Rail Industry Standard
RIS-3780-TOM
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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. The document also sets out requirements and guidance for the use of the train radio for communication to or from a moving train.

Issue Record

Issue	Date	Comments
One	03/09/2016	Original document. 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.
Two	02/09/2023 [proposed]	Replaces issue one. This revision incorporates the introduction of the use of a competent person in a non-leading cab as an additional mitigation measure in case of train radio failure. The standard's structure has been revised to make it easier to follow, and clarify responsibilities and guidance. Editorial amendments have been made throughout the document.

Revisions have not been marked by a vertical black line in this issue because the document has been revised throughout.

Superseded Documents

The following Railway Group documents are superseded, either in whole or in part as indicated:

Superseded documents	Sections superseded	Date when sections are superseded
RIS-3780-TOM issue one	All	02/09/2023 [proposed]

Supply

The authoritative version of this document is available at www.rssb.co.uk/standards-catalogue. Enquiries on this document can be submitted through the RSSB Customer Self-Service Portal https://customer-portal.rssb.co.uk/

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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) mainline railway.

1.1.3   Furthermore, this document contains requirements and guidance relating to the use of the on-board 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 are managed across the GB mainline network, taking into consideration the increase in safety risk (immediate and secondary risk) associated with the loss of the GSM-R Railway Emergency Group 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 GSM-R Failure 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   A further safety analysis was undertaken in November 2022 to introduce the use of a competent person as an additional optional mitigation measure for on-board train radio failures. This was a qualitative and quantitative assessment building on the original GSM-R Failure Risk Model.

1.2.7   The operational principles that emerged from these safety analyses form the basis of the requirements and guidance published in *Part 2* and *Part 3* of this document.

1.2.8   *Part 4* of this document also defines the requirements and guidance concerning the use of train radio 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   Compliance requirements and dates have not been specified because these are the subject of internal procedures or contract conditions.

1.3.2   If you plan to do something that does not comply with a requirement in this RIS, you can ask a Standards Committee to comment on your proposed alternative. If you want a Standards Committee to do this, please submit your deviation application form to RSSB. You can find advice and guidance on using alternative requirements on RSSB's website www.rssb.co.uk.

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 that are sequentially numbered. This document also sets out the rationale for the requirement, explaining why the requirement is needed and its purpose and, where relevant, guidance to support the requirement. The rationale and the guidance are prefixed by the letter 'G'.

1.5.2   Some subjects do not have specific requirements but the subject is addressed through guidance only and, where this is the case, it is distinguished under a heading of 'Guidance' and is prefixed by the letter 'G'.

1.6   Approval and authorisation of this document

1.6.1   The content of this document will be approved by the Traffic Operation and Management (TOM) Standards Committee on 27 June 2023 (proposed).

1.6.2   This document will be authorised by RSSB on 28 July 2023 (proposed).

Part 2   Requirements for Managing On-Board Train Radio Equipment Failures

2.1   Starting a journey from a maintenance depot

2.1.1   A railway undertaking shall not allow a train or traction unit to start a journey 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.

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

Rationale

G 2.1.3   Having a working on-board radio on lines where a radio is required is a requirement of the Operation and Traffic Management National Technical Specification Notice (OPE NTSN).

Guidance

G 2.1.4   The on-board train radio is considered to be defective if the driver machine interface (DMI) 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 Flt
d) EPROM/RAM Flt.

G 2.1.5   The failure modes in clause *G 2.1.4* 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).

G 2.1.6   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 a REC are not affected by the registered state of the on-board train radio, as the user's actions and system behaviour are unaffected.

G 2.1.7   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 start a journey 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.

G 2.1.8   A train with a defective on-board train radio may start a journey from a maintenance depot provided the affected driving cab is not driven from until the defect can be rectified. For example, the affected cab may be confined within the train formation and only form an intermediate cab for the duration of its planned workings; or be allowed to form a non-leading cab for a single journey to another location where the fault can be rectified.

G 2.1.9   The railway undertaking's contingency plan takes account of the assessment of the requirements for degraded mode operations set out in their safety management system. The safety risk analysis described in section *1.2* of this document informs the requirements to be included within the railway undertaking's safety management system.

G 2.1.10   RIS-0794-CCS sets out requirements for the application of GSM-R train voice radio systems and contains information about the GSM-R visual and audible alarms.

