (railway undertakings and infrastructure managers) and other railway industry Safety Management System (SMS) holders should, however, demonstrate their commitment to good accident and incident investigation either by adoption of this guide or by stating in their SMS the methods used to ensure good quality investigations are undertaken.

The three documents provide guidance well beyond the scope of Railway Group Standards but it is not intended to supersede or conflict with any parts of these standards.

### 1.3 Scope and use

This guidance is intended to apply to a wide range of undesired events and extends beyond the requirements of Railway Group Standard (RGS) GO/RT3119 Accident and Incident Investigation and its associated Guidance Note GO/GN3519, *(both dated March 2013)* which are largely focussed on train operations. The following undesired events are not mandated for investigation in GO/RT3119 but this guidance could be applied to them:

- Non-train related accidents
- Accidents involving only minor injuries
- Accidents off the main line, eg in depots, sidings and offices
- Construction related accidents including within engineering possessions
- Accidents only involving one duty holder
- Incidents* involving equipment and assets
- Near misses* (sometimes known as close calls or near hits – possibly reported via CIRAS)
- Other undesired events, eg train delayed in a tunnel but with no injuries
- Health exposures (eg noise and asbestos)
- Accidents during travel while on duty
- Accidental release of substances causing harm and/or environmental impact

*The scale of the required investigation should be based on the potential consequences, and therefore risk, should circumstances have been slightly different. This could apply to incidents where the result is no injury or damage. (see 4.2 for more detail)*

Undesired events can vary in scale, from those requiring a Formal Investigation down to a lesser level than Local Investigation. This guidance document, rather than making repeated references to Formal and Local uses three levels of scale of event and consequent investigation, plus the recording of a negligible scale event. The following terms are used:

<table>
<thead>
<tr>
<th>Scale of Events (Accident or Incident)</th>
<th>Level of Investigation (related to risk)</th>
<th>Approximate equivalent to RGS requirement</th>
<th>Typical personnel involved in investigating</th>
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<tr>
<td>Major</td>
<td>High</td>
<td>Formal eg fatality to passenger when boarding or alighting a train</td>
<td>Experienced investigator and team of experts</td>
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<tr>
<td>Medium</td>
<td>Medium</td>
<td>Local eg buffer stop collision where there is no injury to people</td>
<td>Line manager level with/without support</td>
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<tr>
<td>Minor</td>
<td>Low</td>
<td>None</td>
<td>Line manager level</td>
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<tr>
<td>Negligible</td>
<td>Record event</td>
<td>None</td>
<td>Supervisor</td>
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The risk based approach taken by this guidance can also be applied to accidents related to trespass and suicide, which are outside the remit of the above mentioned RGSs. This could range from a report to SMIS up to a high level of investigation where a trend is identified that may relate to significant costs in terms of life, minutes lost, risks or lessons that could be learned.

To assist the processes of research, policy development, investigating and reporting this document contains signposts to other documents:

**Signposts - Contents**

These are hyperlinked where possible to other documents which may contain further useful information or details, such as large checklists, that are too large to repeat in these documents. It also contains a few examples of good practice in addition to the many examples in Part 3.

**Good Practice includes:**

- Examples of processes used by transport operators that are examples of good practice (these are not subject to extensive comparison with others but nonetheless should be useful to most readers)
- Useful lists of points extracted from more than one source
- References to statements in other documents that should be of use to readers

This document is available on the RSSB website and it is intended that good practice examples will be added and updated regularly. Transport operators are encouraged to send examples that they consider good practice to sms.programmes@rssb.co.uk so that these can be shared.

### 1.4 Guiding principles integrated into this document

#### 1.4.1 Risk management

Good safety management depends on understanding safety risks and controlling them in an active and systematic way. When done effectively risk management should result in fewer accidents. However, when an undesired event does occur, the underlying causes should be thoroughly investigated to ensure that appropriate recommendations and actions are taken. High level reviews of investigation findings should then ensure that lessons are learned and acted upon so as to make a similar event less likely and of lower consequence if it were to be repeated.
1.4.2 Human factors

Integration of human factors principles is essential to successful safety management and good investigation practices (including investigation techniques, interviewing, making recommendations and learning lessons). This guidance therefore incorporates an up-to-date understanding of human factors, rather than referring to these as an ‘add on’.

Human factors assist us in understanding why things go wrong, from the unsafe actions and conditions at the time of the undesired event back to the earlier underlying causes. The Swiss Cheese model, which is based on James Reason’s theory of accident causation is a clear illustration of this and is the root of many modern applications of human factors to accident investigation processes. This model illustrates the fact that accidents are usually the result of a complex chain of contributory events some of which are present in normal working conditions. The layers of defences against hazards may each have failures and it is when these line up that the accident occurs, as illustrated in diagram 1 below.

Signposts - **HSG245 Investigating Accidents and Incidents**

This HSE publication contains the following text which matches the approach taken within this guidance document:

‘Carrying out your own health and safety investigations will provide you with a deeper understanding of the risks associated with your work activities. Blaming individuals is ultimately fruitless and sustains the myth that accidents and cases of ill health are unavoidable when the opposite is true. Well thought-out risk control measures, combined with adequate supervision, monitoring and effective management (ie your risk management system) will ensure that your work activities are safe. Health and safety investigations are an important tool in developing and refining your risk management system.’

Diagram 1 Swiss Cheese model
(from the website of the Disaster Management Institute, Bhopal)
The following rail industry example further illustrates the lining up of system failures:

**Diagram 2 Swiss Cheese model - example**

The term ‘human factors’ should not be misunderstood to suggest that the sole focus is on finding fault with an individual whose actions may be immediately perceived to be the direct cause of an accident. It should, on the contrary, lead to a wider analysis of underlying causes, giving consideration to unsafe conditions and identification of system breaches.

The application of human factors is particularly relevant to the identification of causes and Part 3 section 4 and Appendix A contains details on:

- Human error types and violations
- Individual, job and organisational factors related to underlying causes
- Techniques for structuring underlying causes

**Signposts - Human Factors**

RSSB’s *Good Practice Guide on Cognitive and Individual Risk Factors*, 2008 contains more in depth material on human factors with examples of good practice relating to the railway industry.

Network Rail’s *Why People make Mistakes – Investigating the Human Factors* is due for release in 2014

### 1.4.3 Safety culture

Commitment to the development of a strong or ‘positive’ safety culture is fundamental to good accident investigation and continuous improvement. This is reflected in employee (frontline and management) attitudes towards safety, the frequency of key day-to-day safety behaviours and the quality and effectiveness of the underlying SMS.
Organisations with strong safety cultures use a variety of sources, such as employee feedback and management reviews, to actively manage risk. When accidents and incidents do occur, these are seen as opportunities to improve and learn lessons. Based on an understanding of human factors and accident causation, appropriate remedial action is then able to be taken to remove barriers to safe working practices and to reduce the risk of a recurrence. Where the safety culture is poor, near misses may not be reported due to lack of understanding of the importance of reporting, a lack of trust or fear of punishment.

Further explanation on the importance of positive safety culture to all stages of accident management, and some related terminology, is included in Appendix A.

1.5 Terminology for accidents, incidents and near misses

Rail industry literature relating to investigations is inconsistent in its use of many of the central terms used, namely those associated with accidents, as well as incident, near miss and close call.

These words may have different uses ranging from formal use in standards, to regular written and verbal use in technical and management meetings, to the daily front line use by rail managers and staff. The meanings also have different origins, from long term rail industry understanding, through to the more recent common usage by safety professionals, and to different terminology from the construction industry and now used by Network Rail.

This guidance does not mandate definitions but uses the terminology in a way that should suggest common understandings while allowing flexibility.

Transport operators and contractors may wish to continue to use their own terminology and, as it is unlikely to be used in safety critical situations, any ongoing confusion over interpretation should not be critical. However, it is important that the shared data via SMIS input is based on consistent use of terminology and classification/categorisation of causes. Company SMIS data entry personnel therefore have the vital job of translating company terminology into that used by SMIS. The diagram below should help clarify this.

![Diagram 3: Terminology](image-url)
2 Before the event

In order to achieve good accident investigation, the policy, resources, training and other issues related to investigation should be in place, as specified within the company’s SMS and its own procedures and processes.

2.1 Why investigate?

Good quality accident investigation will assist in reducing the number of accidents and their consequences, should they occur. Fewer injuries to employees, passengers and the public and damage to equipment, infrastructure or the environment will bring moral and economic benefits. Good accident investigation will also protect organisations against subsequent litigation if an accident does recur. As a consequence of these loss will be reduced.

There are also legal requirements relating to accident investigation and the most obvious for the railway industry are listed here, but this list is not exhaustive:

- The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (as amended) [ROGS], in particular Schedule 1 which requires of a Safety Management System: ‘procedures to ensure that accidents, incidents, near misses and other dangerous occurrences are reported, investigated and analysed and that necessary preventative measures are taken’
- The Railways (Accident Investigation and Reporting) Regulations 2005
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR)
- The Safety Representatives and Safety Committees Regulations 1977
- Health and Safety at Work etc Act 1974

If a serious accident occurs and it is found that previous warnings, eg from previous investigations into similar circumstances, have been ignored, then regulatory authorities are likely to take a firm line.

Transport operators must also comply with the requirements of RGS and some of these are signposted throughout this guidance document. The most obviously connected ones (available via RSSB website) are:

- GE/RT8047 Reporting of Safety Related Information (June 2011)
- GO/RT3119 Accident and Incident Investigation (March 2013)

Signposts - Key investigation requirements

The Background and Principles in section 1.2 of GO/RT3119 describe the key requirements on the industry for investigation set by this standard.

- GO/RT3118 Incident Response Planning & Management

Guidance Note GO/GN3519 Guidance on Accident and Incident Investigation, also gives specific guidance related to GO/RT3119.

In addition to the identification of underlying causes (described in section 4.7), the investigation should provide a true snapshot of what really happened and how work activities are undertaken and so expose any shortcuts and unsafe actions.
2.2 Cost of accidents

Much has been written about the cost of accidents, particularly by the HSE, both in the rail industry and the wider UK economy. Some important principles and observations are worthy of reference for senior and safety managers and others who may be required to act on recommendations, and these are listed below:

- Good application of the SMS and its components such as risk assessment and control, accident management, competence systems, outcome and activity indicators, acting on recommendations, high level review and learning lessons, will lead to a reduction in accidents and therefore costs.

- The HSE’s HSG245 states: ‘As well as being a legal duty, it has been found that where there is full cooperation and consultation with union representatives and employees, the number of accidents is half that of workplaces where there is no such employee involvement.’

- Claims are sometimes an element of the total cost and those that are made constitute a larger percentage of costs for the lower level occupational health and safety (eg slips, trips and falls) or passenger accidents, compared with the higher consequence accidents. Again, good accident investigation should lead to fewer accidents and so fewer claims. A close relationship between the company claims manager and investigators should bring benefits in both investigations and reducing claims.

- Accidents are expensive, with many factors contributing to the costs. In addition to the more obvious ones are the loss of reputation and morale, distraction from main tasks and resources involved in investigating. For major accidents these costs can be extreme to the level of business collapse. Costs of legal fees can also be significant, sometimes several times the more obvious costs. RSSB’s Taking Safe Decisions describes the industry consensus view on how decisions that affect safety are made, and sets out the different costs that should be taken into account both when assessing compliance with the legal duty to ensure safety so far as is reasonably practicable, and whether a decision makes sense from the wider business perspective.

- The HSE website also publicises an accident costs overview for British industry. For example, each year over one million injuries and 2.3 million cases of ill-health are experienced by workers and many organisations will not be aware of the full cost of their own accidents and ill-health.

- The HSE website provides basic tools to assist in identifying approximate annual accident costs and those for specific accidents. The Annual Accident Calculator includes insurance premiums and uninsured costs such as lost time, production delays, extra wages, legal costs and loss of contracts. HSE studies have shown the ratio of insurance premium paid to uninsured losses to be between 1:8 and 1:36.

