



# RIS

**RIS-3702-TOM**

**Rail Industry Standard for Management of Route Knowledge for Drivers,  
Train Managers, Guards and Driver Managers**

**Issue Two: December 2014  
Rail Industry Standard**

Published by:

RSSB  
Block 2  
Angel Square  
1 Torrens Street  
London  
EC1V 1NY

© Copyright 2014  
Rail Safety and Standards Board Limited

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

## Issue record

Issue	Date	Comments
One	September 2011	Original document
Two	December 2014	Replaces issue one. Revised document includes additional requirements and guidance dealing with drivers who transfer in (section 2.2.3) or are employed on 'zero hours' contracts (section 2.2.4). The changes have been made in response to a RAIB recommendation. Minor editorial changes have also been made throughout the document.

Amended or additional parts of revised pages have been marked by a vertical black line in the adjacent margin, with the exception of minor editorial changes.

## Superseded or replaced documents

The following Railway Group documents are superseded or replaced, either in whole or in part as indicated:

Superseded documents	Sections superseded	Date when sections are superseded
RIS-3702-TOM Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers, issue one	All	December 2014

## Supply

The authoritative version of this document is available at [www.rgsonline.co.uk](http://www.rgsonline.co.uk).  
Uncontrolled copies of this document can be obtained from Communications, RSSB, Block 2, Angel Square, 1 Torrens Street, London EC1V 1NY, telephone 020 3142 5400 or e-mail [enquirydesk@rssb.co.uk](mailto:enquirydesk@rssb.co.uk). Other Standards and associated documents can also be viewed at [www.rgsonline.co.uk](http://www.rgsonline.co.uk).

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

## Contents

Section	Description	Page
<b>Part 1</b>	<b>Introduction</b>	<b>4</b>
1.1	Purpose of this document	4
1.2	Application of this document	4
1.3	Health and safety responsibilities	4
1.4	The structure of this document	4
1.5	Copyright	5
1.6	Approval and authorisation of this document	5
<b>Part 2</b>	<b>Requirements for Railway Undertakings</b>	<b>6</b>
2.1	Determining what basic route knowledge is required by staff	6
2.2	Factors which affect route learning	6
2.3	Undertaking a route risk assessment	8
2.4	Provision of route knowledge information	9
2.5	Methods of providing route knowledge information	9
2.6	Organisation of route learning	9
2.7	Route knowledge retention	9
2.8	Assessing route knowledge	11
2.9	Competence of instructors, trainers, assessors and managers	14
2.10	Assessing the impact of change on route knowledge and route competence requirements	14
2.11	Records	16
2.12	Review of the route competence assessment process	17
<b>Appendices</b>		
Appendix A	Factors to assess as part of the route risk assessment	18
Appendix B	List of route knowledge requirements	20
Appendix C	Methods of providing route knowledge information	22
Appendix D	Organisation of route learning activities	24
Appendix E	Competence of train driver route conductors	26
Appendix F	Route knowledge assessment	27
<b>Definitions</b>		
		<b>28</b>
<b>References</b>		
		<b>30</b>

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

## Part 1 Introduction

### 1.1 Purpose of this document

- 1.1.1 This document is a standard on the training, development, monitoring and assessment of staff on route knowledge and route risks, for the rail industry to use if they so choose. This document, where appropriate, also contains additional guidance to be considered by the railway undertaking during the development and management of its route learning and assessment processes.
- 1.1.2 Route learning provides staff with sufficient knowledge of route factors and route risks and appropriate practical operating experience to enable them to work safely over each route and to give them the necessary skills and confidence to predict and react to environmental changes and conditions.
- 1.1.3 Route learning is primarily aimed at equipping trainees with the necessary knowledge and skills<sup>1</sup>, together with practical experience, to enable them to operate trains under all climatic and operating conditions.
- 1.1.4 Route learning procedures may be reviewed in light of infrastructure changes and technological advances so that any necessary changes can be made to route learning procedures and to enable staff skills and knowledge to be updated. The introduction of European Rail Traffic Management System, for example, may impact on route knowledge learning requirements.

### 1.2 Application of this document

- 1.2.1 A member of RSSB may choose to adopt all or part of this document through internal procedures or contract conditions. Where this is the case the member of RSSB will specify the nature and extent of application.
- 1.2.2 Therefore specific compliance requirements and dates have not been specified since these will be the subject of internal procedures or contract conditions.

### 1.3 Health and safety responsibilities

- 1.3.1 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.

### 1.4 The structure of this document

- 1.4.1 This document is set out as a series of requirements, in some cases followed by relevant guidance. The guidance is indicated by prefixing the paragraph number with the letter 'G'.

---

<sup>1</sup> Route learning training is related to the development of non-technical competence of drivers and other staff. For example, elements of situational awareness are required for a large proportion of driving tasks including detailed monitoring tasks, observing speed limits, retaining information about changed stopping patterns, managing distractions, looking out for hazards, assessing and understanding driving situations, and changing driving strategies depending on changing situations. More information can be found in research project T869 Non-technical skills for rail: development, piloting and evaluation of a training course.

The first deliverable from the project, which is essentially a list of non-technical skills that are relevant to the driver role, a description of the observable behaviours and tasks associated with each skill, and an explanation of how these skills were identified. The T869 project deliverables can be downloaded from the RSSB Spark website at <http://www.sparkrail.org>

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

## **1.5 Copyright**

- 1.5.1 Copyright in the Railway Group documents is owned by Rail Safety and Standards Board Limited. All rights are hereby reserved. No Railway Group document (in whole or in part) may be reproduced, stored in a retrieval system, or transmitted, in any form or means, without the prior written permission of Rail Safety and Standards Board Limited, or as expressly permitted by law.
- 1.5.2 RSSB members are granted copyright licence in accordance with the Constitution Agreement relating to Rail Safety and Standards Board Limited.
- 1.5.3 In circumstances where Rail Safety and Standards Board Limited has granted a particular person or organisation permission to copy extracts from Railway Group documents, Rail Safety and Standards Board Limited accepts no responsibility for, nor any liability in connection with, the use of such extracts, or any claims arising therefrom. This disclaimer applies to all forms of media in which extracts from Railway Group documents may be reproduced.

