Operational Requirements for GSM-R Radio

Synopsis

This document contains requirements and guidance for the development of contingency plans to manage failures of the GSM-R voice system. Furthermore, the document defines requirements and guidance relating to the use of train radio to or from a moving train.
This new RIS addresses the need for industry to have a consistent method by which to manage GSM-R system failures across the GB mainline network. It sets out the principles by which transport operators can develop company procedures to safely communicate to or from a moving train, supporting associated changes in the Rule Book.

This document will be updated when necessary by distribution of a complete replacement.

**Superseded Documents**

This Rail Industry Standard does not supersede or replace any other Railway Group documents

**Supply**

The authoritative version of this document is available at www.rssb.co.uk/railway-group-standards. Enquiries on this document can be forwarded to enquirydesk@rssb.co.uk.
Operational Requirements for GSM-R Radio

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Part 1 Purpose and Introduction

1.1 Purpose of this document

1.1.1 This document defines the operational requirements for the use of Global System for Mobile Communications – Railway (GSM-R), for transport operators (infrastructure managers (IMs) and railway undertakings (RUs)) to use to assist them in carrying out their legal obligations in relation to safety.

1.1.2 This document contains requirements and guidance for the development of contingency plans to manage failures of the GSM-R system affecting the Great Britain (GB) main line railway.

1.1.3 Furthermore, this document contains requirements and guidance relating to the use of train radio on the move.

1.2 Introduction to the requirements

1.2.1 This document defines a consistent method by which GSM-R system failures shall be managed across the GB main line network, taking into consideration the increase in safety risk (immediate and secondary risk) associated with the loss of the GSM-R Railway Emergency Call (REC) function.

1.2.2 The approach used to evaluate the requirements defined in this document was consistent with Commission Implementation Regulation (EU) 402/2013: Common Safety Method for Risk Evaluation and Assessment (CSM RA) and RSSB’s ‘Taking Safe Decisions’.

1.2.3 The requirements and guidance published in this document were derived from detailed safety analysis undertaken by RSSB on behalf of the industry between January and November 2015.

1.2.4 The safety analysis was a quantitative assessment of risk. The methodology adopted focused on the evaluation of safety risk and consciously avoided the application of a cost benefit analysis that would have considered the trade-off between safety and performance when determining whether the proposed mitigation measures were safe so far as is reasonably practicable (SFAIRP).

1.2.5 As a consequence RSSB developed a new safety risk model. The model was built upon a range of relevant network averages and enabled a base case to be established. The base case assumed trains were driver only operation (DOO) and train detection was achieved through axle counters. The establishment of a base case enabled the effectiveness of proposed mitigation measures to be evaluated and the development of a set of operational principles. Furthermore, the model enabled the effectiveness of the operational principles to be evaluated through sensitivity analysis by increasing the two key characteristics associated with the base case, that is, maximum permissible line speed and headway.

1.2.6 The operational principles that emerged from the safety analysis form the basis of the requirements and guidance published in Parts 2 and 3 of this document.

1.2.7 Part 4 of this document also defines the requirements and guidance concerning the use of train radio by signallers and drivers while the affected train is in motion. These requirements and associated guidance were derived from a human factors study undertaken on behalf of RSSB between December 2015 and February 2016.
1.3 Application of this document

1.3.1 In the interests of consistent practice and implementation across the railway industry it has been agreed that the requirements in this document become effective from 03 December 2016 when corresponding changes to GERT8000 Rule Book come into force.

1.4 Health and safety responsibilities

1.4.1 Users of documents published by RSSB are reminded of the need to consider their own responsibilities to ensure health and safety at work and their own duties under health and safety legislation. RSSB does not warrant that compliance with all or any documents published by RSSB is sufficient in itself to ensure safe systems of work or operation or to satisfy such responsibilities or duties.

1.5 The structure of this document

1.5.1 This document is set out as a series of requirements, in some cases followed by relevant guidance.

1.6 Approval and authorisation of this document

1.6.1 The content of this document was approved by Traffic Operation and Management (TOM) Standards Committee on 14 June 2016.