2.3 Roles of the various investigation bodies

Various bodies, the main ones being RAIB, BTP and ORR, have legally specified roles relating to railway investigations. These are described in a Memorandum of Understanding (MoU), dated April 2006. The MoU content is likely to be of interest to investigators and is summarised, including a significant amount of useful detail, in Appendix B.

In relation to environmental damage the Environmental Agency and Scottish Environmental Protection Agency may be involved and further details are included in section 3.
2.4 Safety Management System – key elements and resources

Policy, resources, training and other issues related to investigation will be specified within a company’s SMS and its own procedures and processes. These should be in place to meet the legal and RGS requirements and, where appropriate, complement the Network Rail National Emergency Plan and its supporting documents.

Transport operators should, where the risks indicate it appropriate, have joint arrangements for response management and investigation in place with other transport operators and contractors.

The sub-sections below supply guidance on key subject areas that should be included within SMSs and/or company procedures. SMSs should also refer to training provision but, as the guidance has significant content on this issue, it is in the following sub-section 2.5, Training.

2.4.1 Response management procedures

ROGS requires the inclusion of the following amongst the basic elements of a SMS:

provision of plans for action, alerts and information in the case of an emergency which are to be agreed with any public body, including the emergency services, that may be involved in such an emergency

Signposts - The Network Rail National Emergency Plan

The Network Rail National Emergency Plan (September 2011) is the primary industry document for emergency planning. It describes the arrangements in place to provide an effective response to accidents, incidents and emergencies on the Network Rail controlled infrastructure, and is intended to implement the requirements of RGSs.

All relevant stakeholders are consulted on the content of this plan and it outlines the responsibilities of railway undertakings and other interfacing organisations. It includes a section (5) on investigation, which is referred to elsewhere in this guidance.

Railway Group Standard GO/RT3118 Incident Response Planning & Management mandates requirements for interface issues concerning the planning and management of co-ordinated responses to incidents, including using the current edition of the Network Rail National Emergency Plan as an overview to aid the creation of all coordinated incident response plans.

The Rule Book, module M5 Managing Accidents, mandates requirements for managing the site of the accident, including early aspects of the investigation such as the protection of evidence.

Each company will have its own procedures and processes to meet the legal and RGS requirements and to complement the Network Rail National Emergency Plan and its supporting documents.

2.4.2 Investigation procedures

ROGS requires the inclusion of the following amongst the basic elements of a SMS:

procedures to ensure that accidents, incidents, near misses and other dangerous occurrences are reported, investigated and analysed and that necessary preventative measures are taken
Railway Group Standard GO/RT3119 *Accident and Incident Investigation* also mandates requirements for reducing the likelihood and consequence of accidents and incidents. Legislation and RGSs therefore require procedures and systems for accident investigation to be in place and these would normally be contained within the SMS. Good systems for safety management will aim for continuous improvement and learning from operational experience and both of these processes are developed throughout Parts 2 and 3 of this guidance.

Each company will have its own procedures and processes and some may use external commercial systems which are referred to in section 4.

### 2.4.3 Reporting arrangements

Companies should be aware of, and have procedures in place for, reporting to RAIB, ORR and BTP and to meet the requirements of RIDDOR. These are described in more detail in section 3 under Early Reporting.

GE/RT8047 *Reporting of Safety Related Information* mandates requirements for accident reporting on duty holders. For accidents involving non-duty holders reporting should be made via the contracting duty holder organisation.

Safety Management Information System (SMIS) development is controlled and monitored by the SMIS Programme Board (a rail industry group with representation from across the industry) and new versions of the system are released every year to ensure industry requirements are met. SMIS utilises modern reporting software including an easy to use query tool and new ‘dashboard’ functionality. RSSB’s SMIS team ([smis.enquiry@rssb.co.uk](mailto:smis.enquiry@rssb.co.uk)) are available to assist with any SMIS related query.

### 2.4.4 Confidential reporting

Transport operators should make their staff aware of CIRAS (the Confidential Incident Reporting and Analysis System), which provides employees of any company in the railway industry with a confidential and independent way to report safety-related concerns without fear of recrimination, or where they feel unable to report through normal company channels. CIRAS supplements internal reporting systems rather than seeking to replace them.

### 2.4.5 Investigation Resources

In addition to the procedures, appropriate resources are required.

The most obvious of these is trained and competent investigators and accident managers and these requirements are covered later in this section. Companies should also be aware of the possible need for specialist support to investigation teams and should know where to obtain such support.

Managers and staff should be made aware of the importance of good investigation and reporting. Briefings on the policies and after specific relevant accidents will assist in maintaining a workforce that understands the benefits of investigations and continuous improvement.

In addition to the above, adequate time and physical resources should be available for the use of investigators and the latter might include the following (this is not an exhaustive list):

- Local/route maps
- Cameras
- Voice recorder
- Measuring equipment (including non-metallic)
- Facilities to manage all data
- Torch
- Laptop computer
- Secure containers/locations for perishable evidence

Companies should consider preparing a more extensive list in case of major accident response and investigation.
2.4.6 Designation of responsible persons

Each transport operator must have one or more persons to manage the processes for leading and contributing to investigations. The senior of these persons is usually known as the Designated Competent Person (DCP).

Signposts - Role of designated persons

GO/GN3519 Appendix C: in C.1.1.1 lists the activities undertaken by the designated persons and supplies some guidance.

These roles cover the overall management of the investigation process and specifically the management of recording and signalling data, management of the interface with other parties and the establishment of a remit.

The overall risks and the size of the company will determine the accident investigator resource and how it is structured.

Various options are employed, including:

- Designated accident investigation professional/s who undertake/s all investigations
- Trained line managers who undertake investigations in their area of responsibility
- Line managers supported by accident investigators
- Variations on these

Companies should keep this balance under review to ensure adequate resources.

2.4.7 Safety representatives

The involvement of safety representatives in the improvement of safety is an example of a positive safety culture and it can bring many benefits. When accidents occur safety representatives can assist directly and can also help to generate a more constructive response from the workforce. Benefits to the company can be gained if safety representatives are:

- Invited to visit the site
- Consulted on the investigation
- Invited to accompany witnesses in interviews
- Consulted on the formulation of recommendations

Under The Safety Representatives and Safety Committees Regulations 1977 safety representatives have the right of access to safety records and to carry out inspections and examinations of reportable accidents.

The HSE also advises that there should be an agreed system for informing the relevant representative if an accident occurs and that they should then be involved as soon as possible.

2.4.8 Legal support

Good investigation processes and implementation of recommendations should assist in the reduction of liability claims. However it may be useful to have access to legal expertise to review investigation procedures with a view to identifying areas of weakness thus lowering the possible losses due to liability claims.
2.5 Training and human factors

Rail industry stakeholders and RSSB have been working together to develop a strategy to increase the industry's capability to learn from operational experience, including incidents and accidents. As part of this strategy, a review was undertaken of a cross section of incident investigation reports and classifications in the national SMIS database. This review highlighted that current incident investigation processes could be improved by better integrating human factors. Industry stakeholders commissioned RSSB to develop a training course for rail incident investigators to promote human factors understanding. This course provides an opportunity to maximise the accuracy and validity of the data captured in the national safety database which will enable the industry to proactively monitor and manage trends.

Network Rail has also developed a new e-learning programme on incident and human factors investigation.

2.5.1 RSSB’s human factors awareness course for incident investigators

The Human Factors Awareness course has been developed for incident investigators and those with an incident investigation role. It has been recognised that the course would also be beneficial to safety managers, operations managers, safety advisors and safety specialists, hazard analysts, regulators, inspectors and human factors advisors.

The course is run over two days and focuses on the analysis of incidents and accidents from a human factors perspective. It clarifies the process of identifying underlying causes using practical examples and case studies from a range of safety critical industries. It provides an introduction to human factors analysis techniques and the application of these to the incident investigation process. The expected learning outcomes are:

- To raise awareness of the human factors issues that can contribute to the likelihood of accidents and incidents
- To provide incident investigators with practical skills in classifying human error and violations
- To raise awareness of the issues that can influence safety performance at the individual, job and organisational levels
- To enable investigators to identify underlying system weaknesses and to make effective recommendations in investigation reports to reduce the likelihood of future incidents.

The course content is:

Diagram 4 RSSB Human Factors course
The industry has reported that the course has made a positive impact to the way companies investigate incidents and has helped them to understand human factors and to use this knowledge to develop more effective recommendations. Investigators have also reported an observed change in the way their companies investigate and manage human factors issues, which underpins a positive safety culture.

The above Human Factors training aligns with the new RSSB digital training programme and so these should be considered together by organisations when designing their strategy for accident investigation training.

2.5.2 Network Rail’s human factors investigation e-learning programme

The Network Rail e-learning programme Why People Make Mistakes: Investigating the Human Factor was designed to help investigators understand people make mistakes with the aim of improving the way in which immediate and underlying causes are identified. The programme describes the importance of human factors to investigation and the things that can influence people’s behaviour and their decisions and the factors that can increase people’s potential for error.

This programme is currently being updated and will be available in early 2014.

2.5.3 Non-technical skills training

Non-technical skills (NTS) are generic skills that underpin and enhance technical tasks, improving safety by helping people to anticipate, identify and mitigate against errors. RSSB reviews of incidents and accidents in the industry have shown consistently that NTS such as situational awareness, decision making and workload management are key contributors to these events. This is supported by other research across safety-critical industries highlighting how important NTS are to safety. RSSB has identified a full list of NTS that are relevant to the driver role, and developed behavioural markers (examples of good and poor behaviour) which help clarify what is meant by each NTS.

In response to a lack of anything formal within the industry, RSSB has worked with industry to develop NTS training programmes for drivers to raise their awareness of the importance of these skills in their role, and how they can be developed. A course has also been developed by RSSB for managers to enhance their understanding of NTS, how it can be used to mitigate errors, and to enable them to provide objective measurements and feedback on NTS in order to support the ongoing development of their staff. These programmes are also applicable to other front-line roles within the industry. Network Rail have also conducted some work in this area – for more information on both work streams see the ‘signpost’ box below.

The development of NTS training programmes is part of a general strategy to integrate NTS into the complete competence management cycle, from selection through to competence measurement. In line with this, NTS can also be included within the accident investigation and some companies now incorporate a list of NTS and behavioural markers into a checklist of things to consider during investigations. By considering NTS, it becomes easier to identify the required interventions following the investigation. For example, if the individual failed to notice some information and this led to the accident, this suggests that situational awareness and prioritisation could have been a factor and that further training in these areas is required.

Network Rail has followed a similar approach to NTS and has developed behavioural markers into a number of competencies, particularly those related to Controllers of Site Safety (COSS) and signallers. Network Rail states that its ‘training programmes incorporate the most up to date practice and thinking on both Technical and Leadership learning interventions as well as the key behavioural elements of the Life Saving Rules, cultural safety themes and non-technical skills’. It also screens learning interventions to ensure that Diversity and Inclusion principles are applied.
2.5.4 Training – courses and providers

Beyond the supporting digital training programme this guidance does not specify training courses or their content. However, training providers who wish to assist the industry in meeting the quality of accident investigation aspired to in this guidance are likely to want to review any course content that pre-dates it.

Having determined the overall resource required, rail companies should undertake a thorough training needs analysis to determine what additional resources and training are required across the different departments. Rail companies should ensure good training suppliers with a knowledge of the industry and its interfaces. Training of their staff should be pitched at an appropriate level and should cover the essentials of accident investigation aspired to in this guidance, eg: investigation techniques, report writing, managing recommendation from writing them to implementation. Training that is specifically linked to the activities and risks faced by the company is likely to provide better outcomes. ‘Off the shelf’ systems alone are unlikely to provide this. The training that is provided will have a more lasting impact if it is integrated into the competence system and, as such, is measured and monitored.

