19-005 Secondary communications in the absence of GSM-R

Version:	1.8		
Purpose:	Approval to proceed to consultation with objective 1		
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Sponsor:	Tom Lee – Director of Standards		
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Lead industry committee:	Traffic Operation and Management Standards Committee (TOM SC)	**Date:**	25 April 2023
Supporting industry committee:	Control, Command and Signalling Standards Committee (CCS SC)	**Date:**	04 May 2023
Supporting industry committee:	Plant Standards Committee (PLT SC)	**Date:**	3rd May 2023
Supporting industry committee:	Rolling Stock Standards Committee (RST SC)	**Date:**	11 May 2023

Decision

TOM SC is asked to:

DECIDE if the proposed revisions in GERT8000-M1 issue 7 and GERT8000-M2 issue 7 deliver the intentions of the proposal for change.

DECIDE if the proposed revisions in GERT8000-M1 issue 7 and GERT8000-M2 issue 7 are in a suitable state for consultation.

APPROVE that the proposed revisions in GERT8000-M1 issue 7, GERT8000-M2 issue 7 and the associated report *Risk assessment of the use of detonators for assistance protection and divided trains, and consideration of alternative controls* are consulted on.

IDENTIFY any specific organisations or individuals to be included in the consultation.

RST SC, CCS SC and PLT SC are asked to:

DECIDE if the proposed revisions in GERT8000-M1 issue 7 and GERT8000-M2 issue 7 deliver the intentions of the proposal for change.

DECIDE if the proposed revisions in GERT8000-M1 issue 7 and GERT8000-M2 issue 7 are in a suitable state for consultation.

SUPPORT that the proposed revisions in GERT8000-M1 issue 7, GERT8000-M2 issue 7 and the associated report *Risk assessment of the use of detonators for assistance protection and divided trains, and consideration of alternative controls* are consulted on.
IDENTIFY any specific organisations or individuals to be included in the consultation.

19-005 Secondary communications in the absence of GSM-R

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 documents

Number	Title	Issue
RIS-3787-TOM	Secondary communications in the absence of GSM-R OBJECTIVE 2 below – **THIS IS NOT BEING CONSULTED ON AT THIS STAGE IN THE PROJECT AND IS EXPECTED TO BE AVAILABLE IN NOVEMBER 2023**	1
GERT8000-M1	Dealing with a train accident or train evacuation	7
GERT8000-M2	Train stopped by train failure	7

Superseded documents

Number	Title	Issue
GERT8000-M1	Dealing with a train accident or train evacuation	6
GERT8000-M2	Train stopped by train failure	6

Documents for withdrawal

Number	Title	Issue
GOGN3677	Guidance Note on the Provision of Lineside Telephones OBJECTIVE 2 below – **THIS IS NOT BEING CONSULTED ON AT THIS STAGE IN THE PROJECT**	2

This is a two-phase project and only objective 1 is being consulted on at this stage. Sections of this business case for change relevant only to objective 2 have been greyed to underline that they are not being consulted on currently.

Summary

Background and change

An aim of project 19-005 *Secondary communications in the absence of GSM-R* is to address the industry concern about the lack of a consistent approach in providing secondary communications when the Global System for Mobile Communications – Railways (GSM-R) radio is not available due to fault, failure or scheduled maintenance.

[OBJECTIVE 2 below – THIS IS NOT BEING CONSULTED ON AT THIS STAGE IN THE PROJECT]

In addition, this project will look at the use of detonators, by making the relevant changes to reflect the outcome of RSSB research project T1155 *Reviewing the risks and benefits of detonator usage*. T1155 concluded that there are a number of situations when the risk to staff when laying assistance or emergency protection is greater than the risk of collision.

[OBJECTIVE 1 below]

Industry impact due to changes

Impact areas	Scale of impact	Estimated value
A. Legal compliance and assurance	Low	(Objective 1) £17,500
B. Health, safety and security	Medium	(Objective 1) £936,520
C. Reliability and operational performance	High	(Objective 1) £671,973 (Objective 2) £24,921,150
D. Design and maintenance	Low	-
E. People, process and systems	Low	-
F. Environment and sustainability	Low	(Objective 1) £500,000
G. Customer experience and industry reputation	Low	-
Total value of industry opportunity over 5 years =		**£27,047,143**

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 are the objectives associated with this change?

