

Investigators' Handbook

Part 2 – The investigation

Part 2A



This Part 2A includes the following sections:

- Arranging the investigation
- Preparing for the investigation
- Evidence

Part 2 – The investigation

Part 2A

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Arranging the investigation

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Checklist

Below is a checklist of the key points of what needs to be considered when arranging an investigation. Some of the issues to consider will depend on whether witnesses are to be interviewed and some issues may depend on others; for example, the date and time may be affected by the number and availability of the investigation team members.

- ☐ **Date and time**
- ☐ Check availability of investigation team members
 - ☐ Check availability of witnesses
 - ☐ Check availability of accommodation

- ☐ **Venue/accommodation**
- ☐ Room for investigation team and observers, etc.
 - ☐ Room for witnesses (where appropriate)
 - ☐ Facilities/equipment needed
 - ☐ Refreshments

- ☐ **Investigation team members and observers, etc.**
- ☐ Size of the investigation team members and observers, etc.
 - ☐ Investigation team members
 - ☐ Observers
 - ☐ Specialist adviser/expert

- ☐ **Witnesses**
- ☐ Order of attendance
 - ☐ Witnesses unable to attend
 - ☐ Counselling services

- ☐ **Evidence collection and test results**

This section of the handbook provides guidance on what needs to be considered for each.

However, the investigation remit's timescales should not be forgotten and the plan should always be to achieve these.

Where an extension to the remit timescales is considered necessary, further guidance can be found in the 'During the investigation' section of Part 2B of the handbook.

Date and time

For serious or complex accidents and incidents, bear in mind that the investigation may need to be held on a number of days.

The investigation should be held as soon as possible after the event – perishable or time sensitive evidence may be lost if the investigation is unduly delayed.

It is also necessary to consider the timescales set out in the remit. Plan to achieve the timescales!

If the investigation intends to interview witnesses, their memory and recollection of what occurred will fade the longer the delay in them being interviewed, irrespective of any report/statement they may have submitted.

It may, however, be necessary to delay the commencement of the investigation in order to take account of the availability of:

- a) the investigation team members;
- b) witnesses;
- c) evidence; or
- d) a suitable venue/accommodation.

However, it may be appropriate to commence the investigation at the earliest opportunity and for it to be reconvened at a later date when, for example, a witness becomes available or further tests are concluded.

If it is likely that the investigation will need to be reconvened, the DCP should be advised of the reasons and, if necessary, an extension to the timescales should be requested.

Availability of investigation team members

The more serious the accident or incident, the more desirable it is to commence the investigation as soon as possible.

It is good practice to ask investigation team members to provide several dates when they would be available.

The commencement date should be, as far as it is reasonably possible, convenient to all of the investigation team members.

But the investigation should not be overly delayed in order to achieve this; if not convenient to all, it should be on a date that is convenient to the majority. It may be necessary to contact the organisation(s) concerned for them to nominate an alternative investigation team member.

The inability of an organisation to provide a person to attend the investigation team meeting, in whatever capacity, given reasonable notice, should not inhibit the commencement of the investigation.

Availability of witnesses

When witnesses are to be interviewed it is particularly important that the investigation is held as soon as possible.

Witnesses may not be available for the following reasons:

- a) they may have been injured in or shocked by the event;
- b) they may be on annual or other leave;
- c) they may be unable to be released from duties for operational reasons; or
- d) the RAIB or police may need to interview them first.

Availability of a suitable venue/accommodation

The desired venue may not have the necessary accommodation available on the desired date.

Depending on the seriousness of the accident/incident, it may be necessary to seek assistance from the DCP in trying to book meeting rooms at a venue.

Commencement time

Once a date has been agreed, the time can be decided and should take into account:

- a) the need to travel to the venue;
- b) the availability of witnesses.

Venue and accommodation

The investigation should be held at a venue that:

- a) ideally, is in or close to the area in which the event occurred;
- b) is convenient for the majority of witnesses;
- c) is convenient for the majority of the investigation team members;
- d) can accommodate the size of the investigation team;
- e) can separately accommodate, where necessary, any witnesses;
- f) has or is otherwise able to provide the necessary facilities for the investigation.

Location

The availability of suitable accommodation will often determine the venue for the investigation; most likely this will be at existing Rail Industry offices.

Where necessary, liaise with the local Network Rail staff to identify what accommodation exists and the facilities available.

Where Network Rail offices are not available and where other organisations, e.g. train operators, are involved in the investigation contact them to identify if they have available and suitable accommodation.

Convenience

The venue should be convenient to the majority of the witnesses and, more importantly, the key witnesses especially those that may have been injured, shocked or traumatised by the accident/incident.

Consideration may also need to be given to holding the investigation at more than one location, on the same or separate days.

The shift patterns and travelling time from remote locations may help in deciding the venue.

The venue's convenience for witnesses should be considered before the convenience for the investigation team members.

Where possible, the venue should also be convenient for the investigation team members. However, where an investigation team member will be travelling a great distance consideration should be given to delaying the time of commencement. In such circumstances, the investigation team member may decide to travel the previous day, enabling the investigation to commence sooner.

Accommodation size

The venue will need to provide a room that can accommodate all persons participating in the investigation, i.e.:

The investigation team members
Any specialist advisers/experts
Any observers
The witness (where appropriate) when being interviewed

Consideration should also be given to any additional space that may be required to accommodate equipment (for example, the facilities/equipment listed below) that will need to be used during the investigation.

Where witnesses are to be interviewed, a separate room will also need to be made available where they can wait until they are interviewed (or re-interviewed). In some cases, there might be a need to segregate witnesses, or provide some supervision, to avoid possible confrontation or collaboration.

Facilities/equipment needed

When seeking a suitable venue consideration should be given to providing facilities and equipment that will be needed during the investigation. These may include, for example, the following:

- a) flip-chart;
- b) projector;
- c) recording equipment, laptop and speakers;
- d) diagrams/sketches.

Do not forget the need for a suitable power supply for electrical equipment and, where appropriate, a Network connection for laptops.

Refreshments

Consideration should also be given to the need to provide suitable refreshments and, where the investigation may last a whole day, lunch for the investigation team members.

Where witnesses are to be interviewed, consideration should also be given to:

- a) providing refreshments (but not necessarily lunch) in the witnesses' waiting room; and
- b) offering refreshments to the witnesses whilst being interviewed.

Attendees at the investigation

The investigation remit provided by the DCP will normally indicate:

- a) which organisations should be invited to participate as a member of the investigation team and the expertise required;
- b) who should be invited to attend as a specialist expert; and
- c) who should be invited to attend as an observer.

The remit should indicate the organisation and the skills/expertise required, not name any team member, as this may change. The lead investigator should then assemble the investigation team accordingly.

In some cases, however, the arrangements for an investigation may need to be made:

- a) before the remit is available; or
- b) after new information has come to light (once the remit has been received) which may mean other organisations and persons need to be invited to attend.

Invitation to attend

Invitations to attend should be in writing or by e-mail – or by telephone, if arranged at short notice – stating the date, time and place of the investigation.

Where invitations to attend are made by telephone, written or e-mail confirmation should be provided where practicable.

Normally, and especially where witnesses are to be interviewed by the investigation, 7–10 days' notice of the investigation team meeting should be provided to enable team members, observers and witnesses to be released from duty.

In the case of serious accidents, and to enable an investigation to be undertaken promptly, it is sometimes necessary to arrange investigations at short notice by telephone. In these circumstances, a notice period of at least 36 hours may be considered reasonable.

The inability of an organisation to provide a person to attend, in whatever capacity, given reasonable notice, should not inhibit the commencement of the investigation.

Investigation team members

The following offers guidance on identifying who should be a member of the investigation team and their role.

Who should be an investigation team member

Normally, the remit issued by the DCP will identify which organisations need to be invited to provide an investigation team member (or members).

The lead investigator should then identify who the investigation team member(s) will be.