1.6.2 This document was authorised by RSSB on 12 August 2016.
Part 2 Requirements for Managing On-board Train Radio Equipment Failures

2.1 Defective on-board train radio indications

2.1.1 The on-board train radio shall be considered to be defective if the driver machine interface display screen is blank, or one of the following messages is displayed:

a) Failure XX (XX indicates a number in the range from 01 to 07).
b) Radio Failure.
c) Cab Radio FIt.
d) EPROM/RAM FIt.

Rationale

G 2.1.2 These fault indications relate to failure modes that require the attention of the vehicle maintainer. Furthermore, these failure modes make the on-board train radio inoperable and therefore prevent the sending and receiving of calls (including RECs).

Guidance

G 2.1.3 There is no guidance associated with this requirement.

2.2 Unregistered train radio

2.2.1 If the on-board train radio cannot be registered for any reason but it displays GSM-R GB, indicating that it is attached to the network, it shall be considered to be operative and capable of sending and receiving calls (including RECs).

Rationale

G 2.2.2 Registration of the on-board train radio provides access to enhanced features within the GSM-R system. However, registration is not required to provide access to core features within the GSM-R system, the most significant of which is the REC. The sending and receiving of an REC is not affected by the registered state of the on-board train radio, as the user’s actions and system behaviour is unaffected.

Guidance

G 2.2.3 There is no guidance associated with this requirement.

2.3 Entering service from a maintenance depot

2.3.1 A train or traction unit shall not be permitted to enter service from a maintenance depot if the on-board train radio is defective in any cab that is required to be driven from at any time during its planned workings.

Rationale

G 2.3.2 Commission Regulation (EU) 2015/995, the Operation and Traffic Management Technical Specification for Interoperability (OPE TSI), Appendix B, section 8.1 Failure of on-board train radio detected
during train preparation states: ‘In case of on-board train radio failure a train shall not be permitted to start a service on lines where a radio is required’.

G 2.3.3 The OPE TSI definition of train preparation is described as: ‘Ensuring that a train is in a fit condition to enter service, that the train equipment is correctly deployed and that the formation of the train matches the train’s designated pathway. Train preparation also includes technical inspections carried out prior to the train entering service’.

G 2.3.4 It is considered reasonable to expect vehicle maintainers to have systems in place to facilitate the identification and rectification of on-board train radio faults before an affected vehicle is required to enter service from a maintenance depot. Furthermore, it is assumed that the vehicle maintainer would be able to ensure the defective vehicle can be contained within a train formation until the fault is rectified.

Guidance

G 2.3.5 A train with a defective on-board train radio may be permitted to enter service from a maintenance depot providing the affected on-board train radio is to be contained within a train formation until the defect can be rectified. If this is not possible, then the train should not be permitted to enter service from a maintenance depot.

G 2.3.6 This requirement should be included within a transport operator’s Safety Management System (SMS), as it was derived from the safety risk analysis described in section 1.2 of this document.

2.4 Entering service from somewhere other than a maintenance depot

2.4.1 A train or traction unit shall be permitted to enter service from a location that is not a maintenance depot with a defective on-board train radio only in the following circumstances. These are illustrated in Appendix A.

a) The defect is in a cab that is not required to be driven from during the journey that starts from that location.

b) Alternative arrangements cannot be made that would avoid the need to drive from the cab concerned during the journey from the current location.

c) If the cab with the defective on-board train radio is to be driven from during the current journey or on a subsequent journey, GSM-R transportable equipment or an operational hand-portable device which is configured to send and receive RECs shall be provided for that journey.

d) If the defect was not previously known about, and the train is to be driven from the cab with the defective on-board train radio, the train shall be permitted to enter service providing one of the following applies:

• The affected cab has been provided with GSM-R transportable equipment or the driver has been provided with a GSM-R operational hand-portable.

• Arrangements have been made for GSM-R transportable equipment or an operational hand-portable device to be provided at the first location where it is available during the journey before reaching a distance of 75 miles, stopping the train there specially if necessary.

• If it is not possible to provide GSM-R transportable equipment or an operational hand-portable device at any point during the journey, the train may complete its journey providing it is no more than 75 miles. If necessary, to achieve this, a train may be terminated short of its planned destination.

