22-017 Reducing the use of detonators

Version:	2.10		
Purpose:	Approval to proceed to consultation		
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Sponsor:	Tom Lee, Director of Standards		
Lead industry committee:	Traffic Operation and Management Standards Committee (TOM SC)	**Date:**	25 March 2025
Supporting industry committee:	Control, Command and Signalling Standards Committee (CCS SC)	**Date:**	10 April 2025

Decision

Traffic Operation and Management Standards Committee (TOM SC) is asked to:

- **APPROVE** the proposed revisions to modules GERT8000-AC, GERT8000-DC, GERT8000-P1, GERT8000-P2, GERT8000-TS2, GERT8000-TS3, GERT8000-HB5, RS521, and forms RT3191, RT3192 and RT3193 are consulted on
- **SUPPORT** the proposed revision to standard RIS-0733-CCS is consulted on.

  In approving/supporting the standard for consultation, the SC has:

  DECIDED that the proposed revisions deliver the intentions of the proposal for change.

  DECIDED that the proposed revisions are in a suitable state for consultation.
- **IDENTIFY** any specific organisations or individuals to be included in the consultation.

The supporting Standards Committees are asked to:

- **SUPPORT** that the proposed revisions to modules GERT8000-AC, GERT8000-DC, GERT8000-P1, GERT8000-P2, GERT8000-TS2, GERT8000-TS3, GERT8000-HB5, RS521, and forms RT3191, RT3192 and RT3193 are consulted on.
- **APPROVE** that the proposed revision to standard RIS-0733-CCS is consulted on.

  In supporting/approving the standard for consultation, the SC has:

  SUPPORTED that the proposed revisions deliver the intentions of the proposal for change.

  SUPPORTED that the proposed revisions are in a suitable state for consultation.

22-017 Reducing the use of detonators

This business case for change has been developed to support standards committees in taking decisions related to changes to standards, it includes an assessment of the predicted impacts arising from the change.

Proposed revised documents.

Number	Title	Issue
GERT8000-P1	Single Line Working	9
GERT8000-P2	Working single or bi-directional lines by pilot	8
GERT8000-TS2	Track circuit block regulations	7
GERT8000-TS3	Absolute block regulations	8
GERT8000-HB5	Handsignalling duties	3
GERT8000-AC	AC electrified lines	9
GERT8000-DC	DC electrified lines	7
RS521	Signals, Handsignals, Indicators and Signs Handbook	9
RIS-0733-CCS	Lineside Operational Signs	1.4
Form RT3191	Pilot's single line working form	Dec 2025
Form RT3192	Signaller's single line working form	Dec 2025
Form RT3193	Driver's single line working ticket	Dec 2025
Sign AK215	End of degraded working	2

Proposed superseded documents.

Number	Title	Issue
GERT8000-P1	Single Line Working	8
GERT8000-P2	Working single or bi-directional lines by pilot	7
GERT8000-TS2	Track circuit block regulations	6
GERT8000-TS3	Absolute block regulations	7.1
GERT8000-HB5	Handsignalling duties	2.1
GERT8000-AC	AC electrified lines	8
GERT8000-DC	DC electrified lines	6
RS521	Signals, Handsignals, Indicators and Signs Handbook	8
RIS-0733-CCS	Lineside Operational Signs	1.3
Form RT3191	Pilot's single line working form	Dec 2022
Form RT3192	Signaller's single line working form	Dec 2022
Form RT3193	Driver's single line working ticket	Mar 2024
Sign AK215	End of Emergency special Working	1

Summary

Background and change

Over 180 years ago detonators were introduced as a warning method and, despite huge advancements in technology, their use on the GB mainline has not evolved significantly. RSSB research project T1155 (2020) *Reviewing the risks and benefits of detonator usage* examined whether the risks of detonator handling, storage and use are now disproportionate to their benefits. T1155 also made international comparisons and found that all the international railways examined (Germany, Italy, Spain, and the USA) had abolished the use of detonators from their rule books. Project T1155 looked at the different scenarios in which the GERT8000 Rule Book currently requires the use of detonators. T1155 provided recommendations to conduct further work to investigate the feasibility of replacing detonators across the GB railway industry.

Work is currently underway within Network Rail to investigate alternatives to detonators for secondary protection of possessions and line blockages. RSSB standards project 19-005 investigated replacing detonators by alternative arrangements for assistance protection. This led to updated procedures in the Rule Book, which came into force in December 2023, that do not require the use of detonators for assistance protection. Further work to investigate whether suitable alternatives to detonators for emergency protection can be found is also underway.