The following checklist will assist in identifying whether an organisation/function should be invited to nominate a representative as an investigation team member:

How to identify investigation team member		Yes	No
(a)	Was the organisation's or function's employee injured in the event?	<input type="checkbox"/>	<input type="checkbox"/>
(b)	Did the organisation's or function's train/vehicle/equipment suffer damage in the event?	<input type="checkbox"/>	<input type="checkbox"/>
(c)	Is such an employee, train, vehicle or equipment likely to be implicated in the causes of the event?	<input type="checkbox"/>	<input type="checkbox"/>
(d)	Is such an employee, train, vehicle or equipment likely to be implicated in 'Other safety related issues' associated with the event?	<input type="checkbox"/>	<input type="checkbox"/>
(e)	Is a recommendation or local action likely to be addressed to the organisation/function?	<input type="checkbox"/>	<input type="checkbox"/>

If 'Yes' to any of the above then always invite them to participate.

Each involved organisation/function should be informed and accept that the nominated investigation team member(s) will be signatories to the agreed conclusions and recommendations/local actions.

The investigation team should have a balance of knowledge and experience appropriate to the event being investigated.

Investigation led by an independent investigator

When a Senior Investigator or specialist independent investigator has been appointed to lead the investigation, the DCP may nominate a separate Network Rail representative with knowledge/experience of the location, activity, etc. as an investigation team member to assist the lead investigator.

More than one representative from the same organisation/function

In most cases it should be sufficient for each involved organisation/function to nominate one investigation team member who:

- a) has the necessary knowledge and experience to deal with the relevant issues; or
- b) can, if necessary, liaise with other experts within the organisation/function.

However, the circumstances and complexity of the event may require an organisation/function to provide more than one representative covering different areas of expertise.

Having one representative from each involved organisation/function will help in the management of the investigation and avoid potential conflicts where two or more representatives attend.

Organisations that are not Railway Group members

The 'Railway Group' includes Network Rail and other certificated transport operators operating on Network Rail Managed Infrastructure.

Details of 'other certificated transport operators', i.e. those with a safety certificate, can be found on the Network Rail Portal. Go to the 'Applications' tab and select 'National' and 'Safety' and under 'References' click on 'ROGs – Safety Certificates/Authorisations'.

An investigation may need to involve organisations other than Railway Group members (e.g. contractors), who may not be aware of the existence of either Railway Group standard GO/RT3119 or Network Rail's accident investigation standards and the processes they contain.

However, such organisations are encouraged to participate in the investigation process and it is therefore important that, where necessary, they are made aware of what may be required of them. This is normally done by the DCP.

Persons not permitted to attend

The following must not be permitted to attend the investigation:

- a) British Transport Police (BTP) officers (unless attending to provide evidence as a witness) or the Civil Police officers;
- b) Inspectors from the Health and Safety Executive (HSE) or the Office of the Rail Regulator (ORR);
- c) Inspectors from the Rail Accident Investigation Branch (RAIB);
- d) Legal representatives of those involved.

The reason that the BTP and the HSE/ORR are excluded is because they are designated enforcing authorities who have a statutory responsibility for the enforcement of law. As such it would be inappropriate for them to take part in the investigation.

If any of the above insists on attending, guidance should first be sought from the DCP and/or the Head of Corporate Assurance & Accident Investigation.

The role of an investigation team member

An investigation team member is representing the organisation, or other Network Rail function, involved and should be expected to support the investigation:

- a) by representing the organisation or function;
- b) by providing knowledge and expertise on the organisation's or function's operations, processes and activities, etc. that are relevant to the investigation; or
- c) where the investigation team member does not have the knowledge or expertise of a particular area, being able to obtain any relevant information or evidence needed for the investigation.

The investigation team member will be expected to agree and sign the completed report on behalf of the organisation/function they represent.

Size of the investigation team (including observers and specialist experts)

The remit will normally indicate who should attend the investigation (see the [Attendees at the investigation](#) sub-section above).

There should, however, be discussion and agreement by the DCP and lead investigator on the expertise needed and general composition of the investigation team, to enable the lead investigator to determine the size of the investigation team and that those present, collectively, will have the necessary competence to evaluate the evidence.

Consideration should be given to the size of the investigation team such that:

The investigation can be effectively managed.	The larger the investigation team the more difficult it may be to manage the investigation at all stages.
It does not unduly restrict the availability of accommodation	The available accommodation may, if no alternative is available, limit the size of the investigation team.
It does not have an adverse effect on witnesses and enables interviews to be properly conducted	<p>Very few witnesses may have experience of being interviewed at an investigation and may not know what to expect.</p> <p>If it is not possible to do so before the investigation, every effort should be made to make sure witnesses are informed of the purpose of the investigation and they are made to feel at ease.</p> <p>The number of persons present at the time the evidence is given should be sufficient to enable the interview to be properly conducted but does not inhibit the witnesses in giving evidence. However, the larger the investigation team the more likely it will prove to be daunting to witnesses and may inhibit their ability – or willingness – to give evidence, especially those that may have been injured or shocked or traumatised by what occurred.</p>

Specialist adviser/expert

The need for the appointment of a specialist adviser or expert will be dependent on the circumstances of the event and the collective expertise of the investigation team.

This will normally cover the traditional railway disciplines such as traction and rolling stock, track and structures, signalling, train operations, and electrification, as they are relevant to the event under investigation.

Other disciplines or areas of expertise may need to be considered.

Human error is known to play a part in the majority of accidents and incidents and if human factors, i.e. ergonomics, human error or human behaviour, are believed to have played a significant part in the accident or incident, consideration should be given to involving a human factors expert.

See [Appendix A](#) for an explanation of the role of the Network Rail Human Factors specialist and details of who to contact if it is considered such a specialist is needed.

Observers

The arrangements for inviting Trade Union observers to attend an investigation, i.e. where witnesses are to be interviewed, are contained in Appendix C of [NR/L3/INV/0205](#).

Where the investigation team:

- intends to interview witnesses; and
- any of these witnesses is a member of a trade union (i.e. RMT, ASLEF, TSSA or UNITE),

contact the relevant trade union, giving details of the date, time and venue of the investigation and of who is to be interviewed, and invite them to send an observer to the investigation.

Initial contact should be by e-mail or, if at short notice (i.e. at least 36 hours before the investigation's commencement), by telephone with an e-mail sent to confirm the invitation.

Details of the trade union's contacts who should be notified of an investigation and invited to send an observer are provided on [Connect](#).

Other persons may wish to attend the investigation and such persons should be recorded in the investigation report as observers. For example:

- a) an involved organisation (e.g. a witness' employer or an employee representative) may wish another manager to attend to observe proceedings;
- b) a Network Rail manager/trainee may wish to gain experience of an investigation's proceedings;
- c) a Network Rail employee may attend to assist with managing the investigation;
- d) the owner, lesser, or maintainer of any equipment/vehicle/infrastructure involved (if not attending as an investigation team member).

Recognised Passenger Bodies

In the case of formal investigations, and depending on the type and severity of the accident or incident concerned, the DCP may agree with the other participating organisations that the representative of a recognised passenger body (e.g. Passenger Focus) should be invited to attend. Such a representative should be included as an observer.

Witnesses

Individuals that may need to be interviewed fall into five broad categories:

The participants	Those directly involved with the event and the immediate post-incident and recovery period.
Witnesses	Those that saw what happened, but were not directly involved.
Responsible persons	Those individuals that were not directly involved but who may be responsible for the actions of people or the application of relevant control measures.
Specialists	Those who may help to provide a technical understanding of what occurred.
Others	This includes people who believe they may have something to contribute (e.g. other experienced staff or those who have been involved in something similar); they may provide something the investigation team would not otherwise know.

The [Witness Information Pack](#) on *Connect* provides guidance to employees – and their line managers – who may be required to attend a Rail Industry Investigation.

Discussions should be had with the DCP and the involved organisations to agree whether to interview witnesses and, if so, who should be interviewed.

Deciding whether to interview witnesses as part of the investigation will be dependent on a number of factors, including:

- the availability of the witness's statement and/or notes of any interview(s) undertaken by the witness's employer/line manager;
- the availability of other evidence/information (e.g. data recorded downloads, voice communications, CCTV footage, etc.);
- the requirements of the investigation remit to explore issues indirectly related to the event.

The more serious the event the more likely it is that witnesses will need to be interviewed, irrespective of the availability of any statement or interview notes.

See the 'Interviewing witnesses' section of Part 2B of the handbook for further information and guidance on witness interviews.