G 2.1.11   A flowchart illustrating the process for managing on-board train radio equipment failures is shown in Appendix *A*.

2.2   Starting a journey from other than a maintenance depot or during a journey

2.2.1   A railway undertaking shall only allow a train or traction unit to start a journey from other than a maintenance depot or continue a journey with a defective on-board train radio provided one of the following applies:

a) The affected cab will not be driven from at any time during the journey;

b) GSM-R transportable equipment or an operational hand-portable device configured to send and receive RECs is provided in the affected cab (see section *2.3*);

c) Arrangements have been made for GSM-R transportable equipment or an operational hand-portable device to be provided at the nearest location where it is available during the journey before reaching a distance of 120 km (75 miles), stopping the train there specially if necessary (see section *2.3*);

d) 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 provided it is no more than 120 km (75 miles). If necessary, to achieve this, a train may be terminated short of its planned destination; or

e) If it is known that it will not be possible to provide GSM-R transportable equipment or an operational hand-portable device at any point during the journey within 120 km (75 miles), a competent person able to operate an alternative working radio in an emergency may be provided before reaching a distance of 25 km (15 miles), stopping the train there specially if necessary. This mitigation measure is subject to suitable direct means of communication being available (see section *2.4*).

Rationale

G 2.2.2   Having a working on-board radio that provides a means of communication between the driver and the signaller is a requirement of the OPE NTSN.

G 2.2.3   When the defect is identified once the train has started a journey, the OPE NTSN allows a train to continue provided there are other means of emergency communication in place or to continue to the nearest location where the radio can be repaired or the affected vehicle replaced.

Guidance

G 2.2.4   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 start a journey. Furthermore, it is acknowledged that a train with a defective on-board train radio may need to be moved to a location where the fault can be rectified.

G 2.2.5   The railway undertaking's safety management system makes provision for these arrangements, which are derived from the safety analyses described in section *1.2*, and supports them with a suitable and sufficient assessment of risk.

G 2.2.6   When using transportable or portable GSM-R equipment as a mitigation measure, see section *2.3*.

G 2.2.7   If it is not possible to provide GSM-R transportable equipment or an operational hand-portable device at any point during the journey, and before exceeding the 120 km (75 miles) limit, the railway undertaking can consider the use of a competent person who is trained to receive and initiate a REC in an emergency as an alternative mitigation measure.

G 2.2.8   This risk mitigation provided by GSM-R transportable equipment or an operational hand-portable device is considered to be more effective than that provided by the competent person, so it remains the preferred option where available.

G 2.2.9   When using a competent person as an alternative mitigation measure, see section *2.4*.

G 2.2.10   A flowchart illustrating the process for managing on-board train radio equipment failures is shown in Appendix *A*.

2.3   When using GSM-R transportable equipment or operational hand-portable devices

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

2.3.2   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.

2.3.3   When GSM-R transportable equipment or an operational hand-portable device 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 2.3.4   See clause *G 2.2.2*.

G 2.3.5   See clause *G 2.2.3*.

Guidance

G 2.3.6   The railway undertaking's contingency plan takes account of the assessment of the requirements for degraded mode operations set out in their safety management system. The safety risk analysis described in section *1.2* of this document informs the requirements to be included within the railway undertaking's safety management system.

G 2.3.7   It is good practice for transport operators to work collaboratively to determine the number of GSM-R transportable and operational hand-portable devices that 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.

G 2.3.8   It is considered reasonable for vehicle maintainers to have systems in place that facilitate the identification and rectification of known on-board train radio defects, and for them to include the need for a defect to be rectified so far as is 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.

2.4   When using a competent person

2.4.1   When formulating the contingency plan for the use of a competent person, the railway undertaking shall take the following into consideration:

a) The competent person has been trained to operate the radio in case of emergency; that is, initiate RECs and act upon receipt of one, and only use the radio for this purpose. It is good practice for any training to include awareness of all the audio-visual alerts displayed, including those shown if the REC was initiated while they were not present in the non-leading cab;

b) The person can remain in the cab at all times. However, if a guard required to carry out dispatch duties is assigned the task of competent person, they may continue to perform safety-critical tasks. That is, they may continue to perform

dispatch duties as long as they are able to return to the non-leading cab immediately without the need to travel through more than one vehicle;

c) The competent person has been trained to respond to an incoming REC in the same way as a driver. That is, the competent person will bring the train to a stand immediately and listen to the message; and

d) In case of a suspected incident, if the competent person cannot contact the driver, they may deem them to be incapacitated and initiate a REC.