## **1.6 Approval and authorisation of this document**

- 1.6.1 The content of this document was approved by Traffic Operation and Management Standards Committee on 09 September 2014.
- 1.6.2 This document was authorised by RSSB on 24 October 2014.

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

## Part 2 Requirements for Railway Undertakings

### 2.1 Determining what basic route knowledge is required by staff

2.1.1 Railway undertakings shall identify and document the elements of route knowledge essential for safe operation of their trains on the routes over which they operate, including diversionary routes and unusual moves.

---

G 2.1.1.1 Route knowledge will usually include, but not be limited to:

- a) Available stopping distances for the trains to be driven.
  - b) The effect the infrastructure can have on the braking capabilities of the types of train that are to be driven.
  - c) Signals which have been identified as multiple SPAD signals.
  - d) Signals which may be misread by drivers because of the effects of sunlight, positioning on gantries, the presence of overhead line equipment or other factors.
  - e) Position of stopping points on platforms and knowledge of platform lengths.
  - f) Differences between driving over the route in daylight, darkness and poor visibility.
  - g) Types of traction unit / train worked over each route.
  - h) Diversionary routes.
  - i) Unusual moves.
- 

### 2.2 Factors which affect route learning

#### 2.2.1 Physical factors that may affect route learning

2.2.1.1 Railway undertakings shall identify and document those route factors which, for each route operated by their trains, could affect the ability to learn and retain route knowledge.

---

G 2.2.1.1.1 Route factors include, but are not limited to:

- a) The complexity of station, junction and yard layouts and associated signalling.
  - b) Time of day and year when climatic conditions may negatively affect a route or part of a route.
  - c) The frequency a driver is rostered to drive over a route, including any specific signalling and routing combinations.
- 

#### 2.2.2 Identifying individual factors that may affect route learning

2.2.2.1 Railway undertakings shall identify and document individual factors that could affect the ability to learn and retain route knowledge.

---

G 2.2.2.1.1 Individual factors include, but are not limited to:

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

- a) New entrants with no previous operational experience of the railway environment.
  - b) Existing staff learning new or revised routes.
  - c) Staff with previous operational experience transferring from one railway undertaking to another.
- G 2.2.2.1.2 Railway undertakings may wish to consider the previous experience and capabilities of staff when determining any variations to the core route learning programme that may be needed, so that individual training and development needs can be met.
- G 2.2.2.1.3 The development of route learning plans may benefit from considering the individual learning needs of staff so that personal development can be aligned to previous experience, skills, knowledge and abilities. Individual learning preferences may also be considered when aligning route learning plans to each individual.
- G 2.2.2.1.4 Route learning plans may be used to identify a minimum amount of time to review parts of the route already learned when progressing to other parts of the route.
- G 2.2.2.1.5 Where separate routes are being learned, consideration may be given to the provision of a period of driving over a route following completion of route learning before moving on to another route. Where such opportunities are not provided, the risk of skills fade is an important consideration.

---

## **2.2.3 Managing the competency of transferred-in drivers having previous driving experience**

2.2.3.1 Railway undertakings shall establish the level of route knowledge competency of all transferred-in drivers having previous driving experience to determine whether additional training is required.

- 
- G 2.2.3.1.1 Railway undertakings may benefit from assessing the level of route knowledge competence currently held by newly transferred-in drivers to determine if further training is required to meet their current business requirements. This may be achieved by:
- a) Conducting a detailed training needs analysis, taking into consideration the individual's experience as set out in G2.2.3.1.2.
  - b) Determining any potential competence gaps.
  - c) Creating and documenting a detailed individual training plan to meet the identified needs.
  - d) Providing training in accordance with the plan.
  - e) Assessing and documenting the driver's competence using company processes.
- G 2.2.3.1.2 Consideration may be given to:
- a) The last time the route/s had been physically driven over and whether this is aligned with company policy.
  - b) The amount of time previously spent driving over the route/s.

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

- c) Experience in operating the type of traction that will be worked over the route whilst working for the railway undertaking.
- d) Different operating characteristics of traction and train types to those operated in the past, such as stopping / fast services, suburban / intercity services, freight / passenger or fast / slow operation.

---

## 2.2.4 Managing the competency of drivers employed on 'zero hours' contracts or who drive for more than one railway undertaking

2.2.4.1 Railway undertakings shall establish the level of route knowledge competency of all drivers who are employed on 'zero hours' contracts or drive for more than one railway undertaking, to determine whether additional training is required.

---

G 2.2.4.1.1 In determining whether additional training is required for drivers employed on 'zero-hours' contracts or working for more than one railway undertaking, the following may be considered:

- a) The last time the route/s had been physically driven over and whether this is aligned with company policy.
- b) The amount of time spent driving over the route/s.
- c) Experience of operating the type of traction that will be worked over the route whilst working for the railway undertaking.

---

## 2.3 Undertaking a route risk assessment

2.3.1 Railway undertakings shall carry out and record route risk assessments to identify and manage factors which could increase safety risk.

---

G 2.3.1.1 The following may be considered when undertaking the route risk assessment:

- a) Information provided by experienced staff, managers and trainers.
- b) Reports of incident investigation and signal sighting committees.
- c) Route information from the infrastructure manager.
- d) Information from local, regional or national cross-industry risk management groups.