2.6 Competences

The application of competence management systems for those whose responsibilities include conducting investigations will bring benefits in the form of better investigations and reports and consequently fewer accidents. Whether designated competent persons, other trained investigators, or those who carry out only occasional investigations that relate to their area of management, a training needs analysis should be applied and the agreed appropriate training and competence regime will then bring benefits. The following could be included for a basic level of competence:

**Good Practice – Basic investigator competence suggestions**

**Competence Management System processes:**
- Basic training to suit level and type of investigations – the digital training programme should be a very good starting point for most investigators
- Refresher training as appropriate in recognition of the impact of non-use of skills (possibly as a result of fewer accidents due to improved learning – this should be kept under review)
- Keeping a record of all related training

**Competence requirements:**
- Knowledge of the relevant command structures
- Useful qualifications may include the NEBOSH certificate

**Competence Management System processes, beyond the most basic:**
- Logging of the review of all reports and feedback to writer
- Maintaining of competence in human factors as part of thorough accident investigation
Organisations should ensure that investigators maintain their initial competence especially as in some cases this may be difficult as the opportunity to put this competence into practice may be limited. In fact, the result of improved investigation can lead to fewer accidents and this success will mean there are fewer accidents to be investigated. The competence management systems outlined above should be able to facilitate the maintenance of the required competence via refresher training, exercises and regular reviews. The national and route based programme of exercises organised by Network Rail are a good source of experience for investigators, as should be those organised by other transport operators. Railway undertakings and infrastructure managers will require content variations in their training and competence systems for different levels of investigators. When designing a competence system for investigators above the basic level then GO/RT3119 should be referred to:

**Signposts - Designated person competence**

*GO/RT3119 Appendix C.1.2.1 lists what the designated persons should be conversant with.*

*For the higher levels of investigation, training and competence regimes should be of a higher level because:*

- The risks to be addressed and the costs are likely to be higher
- The breadth of experience required is likely to be greater
- It may involve managing a team of investigators

The competence management system could include, in addition to the above basic factors in sub-section 2.6, the following:

**Good Practice – Competence suggestions for investigators above the basic level**

- Independent review of reports
- Involvement in table top exercises and assessment during these
- Programme of training and refresher training to suit level and type of investigations, based on training needs analysis
- Useful qualifications may include formal accident investigation course certification and NEBOSH diploma

Organisations should ensure that investigators maintain their initial competence especially as in some cases this may be difficult as the opportunity to put this competence into practice may be limited. In fact, the result of improved investigation can lead to fewer accidents and this success will mean there are fewer accidents to be investigated. The competence management systems outlined above should be able to facilitate the maintenance of the required competence via refresher training, exercises and regular reviews. The national and route based programme of exercises organised by Network Rail are a good source of experience for investigators, as should be those organised by other transport operators.

In addition to issues of competence, investigators should have good interpersonal skills and they should be able to resist pressures to accept the ‘obvious’ causes without consideration of all the evidence (and have management support for this). Investigators who lead teams should have good leadership skills.
RAIB uses Accredited Agents, who are employees of transport operators, to assist with RAIB investigations, usually in remote locations, before a RAIB inspector is able to arrive on site.

They have three essential tasks:

- Identify and record perishable and vulnerable evidence for RAIB use. This should include photographs, where photographic equipment is available
- Provide an assessment of the accident to the RAIB Duty Co-ordinator
- Ensure as far as reasonably practical that technical evidence is preserved for RAIB, pending the arrival of an Inspector on site

These Accredited Agents receive training from RAIB and such training would be useful to record in competence records.

2.7 Cooperation

Good accident management and investigation is reliant on cooperation between those involved: transport operators, contractors, emergency services, public bodies and other relevant agencies. Organisations should have in place robust arrangements for knowing who they need to cooperate with and also, where possible, build a good relationship with them to enable effective two way communication and cooperation.

The following, Table 2, is a non-exhaustive list of the stages of investigation where cooperation is essential:

Table 2 Cooperation

<table>
<thead>
<tr>
<th>Actions</th>
<th>Organisations</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordination at the scene of the accident</td>
<td>Other transport operators and emergency services</td>
<td>A list by area of names and contact details</td>
</tr>
<tr>
<td>Sharing of evidence, information and data on</td>
<td>Other transport operators and suppliers</td>
<td>Initial contact probably via appropriate personnel in own organisation</td>
</tr>
<tr>
<td>the personnel, equipment, materials and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>vehicles involved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordination of witness interviews</td>
<td>Other transport operators and investigating bodies</td>
<td>If contacts not previously known develop through the investigation</td>
</tr>
<tr>
<td>Discussion on proposed recommendations</td>
<td>Organisations that recommendations are allocated to</td>
<td>Liaise while setting recommendations to ensure they are appropriate and there are no surprises</td>
</tr>
<tr>
<td>Ensuring accurate reporting of data to, eg SMIS</td>
<td>Other transport operators involved and RSSB</td>
<td>Accurate data will improve the information available for future investigations</td>
</tr>
<tr>
<td>Involvement in cross industry groups to learn from accidents</td>
<td>Other transport operators and RSSB</td>
<td>Active participation in such groups can improve system safety management</td>
</tr>
</tbody>
</table>
3 Initial response to event

On being alerted to an accident the responsible organisation’s response should be timely and of an appropriate scale – from the major undesired event to the minor injury. Included in this early response should be elements of the investigation.

3.1 Initial response to event

RGSs, in particular GO/RT3118, *Incident Response Planning & Management* and the Network Rail National Emergency Plan (NRNEP) specify requirements for operational accidents and incidents, as should company procedures for other and smaller scale events.

Employers should make staff aware of the importance of accident reporting via line management or the safety team and on being alerted to an accident the organisation’s response should be timely and of an appropriate scale to the risks – from the major undesired event to the minor injury.

The need to restore normal working is extremely important and will be transport operators’ priority, but amongst these early response actions will be the start of the investigation process, eg recording times and what has happened.

Where a responsible company has staff at the scene of the accident at an early stage, the first actions should be to establish individual safety and arrange protection of the site. Part 3 contains a useful checklist that could be included in company procedures and used by staff in such a situation.

In the event of an occupational health exposure such as fumes or disturbance of asbestos, an early accurate record of the exposure is important for the management of possible future liabilities. Similar records should be made for contractors and agency staff.

Early contact may need to be made with the relevant environmental agency and in the case of water and land pollution, the respective water and local authority. Early actions may also be required to stop or limit accidental release especially when substances are dangerous and where water courses may be polluted.

3.2 Early reporting

Rail industry accident and incident information should be sent to a number of bodies and systems and table 3 contains a very brief summary of initial reporting requirements. Later reference is made in this guidance Part 2 to the requirements for final reports of information.

Cooperation between IM, RU and contractors is necessary to ensure details are reported as required, eg if a Network Rail employee records details when attending an accident site where a passenger of a train operator is injured then details should be forwarded to the train operator’s safety section or other representative of the train operator.
<table>
<thead>
<tr>
<th>Body/system to report to</th>
<th>Reason for reporting and investigation/ Relevant reference document</th>
<th>Signpost - Contact details and timescales</th>
</tr>
</thead>
</table>
| **RAIB**                | RAIB leads the technical investigation into the causes and consequences and makes recommendations to improve safety/ **Guidance on the Railways (Accident Investigation and Reporting) Regulations 2005** | **RAIB enquiries@raib.gov.uk**
tel 01332 253301
Schedule 1 accidents immediate
Schedule 2 accidents 3 days
Schedule 3 accidents 10 days |
| **ORR**                 | ORR investigates potential breaches of health and safety legislation in relation to operation of the railways/ **Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR)**
Introduced minor changes to requirements, including ‘major injuries’ now being replaced with a shorter list of ‘specified injuries’
For accidents away from the operational railway report to HSE/local enforcing authority | **ORR Accident Section**
ORR website or the DfT Duty Officer (020 7944 5445).
**riddor@natbrit.com**
Timescales for reporting: Serious accidents to be reported immediately (see ORR criteria on website); Others to be reported as early as practicable and/or within 3 days
HSE on 0845 300 99 23 |
| **BTP and civil police**| The police investigate to find out if there has been a breach of law and any deaths on behalf of HM Coroner | From local level or via railway control or if necessary via dialling 999 |
| **SMIS**                | **GE/RT8047, Reporting of Safety Related Information** requires reliable safety data to be collected, analysed and made available for use by the rail industry parties in the management of risk | **smis.enquiries@rssb.co.uk**
Initial report to SMIS within five working days |
| **National Incident Reporting (NIR)** | Alerts the industry to vehicle-related safety defects/ **GE/RT8250 Reporting High Risk Defects**
Alerts the industry to operations irregularities/ **GO/RT3350 Communication of Urgent Operating Advice**
Alerts the industry to Workforce Safety issues | **Rail Notices**
www.railnotices.net
(registration is required for this site) |
Network Rail’s National Operations Centre (NOC) | Records details of events occurring on the national rail network (as reported by Network Rail’s route operations controls) – mainly on Network Rail managed infrastructure. NOC issues NIRs (see above) on behalf of the rail industry

| | Allows Network Rail’s contractors to report accidents and incidents to a Network Rail control centre. Details of safety related events submitted to SMIS | The IGC reports safety of line events to the NOC

Environment Agencies | To alert environmental agencies and other authorities with environmental responsibilities. For risk to water environment:
For risk to protected species/habitats: | Environmental Agency and Scottish Environmental Protection Agency Emergency number 0800 80 70 60. Natural England (NE) (0845 600 3078) Scottish Natural Heritage (SNH) (local office)

Some companies have templates for investigation, including early reporting. It is important that required timescales are made clear to assist with prioritising of resources.

In the case of accidents with an environmental impact, such as spillages of pollutants of over 20 litres, infrastructure managers and railway undertakings should have arrangements in place for reporting to the relevant agencies. In addition GE/RT8047 Reporting of Safety Related Information includes reporting requirements for ‘dangerous goods incidents and irregularities’ (page 13) and ‘environmental events’ (page 15).

All environmental incidents on Network Rail property shall be reported to the appropriate Route Control or Infrastructure Group Control. The Network Rail control office will organise spill response and notify the regulatory authority.

3.3 Urgent safety reports

There are various ways of sharing information on urgent safety problems, including Rail Notices www.railnotices.net (registration is required for this site) which was launched by RSSB in January 2010. It is a secure website which is the gateway to a range of notices and alerts including vehicle related safety defects as required by GE/RT8250 Reporting High Risk Defects and operational irregularities covered under Railway Group Standard GO/RT3350 Communication of Urgent Operating Advice. In addition there is the new Workforce Safety Alerts sub-system which will allow companies to share details of workforce safety incidents and actions taken to prevent reoccurrence. If a specific safety event is identified and it warrants the industry being notified then the information is recorded by the user and automatically disseminated to subscribers.

**Signposts - Early reporting of urgent safety problems**

Those that are made aware of such problems should identify any need for an immediate response as required by GO/RT3119 section 2.1.6.1.
4 Investigation

The principal investigation of any undesired safety event, including near misses, is conducted by the organisation immediately responsible for the activity related to the event. An early review of the event is necessary to capture the circumstances while still recent and to decide the resources required for the investigation. Evidence gathering is crucial to a good investigation and early action and planning will be required to ensure perishable and other physical and witness evidence can be obtained.

4.1 Who investigates?

Railway companies have their own arrangements for carrying out internal investigations. Where the event involves other parties transport operators should cooperate with each other in the investigation process and it is useful to have a dedicated contact in other involved organisations.

For the more significant accidents transport operators should have procedures in place to make investigators aware of whether it is RAIB’s intention to investigate and, if so, they should liaise over RAIB’s requirements and timescales. This will include the remits and the arrangements to ensure cooperation, effectiveness of investigations and to optimise resources, eg the sharing of non-confidential evidence such as photographs.