2.4.2   Railways undertakings shall ensure that, when using a competent person as a mitigation measure, direct communication between cabs is available, for example cab-to-cab communications. Train buzzers or bells are not a suitable means of communication between the driver and competent person.

2.4.3   When using a competent person as a mitigation measure, the railway undertaking's contingency plan shall make provision for the train to make subsequent journeys not exceeding 290 km (180 miles) before GSM-R transportable equipment or an operational hand-portable device is collected, or the train is terminated; and for the final journey of the train to be to a location where the defective on-board train radio can be repaired.

Rationale

G 2.4.4   See clause *G 2.2.2*.

G 2.4.5   Suitable means of communication allow instructions or information regarding the nature of any danger to be shared between parties. For example, a driver may need to pass the competent person the details of a hazard on an adjacent line that poses an immediate danger to trains and requires a REC to be initiated; and a competent person may act and stop the train upon receipt of a REC and need to pass the driver the information received. Train buzzer or bells do not constitute a suitable means of communication between the driver and the competent person. When relying solely on the train buzzer or bell, the exchange of information is very limited and, as such, not adequate.

G 2.4.6   See clause *G 2.2.3*.

Guidance

G 2.4.7   The provision of a competent person who is able to operate a working radio in an emergency from a non-leading cab reduces the risk to trains when compared to operating without a functioning on-board radio. This is subject to direct communication between cabs being available, for example cab-to-cab communications.

G 2.4.8   The provision of a competent person is considered a suitable mitigation measure when the person is:

a) Already on board; or
b) Available within 25 km (15 miles).

G 2.4.9   The provision of a competent person is not considered a replacement for the collection of GSM-R transportable equipment or an operational hand-portable device where this is available. However, a railway undertaking may also consider the

provision of a competent person to provide protection while travelling to that location.

G 2.4.10   When the train changes direction during its day's workings, journeys with a working radio do not count towards the maximum permissible distance of 290 km (180 miles) that the train may travel with a competent person as a mitigation measure before GSM-R transportable equipment or an operational hand-portable device is collected.

G 2.4.11   The railway undertaking makes a decision on which staff are suitable to carry out the role of the competent person. This decision takes into account the staff's training and competence, as well as the impact carrying out the role of the competent person will have on their normal tasks. In addition, the decision on the day also considers the suitability of the person based on the fatigue levels incurred from previous work or the length of time they are required to perform the duties of the competent person.

G 2.4.12   RIS-0794-CCS provides information on visual and audible signs regarding RECs in GSM-R.

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   Infrastructure managers shall have processes in place to be promptly notified by the GSM-R network provider of a detected failure within the GSM-R fixed network.

3.1.2   When a service-affecting failure within the GSM-R fixed network is detected, whether or not this affects more than approximately 10 km (6 miles) of route, the network provider shall provide all affected infrastructure managers, as a minimum, the following information:

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; and
e) Estimated time to rectify the failure.

3.1.3   The infrastructure manager shall have processes in place to make all affected railway undertakings 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.

3.1.4   All transport operators shall have systems in place to make all their affected employees aware of a failure to the fixed network.

Rationale

G 3.1.5   The OPE NTSN does not define any requirements concerning the management of GSM-R network failures.

G 3.1.6   Therefore, it is necessary for such arrangements to be considered within a transport operator's safety management system (SMS) and supported by a suitable and sufficient assessment of risk.

Guidance

G 3.1.7   The requirements in this *Part 3* apply to failures of GSM-R equipment, but not to any planned outages.

G 3.1.8   The transport operator's SMS makes provision for the requirements set out in this section as set out in the safety risk analysis in section *1.2* of this document.

G 3.1.9   For further information on:

- Alternative means of communication see section *3.2*.
- Failures affecting less than approximately ten kilometres or six miles of route see section *3.3*.
- Failures affecting more than approximately ten kilometres or six miles of route see section *3.4*.
- Failure continuing for more than four hours see section *3.5*.

G 3.1.10   A flowchart illustrating the process for managing failures of the GSM-R fixed network is shown in Appendix *B*.