Rationale

G 2.4.2 The OPE TSI, Appendix B, section 8.1 Failure of on-board train radio detected during train preparation states: ‘In case of on-board train radio failure a train shall not be permitted to start a service on lines where a radio is required’.
Operational Requirements for GSM-R Radio

Guidance

G 2.4.3 The OPE TSI definition of train preparation is described as: ‘Ensuring that a train is in a fit condition to enter service, that the train equipment is correctly deployed and that the formation of the train matches the train’s designated pathway. Train preparation also includes technical inspections carried out prior to the train entering service’.

G 2.4.4 It is not considered to be reasonable or practicable to expect vehicle maintainers to have systems in place to facilitate the rectification of on-board train radio faults at all locations where trains can enter service. Furthermore, it is acknowledged that a train with a defective on-board train radio will need to be moved to a location where the fault can be rectified; a point that is not considered within the OPE TSI. Therefore, it is necessary for such arrangements to be considered within a transport operator’s SMS and supported by a suitable and sufficient assessment of risk.

G 2.4.5 These requirements should be included within a transport operator’s SMS, as they were derived from the safety risk analysis described in section 1.2 of this document.

2.5 When transportable or portable GSM-R equipment has been provided

2.5.1 When transportable or portable GSM-R equipment has been provided, the train or traction unit can carry out the remainder of its planned workings for that day, but shall finish those workings at a location where the defective on-board train radio can be repaired.

Rationale

G 2.5.2 It is considered reasonable for vehicle maintainers to have systems in place that facilitate the rectification of known on-board train radio defects, and for them to include the need for a defect to be rectified as soon as reasonably practicable. Therefore, vehicle maintainers are expected to have systems in place that enable a train with a known defect to be presented at a maintenance location where the defect can be rectified.

Guidance

G 2.5.3 This requirement should be included within a transport operator’s SMS, as it was derived from the safety risk analysis described in section 1.2 of this document.

2.6 While in service

2.6.1 If the on-board train radio becomes defective in the cab from which a train is being driven during the course of a journey, the train can continue its journey provided that one of the following applies. These are illustrated in Appendix B.

a) GSM-R transportable equipment or an operational hand-portable device which is configured to send and receive RECs can be provided.

b) If it is not possible to provide transportable or portable GSM-R equipment at the location where the defect has been reported, it can be provided at the first location where it is available before reaching a distance of 75 miles, stopping the train there specially if necessary.

c) If it is not possible to provide transportable or portable GSM-R equipment at any point during the journey, the train may be allowed to complete its journey, which shall not exceed 75 miles. If necessary to achieve this, a train may be terminated short of its planned destination.
Rationale

G 2.6.2 The OPE TSI, Appendix B, section 8.2 Failure of on-board train radio when the train has entered service states: ‘When the driver becomes aware that the voice radio is failed, the driver shall inform the signaller as soon as practicable. The driver shall then carry out the formal instructions given by the signaller concerning the further movement of the train. A train with a failed on-board train radio may continue the service: - as long as another means of emergency communication is provided between the driver and the signaller, or - to the nearest location where the radio can be repaired or the affected vehicle replaced as long as another means of communication is provided between the driver and the signaller’.

G 2.6.3 The OPE TSI does not define what is meant by either ‘another means of emergency communication’ or ‘the nearest location’. Therefore, it is necessary for such arrangements to be considered within a transport operator’s SMS and supported by a suitable and sufficient assessment of risk.

G 2.6.4 This requirement should be included within a transport operator’s SMS, as it was derived from the safety risk analysis described in section 1.2 of this document.

Guidance

G 2.6.5 There is no guidance associated with this requirement.

2.7 Provision of GSM-R transportable and operational hand-portable devices

2.7.1 Provision of GSM-R transportable and operational hand-portable devices which are configured to send and receive RECs shall be included within a transport operator’s contingency plans.

2.7.2 In doing so, a transport operator shall take the following into consideration:

a) Equipment shall be available at a sufficient number of locations and in adequate quantities to maximise its effectiveness in mitigating the effect of on-board train radio failures.

b) The location of equipment shall be determined by the number of train movements originating at or running through a location, together with the ease of transferring the equipment by rail or road to any nearby locations where failures may be reported.

c) The selection of locations shall minimise the distance to be travelled by any train which has no operative on-board train radio in the cab from which it is being driven.

d) The equipment shall be kept in a secure place and access restricted to authorised personnel to prevent the accidental initiation of RECs or misuse of the equipment.

e) All equipment shall be fully charged, maintained and compatible with the current GSM-R system configuration so as to be immediately available for use.

f) When any equipment is provided to a train operator to allow a train to enter or continue in service, effective arrangements shall be in place to return it promptly to its home location.