It may not always be necessary for the investigation team to interview a witness. For example, where their report/statement and/or notes of any employer interview(s) provide sufficient information, it may be considered that an interview will obtain no further useful information.

Interviews of witnesses may also be undertaken on behalf of the investigation team by:

- a) the witness's line manager;
- b) an independent interviewer (e.g. a Human Factors specialist);
- c) a sub-group of the investigation team (where the larger investigation team may prove daunting to someone injured or traumatised by the event).

Order of attendance

It is not possible to provide a definitive order of attendance – individual events will require different approaches – but, generally, the order of attendance should be those persons:

- a) who may provide evidence relating to issues prior to the event's occurrence (e.g. work planning) and which may identify questions that may need to be asked of other witnesses;
- b) directly involved with the event;
- c) who witnessed the event;
- d) who may provide evidence relating to post-incident management issues;
- e) who may provide evidence relating to other issues that were identified during any initial investigations.

The actual order of attendance may have to be tailored to accommodate the availability of individual witnesses.

In some cases, it may be desirable to amend this order as this may influence the questioning of subsequent witnesses, e.g. evidence relating to possession planning issues may need to be obtained first.

Arranging the attendance of a witness

Bear in mind the following when arranging witness attendance:

- The manager of each witness required to attend must be given the date, time and location of the investigation.
- Where possible, adequate notice should be given to enable a witness to be released from their roster or to provide cover.
- Attendance should be organised to avoid unnecessary waiting.
- Attendance (and accommodation) for the investigation may need to be organised to avoid the opportunity for discussions between witnesses prior to giving evidence.
- Witnesses should not normally undertake their normal duties on the day of attendance.
- The witness(es) may need to be accompanied to/from investigation if they were injured or have been shocked or traumatised by the event.

Network Rail witnesses

Contact the relevant line manager or DCP, advising the date and venue and the time the witness is to attend, and ask them to arrange for the witness to attend.

Confirm the request by e-mail to the line manager/DCP. It is not necessary to write formally to the witness advising they are required to attend.

Other rail industry witnesses

Contact the organisation's DCP or other nominated contact (e.g. the nominated investigation team member) advising the date and venue and the time the witness is to attend, and ask them to arrange for the witness to attend. Confirm the request by e-mail.

Non-rail industry witnesses, including members of the public

These may be called upon to give evidence, but may be under no obligation to attend. Organisations that undertake work for or on behalf of Network Rail, or other rail industry members, may have it written into their contracts that they should co-operate.

Contact should be made with the person or organisation, advising the date and venue and the time they or a witness is to attend. Confirm the request by e-mail where possible or, where time is available, by letter.

BT Police officers

In exceptional circumstances, and only where their evidence is considered vital to understanding the circumstances and causes of the event, BTP officers may be asked to give evidence but their attendance is subject to the approval and prior authority of the Assistant Chief Constable (Operations), BTP. Where necessary, the HoCAAI should be contacted for assistance.

Witnesses unable to attend

The order of attendance will then need to take account of the availability of individual witnesses, including their ability to reach the venue. And as indicated above, witnesses may not be available for the following reasons:

- a) they may have been injured in or shocked by the event;
- b) they may be on annual or other leave;
- c) they may be unable to be released from duties for operational reasons; or
- d) the RAIB or police may need to interview them first.

This should be borne in mind when deciding the order in which they should be interviewed and when.

If a witness is not able to attend, it may be necessary to reconvene the investigation at a later date when they will be available.

Where a witness's evidence is likely to prove critical to the investigation's outcome, but the witness is unable to attend or give evidence owing to injuries sustained in the accident or ill-health, it may be desirable to interview the witness:

- a) when sufficiently recovered;
- b) in hospital; or
- c) at home.

In such circumstances, discussions should be held with their employer/manager – and the trade union representative, or observer if involved – to decide when and where the witness may be interviewed.

The investigation may be concluded without a witness's evidence provided this is agreeable to the investigation team and:

- a) the witness's evidence is not critical to understanding what occurred and why, i.e. other evidence provides these answers; or
- b) the witness is unlikely to be available for interview due to the nature of the injury/shock.

If the witness's evidence is critical to understanding what occurred and why, and it is anticipated that the witness will be available for interview within a reasonable period of time, the investigation should be delayed to achieve this.

If it is decided to interview the witness when available, the DCP should be asked to provide an extension to the timescales, where this is necessary.

There may be a need, however, to consider whether any immediate action is necessary to address any unsafe actions/conditions.

Witness refusing to attend or not released to attend

The following does not apply to members of the public and to non-rail industry employers who cannot be made to comply.

A witness may refuse to attend or their employer may refuse to release them or permit them to attend. In such cases, the witness and/or the employer must be informed that irrespective of the witness's attendance, the investigation will continue and reach a conclusion.

The witness and/or employer should be reminded of their obligations to co-operate with the investigation. For example:

- a) Employees have a contractual duty to co-operate in the carrying out of their employer's business.
- b) Section 7 of the Health and Safety at Work, etc. Act 1974 imposes a duty on employees to co-operate with their employer to carry out their duties under the Act.

- c) Regulation 22 of the Railways and Other Guided Transport Systems (Safety) Regulations 2006 places a duty of co-operation on transport operators and their contractors.
- d) Section 4.5 of Network Rail's HSMS describes the company's arrangements for co-operation and similar arrangements should exist within the safety management systems of other transport operators.

If the witness continues to refuse to attend, or their employer continues to refuse to release a witness or permit them to attend, a suitable comment should be added to the investigation report. For example:

"The driver of 2T77 suffered major injury and severe distress as a result of the accident. The driver declined to be interviewed by the investigation team. On the basis that sufficient evidence was available from other sources, the investigation team decided not to pursue an interview with the driver."

In the case of a serious accident or other high profile event, then the DCP or senior management should be asked to make an approach to the witness or employer, to encourage their attendance.

Witness refuses to give evidence

See the [Error! Reference source not found.](#) section of Part 2B of the handbook for further information and guidance where a witness attends for interview but refuses to give evidence.

Traumatised witness

Some witnesses may be traumatised by what they saw or may have had close ties with someone injured in the event; they may need special care and attention during their interview.

It may be desirable to arrange for a counsellor from, for example, Care First to be available at the location where the interviews are undertaken in order that any witness who may be traumatised by the event can receive support.

Where such support is provided, the witness should be informed it is available.

Evidence collection and test results

See the [Evidence](#) section of this Part 2A of the handbook for further information on the types of evidence.

Results of tests and checks

Do not delay holding the investigation to await the results of tests or checks that need to be undertaken.

The investigation should commence and then review any evidence/information that tests and checks (for example, a signal sighting committee) may provide when the results (or a report) become available. In many cases, it will not be possible to conclude the investigation without the evidence/information from such tests or checks – the investigation may need to be reconvened when it is available.

Additional evidence

Whilst much evidence will have been collected before it starts, the investigation may identify additional, previously unknown issues. Evidence to corroborate/confirm these issues will need to be obtained.

Any delay in starting the investigation may make it impossible to obtain new evidence to corroborate/confirm these issues.

Appendix A – The role of the Network Rail Human Factors specialist

The following has been developed to help DCPs and lead investigators understand the role of human factors in investigations. It outlines what human factors may be involved in accidents/incidents; how to take account of human factors in the investigation process; what expertise is available to support an investigation; and what expertise a lead investigator may expect from the Human Factors specialist.

Where do I find Human Factors specialists in Network Rail?

Network Rail has an Ergonomics Team which is where the human factors expertise resides. Individuals in this team come from a range of backgrounds; there are occupational psychologists, systems engineers and ergonomists. All are expert in understanding human behaviour and the things in our work environment that can influence our behaviour and cause people to make mistakes.

What is Human Factors?

Human Factors is the discipline of optimising human performance in the workplace. It considers the working environment from a human-centred viewpoint looking at the whole system and its influence on the way people behave.

When is Human Factors relevant to an investigation?

In the case of accidents and incidents that involve humans, the answer to this question is “every time”, since a purpose of the investigation is to understand human behaviour and why someone acted in the way they did to lead to the accident or incident.