Objective 1 – To reduce the current levels of risk that drivers are exposed to when laying detonators.

1.1 RSSB research project T1155 (2020) *Reviewing the risks and benefits of detonator usage* concluded that there are a number of situations when the risk to staff when laying assistance protection is greater than the risk of the assisting train travelling too far and resulting in a collision.

1.2 GERT8000-M1 issue 6 *Dealing with a train accident or train evacuation* and GERT8000-M2 issue 6 *Train stopped by train failure* provide the rules for circumstances in which a divided train or a failed train requiring assistance is to be protected with detonators. T1155 recommended a review of GERT8000-M1 and GERT8000-M2 in relation to movements towards divided trains in order to understand what suitable risk controls should be in place to protect the movement towards the divided portion.

1.3 The work related to secondary communications (see objective 2) may identify further data and opportunities to remove detonators, for example, scenarios where onboard members of staff are required to lay detonators in an emergency.

Objective 2 – Creation of a framework for secondary communications in the absence of GSM-R.

[THIS IS NOT BEING CONSULTED ON AT THIS STAGE IN THE PROJECT]

1.4 The five-year review of GOGN3677 issue 1 *Guidance Note on the Provision of Lineside Telephones* led to the publication of issue two in June 2019. Consultation and feedback from key stakeholders during the process to publish issue two of GOGN3677 identified a wider industry concern related to inconsistencies across the country in the approach to providing secondary communications systems, such as lineside telephones, for use when GSM-R radio is not available due to fault, failure or scheduled maintenance.

1.5 This concern was exacerbated by the withdrawal of the Fixed Lineside Telephony Assessment Tool (FLAT), which was reviewed in parallel with GOGN3677. RSSB concluded that FLAT should be withdrawn because it was based on outdated assumptions, it used outdated data, and its outputs were heavily dependent on expert judgment.

1.6 The Traffic Operation and Management Standards Committee (TOM SC) approved the publication of GOGN3677 issue 2, in February 2019. This was on the understanding that RSSB would develop a proposal to address industry concerns regarding the inconsistent provision of secondary communications.

1.7 There is an industry need to establish a framework that provides alternative secondary communication arrangements, based on the identified levels of risk when GSM-R is not available, that achieve similar levels of safety and performance. The underpinning safety

analysis should take into consideration the likelihood of common failures, for example, damage to fibreoptic cables affecting the availability of GSM-R and the fixed telephone network (FTN) within the same geographical area.

2. How does the content in the standard need to change to achieve the objective?

Objective 1 - To reduce the current levels of risk that drivers are exposed to when laying detonators.

2.1 RSSB has reviewed the instructions in GERT8000-M1 issue 6 and GERT8000-M2 issue 6 following risk assessment work that has assessed alternative control opportunities to reduce or eliminate the use of detonators.

2.2 This risk assessment work (see report *Risk assessment of the use of detonators for assistance protection and divided trains, and consideration of alternative controls*) considered operational scenarios including long block sections and poor visibility, and the possible effectiveness of introducing two additional control measures.

2.3 The first of these is to establish GSM-R communication between the driver of the failed train and the driver of the assisting train. The second is to specify an absolute maximum speed of 25 mph for the assisting train.

2.4 Combining these two control measures eliminates the added risk to the driver when placing detonator protection. This results in an overall collision risk similar to the base case with detonators, with the dominant train risk reducing by 0.2% overall and the divided train risk increasing by approximately 4%.

2.5 GERT8000-M2 has therefore been revised on the basis that the normal procedure where an assisting train is required will be for the driver of the failed train to remain with it; for GSM-R radio communication to be established between the driver of the failed train and the driver of the assisting train; and for the assisting train to proceed at caution without exceeding a speed of 25 mph at any point.

2.6 When direct GSM-R radio communication cannot be established between the driver of the failed train and the driver of the assisting train in normal conditions, reliance would be placed on the driver of the assisting train proceeding at caution up to a maximum permitted speed of 25 mph together with communication of the location of the train via the signaller. The driver of the failed train would remain in the cab. Whilst not as effective as applying both additional control measures described in clause 2.3 (maximum permitted speed and driver-to-driver communication), the overall level of risk is still lower than the base case of the driver leaving the cab to lay detonators.