The use of detonators in temporary block working (TBW) is being addressed in project 23-012 *Introducing Special Working to the Rule Book.*

Leaving aside the use cases above, this project has considered if there were suitable alternatives to the use of detonators in the three remaining use scenarios in the Rule Book. These cases are as follows.

1. Single line working (SLW)
2. Movements to and from a point of obstruction
3. Movements towards an isolated section.

Together with the existing work referred to above, this project has contributed to the elimination of detonators on the GB main line railway.

Impact areas	Scale of impact	Estimated value.
A. Legal compliance and assurance	Low	No quantified benefits
B. Health, safety and security	Medium	No quantifiable benefits
C. Reliability and operational performance	N/A	-
D. Design and maintenance	N/A	-
E. People, process and systems	Low	No quantified benefits
F. Environment and sustainability	Medium	No quantifiable benefits
G. Customer experience and industry reputation	N/A	-
Total value of industry opportunity over 5 years =		**No quantifiable benefits**

The standards change contribution to the total value of industry opportunity				
☐ None or low	☑ Minor but useful	☐ Moderate	☐ Important / essential	☐ Urgent / critical

Detail

1. What were the objectives associated with this change?

Objective 1 – To consider alternatives to the use of detonators for SLW.

1.1 Most SLW implementations require a handsignaller to be positioned by the track and apply detonator protection when the route beyond their position is unavailable. This can place them in a high-risk situation due to passing trains while applying the protection. However, some trains will only pass when the pilot has instructed the driver to obey the hand signal, and at reduced speeds, which can help mitigate this risk.

1.2 Research project T1155 recommended investigating the use of aspects from emergency special working (ESW) in SLW such as the use of a retro-reflective 'EW' board to mark the position of end of section instead of using a handsignaller and a detonator.

Objective 2 – To consider alternatives to the use of detonators for train movements to and from a point of obstruction.

1.3 Research project T1155 noted that working to and from a point of obstruction bears a minimal risk fatalities and weighted injuries (FWI) score of 1 in every 45 years and a pilot in charge of the section is always supporting the driver in this situation.

1.4 T1155 reported that the use of detonators in this case contributed a 50% risk mitigation of train overrun. However, removing detonators from this scenario still left the visual indication of the end-of-authority (the possession limit board (PLB) if possession protection is provided) as well as the pilot to inform the driver of the locations of the end of authority. This is consistent with other scenarios where there are two independent means of enforcing the limit of the movement.

1.5 It is likely that the assumed 50% reduction in train overrun risk used in T1155 to assess the benefits of detonators in this scenario is an overestimate, as it seemed unlikely that 1 in 2 trains will overrun the limits even with a pilot on board. Additionally, the detonators only alert drivers to the fact they have overrun and do not actually stop a train without driver intervention. This project considered whether existing safeguards, excluding detonators, can reduce the risk in this scenario to a tolerable level. The safeguards included, but were not necessarily limited to, the presence of a pilot on every train and the provision of a PLB if this method of protection was used.

Objective 3 – To consider alternatives to the use of detonators for train movements towards an isolated section.

1.6 Research project T1155 noted in this case as above in objective two that the risk score is very low.

1.7 T1155 assumed that detonators have a high effectiveness of bringing a train to a stand, considered to be 50% when included with PLBs. However, in this case a pilot would not be present to advise movements and confirm the limits and so cannot be used as a mitigation as seen in Objective 2.

1.8 T1155's modelling assumed movements towards an isolated section occurred 35,000 times per year, based on the number of isolations taken by Network Rail. This was likely to be an overestimate on the side of safety since for most isolations there is no need to make a train movement towards a limiting point as movements are not necessary beyond a protecting

signal. A single alternative with detonators omitted but retaining the PLBs was also modelled. This increased the FWI from 0.00019 to 0.055.

1.9 As noted for objective 2 above, it is likely that the T1155 report overstates the benefits of detonators both in terms of their effectiveness as a mitigation against trains overrunning, and the number of train movements a year that approach detonators in this scenario to fall on the side of safety with the data available at the time. This therefore means the assumed increase in FWI that the report estimates should detonators not be used is lower than stated.

1.10 This project considered whether existing safeguards excluding detonators may reduce risk in this scenario to a tolerable level. These safeguards would include, but not necessarily be limited to, the provision of a PLB and making sure communications between the signaller and driver were sufficient to make the driver aware of how far a move could take place.

2. How has the content in the standard changed to achieve the objectives?

Objective 1 – To consider alternatives to the use of detonators for SLW.