Human factors addresses many different aspects of work, for example, the way work is designed, the way it is communicated and the work procedures that people are required to follow. These different aspects have been made into a framework of ten key human factors topics, known as the 10 Incident Factors:

Communications
Practices and processes
Information
Equipment
Knowledge, skills and experience
Supervision and Management
Work Environment
Teamwork
Personal
Workload

See the '10 Incident Factors' section in Part 4 of this handbook for more details on the 10 Incident Factors.

Do I need a Human Factors specialist to support every investigation?

The Accident Investigation blended learning programme gives a non-Human Factors specialist an appreciation of the aspects to consider and may avoid the need to involve a Human Factors specialist if the circumstances are straight forward.

The following are some suggestions about when you might require some specific expertise:

- If there are questions about an individual's capability or aptitude for performing the activities they were undertaking at the time of the incident.
- Where there were violations which indicate cultural and motivational problems.
- If there are implications for equipment design.
- Where there is a need to better understand the psychological error mechanisms (i.e. where it is not obvious what the error was or why it occurred).

- Where there is doubt about what the appropriate recommendations are to mitigate the event from re-occurring.
- When human factors tools such as the SPAD Hazard Checklist and the HSE's Fatigue & Risk Index are being used and assistance is required interpreting the outputs.

What level of Human Factors support is there?

There are 3 main levels of support that the Ergonomics team offers:

Level 1	The human factors support tools and training material as supplied by the Ergonomics team (see contact details below)
Level 2	Reviewing draft investigation reports
Level 3	Being a member of the investigation team

What can you expect from a Human Factors specialist during an investigation?

A Human Factors specialist can offer the following expertise and support:

- Interviewing and questioning witnesses to obtain accurate accounts of what happened and why.
- Undertaking 'Why? Because' and other error or human factors analyses as appropriate.
- Reviewing previous accidents and incidents to identify trends and patterns in underlying causes and human factors issues.
- Undertaking analysis of rosters using the Fatigue and Risk Index.
- Identification of the correct error(s) and/or violation(s).
- Identification of the immediate and underlying causes, including the performance influencing factors.
- Identifying where further research or work might be needed to fully understand a human factors issue raised by an investigation.

Ideally, a Human Factors specialist should be a member of the investigation team and be involved in the interviews of witnesses. However, such involvement will depend on the nature of the accident/incident and the subsequent investigation.

Normally, consideration or discussion of human factors issues is integrated into the body of the investigation report (i.e. the 'Factors discussed' section). Where specific human factors assessments or analyses have been carried out as part of the investigation these may be written as a separate report that can be included as an appendix to the investigation report.

Why do people make mistakes?

There are a number of guiding principles that underpin the human factors approach to investigation and why people make mistakes. You can expect a Human Factors specialist to bring these into play in an investigation.

- a) Making errors is human nature and they are not always made on purpose but are a product of other factors shaped by the work system. This means there will often be multiple causes of accidents and incidents.
- b) Active (frontline operator) errors may actually be the dominant factor. Whilst latent (underlying) factors are important, sometimes people really just slip up.
- c) The best people can sometimes make the worst errors.
- d) Short-lived mental states, such as preoccupation, distraction, forgetfulness, inattention, are the last and the least manageable part of an error sequence.
- e) We cannot change the human condition. People will always make errors and commit violations. But we can change the conditions under which they work to make these unsafe acts less likely.
- f) Blaming people for their errors – though emotionally satisfying – will have little or no effect on their future fallibility.
- g) Violations, however, are social and motivational problems. They are best addressed by changing people's norms, beliefs, attitudes and culture on the one hand and by improving the credibility, applicability, availability and accuracy of the procedures on the other.
- h) Violations act in two ways. First, they make it more likely that the violators will commit subsequent errors and, second, it is also more likely that these errors will have damaging consequences.

If you require further information about human factors or want to talk to someone in the Ergonomics team about supporting an investigation, please contact:

Theresa Clarke, Head of Ergonomics on 085 78040 (020 7447 8040) or e-mail theresa.clarke@networkrail.co.uk

or

Emma Lowe, Senior Ergonomist on 085 78506 (020-7557 8506) or email emma.lowe@networkrail.co.uk

Preparing for the investigation

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Contact the investigation team members

It is beneficial to contact the investigation team prior to the investigation team convening in order to:

- identify what evidence is available;
- review what evidence has been provided;
- agree what evidence is to be brought to the investigation team meeting;
- confirm the arrangements for the investigation.

What is needed for the investigation?

Table 1 below provides guidance on what may need to be prepared in advance for use at the investigation team meeting. What may need to be prepared will depend on the nature, severity and complexity of the event being investigated and whether witnesses are to be interviewed by the investigation team.

This is not an exhaustive list.

	Points to note
Recording equipment (if used)	Check sufficient recording medium (e.g. tapes, memory, and disk space) is available. If battery-operated, check spare batteries are available.
Laptop, projector and speakers	These may be needed if it is intended to play-back, for example, voice recordings, CCTV evidence, etc. or to show photographs.
Diagrams/sketches/ photographs	These may be helpful in: <ul style="list-style-type: none">explaining details of the location and/or trains/vehicles/equipment involved;helping a witness to recall where they were at the time and what may have happened. It may be helpful to mark positions of trains/vehicles/equipment as they were found after the accident/incident. Enlarge small diagrams/sketches to make them easier to read.

	Points to note
Flip-chart	This may allow a witness to explain where they were positioned, the positions of others or equipment being used and what they saw.
Causal diagram/mind map	<p>A causal diagram may help to identify questions to be asked/issues to be raised at the investigation.</p> <p>See Causal diagrams/mind maps sub-section below.</p>
List of questions/ Investigator prompts	<p>Based on the evidence collected it may be possible to prepare a list of questions to be asked or issues to be raised with the investigation team members and/or witnesses that will help to understand what actually happened and why. The preparation of a causal diagram may help to identify such questions/issues.</p> <p>'Investigator Prompts', a series of questions based on the 10 Incident Factors, will also help guide the investigation team to address relevant issues. These are included at Appendix B.</p> <div style="border: 1px solid black; background-color: yellow; padding: 10px; margin-top: 10px;"> <p>See the '10 Incident Factors' section in Part 4 of this handbook for more details on the 10 Incident Factors.</p> </div>

	Points to note
Evidence collected	<p>The evidence collected prior to the investigation team meeting should be shared with investigation team members. Ideally, this should be done before the investigation team meeting. However, this may not always be practicable because some evidence:</p> <ul style="list-style-type: none"> • may not be easily sent by e-mail because the data/file is too large (e.g. voice communications) or the necessary software is not available to all investigation team members (e.g. OTDR data); • may be new/only recently received. <div style="border: 1px solid black; background-color: yellow; padding: 10px; margin-top: 10px;"> <p>See the Evidence section of this Part 2A of the handbook for more details of the evidence that may be needed.</p> </div>
Office reception/security desk, where appropriate	To avoid problems with access to the building where the investigation is being held, provide a list of investigation team members, observers and witnesses attending and the rooms where each are to be sent.
The accommodation	<p>Position tables and chairs to accommodate the investigation team members and observers and the witness.</p> <p>Where appropriate, check the accommodation where witnesses are to be held, e.g.:</p> <ul style="list-style-type: none"> • location of toilets; • location of refreshments/kitchen; • fire alarm and evacuation arrangements.

Table 1 – Items needed for the investigation team meeting

Causal diagrams/mind maps

Mind map

Mind maps are a graphical method of taking notes. Their visual basis can help to distinguish words or ideas, often with colours and symbols. They generally take a hierarchical or tree branch format, with ideas branching into their subsections.

Mind maps allow for greater creativity when recording ideas and information, as well as allowing the association of words with visual representations.

They can be used to generate, visualise, structure, and classify ideas relating to the investigation and help to:

- organise the available evidence/information;
- determine what happened; and
- arrive at the conclusions.

By presenting ideas in a radial, graphical, non-linear manner, mind maps encourage a brainstorming approach to planning and organisational tasks.

This can encourage the itemising and connecting of ideas without the tendency to begin within preconceived ideas.

Although software is available, it is often better to draw mind maps by hand (see the [Diagramming technique](#) sub-section below).

Mind map guidelines

There is no “right” or “wrong” with mind maps; the aim is to represent your ideas.