Rationale

G 2.7.3 The OPE TSI, Appendix B, section 8.2 Failure of on-board train radio when the train has entered service states: ‘When the driver becomes aware that the voice radio is failed, the driver shall inform the signaller as soon as practicable. The driver shall then carry out the formal instructions given by the signaller concerning the further movement of the train. A train with a failed on-board train radio may continue the service: - as long as another means of emergency communication is provided between the driver and the signaller, or - to the nearest location where the radio can be repaired or the affected vehicle replaced as long as another means of communication is provided between the driver and the signaller’.
Guidance

G 2.7.4 The OPE TSI does not define what is meant by either ‘another means of emergency communication’ or ‘the nearest location’. Therefore, it is necessary for such arrangements to be considered within a transport operator’s SMS and supported by a suitable and sufficient assessment of risk.

G 2.7.5 This requirement should be included within a transport operator’s SMS, as it was derived from the safety risk analysis described in 1.2 of this document.

G 2.7.6 Transport operators should work collaboratively to determine the number of GSM-R transportable and operational hand-portable devices which are configured to send and receive RECs and to determine the optimum locations to store them. This will reduce overall costs to the industry and ensure such equipment can be shared by transport operators.
Part 3 Requirements for Managing Failures of the GSM-R Fixed Network Equipment

3.1 Notification of failures of the GSM-R network

3.1.1 The GSM-R network provider shall have systems in place to notify all affected IMs of a detected failure within the GSM-R fixed network.

3.1.2 The requirements in this Part 3 apply to failures of GSM-R equipment, but not to any planned outages.

3.1.3 When a failure within the GSM-R fixed network is detected, whether or not this affects more than approximately six miles of route, the network provider shall provide as a minimum the following information to all affected IMs:

a) Details of the geographic scope of the failure.
b) Details of the running lines affected.
c) Time the failure was detected.
d) Nature of the failure.
e) Estimated time to rectify the failure.

Rationale

G 3.1.4 The OPE TSI, Appendix A, section 7, GSM-R rules, does not define any requirements concerning the management of GSM-R network failures.

G 3.1.5 Therefore, it is necessary for such arrangements to be considered within a transport operator’s SMS and supported by a suitable and sufficient assessment of risk.

Guidance

G 3.1.6 These requirements should be included within a transport operator’s SMS, as they were derived from the safety risk analysis set out in 1.2 of this document.

3.2 Alternative means of communication

3.2.1 The IM shall have systems in place to make all affected RUs aware of failures of the GSM-R fixed network and be able to provide details of the impact the failure will have on the normal means of communication. All transport operators shall have systems in place to make all their affected employees aware of a failure to the fixed network.

3.2.2 If a failure within the GSM-R system affects signaller and driver communication, then drivers shall be advised to use an alternative means of communication within the affected area, for example, lineside telephones or public mobile.

3.2.3 If a public mobile phone has been provided for driver to signaller communication, the mobile telephone shall have the telephone numbers for all signal boxes accountable for controlling train movements within the affected area pre-programmed into the devices phonebook.
Rationale

G 3.2.4 Transport operators should be prepared for failures of the GSM-R fixed network and have contingency arrangements in place to manage such events, including clear instructions concerning alternative communication methods.

Guidance

G 3.2.5 It should be anticipated that the public mobile telephone will be used to contact the signaller; therefore pre-programming the relevant signal box telephone numbers is considered to be reasonable and ensures the driver has the required information necessary to communicate with the signaller.

3.3 Failures affecting less than approximately six miles of route

3.3.1 If a failure affects a geographic area that is less than approximately six miles of route, then train operations shall be permitted to continue normally without restriction.

Rationale

G 3.3.2 A geographic area of less than approximately six miles of route is typically the area normally covered by a base station. For large failures the optimum response is always to reduce speed after a delay. For smaller failures, cautioning trains and running at reduced speed through the network failure introduces more knock-on risk than it mitigates through reduction in immediate risk (not being able to stop a train on an adjacent line in an emergency). Consequently, for network failures below six miles, it is safer to continue at line speed.