2.1 A working group was set up with representatives from ASLEF, RMT and Network Rail Project Operations Interface Specialists. This discussed the use cases for detonators, and operational risks and procedures associated with their removal. It also considered how the role of the handsignaller could be repurposed to aid the signaller in observing trains travelling in the wrong direction and acting if a train exceeds the limits of its intended authority.

2.2 After consulting with the working group, technical specialists, human factors specialists and risk experts, the final proposed changes were as follows.

a) Amendment to the relevant GERT8000-P1 *Single line working* sections removing the use of detonators from the end of the single line working section, and in cases where a handsignaller was previously used, installation of a reflective “end of emergency special working” sign, and use of a signaller’s agent to observe movements beyond the sign.

b) Amendment to GERT8000-TS2 *Track circuit block regulations* sections 9.2, 9.3 and 9.4 to replace the use cases for a handsignaller with use of the “end of emergency special working” sign. Section 9.2 and 9.3 were redrafted to enable a better flow of information.

c) Amendment to GERT8000-TS3 *Absolute block regulations* sections 9.2. and 9.3 to replace the use cases for a handsignaller with use of the “end of emergency special working” sign.

d) Amendment to GERT8000-HB5 *Handsignalling Duties*, Section 6. This amendment introduces the role of the handsignaller as a “signaller’s agent” to observe movements back to the correct line. It removes the requirement for the handsignaller to be positioned opposite the protecting signal. The section now sets out the responsibilities of the signaller’s agent, including the need for a clear line of sight to the “end of emergency special working” sign and the ability to contact the signaller if a train is proceeding without authority. The introduction of the signaller’s agent is not required as a new competency but an extension of the role that can be covered by a handsignaller.

e) Amendment to GERT8000-HB5 *Handsignalling Duties*, Section 6 to change the use of a handsignaller to reflect that they are still required to act in the role if the SLW section is divided into multiple sections.

f) Amendment to RS521 *Signals, Handsignals, Indicators and Signs Handbook* to change the name of the End of emergency special working sign to End of degraded working sign to reflect its uses in more than one method of working.

g) Amendment to RIS-0733-CCS *Lineside Operational Signs* to change the reference to the Emergency special working sign to End of degraded working sign allowing the sign to be used in wider range of methods of working.

h) Amendment to Sign AK215 *End of Emergency special Working* to change the name of the sign to a more generic title to enable the sign to be used in a wider range of methods of working.

Objective 2 – To consider alternatives to the use of detonators for train movements to and from a point of obstruction.

2.3 The working group mentioned in objective one discussed the use cases, the operational risks and procedures associated with removal of detonators from working to a point of obstruction.

2.4 The working group determined that modules GERT8000-P1 *Single line working* and GERT8000-P2 *Working single or bi-directional lines by pilot* do not directly reference the use of detonators as part of the method of working, but direct readers to modules GERT8000-M1 *Dealing with a train accident or train evacuation* and GERT8000-T3 *Possession of a running line for engineering work* for protecting the obstruction. Alternatives to detonators would, therefore, follow from existing workstreams directly dealing with emergency protection and possessions.

2.5 The technical specialist found omissions in the RT3191 and RT3192 forms which meant a pilot or signaller cannot correctly complete the form for this method of working if using GERT8000-P1 *Single line working*. It was agreed to amend the forms to correct the omissions whilst the forms were being edited as part of objective one.

2.6 The technical specialist also took the opportunity to revise the wording in GERT8000-P1 *Single line working* and GERT8000-P2 *Working single and bi-directional lines by pilot* to streamline both sets of wording into a common script, and to add specific references to the forms required depending on which version of this method of working is in use.

Objective 3 – To consider alternatives to the use of detonators for train movements towards an isolated section.

2.7 The working group mentioned in objective one discussed the use cases, the operational risks and procedures associated with removal of detonators from working towards an isolated section.

2.8 The technical specialist also engaged with drivers on the current method of working to gauge whether it was deemed acceptable to remove the detonators from this use case but keep a sign such as a PLB to mark out the limiting point for the movement.

2.9 After consulting with drivers from Southeastern, Trans-Pennine Express and Freightliner, the working group, technical specialists, human factors specialists and risk experts, the final proposed changes were as follows.

a) Amendment to module GERT8000-AC *AC Electrified Lines* section 11.1 to remove the reference to use of detonators as protection but keep the use of a PLB as a marker point. Wording regarding coming to a clear understanding between the signaller and the driver on the limit of the movement were also added.

b) Amendment to module GERT8000-DC *DC Electrified lines* section 12.1 to remove the reference to use of detonators as protection but keep the use of a PLB as a marker point. Wording regarding a coming to clear understanding between the signaller and the driver on the limit of the movement were also added.