G 2.3.1.2 It is important that route risk assessment processes are applied consistently for each route to ensure consideration is given to all factors which might affect safety. Results of this process may be used to determine which factors are to be included in route maps.

G 2.3.1.3 Railway undertakings who operate over the same infrastructure may benefit from developing and maintaining a close liaison to consider those factors that affect their operations and the risk mitigation measures that may be applied to reduce those risks to 'as low as reasonably practicable' (ALARP).

G 2.3.1.4 Appendix A provides guidance on the factors to assess as part of the route risk assessment.

---

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

## 2.4 Provision of route knowledge information

2.4.1 Railway undertakings shall provide an individual engaged in route learning with all route knowledge information appropriate for the routes being learned.

---

G 2.4.1.1 Appendix B provides guidance on the minimum route knowledge requirements for drivers and train managers / guards.

---

## 2.5 Methods of providing route knowledge information

2.5.1 There are no requirements associated with this section.

---

G 2.5.1.1 Appendix C provides guidance on the methods of providing route knowledge information to staff.

---

## 2.6 Organisation of route learning

2.6.1 Railway undertakings shall organise route learning to provide staff with the necessary knowledge to operate trains in normal and degraded conditions.

---

G 2.6.1.1 Where practicable, the structure of route learning will enable individuals to work trains under those conditions shown by the route risk assessment to present a safety risk, appropriate to the nature of the tasks to be performed.

G 2.6.1.2 Railway undertakings may consider providing staff with a level of training that will enable them to operate trains under normal and, where practicable, degraded conditions.

G 2.6.1.3 Additional training and development may, where practicable, be provided to staff who have not had opportunities to experience non-routine and degraded operations on the routes being learned.

G 2.6.1.4 If the railway undertaking employing the route learner does not operate trains over the route to be learnt, arrangements for route learning may be agreed with another operator and / or alternative training considered.

G 2.6.1.5 Some of the required skills and knowledge may be delivered by providing experience of working trains:

a) During weekend diversions.

b) At night.

c) During the leaf fall period.

G 2.6.1.6 Simulators, where available, may be used to practice degraded working.

G 2.6.1.7 Appendix D provides guidance on the organisation of route learning activities.

---

## 2.7 Route knowledge retention

2.7.1 Railway undertakings shall calculate the frequency each individual works over a route to retain route knowledge.

---

## Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

- G 2.7.1.1 The outcome from the route risk assessment may be used to determine the frequency that staff work over each route to retain route knowledge competency.
- G 2.7.1.2 Route knowledge retention may be influenced by route complexity, the types of train operating over them and operations during degraded working.
- G 2.7.1.3 The factors shown in G2.2.2.1.1 a), b) and c) may, when considered on an individual basis, influence the minimum frequency that staff are required to work over a route to retain route knowledge competency.
- G 2.7.1.4 Where parallel running lines exist, railway undertakings may consider any additional route knowledge training or development required where trains work almost universally over one line (fast lines), including account of the ability of staff to observe route characteristics of adjoining lines and the potential risks of specific signalling systems such as bi-directional working or simplified bi-directional working (SIMBIDS).
- G 2.7.1.5 Consideration may be given to freight train and yellow plant operations, which by nature of train regulation, may transit from loop to loop, relief line etc, and encounter a wider range of signal aspects.
- G 2.7.1.6 Consideration may be given to the level of refresher training and assessment required for locations where shunting moves can be made, including the complexity of layout, signalling and the planned movements at each location.
- G 2.7.1.7 Where planned engineering works result in shunting movements at locations where refresher training is not usually provided, briefing may be considered for those staff who will be affected so that all staff are clear about the movements that are to be made and the signals that apply.
- G 2.7.1.8 Railway undertakings may benefit from liaising with infrastructure managers so that staff engaged in shunting movements associated with any engineering work taking place can be provided with sufficient briefing material to address potential risks.
- G 2.7.1.9 The minimum route retention frequency may be communicated to all parties involved in the rostering, training and management of route learning.
- G 2.7.1.10 Consideration may be given to the communications skills required and the need for reaching a clear understanding with signalling staff when any doubts arise about signalled moves.
- G 2.7.1.11 Route knowledge may be retained by working regularly over the route in the course of normal work with turns of duty spread evenly throughout the rosters or by other methods such as travelling on trains or, where this is not practicable, using visual aids.
- G 2.7.1.12 The following factors may affect the frequency that staff operate over a route:
- a) Changes to roster structures.
  - b) Exchanges in turns of duty.
  - c) Annual leave, sickness, absence or employment on other duties such as instructing.
  - d) Changes to the train plan / timetable.
-

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

## **2.8 Assessing route knowledge**

### **2.8.1 General requirements**

2.8.1.1 Railway undertakings shall base route competence assessment processes on the minimum route knowledge requirements and identified route risks in normal and degraded operations.

---

G 2.8.1.1.1 Route competence assessments include:

- a) Initial assessment of competence.
- b) Periodic assessment of competence.
- c) Assessment following a period of route refreshing.

G 2.8.1.1.2 Consideration may be given to making the level and nature of route competence assessments proportional to the hazards and risks identified by the route risk assessment.

G 2.8.1.1.3 Assessment methods may involve any combination of direct observation, unannounced monitoring, use of a simulator or written and verbal tests using open and multi-choice questions.

G 2.8.1.1.4 Route competence assessment criteria is intended to be unambiguous and clearly state the intended outcomes so that it promotes a consistent standard of assessment irrespective of who it is performed by.

G 2.8.1.1.5 Route competence assessments may include the competence requirements for staff whose duties include route conducting, based on any identified risks associated with carrying out the task.

G 2.8.1.1.6 Consideration may be given to the interpersonal skills required to undertake the role of route conducting when determining the training and development requirements of each individual. Appendix E provides guidance on the competence requirements for route conductors.