2.7 During poor visibility, without the application of the two controls of GSM-R communication and a maximum speed of 25 mph, the risk assessment report concluded that the risk of collision increases by a factor of 8.8 for a failed train and 6.8 for a divided train; a further element of qualitative risk assessment has been undertaken. The combination of an inability to establish GSM-R communication and poor visibility is likely to be an infrequent occurrence,

causing difficulty in producing a quantitative risk assessment, which would be further compounded by the degree of variability to be considered.

2.8 This qualitative risk assessment work has considered the possibility of applying alternative controls should both of these mitigations not be available during poor visibility. These are described below in 2.11 to 2.24, with the failed train and divided train situations treated separately.

2.9 The absence of driver-to-driver GSM-R communication removes the benefit of the two drivers being able to give or obtain detail including the exact location of the failed train, which was considered to be of particular value where long block sections were involved.

2.10 There is still a requirement for emergency protection to be placed when the driver of a failed train has not been able to speak to the signaller and either emergency special working (ESW) or temporary block working (TBW) is in operation, and these requirements have been perpetuated.

2.11 **Failed trains:** The objective of this phase of the project has been to consider whether the use of detonators as a form of protection can be avoided, and their possible retention has been discounted.

2.12 As an alternative, it is proposed that if it is not possible to establish GSM-R communication between the driver of the assisting train and the driver of the failed train during poor visibility, the driver of the failed train would leave the train and proceed to a location where the assisting train would be met, with a hand danger signal being displayed, the assisting train being stopped. The driver of the failed train is then in a position to accompany and advise the driver of the assisting train.

2.13 The proposed locations where the assisting train would be met are as follows.

2.14 ***Normal arrangement:*** At a distance of 300 metres (approximately 300 yards) from the failed train. Although the exact derivation of the existing distance of 300 metres cannot be precisely determined, it has become established without any apparent deficiency being revealed. It approximates to a minimum signal braking distance of 325 metres on level track from a speed of 25 mph. During poor visibility, the assisting train is likely to be travelling at less than that speed as the requirement is phrased as travelling at caution but not to exceed 25 mph. The hand danger signal is likely to be visible at some distance before reaching it. Once the driver of the failed train has joined the assisting train, necessary information can be passed to the driver of the assisting train as at present.

2.15 ***If there is a stop signal or block marker less than 300 metres from the failed train:*** Providing the signaller can confirm the stop signal will be kept at danger or the route kept closed at the block marker to protect the failed train, the driver would meet the assisting train at that location. The signal will become visible on approach, or on an ETCS line the driver will recognise the end of the movement authority is being reached.

2.16 ***If there is a tunnel entrance less than 300 metres from the failed train:*** This is intended to refer to a tunnel which the assisting train will exit. Under existing arrangements, the driver of

the failed train places detonators at 300 metres from the failed train, but then proceeds to the far end of the tunnel and meets the assisting train there. It has been pointed out that whilst this potentially meets the objective of the hand danger signal being visible from a greater distance, if the tunnel is of any significant length, considerable time may be occupied in traversing the tunnel on foot and the driver is exposed to some risk because of underfoot conditions. It is therefore proposed that the driver would meet the assisting train at the mouth of the tunnel. To overcome the reduction of the 300-metre distance, the hand danger signal would be displayed to the driver of the assisting train and will possibly be visible at an increased distance.

2.17 ***If the driver of the failed train could not contact the signaller:*** If the driver had not been able to contact the signaller, it may have been necessary to leave the failed train to do so, and, if necessary, place emergency protection. In this situation, which could apply during good visibility, the driver can reach a location where emergency protection must be placed, or even to a greater distance. It would then not be possible to establish GSM-R communication. The driver would remain at that location to meet the assisting train. In this situation, the driver is able to advise the driver of the assisting train whilst travelling over a distance greater than 300 metres.

