21-020 Guidance for Stage 3 Assessment of the Compatibility Between Bridges and GB Passenger Rail Vehicles for Underline Bridges

Version:	1.10		
Purpose:	Approval to publish		
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Lead industry committee:	Infrastructure Standards Committee (INS SC)	**Date:**	Click here to enter a date.
Supporting industry committee:	Rolling Stock Standards Committee (RST SC)	**Date:**	Click here to enter a date.
Supporting industry committee:	Plant Standards Committee (PLT SC)	**Date:**	Click here to enter a date.

Decision

Infrastructure Standards Committee (INS SC) is asked to:

- **APPROVE** the proposal for change.

Rolling Stock Standards Committee (RST SC) is asked to:

- **SUPPORT** the proposal for change.

Plant Standards Committee (PLT SC) is asked to:

- **SUPPORT** the proposal for change.

21-020 Guidance for Stage 3 Assessment of the Compatibility Between Bridges and GB Passenger Rail Vehicles for Underline Bridges

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

Revised documents

Number	Title	Issue
GERT8006	Route Availability Number for Assessment of Compatibility between Rail Vehicles and Underline Bridges	4
RIS-8706-INS	Route Level Assessment of Technical Compatibility between Rail Vehicles and Underline Bridges	2
GEGN8616	Guidance on evaluating excessive dynamic effects in underline bridges	1

Superseded documents

Number	Title	Issue
GERT8006	Route Availability Number for Assessment of Compatibility between Rail Vehicles and Underline Bridges	3
RIS-8706-INS	Route Level Assessment of Technical Compatibility between Rail Vehicles and Underline Bridges	1

Summary

Background and change

GERT8006 issue three and RIS-8706-INS issue one were published in March 2021. GERT8006 sets out requirements and guidance for the derivation of Route Availability (RA) numbers for rail vehicles and underline bridges. The RA number is used to determine and communicate the capacity of a route to carry rail traffic based on the assessment of compatibility between rail vehicles and underline bridges. RIS-8706-INS sets out requirements and guidance on the use of the RA number for the assessment of compatibility between the static load characteristics of rail vehicles and the capacity of underline bridges to carry the vertical static loads imposed by rail vehicles and the associated dynamic increment. It was proposed to rectify editorial errors in these documents and clarifications were added to remove ambiguities that affect the accuracy of the calculations.

Network Rail submitted a Request for Help in July 2021 for the development of a Guidance Note to address evaluating dynamic effects in underline bridges where the intended speed of operation exceeds the limits of validity of the RA System.

Rolling Stock Standards Committee agreed on 12 March 2021 that it was beneficial to have an RSSB tool for calculating RA for rail vehicles. It also agreed to RSSB reviewing the options around obtaining a licence for RAVEN, or obtaining a newer tool from consultancies, and to provide information on whether a macro-based spreadsheet or web-based app could be developed instead.

RSSB will build a webpage to summarise the RA system so that users can have a better understanding of the background and subject. The webpage will also point to any referencing documents such as GERT8006, RIS-8706-INS and the Guidance Note GEGN8616.

Industry impact due to changes

Impact areas	Scale of impact	Estimated value £
A. Legal compliance and assurance	Medium	£40,000
B. Health, safety and security	Neutral	0
C. Reliability and operational performance	Medium	Not proportionate to quantify
D. Design and maintenance	Medium	£20,000
E. People, process and systems	Medium	£12,000
F. Environment and sustainability	N/A	-
G. Customer experience and industry reputation	Medium	Not proportionate to quantify
Total value of industry opportunity (per five years) =		**£72,000**

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

Detail

1. What are the objectives associated with this change?

Objective 1 – Amend GERT8006 issue three and RIS-8706-INS issue one to correct editorial errors and to provide clarifications to remove ambiguities

1.1 GERT8006 issue three and RIS-8706-INS issue one were published in March 2021 and the 12-month review identified editorial errors. Clarifications on the application of loadings were also included to remove potential incorrect results from the calculations.