3. How urgently did the change need to happen to achieve the objectives?

3.1 The request for help required this work to be delivered in line with standard timescales of Rule Book updates, and to publish these changes in September 2025.

3.2 The project schedule is currently on track to include the proposed changes in the September 2025 standards catalogue update pending approval and support by standards committees to proceed to consultation, and subsequently publication at the appropriate meetings.

4. What are the positive and negative impacts of implementing the change?

Justification of impact, scale and quantification for the seven impact areas

A. Legal compliance and assurance

4.1 By minimising the number of interactions that on-track staff need to perform laying detonator protection, transport operators will be meeting their legal obligations to control risks as part of their safety management systems under the Railways and Other Guided Transport Systems (Safety) Regulations 2006 (as amended); and protect the safety and welfare of employees under the Health and Safety at Work etc. Act 1974, section 2 (1).

4.2 This also delivers the core aim of Fundamental Operating Principle 8 (RSSB-GBMR-OC *Operational Concept for the GB Mainline Railway*) - Keeping people away from moving trains.

4.3 It has not been possible to quantity this benefit at this stage of the project.

B. Health, safety and security

4.4 The Safety Risk Model indicates that the risk of workforce injury from being struck by a train on a running line is 0.485 FWI per year. If changes to the Rule Book result in a 2% reduction in this risk, it equates to a decrease of 0.0097 FWI per year. With the Value of Preventing a Fatality set at £32,467,000, this reduction translates to a benefit of £314,930 (£1,574,650 over five years). However, only a small portion of this benefit will be realised during the three operational cases studied here. While the rule changes are expected to decrease the number of workforce interactions with the track, the impact is likely too minor to quantify accurately.

C. Reliability and operation performance

4.5 This area is not directly applicable to the changes.

D. Design and maintenance

4.6 This area is not directly applicable to the changes.

E. People, process and systems

4.7 Removal of detonators reduces the risk of a handsignaller having to work on the line to place protection.

4.8 At this stage of the project, these benefits are not quantifiable.

F. Environment and sustainability

4.9 Reducing the use cases for detonators will reduce the number of detonators in storage and the overall need for them. The rationale supporting the retention of detonators in a limited number of scenarios enables the industry to better understand the need and consider how the intent could be satisfied through an alternative solution.

4.10 Detonators have a five-year shelf life, after which they must be disposed of through contractual arrangements. According to T1155, the cost reduction for train operating companies (TOCs) and freight operating companies (FOCs) from removing or replacing detonators over the next five years is approximately £500,000[1]. Additionally, reducing or eliminating the need to dispose of an estimated seven tonnes of detonator waste will provide an indirect environmental benefit by lowering carbon emissions. However, this figure pertains to the removal of detonators from use cases on board trains. Project 22-017 focuses on the infrastructure manager's responsibilities, and while the costs of purchase, replacement, and disposal remain unchanged, T1155 did not provide a specific figure for this benefit. Nonetheless, this project is expected to bring industry-wide benefits in conjunction with other ongoing work streams.

4.11 This project, together with the other work streams set out in the 'Background and change' section above, will assist in reducing the GB rail industry's use of detonators.

G. Customer experience and industry reputation

4.12 This area is not directly applicable to the changes.

5. What is the contribution of this standards change in realising the value to industry opportunity?

5.1 The benefit from introduction of the changes is estimated to be £2,074,650 over five years, but this can only be realised as part of the greater effort within the industry to facilitate the complete removal of detonators from the railway by inclusion of the other work streams ongoing, and as a result cannot quote this is a total benefit for project 22-017 alone.

6. What was the effort required by RSSB to make the change?

6.1 The project engaged with representatives from across the industry to make sure that there was agreement on the way forward, and that the suggested changes were able to be implemented by current operational staff.

6.2 The project team, engaging with a working group, drafted revisions to the relevant Rule Book modules and handbooks to include the revised method of working for single line working, and working towards an isolated section.

[1] T1155: "For all TOC/FOCs to replace detonators in the next five years this is assumed to bring cost savings of approximately £500,000 over 5 years including 3.5% discount factor (£10 detonator cost * 20 detonators per train in service * 3,500 trains in service). It is believed that NR detonator use is higher than TOC/FOC use, to protect workforce safety during planned and unplanned engineering works." Note that cost saving is calculated based on gradual detonator replacement over the five-year period.