Guidance

G 3.3.3 The OPE TSI, Appendix A, section 7, GSM-R rules, does not define any requirements concerning the management of GSM-R network failures.

G 3.3.4 The requirement set out in this section should be included within a transport operator’s SMS, as it was derived from the safety risk analysis set out in section 1.2 of this document.

G 3.3.5 Therefore, it is necessary for such arrangements to be considered within a transport operator’s SMS and supported by a suitable and sufficient assessment of risk.

3.4 Failures affecting more than approximately six miles of route

3.4.1 If a failure affects a geographic area that is more than approximately six miles of route, then train operations shall be permitted to continue, but the permissible speed of train movements through the affected area shall be no greater than 100 mph.

Rationale

G 3.4.2 A geographic area of more than approximately six miles of route is most likely to be a failure of a base station controller, which will affect approximately 10% of the GSM-R fixed network. However, it is also possible for the whole GSM-R fixed network to be affected if the mobile switching centre has failed.

G 3.4.3 Reducing the speed of all trains is a very effective mitigation, in the event of an incident, since both the initial train is less likely to foul an adjacent line, and oncoming trains are much more likely to stop before an obstruction. The immediate risk with a speed reduction is significantly lower than with GSM-R working since the risk from hazards not mitigated by the use of a REC are also significantly lower.
Guidance
G 3.4.4 The OPE TSI, Appendix A, section 7, GSM-R rules, does not define any requirements concerning the management of GSM-R fixed network failures.
G 3.4.5 Therefore, it is necessary for such arrangements to be considered within a transport operator’s SMS and supported by a suitable and sufficient assessment of risk.
G 3.4.6 The requirement set out in this section of the document should be included within a transport operator’s SMS, as it was derived from the safety risk analysis set out in 1.2 of this document.

3.5 Failure continuing for more than four hours

3.5.1 If a failure affecting more than approximately six miles of route is likely to persist for more than four hours, then transport operators shall implement an emergency timetable that will reduce the train service sufficiently to facilitate the safe introduction of a 60 mph blanket speed restriction through the affected area.

3.5.2 Transport operators shall work collaboratively to implement an emergency timetable no later than four hours after the failure occurred.

Rationale
G 3.5.3 The RSSB safety analysis set out in 1.2 concluded that reducing the speed of all trains is a very effective mitigation, in the event of an incident, since both the initial train is less likely to foul an adjacent line and oncoming trains are much more likely to stop before an obstruction. The immediate risk with a speed reduction is significantly lower than with GSM-R working since the risk from hazards not mitigated by the use of a REC are also significantly lower.

G 3.5.4 However, it was also determined that the immediate implementation of blanket speed restrictions introduced significantly higher levels of secondary risk and concluded that any reduction in speed should be planned. The four hour planning period was determined through expert judgement during a workshop consisting of practitioners whose roles and responsibilities included the implementation of emergency timetables during degraded operating conditions.

Guidance
G 3.5.5 Therefore, it is necessary for such arrangements to be considered within a transport operator’s SMS and supported by a suitable and sufficient assessment of risk.
G 3.5.6 These requirements should be included within a transport operator’s SMS, as they were derived from the safety risk analysis set out in 1.2 of this document.
G 3.5.7 The flowchart for managing failures of the GSM-R fixed network is shown in Appendix C.
G 3.5.8 The OPE TSI, Appendix A, section 7, GSM-R rules, does not define any requirements concerning the management of GSM-R fixed network failures.
Part 4 Using On-board Train Radio to Communicate to or from a Moving Train

4.1 General requirements for using on-board train radio to communicate to or from a moving train

4.1.1 Any conversation between a driver and a signaller that is not to give warning of immediate danger shall relate to the immediate journey of the train.

4.1.2 When a train is moving, a driver shall only have to press a single button to initiate a call from the on-board train radio to a signaller.

4.1.3 If the signaller needs to contact the driver of a train, and does not know that the train concerned is at a stand, the signaller shall not attempt to call the driver unless it is an emergency.