Objective 2 –Publish a Guidance Note on the stage 3 check undertaken to evaluate dynamic effects in underline bridges where the intended speed of operation exceeds the limits of validity of the Route Availability System

1.2 A Request for Help was submitted by Network Rail in July 2021 for the development of a Guidance Note. The purpose of the Guidance Note is to provide guidance on evaluating and mitigating the risk of excessive dynamic effects in underline bridges for the introduction of new rail vehicles, modifications to existing bridges and installation of new bridges.

Objective 3 – Develop a calculator for defining the RA for rail vehicles that is accessible for the industry to use

1.3 Rolling Stock Standards Committee confirmed (RST/12032021) on 12 March 2021 that it will be beneficial to have an in-house tool for deriving the RA number for rail vehicles in accordance with GERT8006. It also agreed to RSSB reviewing the options around obtaining a licence for RAVEN, or obtaining a newer tool from consultancies, and to provide information on whether an in-house macro-spreadsheet or web-based app could be developed instead. A review of these options has shown that RAVEN is not accessible in the industry anymore and that a Matlab or a Mathcad license is required for the newer tool that is provided by consultants. One way of developing the in-house web-based tool is to use Python in a Cloud environment.

1.4 The calculator will need to be linked to the webpage for the RA system (objective 4).

1.5 A user guide for the calculator will need to be developed and published. This can be in the form of an Appendix to GERT8006.

Objective 4 – Add a webpage on the RSSB website to explain the RA system

1.6 Building a webpage will help the industry to understand the application of the RA system. With the inclusion of flowcharts, the webpage will also help to point to the right assessments and standards to follow.

1.7 The webpage will refer to the standards including GERT8006, RIS-8706-INS and the new Guidance Note, GEGN8616. It will explain what these standards are and when to apply them.

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

Objective 1 – Amend GERT8006 issue three and RIS-8706-INS issue one to correct editorial errors and to provide clarifications to remove ambiguities

2.1 Where editorial errors were identified in GERT8006 issue three and RIS-8706-INS issue one they have been corrected and additional clarification has been included to remove potential ambiguity in meaning. Examples of the clarifications include stating that the requirements of GERT8006 and RIS-8706-INS are applicable to on-track machines when travelling between work sites during possessions and that at least two units of bogies should be coupled together when determining the RA for rail vehicles.

Objective 2 – Publish a Guidance Note on the Stage 3 check undertaken to evaluate dynamic effects in underline bridges where the intended speed of operation exceeds the limits of validity of the Route Availability System

2.2 Subsequent to the publication of GERT8006 issue two in September 2010, RSSB research report T1066 (2016) *Bridge Compatibility Assessment for GB Passenger Rail Vehicles* has developed an improved understanding of the dynamic risks to which underline bridges can be exposed where passenger vehicles operate at speeds above 100 mph (160 kph). Publication of GERT8006 issue three and RIS-8706-INS issue one in March 2021 introduced a requirement for a Stage 3 compatibility check to demonstrate compatibility for this risk.

2.3 Network Rail collated and prepared draft guidance with content based on findings from RSSB research projects T988 (2012) *Railway bridge design requirements for GB traffic* and T1066 (2016), collaborative research undertaken by European railway administrations/institutions and train manufacturers, and GB experience in undertaking these compatibility checks. The draft guidance developed by Network Rail was reviewed and incorporated in the new Guidance Note, GEGN8616.

Objective 3 – Develop a calculator for defining the RA for rail vehicles

2.4 GERT8006 was updated to point to the newly developed calculator. It has also incorporated a new Appendix that sets out the user guide on the application of the RA for rail vehicles calculator.

Objective 4 – Add a webpage on the RSSB website to explain the RA system and to clarify the procedure to follow for any assessment that is required

2.5 The introductions to GERT8006 issue four, RIS-8706-INS issue two and the new GEGN8616 will point users to the RSSB webpage for the RA system and its application.