2.18 ***If the train has failed within a tunnel:*** This situation has not been fully represented within the rules. The existence of a tunnel is not regarded as intrinsically constituting poor visibility, but would arise if conditions within the tunnel were those of poor visibility. In this situation, if it is not possible to establish GSM-R communication, it would be necessary to proceed to the far end of the tunnel and meet the assisting train there. A driver remaining within the tunnel is unlikely to be able to display a hand danger signal from a position of safety.

2.19 ***Divided trains:*** The risk report identified that provision of GSM-R communication is likely to be problematic, even in good visibility, and proposed four potential controls during poor visibility. These are, however, relevant during good visibility. It was also noted that the need to remove a divided portion of a train during poor visibility is likely to be a rare occurrence, with no recorded incidents identifiable.

2.20 ***Deployment of detonators:*** This would be counter to the objective of avoiding the use of detonators.

2.21 ***Requiring the driver to remain with the train until assistance has arrived:*** This is inconsistent with the scenario described in module M1 of the Rule Book which describes the front portion of the train proceeding forward.

2.22 ***Providing a member of staff with GSM-R or other form of secure communication at the rear portion of the divided train to communicate with the driver of the assisting train***: Subject to the technical feasibility of providing secure communication, this is worthy of consideration. It does, however, require the provision of a member of staff at the site which might not always be necessary to assist the divided portion.

2.23 ***Not to use an assisting train to recover the rear portion:*** As this would mean that the rear portion could not be removed at all, this option can be discounted.

2.24 It is proposed that the existing requirement to place detonators at either end of the divided portion is replaced by a requirement to place a red lamp on the rear and a white light on the front. The instruction to the driver of the assisting train to proceed at caution would be reinforced by the instruction not to exceed 25 mph.

Objective 2 – Creation of a framework for secondary communications in the absence of GSM-R.

[THIS IS NOT BEING CONSULTED ON AT THIS STAGE IN THE PROJECT]

Step 1 – Develop the risk model

2.25 This step is to determine appropriate secondary means of communications (individually or in combination) between signallers and those at the trackside or on-board trains to use in the absence of GSM-R. These may be permanent or temporary provisions and may be on-board or trackside.

2.26 The existing GSM-R failure system risk model will be further developed to derive principles and findings in relation to communication provisions. Furthermore, the model will consider the likelihood, frequency and consequences of common failures, for example, damage to fibreoptic cable affecting the availability of both the GSM-R and FTN within the same geographical area. The model will remain an RSSB internal tool.

Step 2 – Develop the framework for secondary communications in the absence of GSM-R

2.27 The risk model work will form the basis for developing a framework that enables duty holders to determine alternative means of providing communications in the absence of GSM-R. It will also form the basis for developing minimum requirements based on the characteristics that influence the risk profile associated with a line of route or scheme design. The framework will build on the duty of cooperation between transport operators and will be contained in a new Rail Industry Standard (RIS). The proposed standard is expected to supersede GOGN3677 issue 2 and will incorporate any guidance from GOGN3677 that remains relevant.

2.28 The new RIS-3787-TOM will:

- Identify the purposes for which secondary communications systems may be needed, and where on the network these needs may arise. For each case, identify the primary means of communication and provide guidance on how to supplement it via secondary means when unavailable, based on the supporting risk assessment work;
- Provide supporting information to assess the practicality of using each secondary means of communication. The assessment will be carried out in the context of GSM-R fitment, increased axle counter fitment, reduced lineside telephony and wider availability of mobile devices;
- Determine what the requirements for emergency communication and emergency protection should be such that they minimize system risk (examples may be when the driver is incapacitated during the accident; the train's cab radio is broken during the accident; the availability of other GSM-R cab radios on the train, etc).

2.29 Once the RIS work is complete, this project will highlight if the outcome of the works is likely to affect the content of RIS-8048-CCS *Positioning of lineside telephones*. This Rail Industry Standard sets out the requirements and guidance on lineside telephones. Issue 1 of this document has undertaken its 5-year review and the associated project, created in order to implement the necessary changes, is project number 22-003. Any outcomes derived from project 19-005 will be shared with 22-003 to ensure alignment.

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

3.1 This is a high priority project for industry. Research project T1155 concluded in 2020, but the implementation of the findings was delayed due to the effects of the global pandemic, as resources had to be allocated to more pressing work at the time.