Joint investigations with other transport operators or contractors can be of benefit where close communications during the investigation are particularly important. Consideration should also be given to independently chaired investigations.

4.2 Early review and a proportionate level of investigation

This section introduces the Proportionate Response Model which employs a simple three stage filtering process. This is clearly demonstrated in the videos within the digital training programme.

An early review of the event by competent person/s is necessary in order to assess the level of the investigation. The selection of the reviewer/s will depend on the organisations resources, policy and structure and the scale of the event. The level of competence of the person, or team, that decides on the scale of investigation and its remit must be adequate, and some companies may specify that this will be the Designated Competent Person or a senior member of the safety team for higher level investigations. During the decision on the competence of those involved consideration should be given to suitable education, skills, experience and level of authority.

The timing of this review will also depend to some extent on the scale of the undesired event and the ease of gathering the information necessary to make an early decision on the appropriate level of investigation. A rough guide may be that for a low level event (eg slip, trip or fall) the decision on the remit could be made immediately the circumstances of the event are known, eg on the same day. The remit may then be recorded in an e-mail or written instruction. Whereas, for a high level event, (eg train movement accident) 24-72 hours may be reasonable, and both these limits are already common targets in the industry.
The review can involve representatives from different organisations and some early joint understandings, arrangements and decisions may need to be made.

A template (see below for an example of content) for the early review is useful and could be used to encourage an open minded approach to the identification of underlying causes. Where report forms cover the investigation process from beginning to end, including the early requirements, it is advisable to make timescales clear on the form.

Good Practice – Early internal investigation and reporting

One train operator uses a template, headed Injury Prevention, for an early review plus the later report, which includes:

- A checklist on reporting the accident, evidence (interviews and data downloads)
- Sections to gather details on:
  - description of the accident
  - evidence
  - re-enactment of the accident
  - sub-standard acts and conditions
  - causes – immediate and underlying
  - review of related risk assessments
  - actions – taken and to be taken
  - recommendations

The decision on the level of investigation will be based on consideration of the information available at the time.

The following Proportionate Response Model, a three stage filtering process, provides a systematic method which, although dealing with several influencing factors, should bring consistent levels of response, and after first use should be quick and easy to apply.

The Proportionate Response Model text, tables and diagrams below take the reviewer through the three stages of filtering. These include notes and additional explanation of the process to assist the user.

For lower level accidents it may be appropriate that the reviewer (who may later be the investigator) conducts the three stage process described below. In such cases the reviewer should be a manager who is familiar with accident investigation and understands the need for proportionality and the criteria used in stage three. Companies may wish to specify that for medium and high level investigations stage 3 will be undertaken, or at least checked, by the DCP (or similar).

Diagram 5 The Proportional Response Model
Stage 1 - Credible worst outcome

Soon after the undesired event, when enough information has been gathered, Stages 1 and 2 should be undertaken by competent staff.

**Undesired Event**

**Question 1**

What is the credible worst outcome?

**Note 1** Use the currently available information, eg from initial witness statements, early evidence, identifiable causes, human factors observations and risk assessments.

**Note 2** In answering the question start at the least outcome and follow the options below.

**Note 3** See on the next page the descriptions of the levels of consequence linked to the decision points 1-5 in green boxes below.

**Examples**

This stage aims to determine the credible worst outcome, should the circumstances around the accident have been slightly different. The following are three examples of scenarios of different scales.

**Stage 1 Determine the credible potential outcome**

Examples of three accident scenarios:

1. Slip, trip and fall in an engineering depot, resulting in sore ribs but no breakage.
2. Passenger fall after alighting from train, then trying to get on it again, resulting in minor cuts and bruises.
3. Near miss at a level crossing involving a car being stuck in traffic due to road works and moving off just in time.

The following are possible conclusions on Stage 1 for each of the three accidents:

- 1. **No injury or damage?**
  - If the person had fallen towards the train they could have fallen between train and platform resulting in a fatal accident.
- 2. **Minor injuries and/or damage?**
  - If the car had not managed to move off the crossing multiple fatalities could have been expected.
- 3. **Major injuries and/or moderate damage?**
  - If the person had fallen towards the train they could have fallen between train and platform resulting in a fatal accident.
- 4. **Single fatality, multiple major injuries, major damage?**
  - If the car had not managed to move off the crossing multiple fatalities could have been expected.
- 5. **Multiple fatalities, significant damage?**
  - If the car had not managed to move off the crossing multiple fatalities could have been expected.

Select credible potential outcome:

- **LOW**
- **MAJOR**
- **HIGH**
Proportionate Response Model

### Stage 1
- **Credible worst outcome**

### Stage 2
- **Effectiveness of barriers**

### Stage 3
- **Wider factors**

### Level of Investigation

<table>
<thead>
<tr>
<th>Consequence</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury or damage (including financial loss)</td>
<td>There is no actual or potential for injury or damage; no real financial loss other than reporting and recording of the desired event.</td>
<td>Minor injuries and/or minor damage; financial loss up to £5k</td>
<td>Major injuries* (see RIDDOR below) and/or moderate damage; financial loss up to £50k</td>
<td>Single fatality; multiple major injuries* (see RIDDOR below); major damage; financial loss between £50k and £250k</td>
<td>Multiple fatalities; significant damage; financial loss over £250k</td>
</tr>
<tr>
<td>Reputation (societal concern/public relations)</td>
<td>Issue is resolved promptly by day to day management process</td>
<td>Issue is resolved promptly by day to day management process</td>
<td>Stakeholder and community concerns; local media coverage</td>
<td>Major stakeholder and community concerns; major embarrassment for the company; adverse media coverage</td>
<td>Significant adverse impact on the reputation of the company nationally or internationally</td>
</tr>
<tr>
<td>Legal</td>
<td>No actual or potential regulatory or claims issue</td>
<td>No actual or potential regulatory or claims issue</td>
<td>Possible breach of legislation; fines or claims up to £50k</td>
<td>Possible breach of legislation; fines or claims between £50k and £250k</td>
<td>Breach of legislation; possible criminal convictions; fines or claims above £250k</td>
</tr>
<tr>
<td>Environmental</td>
<td>No actual or potential damage to the environment</td>
<td>No actual or potential damage to the environment</td>
<td>Minimal harm; clean up expenses up to £50k</td>
<td>Medium term harm; clean up expense between £50k and £250k</td>
<td>Long term harm; clean up expenses over £250k</td>
</tr>
</tbody>
</table>

**RIDDOR 'Specified Injuries' since RIDDOR 2013 (previously there was a wider list of 'Major Injuries') include:**

- A fracture, other than to fingers, thumbs and toes
- Amputation of an arm, hand, finger, thumb, leg, foot or toe
- Permanent loss of sight or reduction of sight
- Crush injuries leading to internal organ damage
- Serious burns (covering more than 10% of the body, or damaging the eyes, respiratory system or other vital organs)
- Scalpings (separation of skin from the head) which require hospital treatment
- Uncosciousness caused by head injury or asphyxia
- Any other injury arising from working in an enclosed space, which leads to hypothermia, heat-induced illness or requires resuscitation or admittance to hospital for more than 24 hours
Proportionate Response Model

Stage 1  Stage 2  Stage 3  Level of Investigation

Credible worst outcome  Effectiveness of barriers  Wider factors

Stage 2 can be completed immediately following Stage 1 if the necessary information on barriers/controls, eg from CCTVs and OMTRs, is available.

Stage 2 - Effectiveness of Safety Barriers

The barriers in place to prevent or lessen the credible worst outcome should now be considered. If the effectiveness of barriers is judged to be high, eg several remained to prevent escalation, then a lower level of investigation than that for the credible worst outcome may be appropriate. When considering the range of barriers where an interface organisation is involved it may be useful to search for controls in the Industry Shared Risk Database. The focus at this stage should be on the more immediate or local barriers and not, for example, the company recruitment policy.

Table: Stage 2: Answer to Question 2

<table>
<thead>
<tr>
<th>Stage 2: From Stage 1: The credible worst outcome</th>
<th>Negligible</th>
<th>Low</th>
<th>Medium</th>
<th>Major</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Negligible risk</td>
<td>Low risk</td>
<td>Low risk</td>
<td>Medium risk</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>Negligible risk</td>
<td>Low risk</td>
<td>Medium risk</td>
<td>Medium risk</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>Negligible risk</td>
<td>Low risk</td>
<td>Medium risk</td>
<td>Major risk</td>
<td></td>
</tr>
<tr>
<td>Negligible</td>
<td>Negligible risk</td>
<td>Low risk</td>
<td>Medium risk</td>
<td>Major risk</td>
<td></td>
</tr>
</tbody>
</table>

The level should not change to higher than that for the credible worst outcome. To use the matrix below first note the outcome from Stage 1 then answer Question 2 on the effectiveness of barriers. From the identified box then move down to get the initial level of investigation.

Table: Stage 1 Outcomes:

<table>
<thead>
<tr>
<th>Stage 1 Outcomes</th>
<th>LOW</th>
<th>MAJOR</th>
<th>HIGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 2 Determine the effectiveness of barriers against a worse outcome to the event (example uses one barrier only)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 The individual was not fatigued, was wearing safety shoes and helmet, lighting was OK and there was a spillage policy in place.</td>
<td>Negligible risk</td>
<td>Low risk</td>
<td>Medium risk</td>
</tr>
<tr>
<td>2 The driver checked the platform monitors, which were working, and did not see the fallen passenger probably because she fell behind the shelter</td>
<td>Low risk</td>
<td>Medium risk</td>
<td>Major risk</td>
</tr>
<tr>
<td>3 Liaison with the highway authority over proposed road works, although undertaken, had resulted in weak control of potential traffic congestion</td>
<td>MEDIUM effectiveness</td>
<td>MEDIUM effectiveness</td>
<td>LOW effectiveness</td>
</tr>
</tbody>
</table>

Select the initial level of investigation based on the risk level after considering the barrier effectiveness.

<table>
<thead>
<tr>
<th>Initial level of investigation</th>
<th>LOW risk so LOW initial level of investigation</th>
<th>MEDIUM risk so MEDIUM initial level of investigation</th>
<th>MAJOR risk so HIGH initial level of investigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Record the event</td>
<td>Low level</td>
<td>Medium level</td>
<td>High level</td>
</tr>
</tbody>
</table>

Examples

The barriers in place to prevent or lessen the credible worst outcome should now be considered. If the effectiveness of barriers is judged to be high, eg several remained to prevent escalation, then a lower level of investigation than that for the credible worst outcome may be appropriate. When considering the range of barriers where an interface organisation is involved it may be useful to search for controls in the Industry Shared Risk Database. The focus at this stage should be on the more immediate or local barriers and not, for example, the company recruitment policy.

Note: Typical issues to consider when making decisions at Stage 1 and 2 are shown after Stage 3.

Note: Negligible effectiveness of barriers would suggest that only pure chance or exceptional skill, which is not trained for, stopped the credible worst outcome.
Proportionate Response Model

Stage 3 - Consideration of Wider Factors

As soon as the relevant information is available after stage 2, possibly immediately, then stage 3 must be undertaken by competent staff. Such information may include, eg SMIS downloads on similar accidents. This stage should be checked by a more senior manager, and in the case of medium or high level investigations, this should be by the DCP or similar. The time spent on this stage should be roughly proportionate to the scale of the accident.

This stage uses transparent criteria to ensure consistency in response to other similar events and to check against important factors that could influence the decision on the level of the investigation. It provides the chance to look at the undesired event as part of a bigger picture. It must be applied by competent staff and should then be checked by a more senior manager, and in the case of medium or high level investigations, this should be the DCP (or similar).