---

### **2.8.2 Initial assessment of route competence**

2.8.2.1 Railway undertakings shall not permit individuals to perform their duties un-supervised until such time that they have reached a level of competence which is sufficient such that the risk to the safety of operations is as low as reasonably practicable.

---

G 2.8.2.1.1 The initial assessment of route competence usually addresses the knowledge required for normal and degraded operations.

G 2.8.2.1.2 Initial assessments of route competence are normally linked to, and take account of, the route risk assessment data.

G 2.8.2.1.3 Assessment methods may involve any combination of direct observation, unannounced monitoring, use of simulator or written and verbal tests using open and multi-choice questions. Consideration may be given to the use of mandatory pass requirements for questions that address high risks.

G 2.8.2.1.4 Initial assessments of route competence normally provide a demonstration of skills and knowledge that address identified route risks and have sufficient depth and breadth to cover the minimum route knowledge requirements contained within Appendix B.

G 2.8.2.1.5 Initial assessments of route competence may address knowledge of train handling in normal and degraded operations.

---

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

- G 2.8.2.1.6 Underpinning knowledge questions may be supported by a practical assessment of the individual's competence in operating a train over the route. If practical assessments are not carried out in all cases, methods to help those managing the process to determine whether such an assessment is required may be provided. Assessments may take into account specific groups, such as staff in their post-qualifying period and individual factors. The following may be considered, as a minimum, when making this decision:
- a) Route risk assessment data.
  - b) The complexity of the route, including stations, junction layouts, yards, sidings and the associated signalling.
  - c) Balance between knowledge and skill-based elements that need to be assessed.
  - d) Time needed to undertake the assessment.
  - e) Length of route.
  - f) Complexity of infrastructure and signalling.
  - g) Exchange of turns likely to reduce the number of times a member of staff worked over a route.
  - h) Spells of time off, for example, sickness or carrying out other duties.
- G 2.8.2.1.7 Where a practical assessment is not possible (diversionary routes with no booked service), a supplementary means of assessment may be used.
- G 2.8.2.1.8 Railway undertakings may consider asking the route learner to provide a verbal commentary, including the identification of anticipated hazards during a practical assessment.

---

## 2.8.3 Periodic assessment of route competence

2.8.3.1 Railway undertakings shall periodically assess staff on route competence.

---

- G 2.8.3.1.1 The frequency of periodic route competence assessments may be linked to, and take account of, the route risk assessment data.
- G 2.8.3.1.2 The nature and frequency of assessment will depend on the following:
- a) The complexity of the route, including stations, junction layouts, yards, sidings and the associated signalling.
  - b) Balance between knowledge and skill-based elements that need to be assessed.
  - c) Time needed to undertake the assessment.
  - d) Probability and frequency of encountering all aspects of the competencies in day-to-day operations.
  - e) Changes to signals or infrastructure since last signing the route.
  - f) Changes to train handling characteristics.
  - g) Changes to the train plan.

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

- h) Probability and frequency of encountering degraded operations or engineering work.
  - i) Link structure changes likely to reduce the number of times a member of staff worked over a route.
  - j) Exchange of turns likely to reduce the number of times a member of staff worked over a route.
  - k) Individual's performance when last assessed over the route.
- G 2.8.3.1.3 Railway undertakings may, where practicable, carry out assessments under those conditions shown by the route risk assessment to present a safety risk, appropriate to the nature of the tasks to be performed.
- G 2.8.3.1.4 Competence assessments may all have expiry dates.
- G 2.8.3.1.5 Appendix F provides guidance on route knowledge assessments.
- 

## **2.8.4 Assessment of route competence following a route review**

2.8.4.1 There are no requirements associated with this section.

---

- G 2.8.4.1.1 Route competence assessments are not usually required following a route review, where such reviews are provided to maintain the minimum frequency of working over each route, except where individual factors may determine that a route competence assessment is required. Such individual factors include, but are not limited to:
- a) Link structure changes likely to reduce the number of times a member of staff worked over a route.
  - b) Exchange of turns likely to reduce the number of times a member of staff worked over a route.
  - c) Spells of time off, for example, sickness or carrying out other duties.
  - d) Individual's performance when last assessed over the route.
- 

## **2.8.5 Assessments when the minimum frequency of working over a route has not been met**

2.8.5.1 Railway undertakings shall provide individuals with a route review when the minimum frequency of working over a route has not been met.

---

- G 2.8.5.1.1 Railway undertakings may consider providing route reviews to staff who have not operated trains over a route at the frequency determined under clause 2.7.1.
- G 2.8.5.1.2 Railway undertakings may include, as part of their route learning processes, systems to identify when an individual has not met the minimum frequency for working over a route.
- G 2.8.5.1.3 Railway undertakings may include, as part of their route learning processes, a clear indication of the action to be taken when members of staff have not met the minimum frequency of working over a route which may include not permitting staff to continue working over the route until opportunities to refresh the route have been provided.
-

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

## **2.9 Competence of instructors, trainers, assessors and managers**

2.9.1 Railway undertakings shall determine route competence criteria for instructors, assessors and managers.

---

- G 2.9.1.1 Railway undertakings may consider the skills and knowledge required for individuals undertaking training and supervision of route learners.
  - G 2.9.1.2 Railway undertakings may consider the professional (in the operation of the competence management system) and occupational competence (related to their knowledge, skills, etc in the activity they are assessing) required for instructors, trainers, assessors and managers who are required to train and assess staff on their route knowledge.
  - G 2.9.1.3 Trainers, assessors and those involved in the development of route learners are required to have sufficient, relevant and up-to-date occupational competence and experience.
  - G 2.9.1.4 The training and competence requirements for the managers who operate the competence management system usually form an integral part of competence management systems, including the provision of continued professional development and reassessment relating to the competence management system.
  - G 2.9.1.5 Railway undertakings may consider assessing the route competence of staff who are required to assess others with a rigour similar to that used to assess other staff.
  - G 2.9.1.6 The ongoing professional competence of assessors and their occupational competence may be assessed periodically.
  - G 2.9.1.7 Auditing activities may be used to monitor the competence of managers operating the competence management system.
  - G 2.9.1.8 Qualifications obtained through external organisations may not be relied upon as an alternative to internal systems designed to provide the training and assessment criteria to prove competence in the operation of the company competence management system.
  - G 2.9.1.9 The time intervals between assessments may be determined by the level of risk involved in the work and any changes made to the competence assessment process.
- 