- Start in the centre with the event.
- Select key words representing the possible immediate causes of the event and draw these around the event (each word is best alone and sitting on its own line).
- The key words should be connected, starting from the event.
- For each key word select the possible ‘causal’ or ‘contributory’ factors.
- Keep adding these factors until you have exhausted all possibilities.
- Some factors may be linked to more than one key word, so repeat them as often as necessary for each key word.

Once the investigation starts, you can cross off those causes and 'causal' or 'contributory' factors that are not supported by the evidence. Of course, the evidence may identify others that you had overlooked!

Causal diagrams/mapping

The 'Why? Because' technique (see the 'Identifying the causes' section in Part 4 of the handbook) offers a simple technique for determining the underlying causes of an event. However, in some cases it may be too simple, particularly for a larger or more complex event.

For example, in the case of a train derailment, the immediate cause might be that the wheel climbed over the rail. The underlying cause could be a number of factors, including track defect and vehicle defect. How should this be shown?

Multiple-cause mapping

The technique of multiple-cause mapping offers one way of showing complex links between causes. It is better than simple 'Why? Because' diagrams because it allows multiple links between causes to be shown and to also identify causal paths and loops.

In the case of the train derailment, like with the 'Why? Because' technique, begin by showing the immediate cause. Then ask "Why did this occur?" and record each "Because" separately in a diagram, like that in [Figure 1](#):

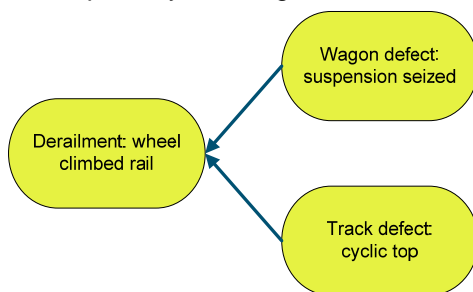


Figure 1 – Multiple-cause mapping (1)

Then, like with the 'Why? Because' technique, ask "Why did the wagon defect/track defect occur?" and add the answers to the diagram.

Figure 2 below is a simplified version of a diagram produced for a real event.

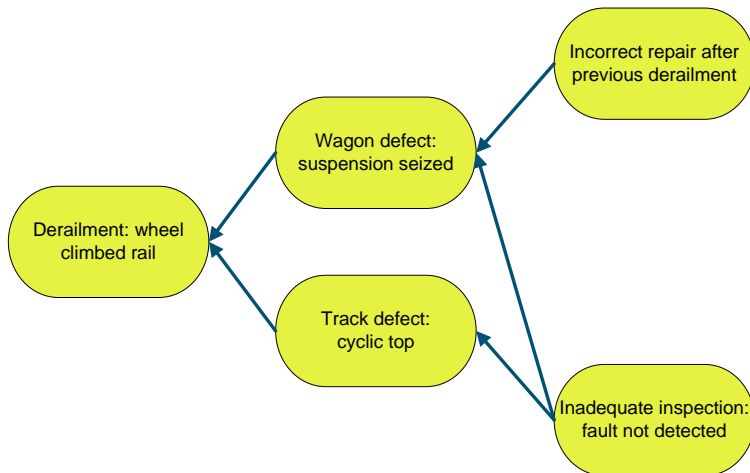


Figure 2 – Multiple-cause mapping (2)

It can be seen from Figure 2 that the underlying cause “Inadequate inspection” is linked to both the wagon and the track defect. In the case of the wagon defect, not only was there an incorrect repair, but the subsequent inspection failed to detect that the suspension was not working properly.

This example shows the strengths of multiple-cause mapping: not only can it be used to show that one event has multiple causes, but it can also show where one underlying cause has multiple effects throughout the causal chain.

Just like the ‘Why? Because’ technique, the process of asking “Why?” continues until it no longer gives meaningful answers.

Care needs to be taken to make sure that the “Because” is a direct cause of the “Why”, and that no intermediate cause has been overlooked – all causes should be shown in the diagram.

Points of intervention

Not only does multiple-cause mapping help to provide a better understanding of the causes and how they link together, it can also help to identify the best place to target recommendations and local actions.

Taking the example shown on the previous page, it can be seen that 'Inadequate inspection' was an underlying cause of both the track defect and the wagon defect. Thus, by improving the inspection procedures (albeit different ones in this particular case), more of the underlying causes can be targeted by just improving wagon repair procedures.

These underlying causes, which affect more than one path through the causal chain, can effectively become points of intervention, i.e. key points where a recommendation can be made to have the greatest effect.

Causal loops

The above has looked at linear causes, i.e. ones that progress from right to left across the diagram, towards the event. However, there may be times when the causation 'flows' in the opposite direction, and thereby the causal path becomes circular.

Figure 3 is also based on a real event:

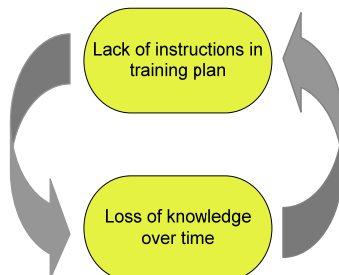


Figure 3 – Circular causal path

It would appear fairly obvious that a lack of training will lead to a loss of knowledge, but is the reverse also true? In this particular case, it was, because the person who compiled the training plan had not been taught certain key facts concerning how a piece of equipment operated. Thus a lack of knowledge leads, over time, to even greater lack of knowledge.

Circular paths such as this are known as causal loops. The one shown in [Figure 3](#) is a fairly simple example: a causal loop may extend through a chain of several separate causes.

When acting in a negative sense, as in this example, causal loops are often known as vicious circles. However, it is important to realise that causal loops can be powerful points of intervention. If the negative effect can be changed to a positive one, then the circular effect can be used to reinforce the benefit: the vicious circle becomes a virtuous circle.

Diagramming technique

Figures 1 to 3 have been created using a computer drawing package. However, you do not need to be an IT wizard to create good diagrams.

Indeed, it is often better not to use a computer package as the effort of using the technology can become a distraction, preventing the free flow of thought.

A pencil, eraser and large sheet of paper are often simpler and easier to use during the investigation; the drawing software package should be reserved for creating presentation versions of diagrams for reports.

It is also worth noting that such diagramming is often better done as a group, by the investigation team, where different ideas can be developed and discussed. Here use of pencil and paper make it easier for all to see what is happening, and to participate.

Finally, bear in mind that when used for analysis, any form of diagramming is an iterative process. As ideas develop and more facts come to light it is often necessary to redraw the diagram to show the new understanding. This is another reason why pen and paper is often better than a computer drawing package.

Examples of causal diagrams and guidance on the technique of multiple-cause mapping are available from the Senior Investigators.

Examples of causal diagrams for actual events – a derailment and a cable strike – are available from the Investigators' Handbook page on [Connect](#).

Appendix B – Investigator prompts

The following questions are based upon the 10 Incident Factors, and are designed to remind a lead investigator about the most common incident factors that are key areas for investigation. They also provide prompts as to the type of questions that could be asked.

The following does not provide an exhaustive list of the questions that may need to be asked.

Incident Factor	Questions to ask
Communications and Teamwork	<ul style="list-style-type: none">• Was the right information communicated to the right person at the right time?• Was the communication accurate, concise and in accordance with communications protocols?• Did the parties involved in the communication reach a clear understanding by repeating back messages?• Was there a breakdown in teamwork? If so:<ul style="list-style-type: none">○ Was there a failure to back up someone?○ Was there a cooperation breakdown?○ Did the parties not trust each other?• Was there a failure in the team's 'shared' understanding of what was going on?• Why did the communications or team work error occur – was it, for example, a training, attitude or workload issue?
Rules, procedures and methods of working	<ul style="list-style-type: none">• Was the rule, procedure, or method of work easy to follow?• Was the rule, procedure, or method of work impractical?• Was a step missed out or performed in the wrong order?• Did the rule, procedure, or method of work cater for the circumstances that had arisen?• Did the individual not understand or know the correct rule, procedure, or method of work?