3.2   Contingency plans and alternative means of communication

3.2.1   Transport operators shall have contingency plans in place to manage failures of the GSM-R fixed network.

3.2.2   The transport operators' contingency plans shall make provision to inform the driver of the alternative means of communication to be used when a failure of the GSM-R system affects signaller and driver communication within the affected area, for example, lineside telephones or mobile phones.

3.2.3   When the railway undertaking provides a mobile phone for driver to signaller communication, the mobile phone shall have the telephone numbers for all signal boxes which control train movements within the affected area pre-programmed into the device's phonebook.

Rationale

G 3.2.4   Transport operators need to 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.

G 3.2.5   When it is anticipated that a mobile phone will be used to contact the signaller, pre-programming the relevant signal box telephone numbers ensures the driver has the required information necessary to communicate with the signaller.

Guidance

G 3.2.6   There is no guidance associated with this requirement.

3.3   Failures affecting less than approximately ten kilometres or six miles of route

3.3.1   Transport operators shall allow operations to continue normally without restriction when a failure affects a geographic area that is less than approximately 10 km (6 miles) of route.

Rationale

G 3.3.2   See clause *G 3.1.5*.

G 3.3.3   See clause *G 3.1.6*.

Guidance

G 3.3.4   A geographic area of less than approximately ten kilometres or 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 ten kilometres or six miles, it is safer to continue at line speed.

3.4   Failures affecting more than approximately ten kilometres or six miles of route

3.4.1   If a failure affects a geographic area that is more than approximately 10 km (6 miles) of route, then transport operators shall allow train operations to continue, but the permissible speed of train movements through the affected area shall be no greater than 160 km/h (100 mph).

Rationale

G 3.4.2   See clause *G 3.1.5*.

G 3.4.3   See clause *G 3.1.6*.

Guidance

G 3.4.4   A geographic area of more than approximately ten kilometres or 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 3.4.5   Reducing the speed of all trains in the event of an incident is considered an effective mitigation for network failures affecting larger areas. This is because 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 is also significantly lower.

G 3.4.6   A flowchart illustrating the process for managing failures of the GSM-R fixed network is shown in Appendix *B*.

3.5   Failure continuing for more than four hours

3.5.1   If a failure affecting more than approximately 10 km (6 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 95 km/h (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   See clause *G 3.1.5*.

G 3.5.4   See clause *G 3.1.6*.

Guidance

G 3.5.5   The RSSB safety analysis set out in section *1.2* concluded that reducing the speed of all trains is an effective mitigation measure in the event of an incident, since both the initial train is less likely to foul and 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 risks from hazards mitigated by the use of a REC are also significantly lower.

G 3.5.6   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.

G 3.5.7   A flowchart illustrating the process for managing failures of the GSM-R fixed network is shown in Appendix *B*.

Part 4   Using the On-Board Train Radio to Communicate to or from a Moving Train

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

4.1.1   Transport operators shall have processes in place to ensure that any conversation between a driver and a signaller that is not to give warning of immediate danger relates to the immediate journey of the train.

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

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

4.1.4   Infrastructure managers shall ensure that the signaller sends 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. Calls that do not have a direct operational impact on the working of the train in question may cause unnecessary distraction.

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.

G 4.1.10   Different types of calls and uses of the GSM-R on-board train radio:

a) For REC or urgent calls, see section *4.2*.

      b) For broadcast calls, see section *4.3*.

      c) For berth-triggered broadcasts, see section *4.4*.

      d) For point-to-point calls, see section *4.5*.

      e) For text messages, see section *4.6*.

      f) For driver-to-driver communication, see section *4.7*.

      g) For when a train is not driven from the leading cab, see section *4.8*.

      h) For engineering possessions, see section *4.9*.

G 4.1.11   Handbook RS523 gives further guidance to users of the GSM-R system.

4.2   Railway emergency or urgent calls

4.2.1   Transport operators shall have processes in place to ensure that an authorised user of the GSM-R system is 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   Infrastructure managers shall ensure that signallers are 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 that 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   Infrastructure managers shall ensure that berth-triggered broadcasts are used to give specific information to a driver without stopping the train.

4.4.2   Railway undertakings shall have processes in place for the driver to 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 and avoids 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   It is good practice for a co-ordinated industry approach to be in place 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.