## **2.10 Assessing the impact of change on route knowledge and route competence requirements**

2.10.1 Railway undertakings shall undertake a review of route risk assessments to establish the impact of infrastructure change on route knowledge.

---

- G 2.10.1.1 Railway undertakings may consider reviewing route factors when:
  - a) There are changes to the infrastructure (such as resignalling or remodelling).
  - b) New or altered rolling stock are introduced.
  - c) Trailing loads are either increased or decreased.
  - d) Incident inquiries reveal shortcomings.

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

- e) Potential route risks are identified by drivers, trainers or their managers.
- G 2.10.1.2 The review of route risk assessments are intended to:
- a) Identify any new or increased risks arising from the infrastructure change.
  - b) Identify appropriate measures to control the risks to ALARP.
  - c) Identify any required changes to the competence management system.
- G 2.10.1.3 The review of route factors following infrastructure changes assists railway undertakings to:
- a) Identify new risks and any changed potential for SPADs and other safety related incidents immediately after implementation of the changes.
  - b) Select appropriate measures to reduce any identified risks to ALARP.
- G 2.10.1.4 The review of route factors may be used to develop a plan for the communication of any identified new risks and any changed potential for SPADs and other safety related incidents.
- G 2.10.1.5 Where infrastructure changes are implemented, railway undertakings may wish to consider the effect that this may have on route knowledge.
- G 2.10.1.6 Railway undertakings may wish to brief all staff who work trains over the route of alterations to signals or infrastructure. The following may be used as an example of the level of briefing to use. Railway undertakings may need to apply a different level of briefing.
- G 2.10.1.7 **Low Risk**
- a) These include, but are not limited to:  
  
Minor changes such as minor permanent way changes, closure of small signal boxes, speed differentials, changes to junctions or crossovers.
  - b) Briefing Method:  
  
Weekly Operating Notices (WON); Periodical Operating Notices (PON).
- G 2.10.1.8 **Medium Risk**
- a) These include, but are not limited to:  
  
A high proportion of relocated signalling alterations between complex signalling areas, signal boxes withdrawn with a high proportion of signals involved, block changes with significant relocation of signals, significant number of speed and signage changes.
  - b) Briefing Method:
    - i) Display of information.
    - ii) Diagrams.
    - iii) 'On site' visits.
    - iv) Signalbox / signalling centre visits.

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

- v) DVD / Video
- vi) WON, PON entries.

## G 2.10.1.9 **High Risk**

- a) These include, but are not limited to:

New location of signals, geographical layout, impact on braking points. Major re-signalling project, doubling of single lines/additional lines. Significant knowledge of route and signalling information required.

- b) Briefing method:

Face-to-face briefing will be required. This brief may be acknowledged by a signature prior to the driver working over the route.

The following may also be considered as part of the route learning brief:

- i) Display of information.
- ii) Diagrams.
- iii) 'On site' visits.
- iv) Signalbox / signalling centre visits.
- v) DVD / Video.
- vi) WON, PON entries.

G 2.10.1.10 The risk assessment process may determine that drivers are accompanied over the route when they first drive over it.

G 2.10.1.11 It may be beneficial to give the brief as close to the implementation date as possible.

G 2.10.1.12 The level of briefing provided to staff may be agreed between railway undertakings and the infrastructure manager, in which case the methods described in G2.10.1.3 may vary.

---

## 2.11 **Records**

2.11.1 Railway undertakings shall maintain records of all route training and assessments carried out.

---

G 2.11.1.1 Records may be kept for each individual engaged in route learning, including, but not limited to, the following information:

- a) Routes over which the individual has been certified competent.
- b) Route learning provided including duration, method(s) used, time spent gaining operating experience (or reasons if operating experience is not provided).
- c) Staff competence and assessment records.

G 2.11.1.2 Railway undertakings may document and brief the conditions under which the route learner is permitted to operate a train and the arrangements for supervision whilst the route learner is doing so.

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

## **2.12 Review of the route competence assessment process**

2.12.1 Railway undertakings shall review all route competence training and assessment processes periodically, or when otherwise necessary, to ensure they remain credible and valid.

---

G 2.12.1.1 Railway undertakings may consider developing an internal verification system to check that route training and competence assessments are being carried out consistently and achieving the intended outcomes.