6.3 The project team also engaged with Network Rail regarding their removal of detonators from possession protection as part of objective two. This workstream lead to no revision to the relevant Rule Book modules with specific regard to detonators, however the technical specialist took the opportunity to reword the sections contained within GERT8000-P1 and GERT8000-P2 into a common script with minor differences regarding the specific forms required for each version of this method of working.

6.4 The project team required a small effort from a member of the Control, Command and Signalling team to update the references in RIS-0733-CCS *Lineside operational signs* and the title of sign AK215 *End of emergency special working*.

7. Did RSSB deliver against industry's expected timescales?

7.1 RSSB allocated the necessary resources to develop this work and is currently on track to publish the updates in September 2025 subject to approvals.

8. How will the industry implement the change?

8.1 The content of the proposed Rule Book changes will enable railway undertakings and infrastructure managers to formalise and implement the briefing of relevant staff that would be primary users of the new procedures regarding the reduction or removal of the use of detonators in the cases listed above.

8.2 A session within the quarterly Standards Webinar will raise awareness of the changes and give industry staff the opportunity to ask questions.

8.3 Additional briefing materials, such as power point slides or animations with commentary will be considered as part of the changes to enable the industry to understand them in simple terms.

8.4 The changes to the rules will also be included in the Rule Book Briefing Leaflet published alongside the new issues of the relevant modules.

9. How will RSSB assess whether the change is achieving the objectives?

9.1 RSSB will review the fitness for purpose of the resulting changes one year after publication. During the review, we will seek specific feedback from transport operators and anyone else that has adopted and implemented the changes.

Appendix A

Table A.1: GERT8000-AC issue 8 to GERT8000- AC issue 9. This table includes only those changes arising from this project, as other projects affect it.

From GERT8000-AC issue 8	To GERT8000-AC issue 9	Way forward	Comments	Objective
11.1 – Towards an isolated section	11.1 – Towards an isolated section	Revised – material change	Removal of the use of detonators from this method of working but retention of the possession limit board. Additional instruction of making sure the driver understands fully what is to take place, and that this movement cannot be propelled. Wording improved for clarity.	3

Table A.2: GERT8000-DC issue 6 to GERT8000-DC issue 7. This table includes only those changes arising from this project, as other projects affect it.

From GERT8000-DC issue 6	To GERT8000-DC issue 7	Way forward	Comments	Objective
12.1 - Moving an electric train towards an isolated section	12.1 - Moving an electric train towards an isolated section	Revised – material change	Removal of the use of detonators from this method of working but retention of the possession limit board. Additional instruction of making sure the driver understands fully what is to take place and wording improved for clarity.	3

Table A.3: GERT8000-P1 issue 8 to GERT8000-P1 issue 9

From GERT8000-P1 issue 8	To GERT8000-P1 issue 9	Way forward	Comments	Objective
3.5.1 – Signaller controlling wrong-direction movements	3.5.1 – Signaller controlling wrong-direction movements	Revised	Addition of the use of a signaller's agent, and handsignallers now referred to as intermediate handsignallers if the single line working section is to be split, or section runs over level crossings.	1
3.5.2 – Arranging handsignallers	3.5.2 - When an end of emergency special working sign and signaller's agent, or intermediate handsignaller is required	Revised	Title changed to reflect the use of the end of emergency special working sign and provision of a signaller's agent and clarifying where handsignallers now need to be positioned if required. Wording improved for clarity.	1
3.5.3 – When a handsignaller is not required	3.5.3 – When an end of emergency special working sign and signaller's agent or intermediate handsignaller is not required	Revised	Title changed to reflect the use of the end of the degraded working sign and provision of a signaller's agent and to add 'intermediate' title to a handsignaller. Cases of handsignaller removed from table where now not required, and wording improved for clarity. Removal of level crossings in table as this was leading to confusion of locations of hand signallers. Level crossings are required to use crossing attendants and not intermediate hand signallers. Diagram P1.1 and P1.2 revised removing the detonators from the image.	1
3.5.4 - During poor visibility	3.5.4 - During poor visibility	Revised	Removal of the reference to the handsignaller, replaced by end of emergency special working sign and signaller's agent. Addition of the pilot travelling on every train through the single line working section as a secondary control of missing the end of emergency special working board.	1