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

3.1 GERT8006 issue three and RIS-8706-INS issue one were published in March 2021 and the 12-month review of fitness for purpose was due in June 2022. Therefore, the corrections to the

errors identified were implemented as early as possible. Early publication of these standards will be beneficial because it will remove potential incorrect results from the calculations.

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

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

A. Legal compliance and assurance

4.1 The revisions to GERT8006 issue three and RIS-8701-INS issue one would potentially avoid confusion and calculation mistakes by eliminating editorial errors and by adding clarifications.

4.2 The publication of the new Guidance Note will provide directions on evaluating and mitigating the risk of excessive dynamic effects on underline bridges.

4.3 The provision of a prescriptive method will avoid rework and will facilitate approvals. It is judged that this could save two days per project at £800 per day which is equivalent to £1,600 per year per project. It is anticipated that the benefit will be realised on five projects per year and therefore the value of the benefit is estimated to be £40,000 over a five-year period.

B. Health, safety and security

4.4 This impact area is not directly applicable to these changes.

C. Reliability and operation performance

4.5 The risks can include potential derailment in the case of excessive dynamic effects. The new Guidance Note GEGN8616 will provide directions on undertaking the Stage 3 compatibility checks set out in RIS-8706-INS where there is a risk of excessive dynamic effects including resonance in rail underline bridges when rail vehicles are proposed for a route. The RA for rail vehicles calculator will assist in compatibility checks when introducing vehicles to a route for cases where limits of validity of the RA system as set out in Railway Group Standard GERT8006 are met.

4.6 In the absence of data, it is considered not proportionate to estimate a value for this benefit.

D. Design and maintenance

4.7 The new Guidance Note GEGN8616 will provide directions for dynamics compatibility checking when projects need to modify existing bridges and when new bridges are proposed.

4.8 It is considered that the changes to the standards and provision of the Guidance Note will help in the design and approvals. It is judged that one day will be saved at £800 per day per project every time a bridge on a route is modified or built on the basis that there are five of these structures a year, a benefit of £20,000 is estimated over a five-year period.

E. People, processes and systems

4.9 The new calculator will facilitate the process of deriving the RA number for rail vehicles for the industry. Its use will result in improved and optimised design.

4.10 On the basis that five days in the design will be saved at £800 per day and that the process needs to be carried out three times every year, the benefit over a five-year period would be equivalent to £12,000.

4.11 Benchmarking and validating the new calculator will be required to provide confidence in the results that are derived from it.

F. Environmental sustainability

4.12 This impact area is not directly applicable to these changes.

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

5.1 The contribution of this standards change in realising value to industry opportunity is categorised as important/essential. The value of industry opportunity is estimated to be £72,000 over a five-year period.

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

6.1 The RSSB resources to carry out this project will include a Principal Infrastructure Engineer, a Project Manager, and a supporting administrative person to update the standards catalogue and RSSB website.

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

7.1 Yes, the revised standards and Guidance Note are planned for publication in June 2024 subject to stage approvals.

8. How will the industry implement the change?

8.1 No new requirement has been proposed so the industry does not have to do anything different as a result of the changes to GERT8006 issue three and RIS-8706-INS issue one. If applicable, the industry will learn, through webinars and focused engagement, about the new Guidance Note GEGN8616 and how to use the RA for rail vehicles calculator.

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

9.1 Undertaking a 12-month review of GERT8006 issue four, RIS-8706-INS issue two and GEGN8616 issue one and seeking users' feedback on the usefulness of the Guidance Note.

9.2 Obtaining feedback from the industry about the RA for rail vehicles calculator.

9.3 Monitoring deviations.

9.4 Obtaining feedback from the industry about the new webpage.

Disposition Table

A disposition table maps changes between old and new documents.