G 2.12.1.2 Where safety of the line incidents indicate a trend in route competence deficiency, a review of route training and the competence assessment system may be undertaken to determine whether:

- a) The structure and duration of route training needs to be amended.
  - b) The route competence assessment criteria need to be amended.
  - c) The structure of the competence assessment system needs to be amended.
-

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

## Appendix A Factors to assess as part of the route risk assessment

### A.1 Factors to assess as part of the route risk assessment

A.1.1 Factors related to signalling equipment include:

- a) Signals which have been the subject of multiple SPAD incidents, particularly where the potential consequences of a SPAD are severe, including the reasons why the signals have been passed at danger.
- b) Signal gantries with a history of SPADs or there is potential to misread signals intended for adjacent lines (reading across).
- c) Signals beyond the signal immediately applicable to the movement which become visible to drivers before, or with similar intensity to, the applicable signal (reading through).
- d) Signals that are known to be affected by bright sunlight at particular times of the day or year (both main and shunting signals).
- e) Signals which are positioned on the right-hand side of the running line in the direction of travel and considered as a risk (both main and shunting signals).
- f) Locations where braking distances between signals are inconsistent.
- g) Locations where the signal aspect sequence changes from four to three aspect.
- h) Start and finish points of bi-directional working.
- i) Stations where the signal is not in view from the station stopping point, with potential for starting against the signal at danger (SOYSPAD).
- j) Stations where the normal stopping point is adjacent to the signal with potential for starting against the signal at danger (SASSPAD).
- k) Risks associated with trains not stopping at designated stopping points within a station platform.
- l) Potential distractions on the approach to a signal, such as a neutral section.
- m) Locations or routes with a mixture of colour light and semaphore signalling.
- n) Locations or routes not fitted with Automatic Warning System (AWS), including termination and commencement points of AWS and AWS gaps.
- o) Any recent changes to infrastructure (internal or external to the railway) on the approach to signals.

A.1.2 Factors related to other physical features and natural hazards include:

- a) Low adhesion due to seasonal factors (including weather and leaf fall) and climatic conditions (such as local temperature differentials causing condensation).
- b) Possibility of unexpected low adhesion conditions at level crossings and the consequential risk of wheel slide, particularly where hazards (for example, high risk signals or stations with permissive working or bay platforms) are located beyond the crossing.
- c) The effects of driving over the route in darkness compared with driving during the daytime.

## Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

- d) Lighting on platforms, in tunnels or adjacent streets which may affect the identification of braking points and sighting of signals.
- e) Locations which may cause distraction, such as depots, yards and booking-on points.
- f) Locations where bi-directional, reversible or multi-track lines do not run parallel to each other.
- g) Locations where there is a significant reduction in line speed.
- h) Gradients that have the potential to affect safe train operations.
- i) Communication black spots (radio, telephone and bleeper etc).
- j) Complex signalling or track layouts.
- k) Details and procedures associated with emergencies in tunnels.
- l) Transition from non-complex to complex locations which increases the driver's cognitive workload.

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

## Appendix B List of route knowledge requirements

### B.1 List of route knowledge requirements for drivers to be used by railway undertakings as appropriate to the routes being learned

B.1.1	<b>Route Features</b>	Stations, depots, yards, sidings, junctions, points, crossings, signal boxes, bridges, tunnels, names of running lines, direction of travel of running lines (including bi-directional lines), gradients (in relation to the type(s) of train to be driven), termination and limiting points of movements.
B.1.2	<b>Signalling</b>	The signalling system(s) in use including signal types, the position, sighting and function of signals and associated route indicators. Signals positioned on the right-hand side of the running line in the direction of travel. Any recent changes to infrastructure (internal or external to the railway) on the approach to signals. Signalling transition areas such as Track Circuit Block (TCB) to European Rail Traffic Management System (ERTMS).
B.1.3	<b>Train Protection Systems</b>	Commencement and termination points of the infrastructure elements such as Automatic Warning System (AWS) and Automatic Train Protection (ATP)
B.1.4	<b>Train Radio Systems</b>	Commencement and termination points of the infrastructure equipment for National Radio Network (NRN), Cab Secure Radio (CSR) and Global System for Mobile communications-railway (GSM-r) where relevant to the operation, this will include channel change locations.
B.1.5	<b>Lineside Signage</b>	Location and meaning of lineside signs applicable to the safe operation of trains, for example, commencement and termination of AWS gaps, fire zones, etc.
B.1.6	<b>Permissible Speeds</b>	Permitted train and line speed restrictions in relation to the type(s) of train to be driven, applicable to all normal and degraded situations.
B.1.7	<b>Level Crossings</b>	The location of all level crossings, relevant speed restrictions, including any special working arrangements for degraded situations.
B.1.8	<b>Power Supplies</b>	As applicable, neutral sections, section gaps, wired / unwired sections of route, isolation procedures, OLE / 3 <sup>rd</sup> rail changeover points.
B.1.9	<b>Communications</b>	Systems in operation along with relevant contact number for signal boxes, service delivery centres and Emergency Control Centres. The location of any communications black-spots.
B.1.10	<b>Operating Restrictions</b>	Restricted use of signal post telephones, restrictions on route availability.
B.1.11	<b>Local Working Instructions</b>	Applicable to stations, depots, yards and sidings.
B.1.12	<b>Authorised Walking Routes</b>	Knowledge of authorised walking routes applicable to all locations to which the person is required to visit.

## Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

### B.2 List of route knowledge requirements for train managers / guards to be used by railway undertakings as appropriate to the routes being learned