3.2 In addition, signalling schemes often struggle to demonstrate that their design is adequate in terms of the secondary communications provision in the absence of GSM-R. RSSB has already been approached on several occasions for assistance in the provision of a common basis for future upgrade projects. There are a number of signalling schemes being developed or underway that will greatly benefit from the outcome of this work.

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

Objective 1 – To reduce the current levels of risk that drivers are exposed to when laying detonators.

4.1 By minimising and optimising the number of interactions that traincrew will need to perform to lay detonator protection, railway undertakings 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 - Keeping people away from moving trains.

4.3 The cost of a personal injury is estimated at a total of £350,000[1]. If one such incident was to occur over the course of five years, and the changes introduced by this project contributed 5% to avoiding this cost, the total benefit would raise to £17,500 over five years.

[1] If a serious personal injury is caused, the likely outcome is the issue of a prohibition notice or prosecution and/or civil claim, and the estimated total potentially incurred is described below:

- Prosecution (average) cost/fine = £200,000 including costs;

B. Health, safety and security

Objective 1 – To reduce the current levels of risk that drivers are exposed to when laying detonators.

4.4 The changes to the Rule Book instructions have the potential to minimise system risk in defined circumstances, allowing drivers to remain in the cab upon train failure or no longer using detonators for divided trains.

4.5 The proposed changes to the Rule Book will reduce the 'added' risk to the driver, such as being struck by a train, and slips, trips and falls when laying detonators. The risk of injury from a driver being struck by a train or from boarding and alighting the train in the Safety Risk Model[2] is 0.162309 FWI per year. If the Rule Book changes contribute to a 50% reduction in the risk of injury to the driver, then this represents 0.081154 FWI per year. Using the Value of Preventing a Fatality (£2,308,000), this represents a benefit of £187,304. Over five years, this is £936,520.

4.6 After the work related to secondary communications is completed (objective 2), further data and opportunities to remove detonators may be identified. The monetary benefit can then be calculated.

Objective 2 – Creation of a framework for secondary communications in the absence of GSM-R. [THIS IS NOT BEING CONSULTED ON AT THIS STAGE IN THE PROJECT]

4.7 There is an opportunity to mitigate the whole system risk for new or updated signalling schemes by:

- Minimising risks associated with emergency protection by determining the optimum means of response.
- Minimising personnel exposure to significant risks, particularly those associated with lineside work, while carrying out maintenance tasks or inspections of fixed equipment.

4.8 There will be some work required in order to implement the new framework for secondary communications. This will offset some of the benefits, so at this point, the monetary benefits are not proportionate to quantify.

C. Reliability and operation performance

Objective 1 – To reduce the current levels of risk that drivers are exposed to when laying detonators.

4.9 Some of the proposed changes to the Rule Book instructions have the potential to reduce the time required to assist a failed train in certain circumstances. The process of laying assistance

- Prohibition notice (cost of stopping operations, rectification costs and reputational damage) = £50,000;
- Civil claim (average amount for serious claim) = £100,000 pp including costs
- Total = £350,000

[2] Using four precursors from the SRM: Driver inattention on track leading to being struck by a train; Driver struck by a train following slip, trip or fall; Driver injury while alighting train to track; and Driver injury while boarding train from track.

protection can be time-consuming, especially in a multi-track layout. There are potential performance benefits associated with the time saved by the removal of the requirement and reduced impact on services using adjacent lines. This would improve the performance of the network.

4.10 Providing assistance to a failed train is a scenario assumed to occur 2,415 times per year[3] in the GB mainline network. If we assumed 60% of these took place in good visibility and unobstructed conditions, a 7.42-minute reduction to 25% of those instances would mean an industry performance benefit of £671,973 over 5 years[4].

Objective 2 – Creation of a framework for secondary communications in the absence of GSM-R. [THIS IS NOT BEING CONSULTED ON AT THIS STAGE IN THE PROJECT]

4.11 A framework that provides secondary means of communication has got the potential to reduce the number of assets installed trackside by identifying suitable alternatives. With this, there is a potential to reduce the time required to attend a lineside asset for maintenance or the associated service delays incurred in case of failure.