Description of text used in the 'Way forward' column of the disposition table:

- No change
- Redrafted – No material change, content reworded to improve clarity (editorial change)
- Revised – Material change to content.
- Withdrawn
- Converted to guidance
- Converted to requirement
- New

Table A1: RIS-8706-INS issue 1 to RIS-8706-INS issue 2

From RIS-8706-INS issue 1	To RIS-8706-INS issue 2	Way forward	Comments	Objective
1.1 Purpose	1.1 Purpose		Title only	
1.1.1	1.1.1	No change		
1.1.2	1.1.2	Redrafted	More guidance added	1
1.1.3	1.1.3	No change		
	1.1.4	New	More guidance added	1
1.1.4	1.1.5	No change		
	1.1.6	New	Guidance to clarify the link of amendments in the INF NTSN to RIS-8706-INS	1
1.1.5	1.1.7	No change		

From RIS-8706-INS issue 1	To RIS-8706-INS issue 2	Way forward	Comments	Objective
1.1.6	1.1.8	No change		
1.1.7		Withdrawn	On-track plant is now considered for assessment of compatibility between a rail vehicle and a route	1
1.2 Introduction	1.2 Introduction		Title only	
1.2.1	1.2.1	No change		
1.2.2	1.2.2	Redrafted	Updated to reference GEGN8616	1
	1.2.3	New		1
1.2.3	1.2.4	No change		
1.2.4	1.2.5	No change		
1.2.5	1.2.6	No change		
1.2.6	1.2.7	No change		
1.2.7	1.2.8	No change		
1.3 Application of this document	1.3 Application of this document		Title only	
1.3.1	1.3.1	No change		
1.3.2	1.3.2	No change		
1.4 Health and safety responsibilities	1.4 Health and safety responsibilities		Title only	
1.4.1	1.4.1	No change		
1.5 Structure of this document	1.5 Structure of this document		Title only	

From RIS-8706-INS issue 1	To RIS-8706-INS issue 2	Way forward	Comments	Objective
1.5.1	1.5.1	No change		
1.5.2	1.5.2	No change		
1.6 Approval and authorisation of this document	1.6 Approval and authorisation of this document		Title only	
1.6.1	1.6.1	Redrafted	Date updated	
1.6.2	1.6.2	Redrafted	Date updated	
2.1 Introduction to the assessment process	2.1 Introduction to the assessment process		Title only	1
G 2.1.1	G.2.1.1	Redrafted	Updated to be clearer	1
G 2.1.2	G 2.1.2	No change		
G 2.1.3	G 2.1.3	No change		
G 2.1.4	G 2.1.4	No change		
G 2.1.5	G 2.1.5	No change		
G 2.1.6	G 2.1.6	No change		
	G 2.1.7	New	Additional guidance added	1
	G 2.1.8	New	Additional guidance added	1
2.2 Verification of compatibility: Compatibility assessment process	2.2 Verification of compatibility: Compatibility assessment process		Title only	

From RIS-8706-INS issue 1	To RIS-8706-INS issue 2	Way forward	Comments	Objective
	2.2.1	New	Requirement added	1
	G 2.2.2	New	Rationale added to support new 2.2.1	1
	G 2.2.3	New	Additional guidance to help with new requirement in 2.2.1	
G 2.2.1	G 2.2.4	No change		
G 2.2.2	G 2.2.5	No change		
G 2.2.3	G 2.2.6	No change		
G 2.2.4	G 2.2.7	No change		
G 2.2.5	G 2.2.8	No change		
G 2.2.6	G 2.2.9	No change		
G 2.2.7	G 2.2.10	No change		
2.3 Stage 1 compatibility assessment	2.3 Stage 1 compatibility assessment		Title only	
2.3.1	2.3.1	Redrafted	References updated	1
2.3.2	2.3.2	No change		
	2.3.3	New	Added to be more explicit as to how to apply the RA number to a route	1
2.3.3	2.3.4	No change		
G 2.3.4	G 2.3.5	No change		
G 2.3.5	G 2.3.6	Redrafted	Updated to be clearer	1
G 2.3.6	G 2.3.7	No change		