B.2.1	<b>Route Features</b>	Stations, depots, yards, sidings, junctions, points, crossings, signal boxes, bridges, tunnels, names of running lines, direction of travel of running lines (including bi-directional lines), gradients (in relation to the type(s) of train to be worked), termination and limiting points of movements.
B.2.2	<b>Signalling</b>	The signalling system(s) in use including signal types, the position, sighting and function of signals and associated route indicators. Signals positioned on the right-hand side of the running line in the direction of travel. Signalling transition areas such as Track Circuit Block (TCB) to European Rail Traffic Management System (ERTMS).
B.2.3	<b>Train Protection Systems</b>	Commencement and termination points of the infrastructure elements such as AWS and ATP.
B.2.4	<b>Train Radio Systems</b>	Commencement and termination points of the infrastructure elements such as, NRN, GSMR and ERTMS where relevant to the operation, this will include channel change locations.
B.2.5	<b>Lineside Signage</b>	Location and meaning of lineside signs applicable to the safe operation of trains, for example, commencement and termination of AWS gaps, fire zones, etc.
B.2.6	<b>Permissible Speeds</b>	Permitted train and line speed restrictions in relation to the type(s) of train to be driven, applicable to all normal and degraded situations.
B.2.7	<b>Level Crossings</b>	The location of all level crossings, relevant speed restrictions including any special working arrangements for degraded situations.
B.2.8	<b>Power Supplies</b>	As applicable, neutral sections, section gaps, wired / unwired sections of route, isolation procedures, OLE / 3 <sup>rd</sup> rail changeover points.
B.2.9	<b>Communications</b>	Systems in operation and relevant contact number for signal boxes, service delivery centres and Emergency Control Centres etc., location of any communications black-spots. Details and procedures associated with emergencies in tunnels.
B.2.10	<b>Specific station characteristics</b>	Positions of platform starting signals / OFF indicators, position of Train Ready To Start (TRTS) buttons, evacuation points, location of Station Supervisor / Manager office, location of staff and public facilities such as messrooms, toilets, access / egress etc., lift / stair access as appropriate.
B.2.11	<b>Operating Restrictions</b>	For example, restricted use of signal post telephones, restrictions on route availability.
B.2.12	<b>Local Working Instructions</b>	Applicable to stations, depots, yards and sidings.
B.2.13	<b>Authorised Walking Routes</b>	Knowledge of authorised walking routes applicable to all locations to which the person is required to visit.

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

## Appendix C Methods of providing route knowledge information

### C.1 Methods of providing route knowledge information

- C.1.1 Consideration may be given to the best method of providing route knowledge information to staff. Route learning plans may include locations where training can be undertaken. Consideration may be given to providing dedicated route schools or dedicated route instructors as a method of providing such route knowledge.
- C.1.2 Route knowledge information may be contained within documentation published by the infrastructure manager for issue to staff by railway undertakings (for example, Sectional Appendices, Weekly and Periodical Operating Notices, Weekly Engineering Notices).
- C.1.3 Examples of other route knowledge information sources relevant to route learning include:
- a) Route maps and signalling plans. Where signalling plans are used, these are simplified to provide clarity of information.
  - b) PC-based route simulation packages (particularly suitable for supporting learning of changed track layouts and extensive resignalling schemes).
  - c) DVDs.
  - d) Photographs or slides.
  - e) Video of the route taken from the driving cab.
  - f) CD-ROM of signals which have been the subject of multiple SPAD incidents (published by the infrastructure manager).
- C.1.4 Railway undertakings may also need to take into account the individual learning styles of the learners and consider offering a variety of methods for providing route knowledge information, which could include route simulation packages, videos, DVDs, signalling diagrams, route maps, etc.
- C.1.5 Consideration may be given to the following factors when developing route maps:
- a) The intended audience and purpose of the map.
  - b) The scale of the map (state if the map is not to scale).
  - c) A key for all symbols.
  - d) Division of the map into areas with distinct character such as major junctions, large stations, yards etc.
  - e) The publication date of the map and version number.
  - f) Direction of lines.
  - g) Speed of each line including Enhanced Permissible Speeds (EPS).
  - h) Names of controlling signal boxes.
  - i) Location of signals.
  - j) Type of train detection system at each location.
  - k) Location of station platforms.
  - l) Gradients.

## Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

- m) Mileage from point of origin.
  - n) Electrical control areas.
  - o) Radio code areas.
  - p) Length of recess sidings.
- C.1.6 Too much information on a single map may reduce its suitability for training. If the map is to be used for multiple purposes, a layering format may be considered with different levels of detail available on each layer (for example, layer one might show signals and stations, layer two line speeds and gradients, layer three principal route risks).
- C.1.7 Consideration may be given to providing learners with information on the characteristics of good route-specific cues when learning routes; for example, a bridge used as a braking point.

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

## Appendix D Organisation of route learning activities

### D.1 Organisation of route learning activities

- D.1.1 Route learning is normally carried out by:
- a) The individual learner travelling with an individual competent to operate a train over the route.
  - b) Individual study using route maps and other supporting documentation.
  - c) Working with route simulation packages.
  - d) DVDs.
  - e) Videos.
  - f) Other supporting media.
- D.1.2 Factors to take into account when planning route learning activities include, but are not be limited to:
- a) Methods of route learning appropriate to the individual, for example, accompanied or unaccompanied.
  - b) Frequency of service and opportunities for travelling in driving cabs or on passenger trains.
  - c) Opportunities for practical operating experience as part of route learning.
  - d) The need to obtain experience across a range of operating conditions such as daylight, darkness, engineering and degraded working arrangements.
  - e) Route learning aids and other supporting information available, such as route simulation packages, video, signalling diagrams, route maps.
  - f) Data from incident reports which identify specific deficiencies in route competence relevant to the route or individual concerned.
  - g) The need for competence assessments to provide an assurance of practical train operating competence, including route competence.
- D.1.3 Where a learner is having difficulty in learning a particular route, it may be worthwhile offering one-to-one training with a qualified trainer or manager. Usually, this will present a better opportunity to identify the areas that additional training will need to focus on and can subsequently, if required, be written into an individual action / learning plan.
- D.1.4 Assistance and advice can enhance the learning process and allow the learner to feel supported throughout.
- D.1.5 A route learning saloon is valuable if a group requires training or refreshing over a route which the railway undertaking uses infrequently (for example, a new or diversionary route).
- D.1.6 Consideration may be given to the learner recording each journey (including those on foot) to assist in the control of the activity and these records being retained as a record of route training.
- D.1.7 Route learning is normally preceded by:
- a) Providing the learner with route information material.
  - b) Briefing the learner on the route learning requirements.

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

- c) Provision of a means to enable the route learner to note key points in a structured way.