4.12 GSM-R failures often result in reduced speeds on the network, introduction of temporary emergency timetables and high number of delays due to multiple reasons. Furthermore, common causes, for example, damage to fibreoptic cables shared by both the GSM-R and FTN can further increase the impact on delays and cause significant service disruption. By having a process in place that considers all credible failures affecting primary (GSM-R) and secondary (FTN) communication systems it is possible to reduce the disruption caused to services and the cost of delays.

4.13 In 2019/2020, there were at least 3,286 GSM-R-related incidents, with a cost of over £204 million to industry. Using a more recent measure, 2020/21 saw at least 1,549 GSM-R-related incidents, with a cost of over £99 million[5]. A conservative potential reduction of 5% of this cost as a result of this project would translate onto savings to industry of over £24 million over five years.

D. Design and maintenance

Objective 2 – Creation of a framework for secondary communications in the absence of GSM-R. [THIS IS NOT BEING CONSULTED ON AT THIS STAGE IN THE PROJECT]

[3] Using SMIS data, T1155 estimated that providing assistance to a failed train occurred 3,975 times per year in the GB mainline network. Further analysis has shown that this may be an overestimate, so for the purpose of this document, a revised estimate of 2,415 events has been used.

[4] 7.42 minutes is the time estimated a driver would take to lay protection in these circumstances. Considering this time being saved for 25% of the incidents would mean a saving of 2,687 minutes or £134,394 per year (£671,973 over 5 years). RSSB uses a measure of £50 per performance minute delay.

[5] Data extracted from Network Rail's 'total performance dataset'. (PfPI minutes used = total delay including cancelations)

- 2019/20: 3286 GSM-R-related incidents causing a total of 4,096,915 minutes delay.
- 2020/21 shows a total of 1549 GSM-R- related incidents, causing a total of 1,993,692 minutes delay. RSSB uses a measure of £50 per performance minute delay.

4.14 The outcome of this work will support the development of new and upgraded signalling schemes by providing a framework that allows the designer to evaluate minimum requirements necessary to minimise the risks from a train accident perspective.

4.15 In addition, by identifying suitable alternatives, the outcome of this work has the potential to reduce the level of maintenance required, as well as contributing to the optimisation of the life cycle cost for new or upgraded signalling schemes.

4.16 There is the potential for a gradual harmonisation of acceptable provisions and operational responses which may accelerate the design process.

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

E. People, process and systems

4.18 The overall project's aim is to simplify processes for staff.

4.19 However, since one of the intentions of the new RIS document will be to set up minimum requirements, a potential misinterpretation of the published content could lead operators to implement too literally and not use the extra guidance to provide further system resilience. In the same way, confusion in the application of new instructions when laying detonators could lead to unsafe practices.

F. Environment and sustainability

Objective 1 – To reduce the current levels of risk that drivers are exposed to when laying detonators.

4.20 Even if the outcome of the work does not conclude that the use of detonators is to be completely removed, a reduction in the number of scenarios in which they are used may reduce the number of detonators in storage and the overall need for them. Moreover, the rationale supporting the retention of detonators in a limited number of scenarios will enable the industry to better understand the need and consider how the intent could be satisfied through an alternative solution.

4.21 Detonators have a shelf life of five years, after which they need to be destroyed by incineration. According to T1155, the reduction in cost to TOC/FOCs to remove/replace detonators over the next five years is approximately £500,000[6]. In addition, reducing or removing the need to dispose of the estimated seven tonnes of detonator waste will bring an indirect environmental benefit of reduced carbon emissions.

Objective 2 – Creation of a framework for secondary communications in the absence of GSM-R. [THIS IS NOT BEING CONSULTED ON AT THIS STAGE IN THE PROJECT]

[6] 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.

4.22 With the potential to reduce the number of assets installed trackside, there will be a contribution to sustainability with a reduction on the number of staff car journeys required to the site.

4.23 These benefits are not proportionate to quantify.

G. Customer experience and industry reputation

Objective 1 – To reduce the current levels of risk that drivers are exposed to when laying detonators.

4.24 By reducing the number of times that traincrew need to lay assistance protection in case of failure, the time to resolve a failure will be reduced, improving the passenger experience.