4.1.4 A signaller shall be permitted to send a ‘contact signaller’ message to the train concerned to make the driver aware of the need to contact the signaller.

Rationale

G 4.1.5 The driver is required to make a professional judgement as to whether a radio call is the most appropriate method of conveying information, and to take into account situational factors in order to make a call safely. It is not desirable that calls are made which do not have a direct operational impact on the working of the train in question.

G 4.1.6 The ability to originate a radio call from a moving train requires a judgement that this can be done safely in the conditions prevailing, and a need to search through menu structures is likely to extend the time occupied by the call and make it less likely that the identified safe conditions for doing so will still apply.

G 4.1.7 The driver of a moving train is required to make a judgement based on the prevailing situation as to whether it appropriate to originate a train radio call. A signaller is not in a position to be aware of those circumstances and cannot apply a similar judgement as to whether a call should be originated.

G 4.1.8 Because a signaller is unable to judge whether a speech call to a driver could be answered safely, the method of initiating a conversation with a driver is required to be one that does not demand an immediate direct response.

Guidance

G 4.1.9 A human factors study conducted on behalf of RSSB between December 2015 and February 2016 examined the use of on-board train radio on the move. The study concluded that the primary hazard of a driver becoming distracted from the driving task is one that should be mitigated by the driver’s professional judgement, while taking into consideration the situational factors at the time.

4.2 Railway emergency or urgent calls

4.2.1 An authorised user of the GSM-R system shall be permitted to give warning of immediate danger to or from a moving train at any time.

Rationale

G 4.2.2 A primary objective of introducing an on-board train radio system was that it would permit a warning of immediate danger to be given as soon as possible, to allow an opportunity of preventing any
approaching train being exposed to that danger. Any emergency or urgent point-to-point call is therefore permitted to be sent by a driver or signaller as soon as it becomes apparent that there is a need to do so, irrespective of the conditions which may apply when any driver is sending or receiving the message.

Guidance

G 4.2.3 There is no guidance associated with this requirement.

4.3 Broadcast calls

4.3.1 A signaller shall be permitted to use broadcast calls to give information to the drivers of moving trains.

Rationale

G 4.3.2 Information can be provided to drivers that is useful to them in relation to the running of their trains. If this is of a nature which does not require positive action or acknowledgement, a driver can exercise a choice as to whether the information is absorbed, or when the situation requires total concentration on the driving task, can choose to effectively disregard the broadcast message.

Guidance

G 4.3.3 There is no guidance associated with this requirement.

4.4 Berth-triggered broadcasts

4.4.1 A berth-triggered broadcast shall be permitted to give specific information to a driver without stopping the train.

4.4.2 The driver shall acknowledge the receipt of a berth-triggered broadcast message, providing the content has been understood.

4.4.3 If information or instructions are to be passed to a driver by means of a berth-triggered broadcast, the suitability of this method for conveying that type of message shall be agreed by all affected transport operators before any attempt is made to apply it.

Rationale

G 4.4.4 This procedure allows information to be focussed towards trains approaching a particular location without any need to bring the train to a standstill. The driver then contacts the signaller and restarts, so avoiding the situation in which drivers receive broadcast messages that are not relevant to the current movement of the train.

G 4.4.5 If a berth-triggered broadcast is used as a means of giving a driver a specific instruction, such as a requirement to proceed at caution, a positive response is necessary from the driver to confirm receipt and understanding, giving assurance that the instruction will be correctly applied. If the driver has been unable to fully understand the message, or has not judged it appropriate to concentrate on the message owing to other driving tasks demanding attention, the absence of any acknowledgement indicates this.

G 4.4.6 A co-ordinated industry approach is recommended to allow for the controlled implementation of additional applications of the process, especially where a driver acknowledgement is necessary. Hazards have been identified with the use of berth-triggered broadcasts and it is important that these have been considered, as well as consistency in the extent to which the process is applied.
4.5 Point-to-point calls

4.5.1 If the driver needs to give some information to the signaller or train operator’s control immediately, or as soon as possible, or the driver is responding to a ‘contact signaller’ or ‘contact train operator’s control’ message, the driver shall be permitted to use the on-board train radio while a train is moving, providing all of the following apply:

a) It is possible to speak directly to the appropriate signaller.

b) The Rule Book does not require the train to be stopped in that situation.

c) The driver reduces the speed of the train before commencing the call, so that full control of the train can be retained.

d) The driver judges that the call should not be delayed until the next planned stop of the train.

e) The train is not approaching or running under cautionary aspects or a speed restriction.