## **D.2 Managing risks during route learning: access to driving cabs**

- D.2.1 Railway undertakings may consider assessing the suitability of the driving cabs to be used for route learning and any relevant restrictions that may be required to limit the number of route learners in the driving cab, including whether the route learner has an unrestricted view of the route ahead.

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

## Appendix E Competence of train driver route conductors

### E.1 Competence of train driver route conductors

- E.1.1 In addition to the necessary route knowledge, the route conductor would ideally have skills in communicating the information to the train driver. Training of route conductors may take account of:
- a) The need for the route conductor to intervene in sufficient time to enable the train driver to operate the controls and the train to respond.
  - b) Differences in handling characteristics between the train being conducted and trains which the route conductor usually drives.
  - c) The need to avoid misunderstanding when speaking to the driver, arising from dialect, accent or background noise in the driving cab.
  - d) Procedures to be applied in an emergency which may differ from trains which the route conductor drives under normal circumstances, for example, dangerous goods.
  - e) Differences in sighting of signals between the train driver's position in the cab and that of the route conductor.
  - f) Differences in route availability or specific gauging constraints.
- E.1.2 Consideration may be given to the skills, knowledge and experience of staff who are utilised to carry out route conducting. Where skills or knowledge gaps are identified, additional training would normally be provided.
- E.1.3 Consideration may be given to any additional training required for conductors when they are required to conduct traction types that they do not sign, specifically where such traction types have speed restrictions for the route for which the conductor would not normally have knowledge.

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

## Appendix F Route knowledge assessment

### F.1 Route knowledge assessment

F.1.1 Route knowledge assessments include, but are not limited to:

- a) Route specific knowledge.
- b) Diversionary routes.
- c) Unusual moves.
- d) Knowledge of movements that can be made at locations where trains can be terminated and turned back as part of the contingency plan.
- e) Locations where shunting is carried out where there have been incidents such as SPADs, derailments or collisions.
- f) Control command and signalling system, including related cab signalling indications.
- g) Tilt Authorisation and Speed Supervision (TASS) areas.
- h) Permanent speed restrictions.
- i) Junctions, names of running lines and direction of travel.
- j) Tunnels (and associated emergency arrangements).
- k) Gradients.
- l) Low adhesion areas.
- m) Electrified lines (if present).
- n) Station names, their position and the distance they are sighted from.
- o) Name and position of signal boxes.
- p) Particular operating features: special signals, signs, departure conditions, etc.
- q) Yards and local arrangements.
- r) Communication systems in operation.
- s) Areas of risk such as Multi-SPAD signals, areas of possible misread and short signal sections.
- t) Speed limits for the different train categories driven.

F.1.2 Route knowledge assessments are designed to establish that staff understand the reason why certain route characteristics are potentially a higher risk than others.

F.1.3 Assessment methods may involve any combination of direct observation, unannounced monitoring, use of a simulator or written and verbal tests using open and multi-choice questions.

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

## Definitions

### **Degraded operations**

Situations where trains are unable to continue on their planned route due to infrastructure, signalling or energy supply problems.

### **Individual factors**

Factors concerning experience, capabilities and learning styles that may affect a person's ability to learn a route.

### **Infrastructure manager**

'Infrastructure manager' means a person who:

- a) In relation to infrastructure other than a station, is responsible for developing and maintaining that infrastructure or, in relation to a station, the person who is responsible for managing and operating that station, except that it shall not include any person solely on the basis that he carries out the construction of that infrastructure or station or its maintenance, repair or alteration; and
- b) Manages and uses that infrastructure or station, or permits it to be used, for the operation of a vehicle.

*(Note: This definition is sourced from The Railways and Other Guided Transport Systems (Safety) Regulations 2006)*

### **Multiple SPAD signal**

A signal that has been passed at danger more than once in five years.

### **Railway undertaking**

A transport undertaking, as defined in the Railways and Other Guided Systems Regulations 2006, whose safety certification covers operation of trains on the managed infrastructure, as defined in the Railway Group Standards Code.

### **Route competence assessment**

An assessment to determine whether an individual has the required knowledge and skills to operate a train over a route.

### **Route competence criteria**

The part of a railway undertaking's competence management system that details the required training, monitoring, development and assessments for each route.

### **Route conductor**

An individual who is provided to assist a driver who does not have route knowledge for a section of route, by providing the driver with information in sufficient time to enable the train to be controlled to comply with signals, reductions in permissible speed and scheduled stopping points.

### **Route factors**

Those elements of a route which railway undertakings have identified as potentially affecting the ability of staff to learn a route.

### **Route knowledge**

Essential knowledge requirements necessary to enable staff to work safely over a route.

### **Route learning**

The training and development of staff required to equip them with the knowledge and operating experience to enable them to work safely over a route.

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

## **Route maps**

Route information provided by railway undertakings in various media, including signalling plans.

## **Route retention frequency**

The minimum number of occasions an individual is required to work over a route to maintain knowledge and operating experience of the route.

## **Route review**

A period of time provided to enable staff to update their route knowledge whilst not engaged in working a train.

## **Route risks**

Physical factors relating to a route which could increase safety risk.

## **Route risk assessment**

A risk based assessment of a route to identify route factors that may increase risk.

## **'Zero hours' contract**

A 'zero hours' contract is a contract of employment used in the United Kingdom which, while meeting the terms of the Employment Rights Act 1996 by providing a written statement of the terms and conditions of employment, contains provisions which create an 'on call' arrangement between employer and employee.

# Rail Industry Standard for Management of Route Knowledge for Drivers, Train Managers, Guards and Driver Managers

---

## References

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

RGSC 01	Railway Group Standards Code
RGSC 02	Standards Manual

## Documents referenced in the text

### Railway Group Standards

None

### RSSB documents

None

### Other References

T869	Non-technical skills for rail: development, piloting and evaluation of a training course
------	--

## Other relevant documents

None