Incident Factor	Questions to ask
Information	<ul style="list-style-type: none"> • Was information presented clearly and unambiguously? • Was the information overly complex? • Was the information relevant? • Was the information complete and accurate? • Was the information easy to read/follow? • Was the information structured?
Equipment	<ul style="list-style-type: none"> • Was the equipment compatible for its intended use? • Was the equipment reliable? • How much trust do users put in the equipment? • Was it designed such that users can: <ul style="list-style-type: none"> ○ See important displays? ○ Easily identify emergency buttons? ○ Work in a comfortable position? ○ Distinguish between different alarms and displays? • Did it provide the information needed at the right time? • Was it being used as intended? If not was this: <ul style="list-style-type: none"> ○ Deliberate? ○ Due to poor design? ○ Due to lack of training? • Was the correct equipment available? • Was the equipment laid out in a logical order? • Had users received training in use of the equipment? • Was the equipment faulty and if so was this because: <ul style="list-style-type: none"> ○ It was not maintained appropriately (i.e. inappropriate specification, inadequate resources to meet plan, incorrect scheduling of the plan)? ○ The fault was not correctly reported?

Incident Factor	Questions to ask
Knowledge, skills and experience	<ul style="list-style-type: none"> • Was the training adequate (e.g. was it comprehensive, up-to-date, relevant, delivered in a way that meant it transferred easily to the job)? • Was the frequency of refresher training appropriate and did it include the right content? • Was the individual/team familiar with the task being performed (i.e. when was it last performed, was it performed in a similar situation)? • Was assessment adequate (i.e. did it include assessment of both knowledge and application; did it occur frequently enough to identify whether an individual had retained their knowledge and skill)?
Supervision and Management	<ul style="list-style-type: none"> • Was the supervisor/manager setting a good example? • Have previous incidents or events involving errors been dealt with appropriately such that the unsafe behaviours were not condoned? • Was the supervisor/manager enforcing the appropriate safety standards? • Are there clear responsibilities for the supervisor/manager? • Was the supervisor/manager experiencing conflicting demands? • Was the supervisor/manager capable and motivated to manage?
Work Environment	<ul style="list-style-type: none"> • Was there excessive noise? • Were there extremes of temperature/weather? • Were lighting levels appropriate for the task? • Was there adequate space to perform activities?

Incident Factor	Questions to ask
Attention and Awareness	<ul style="list-style-type: none">• Was any individual involved pre-occupied or distracted? Consider the source of:<ul style="list-style-type: none">○ the preoccupation (i.e., health/domestic problems, work problems, morale)○ the distraction (i.e., other people, alarms, phones, conflicting work activities)• Was any individual involved not concentrating on their job? Consider:<ul style="list-style-type: none">○ Was the individual in autopilot?○ Was the individual anticipating what was going to happen and failed to notice new information?• Was there a known pattern of events/information that led to a strong expectation or mindset of what was going to happen?• Was any individual involved too focussed on an event/activity to the detriment of others?• Did the individual see what they “expected” to see?

Incident Factor	Questions to ask
Personal	<ul style="list-style-type: none"> • Were there any personal difficulties at home? • Were there any difficulties at work? • Were there any particular features of the roster prior to the incident which could have led to fatigue? Consider the: <ul style="list-style-type: none"> ○ number of consecutive shifts, particularly night shifts that have been worked ○ rest between shifts ○ number of early starts, what time an individual had to get up and what effect this had on the time available for sleep • Were there opportunities to take breaks at work? Consider the nature, frequency and duration of any breaks and opportunities for refreshment. • Were the individuals involved adequately rested for work? Consider roster pattern, lifestyle issues, travelling time. • Was any individual involved undertaking work that could have resulted in fatigue (i.e. physically or mentally demanding work or work that was not usually encountered)? • Was any individual involved influenced by drugs or alcohol? • Did any individual report any ill-health or conditions that they were taking medication for?

Incident Factor	Questions to ask
Workload	<ul style="list-style-type: none">• Was the workload unusually excessive?• Were there conflicting activities being carried out (i.e. requiring an individual to do two things at once or look at two sources of information at the same time)?• Was there pressure to get the work done in a particular time?• Were any of the activities associated with the work very similar such that they could be easily confused?• Was there degraded or non-routine working at the time of the incident?• Was any of the team under-loaded?

Evidence

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General

This section of the handbook identifies the main types and sources of evidence and provides guidance in its collection and management.

Evidence is generally divided into the following categories:

Category	Includes, for example
Inspections and details taken at the site/scene	<ul style="list-style-type: none">• Track surveys• Measurements• Weather conditions
Photographs, video, security and CCTV cameras	<ul style="list-style-type: none">• Photographs taken at the site• Station security cameras• On-train CCTV
Statements from those involved and/or witnesses	<ul style="list-style-type: none">• Reports and notes of interviews with those involved• Investigation team interviews with those involved
Records	<ul style="list-style-type: none">• Maintenance records and log books• Personal records, including service history, training and health details/records of staff involved• Failure/fault records• Previous investigation reports (see the Records of previous related events sub-section below)• Risk assessments
Communications records	<ul style="list-style-type: none">• Signal box train registers/occurrence sheets• Telephone and radio voice recordings (e.g. NICE)
Completed reports/planning paperwork	<ul style="list-style-type: none">• Possession planning and PICOP briefings/logs• Pre-planned protection records (e.g. COSS packs, RT9909, RT3181 forms, etc.)

Category	Includes, for example
Standards, instructions and regulations	<ul style="list-style-type: none"> • Railway Group and company standards, including Rule Book • Sectional Appendix instructions • Local operating procedures/methods of working • Legislation
Specialist/expert inspection and reports	<ul style="list-style-type: none"> • Signal sighting committee • Testing of removed items of signalling equipment • Independent derailment investigation
Data from data recording systems	<ul style="list-style-type: none"> • Data from on-train data recording (OTDR) equipment • Data from signalling and level crossing recording systems, e.g. solid state interlocking systems, equipment data loggers, automatic route setting (ARS) • TRUST related systems, e.g. TOPS and Control Centre of the Future (CCF) • Infrastructure recording systems (e.g. OMNICON)
Results of tests	<ul style="list-style-type: none"> • Tests of software, hardware equipments • Electric equipment tests • The results of alcohol and drug test results should also be made available
Previous similar events	<p>See the Records of previous related events sub-section below.</p> <p>Other sources include, for example:</p> <ul style="list-style-type: none"> • OTDR downloads • Related risk assessments
Audit/assurance activity	<p>See the Audit/assurance activity sub-section below.</p>

Table 2 – Types of evidence

Some evidence will be recorded on standard forms.

Appendices C to E provide guidance on the types of evidence that may need to be collected and who may have or provide the evidence.

Appendix C – Typical list of evidence	Provides a list of the typical evidence that may need to be collected for an investigation.
Appendix D – List of general evidence types	Provides a list of evidence types and where these might be obtained from.
Appendix E – List of evidence types for specific events	Provides a list of evidence types for specific events

Table 3 – Guidance of types of evidence to be collected

All evidence collected should be shared with the investigation team members and, where practicable, provide evidence packs in advance of the investigation.

Priorities for the collection of evidence will vary according to its type and nature. The following should be used as a guide.

Perishable evidence

Perishable evidence may be collected as part of any on-site investigation, in accordance with existing standards. Operations Control may initiate requests for data to be downloaded from on-train data recording (OTDR) and CCTV equipment.

Perishable evidence includes, for example:

- assessments of weather, atmospheric and rail head conditions;
- in-cab indications at the time of the event;
- retrieval of data logging/event recording/photographic evidence.

OTDR and on-train CCTV data is normally available up to 7 days after the event, but this may vary according to the type of recording equipment.

Interviewing those directly involved and other witnesses

Obtaining written reports from, and interviews of, the staff that were involved in or witnessed the event as soon as possible, when the circumstances of the event are fresh in the memory, will greatly assist the investigation.

The longer it takes to commence interviews the more likely it will be that a witness will forget or, as they repeatedly recall events, may have a 'false memory', of what actually occurred.

Site visit

A site visit may assist in understanding the evidence presented and putting it into context.

In some cases, it may be beneficial to undertake a site visit, e.g. to the location of the event or to the signal box controlling the area where it occurred, particularly for a lead investigator not familiar with the location.

It may also be beneficial for such 'site visit' to be undertaken from the driving cab of a train.