Question 3
Should the initial level of investigation be confirmed, escalated or downgraded after consideration of the following criteria?
• Any likely systematic management failures
• Existing company policies
• Potential loss via claims and insurance premiums
• The level of investigation for similar previous events
• Other related undesired events forming a series (eg common location, equipment, behaviours, personnel or underlying causes)
• Gaining the optimum safety benefit for the company and the industry
• Other investigations into the same event by, eg, ORR, BPT and RAIB
• A sense check including consideration of public, passenger and stakeholder interests
• Issues relating to other involved Transport Operators

Confirm, escalate or downgrade the initial level of investigation and record the reason for the decision.

Final: Record the event
Final: Low level of investigation
Final: Medium level of investigation
Final: High level of investigation

The level of investigation should be kept open to review throughout the investigation process.

Examples
This stage uses transparent criteria to ensure consistency in response to other similar events and to check against important factors that could influence the decision on the level of the investigation. It provides the chance to look at the undesired event as part of a bigger picture. It must be applied by competent staff and should then be checked by a more senior manager, and in the case of medium or high level investigations, this should be the DCP (or similar).

Stage 2 Initial level of investigation:
LOW MEDIUM HIGH

Stage 3 Apply the criteria (Question 3) to confirm, downgrade or escalate level of investigation:

1. Further enquiries revealed that the cleaning company had not been meeting requirements at several depots and two claims were pending
   ESCALATE

2. There have been no similar incidents at this station or on the route, which has an effective ban of alcohol on trains
   CONFIRM

3. Over the last 2 years the introduction of new or modified road routes has led to some level crossing incidents.
   Road/rail incidents account for nearly half the catastrophic train accident risk on Britain’s railways
   CONFIRM

Select final level of investigation:
MEDIUM level of investigation MEDIUM level of investigation HIGH level of investigation
Proportionate Response Model

**Stages 1 and 2 - Typical issues to consider when making decisions in the above scenarios** - using the ten incident factors described in Part 3 Section 4.11 as a starting point: Communications, Practices and processes, Information, Equipment, Knowledge, Skills and Experience, Supervision and Management, Work environment, Teamwork, Personal, and Workload.

<table>
<thead>
<tr>
<th>Stages 1 and 2 - Typical issues to consider when making decisions in the above scenarios:</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental conditions - eg lighting</td>
<td>Environmental conditions - eg lighting</td>
<td>The barrier sequence and controls operating correctly</td>
<td></td>
</tr>
<tr>
<td>Current workplace and task related risk assessments</td>
<td>Current train dispatch risk assessment - right class and type of trains operating</td>
<td>All signage associated with this type of crossing is presented appropriately to road users and pedestrians</td>
<td></td>
</tr>
<tr>
<td>Footwear policy - and correct footwear worn</td>
<td>Train dispatch arrangements followed correctly</td>
<td>Environmental conditions - foliage obstruction of any part of the crossing and/or signage</td>
<td></td>
</tr>
<tr>
<td>Cleaning and housekeeping arrangements</td>
<td>Any recent building / refurbishment work which may impact on the driver's view of the platform</td>
<td>Current level crossing risk assessment</td>
<td></td>
</tr>
<tr>
<td>State of the flooring</td>
<td>CCTV and monitors working correctly</td>
<td>Use of all the All Level Crossing Rism Model (ALCRM) for this level crossing?</td>
<td></td>
</tr>
<tr>
<td>Fatigue</td>
<td>Correct train stop location and in the correct location and train length platform markers placed appropriately</td>
<td>Proper consultation and liaison between the highway authority (County Council) and Network Rail</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Changed platform dwell times</td>
<td>Road works contractor compliance with any permits to work</td>
<td></td>
</tr>
</tbody>
</table>

**Stage 3 - Typical issues to consider when making decisions in the above scenarios:**

<table>
<thead>
<tr>
<th>Stage 3 - Typical issues to consider when making decisions in the above scenarios:</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Similar incidents/investigations at this location</td>
<td>Similar incidents at this location, with this class of train or on this route involving this company or other operators</td>
<td>Similar incidents at this location or with this type of level crossing</td>
<td></td>
</tr>
<tr>
<td>Previous investigations and immediate and underlying causes</td>
<td>Previous investigations and immediate and underlying causes</td>
<td>Previous investigations and immediate and underlying causes</td>
<td></td>
</tr>
<tr>
<td>Relevant outstanding corrective action reports or recommendations</td>
<td>Relevant outstanding corrective action reports or recommendations</td>
<td>Relevant outstanding corrective action reports or recommendations</td>
<td></td>
</tr>
<tr>
<td>Involvement of those connected with the incident in similar incidents</td>
<td>Involvement of those connected with the incident in similar incidents</td>
<td>Involvement of those connected with the incident in similar incidents</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Appointment of blame by injured person</td>
<td>Appointment of blame by person in the car</td>
<td></td>
</tr>
</tbody>
</table>
Additional useful guidance on the level of investigation is available in the following Guidance Note;

**Signposts - Level of investigation**

*GO/GN3519* Appendices A and B provide criteria for deciding whether an investigation should be Formal or Local along with some appropriate guidance. There are many accident scenarios outside of these criteria.

The three stage filtering process should assist in assessing the importance of the many variables and in steering towards the suggested scale of investigation in the examples below:

**Table 4 Examples of scale of investigation**

<table>
<thead>
<tr>
<th>Event</th>
<th>Use 3 stage process?</th>
<th>Suggestion on scale of action/level of investigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cut finger in office</td>
<td>no</td>
<td>First aid and entry in accident book</td>
</tr>
<tr>
<td>Asbestos exposure</td>
<td>yes</td>
<td>Full record in internal files after appropriate level investigation</td>
</tr>
<tr>
<td>Hit by falling luggage with minor injury</td>
<td>yes</td>
<td>SMIS report which includes minimal explanation</td>
</tr>
<tr>
<td>Slips, trips and falls</td>
<td>yes</td>
<td>Minor investigation unless significant trends and then possibly a review</td>
</tr>
<tr>
<td>Buffer stop collision with no injury</td>
<td>yes</td>
<td>Medium level of investigation (Local) – see Table 1 page 4</td>
</tr>
<tr>
<td>Passenger fatality when boarding train</td>
<td>no</td>
<td>High level of investigation (Formal)</td>
</tr>
<tr>
<td>Event where causes are clearly unknown</td>
<td>yes</td>
<td>Investigation which may be of a greater scale than the initially known risks would warrant</td>
</tr>
<tr>
<td>Event associated with new technology or new ways of working</td>
<td>yes</td>
<td>Level of investigation based on risk and to include expertise on the new technology/ work method</td>
</tr>
<tr>
<td>Near miss</td>
<td>yes</td>
<td>See descriptions below</td>
</tr>
<tr>
<td>Derailment on a running line</td>
<td>no</td>
<td>High level of investigation (Formal)</td>
</tr>
</tbody>
</table>

A near miss investigation may warrant a significant resource depending on the related risks and this is clearly explained in the following extract from the ORR’s ROGS Guidance on Regulations, April 2006: ‘For near misses the collection and analysis of data can provide real value in helping to prevent accidents and incidents’ and that ‘for the investigation arrangements to be adequate, it is essential that incidents, which have the potential to endanger people, be examined effectively and those that could lead to more serious consequences should be treated with a similar rigour to accidents that actually do cause harm’.

The near miss may well be easier to investigate as there will be no injured people and both the threat of criminal proceedings and low workforce morale are less likely. Improving systems as a result of near miss investigation should be seen as a cost effective way to manage safety.
4.3 The remit and the investigation team

Having made the decision on the level of investigation a remit is required and its details can be determined:

Appoint a person or persons to lead the investigation

The lead investigator and the investigation team will need to have the competence, experience and skills to do the job (see section 2, sub-section on competence). It is important that the necessary expertise is recognised when writing the remit but if a gap is realised later then the remit should be amended accordingly. It may be appropriate good practice to have an independent lead investigator (external or internal to the company):

Good Practice – Degree of independence

GO/GN3519 (GN07) makes reference to reasons for independence but additional factors may be useful in determining the degree of independence:

- Any potential conflicts of interest (e.g. investigation of own line management or even own previous actions)
- Where a systemic cause is likely to be identified
- Concerns expressed by other parties
- Adverse safety audit reports
- Where the necessary expertise is not held within the organisation
- Where the need to challenge is considered necessary

Advise on the team to support the lead investigator

As for the selection of the lead investigator, appointment of supporting staff will be dependent on company resources. The selected lead investigators may require support especially if they are line managers with limited experience in investigations and they are under pressure of time. Technical expertise may also be required from inside or outside the organisation, e.g. fire/explosion expert or engineering specialists in traction and rolling stock or structures. Consideration should be given to the appropriate level of independence of such experts. Computer software is growing in importance in both technical and management systems and such expertise in investigation teams is likely to require a higher profile.

Signposts - Technical expertise

GO/GN3519 Section 2.1.3.2 and GN08 lists fields of technical expertise that may be of value.

Determine content of initial remit for the investigation

The application of the Proportionate Response Model will have partly shaped the remit and provided some necessary information.

A good investigation report requires a good remit to make what is required very clear. The remit will include:

- the requirements and objectives of the investigation, the basic ones being:
  - to establish the events leading up to the accident
  - the immediate and underlying causes

It is important that the remit encourages the identification of underlying causes and that it does not close out useful channels for investigation based on an early assumption of causes. The investigation may have other objectives such as determining how lessons learnt might be communicated to staff.
Templates for remits should assist in ensuring consistency and maintaining the benefits of previous good practices.

**Good Practice – Remit requirements**

- Determination of events leading up to accident
- Immediate and underlying causes
- Recommended system improvements to address likelihood of recurrence and the consequences and any local actions
- Report urgent safety problems requiring early remedial action
- Completion timescale
- A well-structured report covering the above

**Good Practice – Remits**

Network Rail has very detailed requirements and guidance in its *Investigators’ Handbook* and some of its content is incorporated into this guidance document.

Liaison with the investigator during the development of the remit can help improve understanding of what is required and help make the objectives more realistic. As the investigation progresses and more evidence becomes available, it may be appropriate for the remit and scale of the investigation to be altered.

Companies should have a process in place for the checking and approval of draft remits, including the option of amending them.

**Consider any early information required and any early reports/recommendations.**

Such information may include perishable evidence and statements from those directly involved in the event. It may also be appropriate to make quick reports (see section 3) or recommendations.
4.4 Gathering of evidence and information

The gathering of evidence is crucial to a good investigation and early action and planning will be required to ensure perishable and other physical and witness evidence can be obtained. Some of this evidence will already have been gathered while applying the three stage filtering process.

Signposts - **HSG245** Suggested questions

This HSE guidance document includes extensive content on suggested questions: *Where? When? and Who?* Aimed at gathering relevant information and evidence

Signposts - Evidence

[GO/GN3519](#) in section 2.1.5.1 and related GNs require records of evidence of causes and consequences for Formal and Local Investigations. 2.1.5.2/3 refer to SPAD data collection forms and the related GNs include a detailed list of types of evidence.

The principles of good evidence gathering and preservation apply to all levels of investigation and should include processes to obtain the following:

- Photographs and diagrams of the site
- Witness statements [see next sub-section]
- Description of activities and environment
- Communications records
- Training records
- Maintenance histories
- Data on precursor events
- Assurance records
- Work incentives

A more detailed checklist for investigators is included in Part 3 section 4.4.

4.5 Witness evidence

Organisations applying a just safety culture will arrange for their staff to be supported in their preparation for a series of interviews by being informed about their rights, the number of interviews that will be likely to take place, why they are taking place and what order they will take place.

Valuable evidence can be obtained from those involved in the event and Part 3 section 4.5 provides suggestions to manage the processes of arranging interviews and questioning techniques.

**Good Practice – Witnesses**

Network Rail, for example, in its ‘[Guidance to Trade Union Observers on the Network Rail Investigation process where witnesses are to be interviewed](#)’ includes a note stating that consideration will be given to counselling where a witness may be traumatised or shocked.