From RIS-8706-INS issue 1	To RIS-8706-INS issue 2	Way forward	Comments	Objective
G 2.3.7	G 2.3.8	Redrafted	Updated to be clearer	1
G 2.3.8	G 2.3.9	No change		
G 2.3.9	G 2.3.10	No change		
	G 2.3.11	New	More guidance added	1
G 2.3.10	G 2.3.12	Redrafted	Additional guidance added and references updated	1
G 2.3.11	G 2.3.13	Redrafted	More guidance added	1
G 2.3.12	G 2.3.14	No change		
G 2.3.13	G 2.3.15	No change		
	G 2.3.16	New	Additional guidance for clarity	1
2.4 Stage 2 compatibility assessment	2.4 Stage 2 compatibility assessment		Title only	
2.4.1	2.4.1	Redrafted	Updated to include reference to figure 1	
2.4.2	2.4.2	No change		
	2.4.3	New	Added to be clearer	1
2.4.3	2.4.4	No change		
2.4.4	2.4.5	Redrafted	Added to be more explicit	1
	2.4.6	New	Additional guidance for clarity	1
G 2.4.5	G 2.4.7	Redrafted	Updated to be more explicit	1
	G 2.4.8	New	Additional guidance for clarity	1

From RIS-8706-INS issue 1	To RIS-8706-INS issue 2	Way forward	Comments	Objective
G 2.4.6	G 2.4.9	Redrafted	Updated to be clearer	1
G.2.4.10	G 2.4.10	No change		
	G 2.4.11	New	Additional guidance for clarity	1
	G 2.4.12	New	Additional guidance for clarity	1
G 2.4.7	G 2.4.13	No change		
G 2.4.8	G 2.4.14	No change		
G 2.4.9	G 2.4.15	Redrafted	Updated to be clearer	1
	G 2.4.16	New	Additional guidance for clarity	1
	G 2.4.17	New	Additional guidance for clarity	1
	G 2.4.18	New	Additional guidance for clarity	1
2.5 Stage 3 compatibility assessment	2.5 Stage 3 compatibility assessment		Title only	
2.5.1	2.5.1	Redrafted	Updated to be more explicit	1
2.5.2	2.5.2	No change		
2.5.3	2.5.3	No change		
2.5.4	2.5.4	No change		
2.5.5	2.5.5	Redrafted	Updated to be more explicit	1
G 2.5.6	G 2.5.6	Redrafted	Updated to be more explicit	1
G 2.5.7	G 2.5.7	Redrafted	Updated to be more explicit and split into G 2.5.7 and G 2.5.8	1

From RIS-8706-INS issue 1	To RIS-8706-INS issue 2	Way forward	Comments	Objective
	G 2.5.8	New	Additional guidance	1
G 2.5.8	G 2.5.9	No change		
	G 2.5.10	New	Additional guidance for clarity	1
G 2.5.9	G 2.5.11	Redrafted	References updated and guidance on latest knowledge added	1
G 2.5.10	G 2.5.12	No change		
	2.6 Verification of compatibility: Plant travelling in possessions		Title only	
	2.6.1	New	New requirement relating to plant in possessions	1
	2.6.2	New	New requirement relating to plant in possessions	1
	2.6.3	New	New requirement relating to plant in possessions	1
	2.6.4	New	New requirement relating to plant in possessions	1
	2.6.5 Rationale	New	Rationale to support the new requirements	1
	G 2.6.6 Guidance	New	Guidance to support the new requirements	1
	G 2.6.7	New	Guidance to support the new requirements	1
	G 2.6.8	New	Guidance to support the new requirements	1
	G 2.6.9	New	Guidance to support the new requirements	1
	G 2.6.10	New	Guidance to support the new requirements	1
	G 2.6.11	New	Guidance to support the new requirements	1

From RIS-8706-INS issue 1	To RIS-8706-INS issue 2	Way forward	Comments	Objective
2.6 Underline bridge data: Relevant asset characteristics	2.7 Underline bridge data: Relevant asset characteristics		Title only	
G 2.6.1	G 2.7.1	Redrafted	Updated to include reference to Network Rail's network statement	1
G 2.6.2	G 2.7.2	No change		