Guidance

G 4.4.7   There is no guidance associated with these requirements.

4.5   Point-to-point-calls

4.5.1   Railway undertakings shall have processes in place to allow a driver to give some information to the signaller or train operator's control immediately or as soon as possible, or for the driver to respond to a 'contact signaller' or 'contact train operator's control' message using 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, if necessary, 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; and

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

4.5.2   Railway undertakings shall ensure that, if the conversation cannot be concluded quickly, the driver terminates the call or stops the train.

4.5.3   If a call is being made to seek clarification, advice or information from a signaller, railway undertakings shall ensure that the call is only 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. Railway undertakings shall ensure that the driver abandons the call or concludes it while stationary.

Rationale

G 4.5.5   This procedure allows an opportunity to report events when the driver has 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 the situation described in *4.5.3*, 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, railway undertakings shall ensure that the driver only reads 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, infrastructure managers shall ensure that the signaller uses 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, railway undertakings shall have processes in place to allow them 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, an 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, railway undertakings shall have processes in place to allow messages concerning the control of the movement 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 associate with this requirement.

4.9   Engineering possessions

4.9.1   Transport operators shall have processes in place to allow messages concerning movements of a train in a possession to be passed between signallers, drivers, persons in charge of possession (PICOPs), 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 the use of the 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   Railway undertakings shall not allow the train operator's control to contact the driver of a train unless it is known that the train concerned is at a stand.

4.10.2   Railway undertakings shall have processes in place to allow a train operator's controller 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.