Witness statements are a vital source of investigations and the preparation for interviews to gain the best from output is therefore important. Witnesses to an undesired event may face significant pressures and in these circumstances employers have a duty of care so employees should be treated sympathetically.
Advice from human factors specialists on applying a just culture policy to interviewing processes should be of benefit when developing company procedures but also after specific events, depending on the circumstances.

The ORR/RAIB/BTP Memorandum of Understanding referred to in section 2 states that the RAIB will normally wish to conduct their confidential interviews before the police or ORR do so, in order to obtain the fullest and most frank account of events.

Organisations involved in an accident can do little to influence the number of external investigations (eg ORR, RAIB and BTP) that may be carried out, though transport operators and their contractors may be able to combine investigations and share interviews.

4.6 Timeline

The use of a timeline can assist especially when there are a complex set of factors to consider in the lead-up to the event. These factors may or may not be considered to be causal at the stage of developing the timeline but all should assist in building the picture. Part 3 section 4.6 expands on this topic.

4.7 Causes – immediate and underlying

As it is necessary to consider all the causes leading up to an undesired event it is useful to work backwards from the moment of the accident through the history of the causes that eventually led to the final event.

This guidance document uses terms for two types of cause: immediate and underlying.

The immediate cause is the error/unsafe act or condition just before the accident and usually there would be only one such immediate cause.

For the purposes of this guidance underlying refers to what are also known elsewhere as root causes and all the causes that may have preceded the immediate unsafe acts and/or conditions.

References to root causes and root cause analysis can still be found in railway documentation and these are largely derived from the Ladbroke Grove inquiry report which recommended root cause analysis training for driver standards managers. This training was aimed at identifying weaknesses in management systems.

One of the reasons for this guidance is the industry’s past weakness in the identification within reports of the underlying causes leading up to the immediate cause and it is hoped that this section and the further sections on human factors will lead to improvements in identifying underlying causes.

RAIB also uses Causal Factors in its reports and these are defined in footnotes as: ‘Any condition, event or behaviour that was necessary for the occurrence. Avoiding or eliminating any one of these factors would have prevented it happening’. RAIB also refers to Contributory Factors.

4.8 Human factors

4.8.1 Errors and violations

Investigators should have an understanding of why people make mistakes in order to consider why accidents happen. Everyone, regardless of knowledge, experience or training can commit errors. However, human errors can result from understandable, predictable aspects of the environment in which we work.

Developing an understanding of human error will help investigators understand the range of underlying causes that can contribute to unsafe acts. This will enable investigators to develop more robust recommendations for managing and mitigating the likelihood of accidents occurring in the future.

The complex issue of why people make mistakes, with detailed explanations of errors and violations, is expanded upon in Part 3 Appendix A.
4.8.2 Individual, job and organisation factors

In attempting to understand why an accident happened and to determine the underlying causes, many factors may need to be considered. It is recognised that accidents are the result of a complex chain of contributory events or factors. Section 1.4.2, earlier in this document, introduces the Swiss Cheese model and discusses unsafe conditions in further detail. There may be contributory factors relating to the individual, job and the organisation which may create unsafe working conditions and these are expanded upon in Part 3 section 4.

4.8.3 Techniques for structuring underlying causes

There are a number of different approaches to structuring underlying causes, each with its own training requirements. This guidance does not aim to promote any particular method of analysis but some of the more commonly accepted approaches are outlined in Part 3 Appendix B.

4.9 SPAD investigations

According to the industry’s Safety Risk Model, signals passed at danger (SPADs) account for a low percentage of overall risk though there is the potential for catastrophic harm. Different priorities are given to this risk by different sections of the industry in relation to the risks, as perceived by transport operators, the public and the ORR.

Despite the well-known and well-practiced process for SPAD investigation, a 2009-10 RSSB study identified some inconsistent quality in investigations and reports:

- A significant number of investigation reports have taken an excessively long time to produce
- Some had not considered all available sources of information
- Some did not have a consistent approach and failed to demonstrate logical conclusions and recommendations
- Some had recommendations/local actions that were not time-bound

RSSB has developed a simple system for measuring the effectiveness of SPAD reports and these were used to monitor and then report back to the industry’s Operations Focus Group (OFG) during 2010. This guidance has been updated to incorporate the criteria used in this measuring system.

Railway Group Standard GO/RT3119, Issue 3 came into force in March 2013. It includes a revised definition and requirements relating to SPADs.

The infrastructure manager (Network Rail only) shall identify its initial assessment of each alleged SPAD specific incident as ‘provisional’, prior to full cause investigation and incident confirmation by the designated lead organisation.

GE/RT8047 is due to be re-issued in late 2013 and what are currently B, C and D SPADs will no longer be defined as SPADs. Category As will remain as SPADs in line with ERA reporting requirements and, as before, will be subject to SPAD risk ranking by Network Rail.

The re-categorised B, C and Ds should not be treated as lesser risk because they are no longer known as SPADs. Each should be treated proportionately in line with the risks involved.

The Guidance Note GN/RT3519. Issue 3, supports GO/RT 3119 and contains new text on proportionality: Depending on the complexity of the incident being investigated, the length and depth of the report should be proportionate to the circumstances of the incident. For example, in the case of a lower SPAD risk incident the report may consist of the completed Provisional SPAD data collection forms, with suitable narrative added to record causation details and any recommendations. Or if, for example, the causes and circumstances of an accident or incident are so clear as to indicate a degree of certainty of cause and effect, then the duty holders concerned may decide as part of their initial joint review (sometimes referred to as ‘table top meeting’), that a reduced and more proportionate type of investigation be held. In this case the parties concerned should be able to justify their decision on a risk based basis in order to make sure that the decision is fully justified.
This application of proportionality could be enhanced by applying the similar principles and process described in Part 2, section 4.2 of this guidance. This proportionality can equally be applied to SPADs and the re-categorised SPADs referred to above.

This guidance document should be equally applicable to SPAD investigations and the examples of good practice throughout, particularly in relation to identification of underlying causes, could equally apply to SPADs. Specific SPAD investigation requirements and some guidance can be obtained in the following guidance note:

**Signposts - SPADs**

**GO/GN3519** contains requirements and guidance on SPADs covering the following main issues:

- SPAD categorisation
- Post incident inspection
- SPAD risk ranking
- Signal Sighting Committees
- SPAD forms 3119 A and B

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### 5 Investigation report

The objective of an investigation report should not only be to report accurately on the accident mechanism and its causes and to formulate recommendations to improve safety, but also to demonstrate that the investigation has been conducted with a high level of professionalism.

#### 5.1 Writing the report

The report should be clear, easy to read and factual and must address the requirements of the remit. Further general guidance is available from many sources, but specifically for the rail industry in the following:

**Signposts - Guidance on report content**

**GO/GN3519** Guidance on accident and incident investigation in 2.2.5 and 2.3.3, including the mandated requirements for Formal and Local investigation reports

An investigation into an undesired occupational health and safety event may follow similar principles to other investigations but in some cases a brief report may be compiled without an investigation. In each case it is important that a record of the exposure or complaint is kept, including on personnel files. Such events may include:

- Asbestos or lead exposure
- Fumes
- Arc-eye
5.2 Data protection issues

The Data Protection Act (DPA) is primarily aimed at protecting individuals from misuse of their personal details. It makes provision for the regulation of the processing of information relating to individuals, including the obtaining, holding, use or disclosure of such information. It becomes relevant to those involved in accidents and their investigation when details could be passed on to a third party that may use the information for other than matters directly relating to the accident investigation.

Most of the potential problems in relation to the DPA can be avoided by not including names of individuals in documentation that may be made available to third party organisations. In 2003 the Health and Safety Executive published an Accident Book (BI510) - approved by the Information Commissioner – which should help organisations to comply with Data Protection legislation.

The HSE advises that ‘Accident report forms should include consent for disclosure to a third party. ’ This could be achieved by including a consent statement on the form itself, for example ‘I agree to [name of employer/data controller] processing my [personal information/sensitive* personal information] for the purpose of accident investigation and compilation of safety data. I further agree to my [personal information/ sensitive personal information] being passed to [name of third party organisation, eg RSSB] for this purpose.

* Medical information is considered under the DPA to be ‘sensitive’

One Transport Operator uses text similar to the following:

**Good Practice – Data protection notice**

‘Data Protection: This information may be shared with the ORR, RAIB and RSSB and other agencies, with other rail businesses, and with our solicitors and legal representatives. Staff accidents will be reported to trades union Safety Representatives. This information will not be used for marketing or other commercial purposes.’

These third party organisations should also be informed that they are required to acknowledge that the data will only be used for the purposes of the investigation and compilation of safety data, and data should not be sent to them until this agreement is given.

5.3 Recommendations

The investigation will be productive to the extent that the real causes of unsafe acts and conditions are accurately identified, evaluated and corrected. The quality, relevance and practicability of the recommendations in addressing the causes of the event and the unsafe acts and conditions that preceded it are of paramount importance; the number of recommendations is not. Part 3 contains extensive guidance on SMART recommendations plus other useful factors that should be considered.

HSG 245 refers to the need to review related risk assessments and where the investigation reveals weaknesses in these and competence assessments then recommendations relating to altering and improving these may be appropriate, eg **re-assessment of risk of slipping on a platform after several such accidents**. Investigators should be required to address the issue of risk assessments.

5.4 Review of the draft report

Internal management processes should ensure that the remit has been achieved and that the draft report is of a good standard, with appropriate feedback given to the investigator in order to achieve consistency and improved investigating and reporting in the future. This may also give consideration to the cost and benefits associated with the recommendations.
5.5 Management of recommendations

Some aspects of the management of recommendations, from writing them through to tracking their implementation, are mandated by legislation and Railway Group Standards but guidance may be useful where this is not the case. The table below lists these requirements but also supplies guidance for these stages of managing recommendations.

5.5.1 Issue and distribute recommendations

On completion of the report it should be distributed to those involved. These may include:

- Organisations to which recommendations have been allocated
- Organisations whose employees were involved in the undesired event or who gave evidence
- Organisations responsible for managing safety

5.5.2 Accept recommendations

When recommendations are received they should be thoroughly evaluated at the appropriate level and actions agreed or, if no action is to be taken, the issuing organisation should be informed and given a justification for the reason. Records of such actions and decisions should be kept. Every effort should be made to agree on how to resolve differences over the implementation of recommendations.

5.5.3 Implement recommendations

While investigators would be expected to have an awareness of the costs vs benefits of their recommendations, the organisation or manager responsible for implementing the recommendation would normally undertake a more detailed assessment of the costs and benefits and would possibly rank the risks with other recommendations.

Having accepted recommendations and agreed on actions, organisations that have several recommendations to act on may wish to prioritise these actions in terms of resources and timescales.

Recommended actions should be built into systems so that they are sustained and do not fade away as the memory of the accident does. The actions taken and the lessons from the accident should be communicated to staff in an appropriate way, ranging from supply of information, to gaining understanding and support, to briefing, training, competence regime changes and appropriate supervision.

Those responsible for implementing recommendations should report on progress and completion to the issuing organisation/person.

5.5.4 Track recommendations

The tracking of recommendations is a vital part of the investigation output as the failure to implement recommendations is a common management fault that is seen as a precursor to many major accidents. The overseeing of the effective implementation of recommendations should be at a high level to ensure that appropriate resources are made available to match the risks involved. Records of accidents, their causes and the agreed actions should be kept to assist in the monitoring of performance and to detect trends.

SMIS should be used to report details of undesired events, the investigations and to log and track recommendations for the range of inquiries and investigations: from public inquiries, HSE inspectorate inquiries, RAIB investigations, Formal and Local investigations and others.

Some companies have introduced their own parallel recommendation reporting and tracking systems, some of which are integrated business processes and include the logging of the progress of outputs from audits and risk assessments. SMIS is intended to act as a simple recommendation tracking system and transport operators should not need to duplicate such a system, though some may opt for more comprehensive systems.