From GERT8000-P1 issue 8	To GERT8000-P1 issue 9	Way forward	Comments	Objective
4.2 – Pilot allowing single line working to start	4.2 – Pilot allowing single line working to start	Revised	Addition of the use of the end of emergency special working sign, and wording regarding the use of the handsignaller clarified to their use in the intermediate section if required.	1
6.2a) – Signalling arrangements	6.2a) – Signalling arrangements	Revised	Addition of the reference to the end of emergency special working sign where trains will return to the proper line.	1
9.4.1 – Controlling movements	9.4.1 – Controlling movements	Revised	Wording improved for clarity including the use of signaller's authority to move as part of controlling movements, as well as use of handsignals. Wording regarding provision of an end of emergency special working sign also added.	1
9.4.3 - Signals on the obstructed line	9.4.3 - Signals on the obstructed line	Revised	Additional wording regarding if the end of emergency special working sign is not in place.	1
9.4.5 – Returning to the proper line	9.4.5 – Returning to the proper line	Revised	Wording improved for clarity with sub-headings now provided. Removal of the use of the handsignaller and replaced using an end of emergency special working sign.	1
10.1 – Method	10.1 – Method	Revised	Wording improved for clarity, including additional text in line with reformatting this method of working in module GERT8000-P2, and addition of specific use of RT3191 form which has also been amended to correct omission of this method of working.	2
10.2 – Protection arrangements	10.2 – Protection arrangements	Redrafted	No material change, wording amended to improve clarity.	2
10.3 – Travelling with the driver	10.3 – Travelling with the driver	Revised	Wording reordered and specific reference to RT3193 form added for clarity.	2

From GERT8000-P1 issue 8	To GERT8000-P1 issue 9	Way forward	Comments	Objective
11.2 – Wrong-direction movements	11.2 – Wrong-direction Movements	Revised	Diagram P1.3 revised removing the use of the detonators in the drawing and adding end of emergency special working sign and signaller's agent.	1
11.4 – Where conflicting movements cannot be avoided	11.4 – Where conflicting movements cannot be avoided	Revised	Removal of the references to handsignallers and replaced with end of emergency special working sign and use of signaller's agent. Additional instruction added to section c) requiring the signaller to tell the agent that a train may proceed past the sign before authorising a driver to do so.	1
14.2a) – Protection and signalling	14.2a) – Protection and signalling	Revised	Addition of the removal of end of emergency special working sign, and addition of "intermediate" to handsignallers	1

Table A.4: GERT8000-P2 issue 7 to GERT8000-P2 issue 8. This table includes only those changes arising from this project, as other projects affect it.

From GERT8000-P2 issue 7	To GERT8000-P2 issue 8	Way forward	Comments	Objective
4 – Working by pilot to and from the point of obstruction	4.1 – Method	Revised – material change	Revision of wording and wording from section 4 then split into 3 separate sub-sections to mirror changes to same method of working in GERT8000-P1 module. Addition of reference to RT3154 to clarify which paperwork is required as was previously not mentioned.	2
4 – Working by pilot to and from the point of obstruction	4.2 – Protection arrangements	Revised – material change	Revision of wording and wording from section 4 then split into 3 separate sub-sections to mirror changes to same method of working in GERT8000-P1 module to improve clarity.	2
4 – Working by pilot to and from the point of obstruction	4.3 – Travelling with the driver	Revised – material change	Revision of wording and wording from section 4 then split into 3 separate sub-sections to mirror changes to same method of working in GERT8000-P1 module and specific reference to RT3156 form added for clarity.	2

Table A.5: GERT8000-TS2 issue 5 to GERT8000-TS2 issue 6

From GERT8000-TS2 issue 5	To GERT8000-TS2 issue 6	Way forward	Comments	Objective
9.2.1 - If there is a main aspect signal to control the movement through the crossover at the other end of the single line	9.2.1 - If there is a main aspect or stop signal or end of emergency special working sign at the other end of the section	Revised	Revision of the title, and addition of end of emergency special working sign and signaller's agent and associated safe distance beyond this point to new list of when trains can be allowed to enter the single line working section in the wrong direction. Extra wording added requiring a sign and agent to be provided even if a position light signal is provided. Instructions for signallers setting and authorising trains into the section added to improve clarity.	1
9.2.2 – If there is a handsignaller opposite the signal protecting that crossover	N/A	Withdrawn	Removal of the use of handsignallers at the end of an SLW section means this section is no longer relevant and has been withdrawn. The use of an end off degraded working sign in place of the handsignaller has meant that the replacement information is contained with section 9.2.1.	1
9.2.3 – If there is no main aspect signal to control the movement through the crossover at the other end of the single line, and no handsignaller opposite the signal protecting that crossover	9.2.2 – If there no main aspect or stop signal or end of emergency special working sign at the other end of the section	Revised	With the withdrawal of the previous section 9.2.2, this section has been retitled to reflect the removal of handsignallers at the end of the single line working section and replaced by a signaller's agent and end of emergency special working sign. Wording has been improved for clarity and now includes detail previously missing such as the pilot must travel on all trains where the end of the single line working section is not protected.	1