Objective 2 – Creation of a framework for secondary communications in the absence of GSM-R. [THIS IS NOT BEING CONSULTED ON AT THIS STAGE IN THE PROJECT]

4.25 By providing alternative means of communication, there will be less disruption to passengers, with less services delayed or cancelled due to GSM-R failures and the impact caused by common failures affecting the GSM-R and FTN systems.

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

5.1 Although the estimated potential benefit of this project is currently estimated at over £27 million, a large part of the actual benefit will rely on the uptake and application by industry of the proposed measures contained in the new RIS-3787-TOM. In order to mitigate this, extensive informative sessions will be planned, so industry can fully understand the intention of the documents and how can they benefit from the correct application of their content.

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

6.1 RSSB will carry out the work in several parts:

- Update of the relevant Rule Book modules.
- Gathering of data for risk work and production of a final report.
- Creation of a new Rail Industry Standard.

6.2 Engagement with risk experts and outputs from the works will be necessary to fulfil objective 1 and part of objective 2.

6.3 Engagement with an industry steering group will be required in order to provide sufficient relevant data for the risk work.

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

7.1 Although there is no industry-specified timescale for the new RIS-3787-TOM and Rule Book updates, they are considered to be a high priority. RSSB will allocate the resources to achieve the earliest publication date, recognising that the delivery will be dependent on the completion of supporting risk justifications and achieving industry consensus on recognised complex matters.

7.2 The current timescales for the project are:

- Publication of updates to Rule Book modules M1 and M2 in September 2023 (in-force December 2023) (objective 1); and
- Publication of the new RIS-3787-TOM in March 2024 (objective 2).

8. How will the industry implement the change?

8.1 The implementation strategy will depend on the level of change introduced and will be updated later in the project.

8.2 It is anticipated that the new RIS-3787-TOM will require more involved stakeholder engagement in order to facilitate effective use, as well as in-depth informative materials and briefing sessions, for example, scheme designer and signal sighting committee briefings and webinars.

8.3 So far as objective 1 is concerned, it has been identified that the process of putting the drivers of the two trains concerned in communication, which involves action by the signaller, is not a procedure commonly carried out. An extent of, at least, re-briefing, if not training, will be necessary to achieve the required level of competency.

8.4 The proposed amendment to GERT8000-M1 to provide a white light on the leading end of the divided portion and a red light on the rear implies that both a red and a white light of some description will be readily available. Therefore, lamps will need to be provided in locomotive cabs if this is not the case. However, no associated costs of doing so have been included within this business case for change.

8.5 An impact of these changes is likely to be that drivers will be required to place detonators less frequently, whilst still having a residual requirement to be competent to do so. To reduce the potential 'skills fade' in this respect, it would be good practice for railway undertakings to review their competence management systems to consider whether greater emphasis must be placed on conveying and refreshing that element of competency.

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

9.1 RSSB will review the new standard and the updated rules 12 months after their publication to assess whether their content is fit for purpose.

9.2 We will seek specific feedback from transport operators and projects that have adopted and implemented the changes.

Appendix A. Disposition Table

Table A1: GERT8000-M1 issue 6 to GERT8000-M1 issue 7

From GERT8000-M1 issue 6	To GERT8000-M1 issue 7	Way forward	Comments	Objective
Section 5 Accidental train division 5.4 If the two portions cannot be recoupled	Section 5 Accidental train division 5.4 If the two portions cannot be recoupled	Revised	New requirement for the driver to place a red light on rear and a white light on front portion of the vehicles left in section.	1
N/A	5.5 Dealing with an assisting train	New	New instruction for signallers to instruct driver of assisting train including requirement not to exceed 25 mph.	1

Table A2: GERT8000-M2 issue 6 to GERT8000-M2 issue 7

From GERT8000-M2 issue 6	To GERT8000-M2 issue 7	Way forward	Comments	Objective
Section 1 If the train fails 1.1 Telling the signaller	Section 1 If the train fails 1.1 Telling the signaller	Revised	New paragraph added for completeness to explain the signaller should be told by the on-train radio and if this is not possible by the quickest means available.	1
Section 1 If the train fails 1.4 Telling the guard	Section 1 If the train fails 1.4 Telling the guard	Revised	New item inserted for completeness to refer also to a need to leave the train to contact the signaller.	1