Where recommendations are allocated to a non-duty holder the relevant duty holder that they are contracted to or supply to should make necessary SMIS entries and track progress.
In addition to the implementation of the recommendations, management should review the effectiveness of these recommendations and act on the results of such reviews to assist with continuous improvement.

RAIB’s recommendations on the rail industry are addressed to the ORR, which must then ensure that they are considered and that, where appropriate, action is taken by the duty holders.

The table below references the mandated elements (blue) and provides some guidance (green).

Table 5 Management of recommendations

| Progress of Recommendations | Types of Investigation – Note SMIS requires details of accidents and incidents listed in tables A, B and C of GE/RT8047 and these will include those requiring RAIB, Formal and Local, and some other Investigations. |

<table>
<thead>
<tr>
<th>RAIB</th>
<th>High Level (Formal) Investigation</th>
<th>Medium Level (Local) Investigation</th>
<th>Other Investigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write</td>
<td>The Railways (Accident Investigation and Reporting) Regulations 2005 Section 11 and Schedule 6. RAIB may provide reports and recommendations</td>
<td>GO/RT3119 section 2.2.5.1 g) Cross reference to relevant part of report. Purpose is to reduce future risk GO/GN3519 section 2.2.5.2 Address recommendations specifically to the end implementers and GN43 gives guidance on choosing recipient</td>
<td>GO/RT3119 section 2.3.1.1 d) Provide a remit including a written report with ‘local system improvements’</td>
</tr>
<tr>
<td>Issue/ Distribute</td>
<td>Above Regs Section 12 (1) (a) and (4). Addressed to ORR (but also directly to end implementer)</td>
<td>GO/RT3119 section 2.2.5.1 Provide written report to prescribed parties GE/RT8047 section 2.1.2.1/2 Summary report, recs, immediate and underlying causes to SMIS</td>
<td>GO/RT3119 section 2.3.1.1 d) Provide a remit including a written report with ‘local system improvements’</td>
</tr>
<tr>
<td>RAIB</td>
<td>High Level (Formal) Investigation</td>
<td>Medium Level (Local) Investigation</td>
<td>Other Investigation</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------</td>
<td>-----------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td><strong>Accept</strong></td>
<td>Above Regs Section 12 (4) (b). End implementer to give details of measures and timetable or reason for no measures to ORR</td>
<td>GO/RT3119 section 2.1.6.2/3 Evaluate recs and document reasons for rejecting or alternative measures SMIS Can be used to accept An electronic system should assist and include details of timescales etc</td>
<td>The acceptance of recommendations should be recorded. SMIS Can be used to accept An electronic system should assist and include details of timescales etc</td>
</tr>
<tr>
<td><strong>Implement</strong></td>
<td>Above Regs Section 12 (5). Not to comply with ORR requirement is an offence End implementer implements. GO/RT3119 section 2.1.6.4 Report implementation progress in SMIS</td>
<td>GO/RT3119 section 2.1.6.4 Report implementation progress via SMIS GE/RT8047 section 2.1.2.3 Report progress on implementation via SMIS</td>
<td>GE/RT8047 section 2.1.2.3 Report progress on implementation via SMIS</td>
</tr>
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<td><strong>Track</strong></td>
<td>GE/RT8047 E1.2 ORR uses SMIS to track progress for its reports to RAIB</td>
<td>GO/RT3119 section 2.2.5.1 g) and C.1.1.1 h) check DCP tracks own and accepted recommendations GE/RT8047 E1.2 A single reporting process for recommendations An electronic system should assist in the tracking of issued and received recommendations</td>
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**SMIS** Can be used to accept The acceptance of recommendations should be recorded. An electronic system should assist and include details of timescales etc
5.6 Final SMIS report

GE/RT8047, section 2.1.3, requires that transport operators, where they are the event owner, finalise, possibly amending, and close the SMIS entry, including details of causes, within 20 working days of the event. In addition the event owner shall finalise the record in SMIS of causation details, completed summary report and recommendations arising from an investigation within twenty working days of publication of the investigation report. Tables A, B and C in this RGS illustrate who the event owners are in different scenarios.

The range of SMIS fields was extended on 1 April 2010 to ‘any location that is connected to, but away from, the running lines comprising NRMI, where train maintenance, stabling, marshalling and/or servicing (including refuelling) takes place under the management of another infrastructure manager’ and transport operators are encouraged to report such data to assist with their own and the industry’s accident trend analysis. The scope for reporting under SMIS was extended beyond the scope under ROGS in order to provide enough data for the SRM to allow risking modelling for yard, depot and siding working. Because this is out of ROGS’ scope, it is non-mandatory at present.

6 Learning from investigations

To systematically learn lessons organisations will need high level review processes. Once lessons have been learned the benefits will be gained through, for example, updated procedures and SMSs, training and briefing of staff and changes to monitoring and review processes.

6.1 Learning lessons

The history of accidents is one of commitments that they will not be repeated but unfortunately, despite this assumption, failures to learn important lessons are common.

The effective learning of lessons, in relation to accident investigation, is not simple and requires management commitment and resources. The output from the investigation, largely the recommendations, should, when reviewed, lead to the learning of lessons. These may be of different types, eg:

- New design or technologies, eg modification to rolling stock
- Improved processes eg training or maintenance regimes
- Correction of systemic problems, eg supervision levels

Once lessons have been learned the benefits will be gained through, for example, updated procedures and SMSs, training and briefing of staff and changes to monitoring and review processes.

Effective systems for safety validation of change should question the potential loss of corporate knowledge, eg expertise and familiarity with management systems. This validation should give assurance that safety performance is maintained, and where appropriate improved, at a time of rapid change and high staff turnover.

6.2 Major accidents and failure to learn lessons

Over the last 20 years investigations of several major accidents have identified common failures of Safety Management Systems. One significant element of these failures is the lack of learning from previous experience of accidents and/or failure to act on the lessons learned. Table 6 is a simplified but significant record of these failures.

These major accident failures are regularly made reference to in recent safety literature but it should be noted that the same sort of failures to learn occur at a lower and less well known level. Rail industry investigations often investigate accidents that have similar precursors to previous ones. This indicates that either lessons have not been learned or that they may have been learned but recommendations and other necessary actions have not been effectively applied.
6.3 Management review of accidents and trends

To systematically learn lessons organisations will need high level review processes. One example is a safety review group of professional heads meeting (which most transport operators will have in place), perhaps quarterly, with a standing agenda item: ‘review of safety losses’. This could include:

- Reports on activity (leading) and outcome (lagging) indicators, noting trends and reasons for them (Further information on developing safety performance indicators is available from RSSB in Measuring Safety Performance on the RSSB website)
- Analysis of a relevant major accident, noting underlying causes
- Implementation and effectiveness of previous recommendations
- Agree actions from lessons learned and review of previous actions

The quality of the review and decision making processes will determine the effectiveness of the overall management of accidents.
6.4 Measuring improvement in loss due to accidents

The ROGS Regulations (Schedule 1) require demonstration of the continuous improvement of the SMS. Action taken in response to good accident investigation and reporting should be a significant element of this improvement; the ROGS Regulations requiring that the ‘necessary preventative measures are taken’ following investigation.

In accepting the commitment to continuous improvement of the SMS, and as a result reducing the loss due to accidents, it becomes necessary to determine how these can be measured. The following questions are suggested for use in measuring any improvements in the management of accidents (and consequently improvements in the implementation of the SMS):

- Are adequate resources, including competent staff, available for proportionate investigation.
- Were reports completed to meet the timescale in the remit?
- Was feedback given to the investigators/report writers?
- Were the recommendations implemented on time?
- Were the interface arrangements with others satisfactory (from the accident to recommendation implementation)?
- Was the effectiveness of the implemented recommendations reviewed at a high level?
- What is the overall accident trend?

At the industry level the various cross industry groups undertake a level of review of individual accidents and trends.

6.5 Learning from operational experience

RSSB’s Learning from Operational Experience (LOE) annual report contains the following statement:

‘LOE is defined as the process by which knowledge from the operation of systems is gained, exchanged and used, leading to continuous improvement and the development of a positive safety culture. LOE is discharged through the rail industry’s national stakeholder groups, all of which have been established by the RSSB Board.’

There are five high-level principles which support LOE for the railway industry in Britain:

1. Industry decision makers should have access to good quality intelligence in a way that meets their needs.
2. Accidents and incidents should be investigated promptly and proportionately with relevant learning points effectively identified and acted upon.
3. Good practice should be proactively identified, shared and used among industry partners.
4. Organisations should have processes to understand, interpret and embed lessons so as to prevent recurrence of similar/repeat events.
5. Industry processes should support the retention and communication of knowledge and experience.’

6.6 Industry review of accidents and trends

LOE is partly discharged through the rail industry’s national stakeholder groups, which have been established by the RSSB Board. Following an RSSB-led review and consultation, the industry is now in the process of modernising and improving system safety co-operation.
The current range of national and regional meetings has been replaced with:

i. A single System Safety Risk Group (SSRG) formed from SPG, CSSG and OFG – responsible for reviewing 100% of rail system risk, looking at future trends, identifying and sharing good practice and supporting Route and National Groups.

ii. Dedicated National Safety Groups for freight operators, infrastructure contractors who operate mainline trains, cross-country trains and charter operators.

iii. Route based Safety Groups between local train operators and their Network Rail route counterparts or equivalent if part of an ‘alliance’.

The first stage of implementation, which has established the National Freight Safety Group (NFSG), SSRG, a Wessex Route Safety Group and implementation of the groups, continues during 2013/14.

6.7 Incident Factor Classification System (IFCS)

The IFCS contains classifications of incidents based on information from investigation reports. The classifications range from engineering to human factors issues. Reviews of the classifications will be undertaken by human factors and safety specialists working within the rail industry. Some of the classifications are already in use by investigating organisations, including the RAIB and Network Rail. The longer-term aspiration is that the IFCS is used to classify a wider range of incidents from across the rail industry (including those in other countries), and also other industries. This will increase the analysis that can be done and the potential learning that can be obtained from the investigations.

Good Practice – IFCS information and trends

The IFCS provides two key advantages to the rail industry:

- **Cross-industry learning.** Causal trends will be identified for all in the industry using a consistent classification for key incidents. This will include key railway incident investigation reports and a selection of reports from other industries and countries.
- **Use by incident investigators.** Use by incident investigators to identify incidents with similar causes which have happened in the past. This will help ensure that previous investigation work is not repeated and recommendations are not duplicated or contradicted.

6.8 Sources of lessons from accidents

There are many sources of accident information which transport operators and others in the industry can contribute to and learn from. A number are listed here but the list is not exhaustive and is subject to change:

- **RAIB Bulletins** – In addition to full accident reports and urgent safety advice when there is a need to provide immediate information to the relevant bodies, RAIB issues bulletins. These are kept brief and are produced after preliminary examinations when general issues and lessons are identified that would be beneficial if known across the industry. They summarise the circumstances and focus on ‘learning points’. Three such bulletins were issued in 2008 and nine in 2009. See the RAIB website [www.raib.gov.uk](http://www.raib.gov.uk)
- **Rail Notices** - The application of GO/RT3350 Communication of Urgent Operating Advice and GO/RT8250 Reporting High Risk Defects facilitate the sharing of safety critical information and lessons learned from accidents and incidents, via [www.railnotices.net](http://www.railnotices.net) (registration is required for this site)
- **Railway archive** - This contains a database of accidents and can be found at: [railway archive](http://railwayarchive.com)
- **RED** - This is a DVD series about operational safety designed for the briefing cycle for front-line personnel. Its aim is to promote a more progressive and open safety culture in which there is respect for the contribution of all and recognition of the value of learning from operational experience. It makes extensive use of incident reconstructions to make clear learning points which remain in the memory. Copies are made available through a controlled distribution – contact [enquirydesk@rssb.co.uk](mailto:enquirydesk@rssb.co.uk) or go to [www.opsweb.co.uk](http://www.opsweb.co.uk)
• **RSSB Operational Feedback Updates** - These are ad hoc reports produced to highlight issues raised by overseas rail accidents and inquiries into non-rail events with a view to promoting pan-industry learning. See [www.opsweb.co.uk](http://www.opsweb.co.uk).