From GERT8000-TS2 issue 5	To GERT8000-TS2 issue 6	Way forward	Comments	Objective
9.3.1- If there is a handsignaller opposite the signal protecting the crossover	9.3.1 - If there is an end of emergency special working sign opposite the signal protecting the crossover.	Revised	Retitled to reflect the removal of handsignallers from this method of working. Wording revised to remove handsignaller and replace with use of end of emergency special working sign and signaller's agent. Wording of second sub-section improved for clarity.	1
9.3.2 - If there is no main aspect signal and no handsignaller opposite the signal protecting the crossover	9.3.2 - If there is no main aspect or stop signal and no end of emergency special working sign opposite the signal protecting the crossover	Revised	Retitled to reflect removal of handsignallers and replaced with end of emergency special working sign.	1
N/A	9.3.3 – When a signaller can clear the main aspect or stop signal at the opposite end of the single line and the crossover is facing to the movement	New	Additional wording added for clarity and added completeness to the method of working, enabling the rules to apply to when more than one signaller is involved in the method of operation.	1
9.4- If the single line has been divided into two sections	9.4 - If the single line has been divided into two sections	Revised	Removal of the reference handsignaller at the end of the single line working section and replaced with end of emergency special working sign.	1

Table A.6: GERT8000-TS3 issue 7.1 to GERT8000-TS3 issue 8

From GERT8000-TS3 issue 7.1	To GERT8000-TS3 issue 8	Way forward	Comments	Objective
9.2.4 - Accepting trains in the wrong direction at signal box C from signal box B	9.2.4 - Accepting trains in the wrong direction at signal box C from signal box B	Revised	Removal of the reference to the use of a handsignaller at the end of the single line working section and replaced with use of end of emergency special working sign and signaller's agent. Section has been given extra sub-titling to split the instructions specific to facing or trailing crossovers for clarity.	1
9.3.1 – If the crossover is facing to the movement	9.3.1 – If the crossover is facing to the movement	Revised	Removal of the reference to the use of handsignaller at the end of the single line working section and replaced with instructions for the signaller to contact the signaller's agent, and reference to the end of emergency special working board added for clarity.	1
9.3.2 – If the crossover is trailing to the movement	9.3.2 – If the crossover is trailing to the movement	Revised	Removal of the reference to use of handsignaller at the end of the single line working section and replaced with use of signaller's agent and end of emergency special working sign.	1
9.3.3 – No handsignaller provided	9.3.3 – If there is no end of emergency special working sign and no signaller's agent provided	Revised	Title and wording revised to remove reference to use of handsignaller and replaced with reference to signaller's agent and end of emergency special working sign. Wording improved for clarity when these are not available.	1
Diagram TS3.6	Diagram TS3.6	Revised	Removal of detonators from the drawing.	1
Diagram TS3.7	Diagram TS3.7	Revised	Removal of detonators from the drawing.	1
Diagram TS3.8	Diagram TS3.8	Revised	Removal of detonators and addition of an end of emergency special working sign and signaller's agent to the drawing, and removal of the reference to handsignaller in the caption. Pilotman also retitled to Pilot.	1
Diagram TS3.9	Diagram TS3.9	Revised	Removal of detonators from the drawing and removal of the reference to handsignaller in the caption. Pilotman also retitled to Pilot.	1

From GERT8000-TS3 issue 7.1	To GERT8000-TS3 issue 8	Way forward	Comments	Objective
Diagram TS3.10	Diagram TS3.10	Revised	Removal of detonators from the drawing and removal of the reference to handsignaller in the caption. Pilotman also retitled to Pilot.	1
Diagram TS3.11	Diagram TS3.11	Revised	Removal of detonators from the drawing and removal of the reference to handsignaller in the caption. Pilotman also retitled to Pilot.	1

Table A.7: GERT8000-HB5 issue 2.1 to GERT8000-HB5 issue 3. This table includes only those changes arising from this project, as other projects affect it.