A site visit will give a better idea of the local environment and conditions and will often reveal issues that cannot be determined by sitting in an office. Getting out and talking to people on site may provide some useful information and/or insight.

A site visit will also enable photographic evidence to be obtained of local conditions.

Evidence from data systems

Where a document/data has been obtained from an electronic source, it should identify the source and when it was produced/printed.

Data protection

In the case of any evidence that contains personal data/information (such as the name, address or date of birth) of any individual involved must be kept secure in accordance with Network Rail's [Data Protection Policy](#).

Reconstruction

A reconstruction may have been undertaken shortly after the accident/incident occurred, in order to assist with understanding what may have happened. Such reconstruction will have been undertaken under controlled conditions.

Reconstructions should not be treated lightly; the need for such needs to be judged on its merits with the following borne in mind:

Controlling risks	Additional control measures and resources may be required to overcome the risks arising from recreating a dangerous, or potentially dangerous, situation.
Loss of evidence	Reconstruction may lead to some evidence being lost unless carefully managed.
Limit scope	Reconstruction should be limited to understanding what happened – don't use to test other possible scenarios as these this may create further hazards or unacceptable risks.
Record	Where appropriate, video the reconstruction – it will serve as an evidence-gathering tool.

Records of previous related events

An archive of previously published investigation reports is available on CCMS2 – contact the relevant Safety Reporting Specialist or Senior Investigator to find out what's available.

The general objectives of the investigation remit require consideration of previous accidents/incidents of a similar nature.

This includes, for example:

- investigation reports of previous similar events (at the same location or elsewhere, or involving the same traction unit/rail vehicle) or events with similar causes;
- any associated review of risk assessment;
- obtaining records that relate to previous safety events involving the same persons, location or rail vehicles, etc.;

- d) records of previous events, failures of or faults with the equipment involved;
- e) records of timetable changes, including a review of the risk assessment required by Railway Group standard GI/RT7006 *Prevention and Mitigation of Overruns – Risk Assessment*, where available;
- f) signal sighting committee reports related to the signal involved.

Details of previous events can be obtained from:

	Will be able to assist with:
Safety Reporting team at Milton Keynes	<ul style="list-style-type: none"> a) identifying details of previous events from SMIS; b) obtaining data/statistics on previous similar events; c) providing copies of investigation reports of previous similar events.
DCP and Senior Investigator	Providing reports of previous similar events.
Relevant Network Rail maintenance engineer	Details of failures/faults with infrastructure-related equipment (e.g. signalling, overhead line, track, level crossings, etc.).
Train operator	Details of failures/faults with train-borne equipment.
Owner/operator	Details of failures/faults with any rail vehicles and on-track plant involved.

Table 4 – Sources of information on previous events

Implementation of recommendations and local actions arising from previous similar events

In the case of previous similar events or events with similar causes (see above), the related reports should include details of recommendations and/or local actions made by the investigation team(s).

In such cases, it will also be necessary to identify:

- what happened to those recommendations and/or local actions (i.e. what action was actually taken and when were they implemented?), and
- if a recommendation was rejected, why was it rejected and which review body rejected it?

Audit/assurance activity

The general objectives of the investigation remit also require consideration of the findings/intelligence from relevant audit/assurance activity.

Figure 4 below provides an overview of the Safety Assurance Framework within Network Rail – the following table provides guidance on what each includes.

Similar evidence may need to be obtained, where appropriate, from train operators, contractors, etc. involved in the investigation.

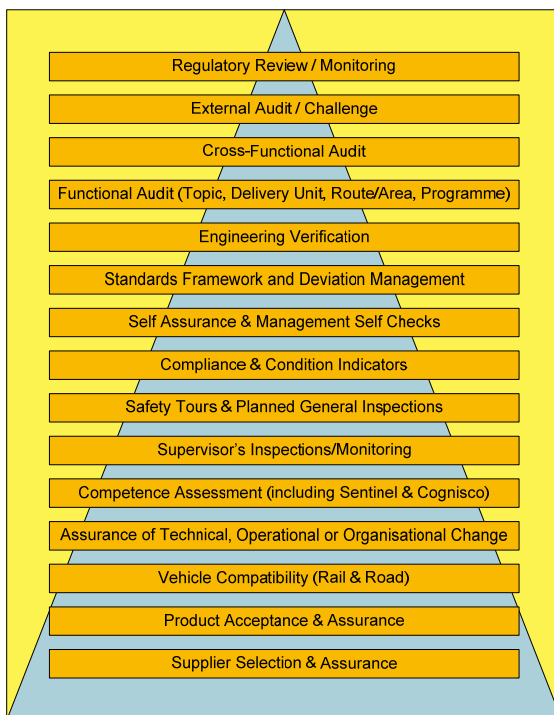


Figure 4 – Safety Assurance Framework

Table 5 below provides guidance on what may be included under each audit/assurance activity.

Audit/assurance activity	Includes, for example:
Regulatory Review/Monitoring	<ul style="list-style-type: none"> • ORR intervention reports; • actions arising from Network Rail/ORR Interface Liaison meetings; • enforcement notices and prosecutions.
External Audit/Challenge	<ul style="list-style-type: none"> • assurance activity undertaken by external non-regulatory sources (either internally or externally commissioned); • findings from Rail Accident Investigation Branch (RAIB) and non-Network Rail led Industry Investigation reports. <p>It can also include concerns raised through correspondence (e.g. Trade Unions or Train/Station Operators) or through confidential reporting channels such as CIRAS.</p>
Cross-Functional Audit	Internal audits with covering processes or assets managed by more than one function e.g. level crossings.
Functional Audits	<p>These are internal audits undertaken by functions and include:</p> <ul style="list-style-type: none"> • topic audits; • audits of Routes/Areas/Delivery Units; • programme/project audits; • process audits; • findings from Health & Safety Management System audits.
Engineering Verification	Internal assurance activity involving the visual and tactile examination of an asset to determine that its condition is fit for purpose and conforms to the requirements of Network Rail standards and specifications.

Audit/assurance activity	Includes, for example:
Standards Framework and Deviation Management	<p>Any temporary non-compliances or derogations either applied for or agreed in respect of control measures (i.e. standards, processes, etc.) relevant to the event being investigated.</p> <p>Requirements (including key risk controls) are captured within a suite of Railway Group standards (industry level) and Network Rail standards (company level). Where it is not possible to comply with the mandatory requirements of these standards, applications can be made for:</p> <ul style="list-style-type: none"> • temporary non-compliance, • non-compliance pending standards change; or • derogation. <p>Network Rail standards can be mandated on suppliers through contract requirements.</p>
Self-Assurance & Management Self-Checks	<p>Internal assurance activities where the person on whom a legislative/standard/process requirement is placed (or their line manager) is requested to confirm compliance (or otherwise) with that requirement. This includes:</p> <ul style="list-style-type: none"> • the annual Line Manager's Self-Assurance process; • function-specific self-assurance activities or management assurance 'checks'.

Audit/assurance activity	Includes, for example:
Compliance and Condition Indicators	<p>These are measures and indicators used to monitor safety performance. They include those measures directly relating to safety and also indirect measures such as employee engagement:</p> <ul style="list-style-type: none"> • safety performance indicators – reactive and proactive – and information related to particular activities; • alerts and bulletins issued in accordance with NR/L2/OPS/035 and GE/RT8250. <p>Such measures are in place at industry level, company level and supplier level.</p>
Safety tours and Planned General Inspections (PGIs)	<p>Internal visual inspections undertaken by directors and senior management within the company to identify both safety shortcomings and good practice.</p> <p>PGIs follow a more structured format than safety tours which are intended to offer greater flexibility in approach.</p> <p>Includes, therefore:</p> <ul style="list-style-type: none"> • the findings – and the action taken - from safety tours; • reports and data relating to planned health, safety and environmental general inspections to check that formal controls are being implemented and unsafe acts or conditions are identified.
Supervisor's Inspections/Monitoring	<p>These assurance activities are the day-to-day management and monitoring activities undertaken by Line Managers (and Supervisors) to confirm controls are being applied and are effective.</p>

Audit/assurance activity	Includes, for example:
Competence Assessment	<p>Persons employed in specific roles, or undertake specific duties, have specific competence requirements.</p> <p>The 'assurance activities' relate to confirming that individuals possess the required competencies to undertake the role, both initially and on an ongoing basis.</p> <p>Information should be available from Assessment in the Line (AiTL), Sentinel and Cognisco.</p>
Assurance of Technical, Operational or Organisational Change	<p>Assurance activities related to:</p> <ul style="list-style-type: none"> • technical changes such as the introduction of new or modified infrastructure in complying with the requirements, as appropriate, of legislation such as: <ul style="list-style-type: none"> » the Interoperability Regulations, Technical Standards for Interoperability (TSIs), » the Railway and Other Guided Transport (ROGS) Regulations (i.e. safety verification); » the Construction, Design and Manufacture (CDM) Regulations. • compliance with relevant industry and company level standards; • operational changes such as timetable changes and changes to authorised line speeds; • safety validation of organisational change. • feedback received as part of a Competent Independent Person process during the review of projects (e.g. signalling schemes) for new/modified infrastructure.