• **Right Track** - A quarterly magazine sponsored by OFG aimed at drivers, signallers, shunters, station staff, track workers, depot staff, managers – anyone and everyone who plays a vital role in keeping the railway going. Its purpose is to help companies share initiatives and perspectives in an accessible and down-to-earth way. It is available in hard and soft copy format. For more information log on to Opsweb ([www.opsweb.co.uk](http://www.opsweb.co.uk)) or email righttrack@rssb.co.uk.

• **Worldwide Accident Investigation Summary** - Is a monthly RSSB summary covers rail accident investigations from across the world, providing a synopsis of the event, its causes and the recommendations that have been made to mitigate them. OFG cascades this information to the OPSRAMs, thus facilitating wider learning throughout the industry. These summary documents may be downloaded from [www.raib.gov.uk](http://www.raib.gov.uk) and [www.opsweb.co.uk](http://www.opsweb.co.uk).

Network Rail’s National Recommendations Review Panel routinely reviews reports and now identifies where the industry would benefit from sharing the lessons learnt. Network Rail now produces ‘Lessons Learnt’ publications following events which have led to formal investigations or local investigations where significant points of learning have resulted.

### 6.9 Learning culture and cooperation

The Duty of Cooperation Guide (2008) published by RSSB includes the following text on the topic of a learning culture:

‘The establishment of a learning culture is a vital component in improving safety performance and transport operators should collaboratively review and identify the lessons from accidents / incidents which can be learned from to prevent recurrence and to reduce future risks…

…There should be clear and demonstrable commitment to learning lessons and also willingness to share learning points between transport operators. As such, ‘lessons learned’ should be discussed and considered regularly between organisations’
Appendix A - Safety Culture

Diagram 4 below illustrates the interplay between behaviours, attitudes and systems that define an organisation’s safety culture. The ‘maturity’ (or strength) of an organisation’s safety culture is defined by the extent to which employees (at all levels) share positive attitudes towards safety and organisational safety management, the extent to which these attitudes translate into safe/unsafe working behaviours and the extent to which the SMS supports and facilitates safe working practices.

Safety Culture

‘The safety culture of an organisation is the product of the individual and group values, attitudes, perceptions, competencies and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organisation’s health and safety management’.
‘Organisations with a positive safety culture are characterised by communications founded on mutual trust, by shared perceptions of the importance of safety and by confidence in the efficacy of preventive measures’.
ACSNI Human Factors Study Group, HSE (1993)

Psychological Aspects
‘How people feel’
Individual and group values, attitudes and perceptions towards organisational safety and safety management systems (sometimes described as the ‘safety climate’ of the organisation).

Behavioural Aspects
‘What people do’
Safety-related actions and behaviours.

Situational Aspects
‘What the organisation has’
Policies, procedures, regulations.

Diagram 4  Definition of safety culture
Key elements of a positive safety culture

• **Organisational learning and continuous improvement:**

  Incidents and failures are seen by organisations with good safety cultures as valuable opportunities to improve operations and learn lessons to avoid more serious events. This includes: (i) in-depth root cause analysis and learning from accidents, incidents and near misses; (ii) soliciting and responding to ideas from employees, and (iii) providing timely feedback and sharing of information across the organisation. It incorporates:

• **A Just Culture:**

  In a just culture, the company line is more clearly drawn between acceptable (non-culpable) and unacceptable (culpable) behaviour (ie clear statement in Company Safety Policy) so that appropriate action can be taken to prevent a recurrence. Based on an understanding of human factors, unintentional unsafe acts (ie honest errors, routine and situational violations) are seen as opportunities for organisational learning. Conversely, deliberate, intentional unsafe acts (ie reckless non-compliance, criminal behaviour, substance abuse and sabotage) are dealt with accordingly, with the required level of sanction.

  Note: A Roadmap To A Just Culture: Enhancing the Safety Environment.
  flightsafety.org/files/just_culture.pdf

• **A reporting culture:**

  An effective reporting culture recognises that the ‘system’ needs to be proactively monitored to accommodate human error to ensure continual improvement. This should include the use of good quality lead indicators to provide feedback on key organisational behaviours (ie number of suggestions for safety improvements; perceptions of management commitment to safety; safety policy published; number of safety tours carried out; percentage of improvement solutions implemented and closed out). Employees need to be encouraged and willing, even rewarded, for coming forward and reporting essential safety-related information (ie errors they have made; behaviours they have observed) without fear of sanction. This depends crucially on how an organisation handles blame and punishment and the building of an atmosphere of trust.

• **Effective and appropriate management systems:**

  Organisational systems, procedures, training and workplace environment that support safe working behaviours and foster positive attitudes (ie do excessively complex procedures and controls unwittingly induce unsafe behaviours)?

• **Demonstrable (senior and line) management commitment to health and safety:**

  Visible (senior and line) management commitment, leadership and involvement in improving health and safety performance is vital. The interest in, and priority placed on, safety by management needs to be ‘felt’ by the organisation (ie management modelling of safe behaviours, good quality and effective communications, safety tours).

• **Participation, involvement and workforce attitudes to health and safety:**

  Taking personal responsibility for safety means that staff at all levels accept they have a role in making sure their behaviour and decisions do not endanger others. Individuals (peers and managers) should feel comfortable to intervene and challenge unsafe behaviour, but this should be done from a coaching, not blame perspective.
Appendix B - Roles of various investigation bodies

The following is a brief outline of the roles of the various bodies who may undertake investigations on the rail infrastructure and the arrangements for their working together.

A Memorandum of Understanding (MoU) was agreed between the Rail Accident Investigation Branch (RAIB), the British Transport Police (BTP), the Association of Chief Police Officers (ACPO), and the Office of Rail Regulation (ORR) in April 2006.

This MoU is summarised below using extracts from its own text. The full MoU should be consulted if details of the variations in Scotland are required.

It sets out the principles for effective liaison, communication and co-operation between these parties so that rail accidents, and related criminal incidents and deaths, can be independently investigated, as necessary, by each party, in a thorough and professional manner, taking into account their respective roles and responsibilities, while also ensuring that legitimate public expectations are met.

The MoU recognises that all parties have duties to perform in relation to investigating rail accidents and incidents and that each party in fulfilling these duties should appropriately take into account the respective roles and responsibilities of the other parties.

The MoU provides a framework within which each party can carry out their respective roles and responsibilities, and, where necessary, carry out parallel independent investigations in cooperation with one another, in a way which achieves the best outcome for all concerned.

Rail Accident Investigation Branch

RAIB was established by the Railways and Transport Safety Act 2003 (RTSA) following a recommendation by Lord Cullen’s inquiry into the accident at Ladbroke Grove. It is the independent railway accident investigation body for the United Kingdom, as required by the European Railway Safety Directive, 2004/49/EC. The Railways (Accident Investigation and Reporting) Regulations 2005 (RAIR) implement that part of the Safety Directive dealing with rail accident investigation which was not implemented already by the Railways and Transport Safety Act 2003.

RAIB conducts ‘no blame’ investigations into railway accidents and incidents to identify the causes and make recommendations to improve safety. The purpose behind their investigation is to ensure that safety lessons are learned quickly and that the site of the accident is restored to service as soon as possible.

RAIB is administratively part of the Department for Transport, but is functionally independent in its conduct of investigations, and submits its accident and incident investigation reports directly to the Secretary of State.
RAIB is required by the Directive to investigate serious accidents, as defined by the Directive, and has discretion to investigate other accidents and incidents. Its remit covers all railways, except for those in: some industrial premises; museums; and funfairs. The remit also includes trams in England and Wales, and the UK side of the Channel Tunnel Fixed Link up to the mid-point. Railway industry bodies are required to notify RAIB of certain fatalities, specified major injuries, derailments, collisions and other specified dangerous occurrences. (see regulation 4 of the signposted guidance below for more information)

Signposts - RAIB guidance

Guidance on the Railways (Accident Investigation and Reporting) Regulations 2005 contains useful information about the roles, responsibilities and powers of RAIB and its reporting.

BTP and Home Office police forces
The BTP is the national police force for the main line railways throughout England, Wales and Scotland. In addition to the main national railway network, it is also responsible for policing the London Underground System, the Docklands Light Railway, the Midland Metro Tram system and Croydon Tramlink.

BTP will work closely with the local Home Office police force on whose geographic area an incident occurs, in accordance with procedures approved by ACPO.

The primary duty of the police is to protect life and property, and to prevent and detect crime. In relation to accidents involving fatalities, the police have a duty to investigate and determine whether there is evidence of criminal culpability on the part of any person or corporation. The police also have a duty to investigate any death on behalf of HM Coroner.

The Office of Rail Regulation
ORR is the safety authority and the safety regulator for the railway industry. This safety regulator function was transferred to ORR from the Health and Safety Executive on 1 April 2006 when the Health and Safety (Enforcing Authority for Railways and Other Guided Transport Systems) Regulations 2006 came into force. The ORR works to maintain and improve railway safety by operating a system of safety certification and authorisation, by actively monitoring and ensuring compliance, and by developing the regulatory framework. Its jurisdiction covers all Great Britain’s railways and associated infrastructure, including light railways, underground systems and tramways. It does not include the UK side of the Channel Tunnel Fixed Link.

As part of its statutory functions ORR investigates potential breaches of health and safety legislation in relation to the operation of the railways, including those arising from rail accidents and incidents. Following an investigation, ORR will take action as appropriate and in accordance with its Health and Safety Enforcement Policy. Although the RAIR Regulations make significant changes to the way railway accidents and incidents are investigated, they do not alter the duties and functions of the rail safety regulator as they have been transferred to ORR in 2006.

Co-operation between parties
The MoU sets out the circumstances in which an RAIB investigation takes precedence and in which a police investigation takes precedence. It would normally require firm indications of serious criminality to justify a criminal investigation taking precedence over a RAIB investigation whose results will be made public so in most cases RAIB will be the lead party.

The lead party must take into account the other parties’ needs in the way it handles issues of common interest. For this to work the parties must be committed to fully co-operating and liaising with each other.

This guidance contains further references to the arrangements of RAIB and the police, in particular with regards to the interviewing of witnesses.
# Glossary

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>BTP</td>
<td>British Transport Police</td>
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<td>CIRAS</td>
<td>Confidential Incident Reporting and Analysis System</td>
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<td>DCP</td>
<td>Designated competent person</td>
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<td>DPA</td>
<td>Data Protection Act</td>
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<td>FOC</td>
<td>Freight Operating Company</td>
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<td>HSE</td>
<td>Health and Safety Executive</td>
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<td>HSG</td>
<td>Health and Safety Guidance (published by the HSE)</td>
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<td>IFCS</td>
<td>Incident Factor Classification System</td>
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<td>Infrastructure Control Group</td>
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<td>LOE</td>
<td>Learning from Operational Experience</td>
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<td>NMRI</td>
<td>Network Rail Managed Infrastructure</td>
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<td>National Operations Centre</td>
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<td>Network Rail National Emergency Plan</td>
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<td>Non-technical skills</td>
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<td>Operations Focus Group</td>
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<td>Office of Rail Regulation</td>
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<td>RAIB</td>
<td>Rain Accident Investigation Branch</td>
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<td>RGS</td>
<td>Railway Group Standard</td>
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<td>SMART</td>
<td>Specific Measurable Attainable Relevant Time-bound</td>
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<td>SMIS</td>
<td>Safety Management Information System</td>
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