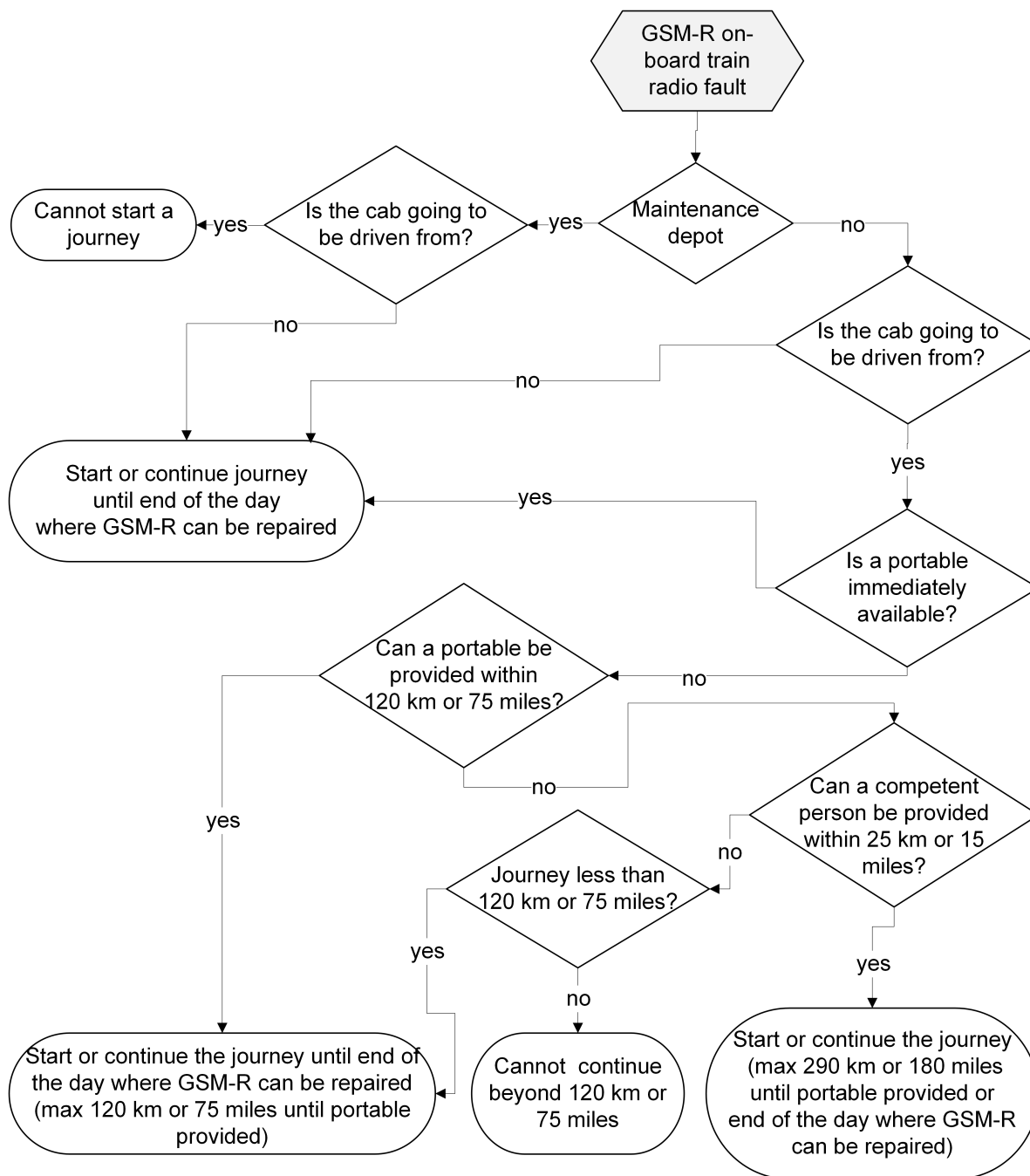# Appendices

Appendix A   On-Board Train Radio Failure

Figure 1: Flowchart for operational response to on-board train radio failure

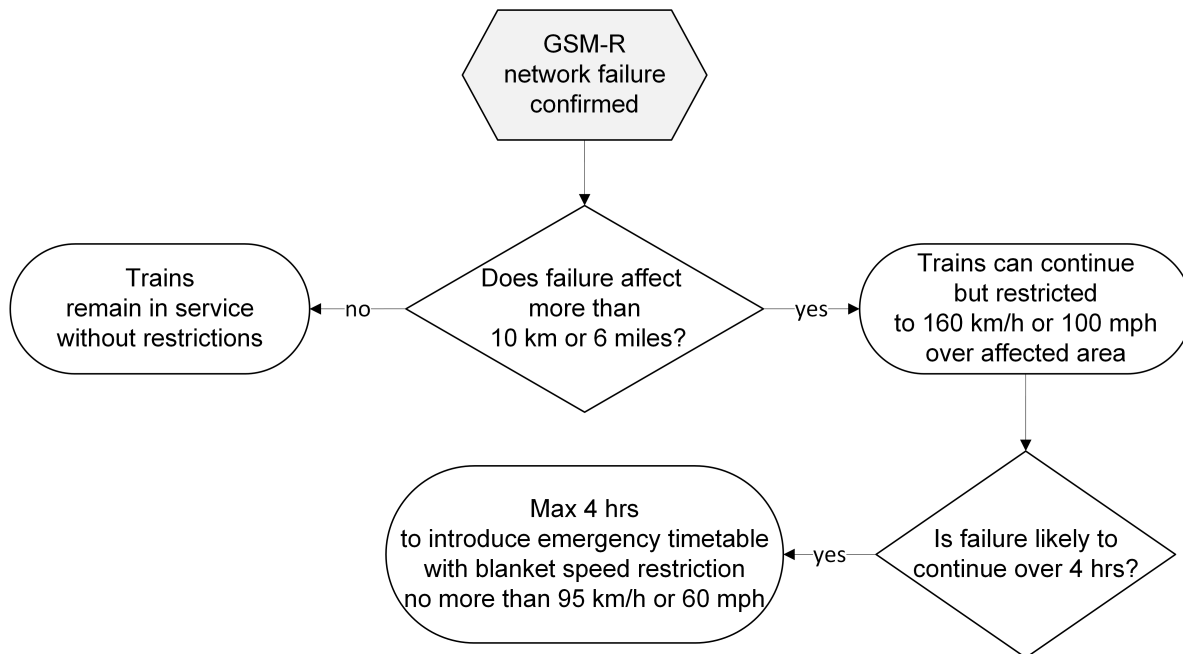## Appendix B   Failures of the GSM-R Fixed Network Equipment