4.5.2 If the conversation cannot be concluded quickly the driver shall either terminate the call or stop the train.

4.5.3 If a call is being made to seek clarification, advice or information from a signaller, the call shall only be made after the train has been brought to a standstill.

4.5.4 Should it not prove possible to conclude the call in the anticipated short timescale, the driver’s judgement that it is safe to make the call while the train is in motion, having regard to the conditions prevailing, and any actions taken in response to those conditions, is no longer a valid one. The driver shall decide either to abandon the call, or to conclude it while stationary.

Rationale

G 4.5.5 This procedure allows an opportunity to report events when they have chosen to do so, enabling a timely response to the event or situation, when the call is not expected to be protracted or complex, and actions can be taken by the driver to manage workload.

G 4.5.6 In this situation a driver is unlikely to be able to predict either the length or complexity of a call, and to avoid protracted conversations, and the possibility of distraction, it is not desirable to attempt such a conversation without stopping the train.

Guidance

G 4.5.7 There is no guidance associated with these requirements.

4.6 Text messages

4.6.1 If the on-board train radio is able to receive text messages, the driver shall only read received text messages when it is safe to do so.

4.6.2 If it is necessary to give a driver any other information about the movement of a train, the signaller shall use the ‘contact signaller’ message.
Rationale

G 4.6.3 Any text message which provides operational information should be in a pre-defined format and capable of being read and interpreted by means of a brief glance. The nature of the content must, however, be such that an immediate response or action is not required, and a driver in consequence can await an opportunity to look at the message when attention is not focussed on other driving tasks, and they do not have to modify the handling of the train before viewing the text message.

Guidance

G 4.6.4 A message which requires the driver to give any greater attention to read and understand it, or which would require more immediate attention by the driver is not one for which a text message is a suitable medium. A driver should not be expected to attempt to interpret or respond to it, and a signaller should initiate the process of speaking to the driver.

4.7 Driver-to-driver communication

4.7.1 Where there are two drivers involved in the movement of one train, and communication between the drivers concerning the movement of the train is necessary, they shall be permitted to speak to one another while the train is moving.

Rationale

G 4.7.2 A number of scenarios were identified in which two drivers are involved in the movement of the same train, or with the movement of an assisting train towards a failed train, and there are actual or implied requirements for them to converse about the control or movement of the train concerned. Whenever this is the case, on-board train radio would be an appropriate means of communication and would be specifically authorised as a possible medium in the Rule Book. The majority of situations involve movement at limited speeds, and it is essential that immediate communication takes place to allow the movement to be appropriately controlled.

Guidance

G 4.7.3 There is no guidance associated with this requirement.

4.8 When a train is not driven from the leading cab

4.8.1 If a train or movement is being driven from a cab that is not the leading cab, and a person is controlling the movement from a cab at the leading end, messages concerning the control of the movement shall be permitted to be given using the on-board train radio.

Rationale

G 4.8.2 In this situation there is an existing requirement for the person at the leading end of the movement to communicate with the driver about the control or movement of the train concerned. Whenever this is the case, an on-board train radio system would be an appropriate means of communication and is referred to in the Rule Book. The majority of situations involve movement at limited speeds, and it is essential that immediate communication takes place to allow the movement to be appropriately controlled.
Guidance

G 4.8.3 There is no guidance associated with this requirement.

4.9 Engineering possessions

4.9.1 Messages concerning movements of a train in a possession shall be permitted to be passed between signallers, drivers, person in charge of possession (PICOP), engineering supervisors (ESs) and safe work leaders (SWLs) while a train is moving.

Rationale

G 4.9.2 Within a possession communication is necessary between those responsible for authorising movements and drivers responsible for making them. On-board train radio would be an appropriate means of communication as well as any other existing methods and would be specifically authorised as a possible medium in the Rule Book. The majority of situations involve movement at limited speeds, and use of on-board train radio might result in opportunities being taken to question or reconfirm details of movements in a more effective manner than when other forms of communication are being relied on.