Audit/assurance activity	Includes, for example:
Vehicle Compatibility	Assurance activities to confirm technical compatibility of rail vehicles (new or modified) with the infrastructure and the proposed operational requirements. Also includes the acceptance of road vehicles.
Product Acceptance & Assurance	Assurance activities to confirm the suitability of products for initial and ongoing use, e.g.: <ul style="list-style-type: none"> • results of the checks undertaken as part of any product acceptance process for equipment involved; • vehicle acceptance, including route acceptance, certification.
Supplier Selection and Assurance	Assurance activities applied to confirm suitability of suppliers' activities and their staff prior to, and following, contract award, e.g.: <ul style="list-style-type: none"> • arrangements for licensing: <ol style="list-style-type: none"> a) Principal Contractors; and b) Rail Plant Operating Companies in possessions. • findings from supplier audits; • findings from Network Rail's and/or train operator audits of suppliers.

Table 5 – Audit/assurance activity guidance

The audit/assurance activity evidence used should be relevant to the event being investigated and the organisations involved.

Retention of evidence

All evidence obtained by and used as part of the investigation needs to be retained with the investigation file.

See the 'Once the investigation is completed' section in Part 2B of the handbook for details of what needs to be included in the investigation file.

Appendix C – Typical list of evidence

The following is a typical list of the evidence and information that might need to be collated as part of an investigation:

- a) Statements or reports of employees involved in the event and other witnesses;
- b) Records or notes of post-event interviews of employees involved in the event;
- c) Training records of employees involved in the event;
- d) The results of alcohol and drugs tests of employees involved in the event;
- e) Maintenance histories and technical tests of equipment involved in the event;
- f) Total Operations Process System (TOPS) train lists for the train(s) immediately involved (or the equivalent for passenger trains);
- g) Train running system on TOPS (TRUST) reports for the train(s) involved;
- h) TOPS train consists for the last train(s) in each direction before the event;
- i) TRUST and/or CCF reports for the last train(s) in each direction before the event;
- j) On-train data recorder (OTDR) data downloads;
- k) Train borne CCTV or visual recording media (interior and exterior), where available;
- l) Technical investigation reports required by other standards (e.g. wrong side failure testing of signalling equipment);
- m) Photographs of the accident or incident site and equipment involved;
- n) Reports from investigations undertaken at the site of the event;
- o) Signal box registers and/or occurrence sheets;
- p) Solid state interlocking (SSI), integrated electronic control centre (IECC) event recorder data or other signalling/level crossing data logging systems for a minimum of two hours prior to the event;
- q) Telephone and radio recordings, where available, for the signal box and the relevant operations control room for the two hours immediately prior to the event;

Appendix D – List of general evidence types

Evidence/report type	Supplied by	Notes
Network Rail		
NOC log item(s)	Portal	
Area/Route Control log item(s)	Route Control/CCIL	
Rail Incident officer's (RIO) report and logbook	RIO	Report required from each RIO involved. Copy of any notes made on site also required (each RIO should have a log book).
Reports of any other Network Rail staff called to attend	Individual concerned	Includes staff called to manage off-site.
Signaller's report	Local Operations Manager	
Shift Signalling Manager's report	Local Operations Manager	
SSI/signalling data logger printout	Signal Maintenance Engineer/Signal box technician	
Automatic train recorder printout	Local Operations Manager	
Copy of train register books	Local Operations Manager	
CCF/Asset view printout	Area Operations team	
Download from voice recorder	Local Operations Manager	Both signalling and control voice recorders may need to be downloaded.
Download of radio system management processor log	Telecomms Field Technician: raise fault via Fault Control	MP log must be downloaded within 6 days of incident.
TRUST printout for train(s)	Route Control	
Photographs of accident/incident	RIO/on-call staff	
Results of 'for cause' testing	Relevant Line Manager	

Evidence/report type	Supplied by	Notes
Fatigue & Risk Index		
Signal box instructions	Area Operations team	
Sectional Appendix – Table A and General and Local Instructions	If not available locally, via Portal (i.e. NESA)	Check updates in relevant PON/WON

Train operator (including OTM/OTP operators)

Train operator's Control log item(s)	Train operator	
Driver's report	Train operator	
On-call driver manager's report	Train operator	
Any other relevant on-train staff reports	Train operator	Conductor , ticket examiner, catering staff, etc.
Notes of any interview(s) undertaken with driver or other relevant on-train staff	Train operator	
Results of 'for cause' testing	Train Operator	
Fatigue & Risk Index		
Copy of train formation/consist	Train operator	For freight trains, copy of TOPS consist required in all cases.
Copy of any movement paperwork accompany train	Train operator	Driver's slip, exceptional loads documentation (RT2973), etc.
On-call fleet engineer/recovery engineer's report	Train operator or Recovery operator	
Reports of any other TOC/vehicle operator's staff called to attend	Train/vehicle operator	Includes staff called to manage off-site.
Photographs of accident/incident	Train operator's on-call staff	
OTDR download	Train operator	Both tabular and graphic outputs required

Evidence/report type	Supplied by	Notes
Vehicle maintenance history	Train operator	Required for all vehicles implicated in derailment. Needs to include details of wheel profile and re-wheeling/tyre turning etc.

Appendix E – List of evidence types for specific events

Report	Supplied by	Notes
<u>Derailments</u>		
On-call track engineer's report	On-call track engineer	Including derailment site workbook (NR/L3/TRK/3405)
Summary history of derailment site	Track Maintenance Engineer	Should include details of track construction, configuration, scheduled periodic maintenance, recurring problems, etc.
Copy of last engineer's inspection of the line	Track Maintenance Engineer	
Copy of recent track section manager's inspections of the line	Track Section Manager	
Reports from staff who carried out recent patrols	Track Section Manager	Including copies of notebooks/forms used to record defects observed on patrol.
Copy of local patrolling policy	Track Section Manager	Including patrol routes and diagrams
Copy of Ellipse current work bank, work bank history, and list of maintenance scheduled tasks, including inspection date history,	Track Maintenance Engineer	To include the following inspections: RT/CE/S/053 and RT/CE/S/054, side wear, rail defect monitoring and non-recorded track.
<u>Category A SPADs</u>		
RT3189 form	Local Operations Manager	
Immediate Category A SPAD report form	Route Control	
Digital photographs of signals		It is acknowledged that photos taken on film may take longer
RT3119A	Local Operations Manager	

Report	Supplied by	Notes
RT3119B	Train operator	
Results of S&T maintenance technician's post incident testing of signal(s)	Signal Maintenance Engineer	
Initial signal visibility exam	Local Operations Manager	See Appendix A to Operations Manual procedure 5-12
Signal Sighting Committee report	Signal Sighting Engineer	Level 1 or 2 report required
SPAD risk ranking	Operations Risk Control Co-ordinator	
SPAD Alert		
Signal Risk Assessment/SAT assessment		For those signals where an assessment has been carried out
Railhead examination reports/swab tests	Local Operations Manager	Incidents where low adhesion is involved or alleged. Route Control to specify when tests are required. Results of swab tests come from Scientifics Ltd, Derby.
72 hour review meeting	Train operator	Not all train operators hold such reviews.
<u>Irregular Working</u>		
Irregular Working Risk Ranking	DCP	