Figure 2: Flowchart for failures of the GSM-R fixed network equipment

Definitions

competent person	A person who has passed as being qualified and has the required knowledge and skills to carry out a particular rule, regulation, instruction or procedure.
Driver Only Operation (DOO)	A method of working which permits trains to operate without the need of a guard.
GB mainline railway	'Mainline railway' has the meaning given to it in the Railways and Other Guided Transport Systems (Safety) Regulations 2006 (as amended) and the associated exclusions. 'GB mainline railway' is the mainline railway network excluding any railway in Northern Ireland, the Channel Tunnel, the dedicated high-speed railway between London St Pancras International Station and the Channel Tunnel, and any other exclusions determined by the Secretary of State.
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. Source: *GERC8517 Issue 1*
good practice	A process or method that has been shown to work well; succeeds in achieving its objective(s); is widely accepted; and therefore can be recommended as an approach.
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.
infrastructure manager (IM)	Has the meaning given to it in the Railways and Other Guided Transport Systems (Safety) Regulations 2006 (as amended), but is limited to those infrastructure managers who hold a safety authorisation issued in respect of the mainline railway. Source: *ROGS*
journey	The route from the starting point of a train (siding, platform or other place) to its planned destination (siding, platform line or other place), or where: • it is required to reverse before continuing to its destination • vehicles are attached or detached • it is terminated short of its destination. Any light locomotive movement, empty coaching stock movement or short distance shunting movement is a separate journey from the associated train movement.

National Technical Specification Notice (NTSN)	Document published by the Secretary of State pursuant to regulation 3B of the Railways (Interoperability) Regulations 2011 (as amended) which sets out the standards, technical specifications and technical rules in use in the United Kingdom as amended or varied from time to time. These may be standards to be complied with in relation to the design, construction, placing in service, upgrading, renewal, operation and maintenance of the parts of the rail system. For the purposes of these Regulations, the essential requirements for a project subsystem conforms with applicable National Technical Specification Notices and National Technical Rules. Source: *RIR*
next available location	The next location on a train's journey where it can be turned, repaired, terminated or re-formed.
on-board train radio	This refers to fixed equipment provided in the cab for GSM-R radio.
Railway Emergency Group 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 group call areas.
railway undertaking (RU)	Has the meaning given to the term 'transport undertaking' in the Railways and Other Guided Transport Systems (Safety) Regulations 2006 as amended, but is limited to any private or public undertaking the principal business of which is to provide rail transport services for goods and/or passengers, with a requirement that the undertaking must ensure traction. Source*: ROGS*
Safety Management System (SMS)	The organisation and arrangements established by a transport operator to ensure the safe management of its operation. Source*: ROGS*
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)	Used in the Health and Safety at Work etc. Act 1974 which places duties on employers in the UK to ensure safety 'so far as is reasonably practicable' (SFAIRP). It is similar to the term ALARP which refers to the principle of reducing risk to 'as low as reasonably practicable'. Although SFAIRP and ALARP are different in law, they are used interchangeably in the GB rail industry and are regarded as representing the same health and safety legal test.
transport operator	An infrastructure manager or railway undertaking.

References

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

RGSC 01	Railway Group Standards Code
RGSC 02	Standards Manual

Documents referenced in the text

RSSB documents

GERT8000	The Rule Book
Handbook RS523	GSM-R Handbook
RIS-0794-CCS	GSM-R Train Voice Radio Systems
	GSM-R failures safety risk model - report dated 2016
	Human factors study on drivers' use of the GSM-R cab radio whilst a train is moving
	Mitigation of GSM-R failure - Use of competent person in non-leading cab - report dated 2022
	Taking Safe Decisions version 2.0 published 2014

Other documents

Regulation (EU) 402/2013	Commission Implementing Regulation (EU) 402/2013 on the common safety method for risk evaluation and assessment. Amended by (EU Exit) Regulations 2019 (SI 2019/837) [amended by (EU Exit) Regulations 2020 (SI 2020/786), (SI Issue 1: March 2021 Page 12 of 13 2020/318) and (SI 2019/1310)] and the European Union (Future Relationship) Act 2020 (2020 c.29)
OPE NTSN	Operation and Traffic Management National Technical Specification Notice (OPE NTSN). Published by the Secretary of State on 1 January 2021 pursuant to regulation 3B of the Railways (Interoperability) Regulations 2011. This NTSN replaces and substantially reproduces the provisions of Commission Decision 2012/757/EU of 14 November 2012 (the OPE TSI), and includes relevant amendments made by Commission Regulation (EU) 2015/995 of 8 June 2015 and Commission Implementing Regulation (EU) 2019/773 which came into force in June 2019