Guidance

G 4.9.3 There is no guidance associated with this requirement.

4.10 Train operator’s control

4.10.1 If the train operator’s control needs to contact the driver of a train, it shall only attempt to call the driver if it is known that the train concerned is at a stand.

4.10.2 A train operator’s controller shall be permitted to send a ‘contact train operator’s control’ message to the train concerned to make the driver aware of the need to contact the train operator’s control.

Rationale

G 4.10.3 The driver of a moving train is required to make a judgement based on the prevailing situation as to whether it appropriate to originate a train radio call. A train operator’s controller is not in a position to be aware of those circumstances and cannot apply a similar judgement as to whether a call should be originated.

G 4.10.4 Because a controller is unable to judge whether a speech call to a driver could be answered safely, the method of initiating a conversation with a driver is required to be one that does not demand an immediate direct response.

Guidance

G 4.10.5 There is no guidance associated with these requirements.
Appendices

Appendix A  Entering Service with an On-board Train Radio Failure

Figure 1: Flowchart for entering service with an on-board train radio failure

Note: The term 'journey' has the same meaning as defined in Guidance Note GOGN3637, that is to say the route from the starting point of a train to the location where the train reaches its planned destination, reverses direction before continuing, where vehicles are attached or detached, or the train is terminated short of its planned destination. Any light locomotive or empty coaching stock movement is to be considered as a separate journey from the associated train movement.
Appendix B  On-board Train Radio Failure While in Service

![Flowchart for on-board train radio failure while in service](image)

**Note:** The term 'journey' has the same meaning as defined in Guidance Note GOSN3637, that is to say the route from the starting point of a train to the location where the train reaches its planned destination, reverses direction before continuing, where vehicles are attached or detached, or the train is terminated short of its planned destination. Any light locomotive or empty coaching stock movement is to be considered as a separate journey from the associated train movement.

**Figure 2:** Flowchart for on-board train radio failure while in service
Appendix C  Failures of the GSM-R Fixed Network Equipment

Figure 3: Flowchart for failures of the GSM-R fixed network equipment
Definitions

Driver Only Operation (DOO)  A method of working which permits trains to operate without the need of a guard.

Global System for Mobile Communications - Railway (GSM-R)  The European Standard specific to railway applications for the transmission by radio of voice and data between train and trackside installations. GERCR8517 Iss 1

GSM-R network provider  The GSM-R network provider in Great Britain is Network Rail Telecommunications (NRT).

Immediate risk  The immediate risk from being unable to use GSM-R during a system failure. This is primarily the risk from not being able to protect an obstructed line but other uses of GSM-R are also considered.

Journey  The route from the starting point of a train to the location where the train reaches its planned destination, reverses direction before continuing, where vehicles are attached or detached, or the train is terminated short of its planned destination. Any light locomotive or empty coaching stock movement is to be considered as a separate journey from the associated train movement.

On-board train radio  This refers to fixed equipment provided in the cab for GSM-R radio.


Railway Emergency Call (REC)  The highest priority call in the GSM-R network, configured as a group call, conveying an emergency stop request to all trains in receipt of the REC. A REC will be broadcast over defined GCAs.

Safety Management System (SMS)  No definition.

Secondary risk  The risk resulting from the impact different operational responses will have on train performance. This includes personal accident risk resulting from extra boarding, alighting, and crowding at stations, as well as train accident risk caused by miscommunication and extra red signal approaches.

So Far As Is Reasonably Practicable (SFAIRP)  No definition.

Transport Operator  An infrastructure manager or railway undertaking that must implement the requirements in this standard.
References

The Catalogue of Railway Group Standards gives the current issue number and status of documents published by RSSB. This information is also available from http://www.rgsonline.co.uk.

RGSC 01 Railway Group Standards Code
RGSC 02 Standards Manual

Documents referenced in the text

Railway Group Standards

GERT8000 The Rule Book.

RSSB documents

GOGN3637 Guidance on Defective On-Train Equipment.


Human factors study on drivers’ use of the GSM-R cab radio whilst a train is moving.


Other documents

Common Safety Method on Risk Evaluation and Assessment CSM RA


Technical Specification for Interoperability TSI