From GERT8000-HB5 issue 2.1	To GERT8000-HB5 issue 3	Way forward	Comments	Objective
6 – Single line working (SLW)	5 – Single line working (SLW)	Renumbered	As a result of the removal of section 5 Temporary Block Working, this section has been renumbered 5.	1
6.1 – Staying where appointed	5.1 – Staying where appointed	Revised	Addition of wording regarding acting as a signaller's agent at the end of a SLW section. Section split into two sub-topics keeping instructions for an intermediate handsignaller with associated wording changes. Diagram HB5.2 also updated with end of degraded working sign replacing handsignaller and detonator.	1
6.2 – Trains travelling in the wrong direction	5.2 – Trains travelling in the wrong direction	Revised	Addition of wording regarding acting as a signaller's agent at the end of a SLW section. Section split into two sub-topics keeping instructions for an intermediate handsignaller with associated wording changes.	1
6.3 – Trains travelling in the right direction	5.3 – Trains travelling in the right direction	Revised	Addition of wording regarding acting as a signaller's agent at the end of a SLW section. Section split into two sub-topics keeping instructions for an intermediate handsignaller with associated wording changes.	1

Table A.8: RS521 issue 8 to RS521 issue 9. This table includes only those changes arising from this project, as other projects affect it.

From RS521 issue 8	To RS521 issue 9	Way forward	Comments	Objective
12.12 – End of emergency special working sign	12.12 – End of degraded working sign	Revised – material change	The name of the sign has changed to enable more use cases and is now used at the end of a single line working section.	1

Table A.9: RIS-0733-CCS issue 1.3 to RIS-0733-CCS issue 1.4

From RIS-0733-CCS issue 1.3	To RIS-0733-CCS issue 1.4	Way forward	Comments	Objective
G 2.2.6	G 2.2.6	Revised – material change	List item c) amended from 'Emergency special working' to 'Other degraded working' to include additional use case.	1
G 3.2.5	G 3.2.5	Revised – material change	Reference to the title of sign AK215 in list item b) has been amended to reflect the title change.	1
Appendix B 2.1	Appendix B 2.1	Revised – material change	Reference to 'emergency special working' has been replaced with 'degraded working'. Changes to the associated table include amendments to the description of the sign, the meaning and the addition of application rule for single line working found in GERT8000-P1.	1
References	References	Revised – material change	Reference to GERT8000-P1 included.	1

Table A.10: RT3191 Form issue December 2022 to RT3191 Form issue December 2025

From RT3191 Form issue December 2022	To RT3191 Form issue December 2025	Way forward	Comments	Objective
Control of wrong direction movements back to the proper line:	Control of wrong direction movements back to the proper line:	Revised – material change	Removal of the reference to the handsignaller at the end of the single line working section and additional text added referring to the use of the 'End of Emergency Special Working' sign in place of the handsignaller.	1
Other handsignallers appointed at:	Intermediate handsignallers appointed at:	Revised – material change	Reference to the use of 'intermediate handsignallers' replaces the word 'other' to recognise the use of a handsignaller to divide a single line working section.	1
N/A	In connection with:	New	Addition of the missing text referring to method of working being used.	2

Table A.11: RT3192 Form issue December 2022 to RT3192 Form issue December 2025

From RT3192 Form issue December 2022	To RT3192 Form issue December 2025	Way forward	Comments	Objective
Control of wrong direction movements back to the proper line:	Control of wrong direction movements back to the proper line:	Revised – material change	Removal of the reference to the handsignaller at the end of the single line working section and additional text added referring to the use of the 'End of Emergency Special Working' sign in place of the handsignaller.	1
Other handsignallers appointed at:	Intermediate handsignallers appointed at:	Revised – material change	Reference to the use of 'intermediate handsignallers' replaces the word 'other' to recognise the use of a handsignaller to divide a single line working section.	1
N/A	In connection with:	New	Addition of the missing text referring to method of working being used.	2

Table A.12: RT3193 Form issue March 2024 to RT3193 Form issue December 2025

From RT3193 Form issue March 2024	To RT3193 Form issue December 2025	Way forward	Comments	Objective
Text on side 2	Text on side 2	Revised – material change	Change to the text added reference to the use of the 'End of Emergency Special Working' sign in place of the handsignaller at the end of a signal line working section.	1
Text on side 2	Text on side 2	Revised – material change	Reference to the use of 'intermediate handsignallers' replaces the word 'other' to recognise the use of a handsignaller to divide a single line working section.	1

Table A.13: Sign AK215 issue 1 to Sign AK215 issue 2

From	To	Way forward	Comments	Objective
Sign AK215 issue 1	Sign AK215 issue 2	Revised – material change	The title for sign AK215 has been amended from 'End of emergency special working' to 'End of degraded working'.	1