From GERT8000-M2 issue 6	To GERT8000-M2 issue 7	Way forward	Comments	Objective
Section 1 If the train fails 1.5 Providing assistance protection	N/A	Withdrawn	The rules developed using the Risk Assessment do not contain any requirement to place assistance protection and the whole of this section can be withdrawn. This also removes the present exemption from providing assistance protection on a permissive line. The basis of this would seem to be that any train approaching the failed train is already being driven prepared to stop short of a train ahead. However, this does not apply if assistance is being provided from the front, and if an assisting train is provided from the rear then it would be logical to provide exactly the same controls against collision with the failed train as on any other line.	1
Section 2 Protecting the failed train with emergency protection 2.2 Providing emergency protection	Section 2 Protecting the failed train with emergency protection 2.2 Providing emergency protection	Revised	Emergency protection is still a requirement in this situation. Where the driver must go to has been reworded to make the intention clearer. A new instruction has been added for the driver to then return to the train, or continue if necessary if signaller has not been spoken to (both appear in module M1 but not in module M2). During poor visibility, if the assisting train will arrive from the rear of the failed train, remain where emergency protection has been placed for assisting train to arrive and show a hand danger signal to driver. The current module M2 does not state this and it has been included for completeness. This instruction was included from 1999 to 2003 but appears to have been omitted in error in the migration to the modular Rule Book. The diagram removed was superfluous, as there is no requirement to lay assistance protection.	1

From GERT8000-M2 issue 6	To GERT8000-M2 issue 7	Way forward	Comments	Objective
Section 3 Providing Assistance 3.1 Waiting for the assisting train to arrive	Section 3 Providing Assistance 3.1 Waiting for the assisting train to arrive	Revised	Divided into two sections. 3.1 a) applies in all visibility conditions providing GSM-R radio communication can be set up between the two drivers, and the driver of the failed train then remains in the cab. In these conditions, when GSM-R radio communication is not available, the removal of detonators is mitigated by the reduction in speed of the assisting train; the driver of the failed train can remain onboard and await instructions. The risk assessment demonstrated that in poor visibility the absence of GSM-R radio communication increases risk by comparison with the use of detonators. To provide an additional control measure, new section 3.1 b) requires the driver of the failed train to proceed to a location corresponding to where assistance protection would be placed and meet the assisting train displaying a hand danger signal on its approach. However, if there is a tunnel entrance within 300 metres of the failed train, the driver will wait at the tunnel entrance rather than being required to proceed to the other end as now, which can be both hazardous and time-consuming. If the train has failed within a tunnel and the 300-metre distance from the failed train falls within the tunnel, the driver will proceed to the far end of the tunnel.	1
Section 3 Providing Assistance 3.2 Signaller allowing the assisting train to enter the section	Section 3 Providing Assistance 3.2 Signaller allowing the assisting train to enter the section	Revised	Divided into two sections. 3.2 a) covers the situation in which GSM-R radio communication can be set up between the two drivers and shows this as the only requirement at this stage. When GSM-R radio communication is not available, in good visibility conditions, the removal of detonators is mitigated by the reduction in speed. The signaller will relay to the driver of the failed train any information relating to the movement. Section 3.2 b) applies during poor visibility when GSM-R communication is not possible and the driver of the failed train is to meet the assisting train at one of five possible locations, or will proceed to one of those locations.	1

From GERT8000-M2 issue 6	To GERT8000-M2 issue 7	Way forward	Comments	Objective
Section 3 Providing Assistance 3.3 Assisting train moving towards the failed train	Section 3 Providing Assistance 3.3 Assisting train moving towards the failed train	Revised	Includes a new requirement for the assisting train not to exceed 25 mph in all circumstances. When it is not possible for the drivers to speak to each other directly, all communications will take place via the signaller. A separate sub-section applies when it is necessary to pick up the driver of the failed train which is not significantly different from the existing instructions. A reference retained to exploding detonators would apply to any emergency protection.	1
Section 3 Providing Assistance 3.4 Driver of the failed train conducting the assisting train	Section 3 Providing Assistance 3.4 Driver of the failed train conducting the assisting train	Revised	Revised to state that this only applies in poor visibility when it has not been possible to set up GSM-R communication between the two drivers.	1