Disposition Table

Table A2: GERT8006 issue 3 to GERT8006 issue 4

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
1.1 Purpose			Title only	
1.1.1	1.1.1	No change		
1.1.2	1.1.2	No change		
1.2 Introduction			Title only	1
1..2.1 Background			Title only	1
1.2.1.1	1.2.1.1	No change		
1.2.1.2	1.2.1.2	Redrafted	More guidance added	1
1.2.1.3	1.2.1.3	No change		
1.2.1.4	1.2.1.4	No change		1
1.2.1.5	1.2.1.5	Redrafted	More guidance added	1
1.2.1.6	1.2.1.6	Redrafted	Reference to European standard updated	1
1.2.2 Principles			Title only	
1.2.2.1	1.2.2.1	No change		1
1.2.2.2	1.2.2.2	Redrafted	References to other documents updated	
1.2.2.3	1.2.2.3	No change		1
	1.2.2.4	New	More references to other documents added	1
1.2.3 Structure of this document			Title only	

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
1.2.3.1	1.2.3.1	No change		1
1.2.3.2	1.2.3.2	No change		1
1.2.4 Related requirements in other documents			Title only	
1.2.4.1	1.2.4.1	No change		1
1.2.4.2	1.2.4.2	No change		1
1.2.4.3	1.2.4.3	Redrafted	More guidance added	1
1.2.4.4	1.2.4.4	No change		1
1.2.4.5	1.2.4.5	Redrafted	References to European standards updated	1
1.2.4.6	1.2.4.6	No change		
1.2.4.7	1.2.4.7	Redrafted	References to European standards updated	1
1.2.4.8	1.2.4.8	Redrafted	References to European standards updated	1
1.2.4.9	1.2.4.9	No change		1
1.2.5 Supporting documents			Title only	1
	1.2.5.1	New	Reference to Network Rail's Network Statement added	1
1.3 Approval and authorisation of this document			Title only	1
1.3.1	1.3.1	Redrafted	Dates updated	1

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
1.3.2	1.3.2	Redrafted	Dates updated	1
Part 2 Requirements for capacity of underline bridges and routes			Title only	1
2.1 Derivation of RA numbers of underline bridges			Title only	1
2.1.1 RA number: Permissible speed at an underline bridge			Title only	1
2.1.1.1	2.1.1.1	No change		1
2.1.1.2	2.1.1.2	No change		1
2.1.1.3	2.1.1.3	No change		
G 2.1.1.4	G 2.1.1.4	Redrafted	More guidance added	1
G 2.1.1.5	G 2.1.1.5	Redrafted	Redrafted for clarity	1
G 2.1.1.6	G 2.1.1.6	No change		
G 2.1.1.7	G 2.1.1.7	No change		1
G 2.1.1.8	G 2.1.1.8	No change		1
	G.2.1.1.9	New	Additional guidance	1
	G 2.1.1.10	New	Additional guidance and figure added	1
	G 2.1.1.11	New	Reference added	1

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
2.1.2 RA number: Differential speeds at an underline bridge			Title only	1
2.1.2.1	2.1.2.1	Redrafted	Updated to exclude CS speeds	1
G 2.1.2.2	G 2.1.2.2	Redrafted	Rationale updated to give additional guidance	1
G 2.1.2.3	G 2.1.2.3	No change		
G 2.1.2.4	G 2.1.2.4	Redrafted	Split into G.2.1.2.4 and G 2.1.2.5 to give greater clarity	1
	G 2.1.2.5	New	Additional guidance	1
2.1.3 RA number: Method for derivation			Title only	
2.1.3.1	2.1.3.1	No change		
G 2.1.3.2	G 2.1.3.2	No change		
G 2.1.3.3	G 2.1.3.3	No change		
G 2.1.3.4	G 2.1.3.4	No change		
G 2.1.3.5	G 2.1.3.5	No change		
2.1.4 RA Number: Assignment of a RA number			Title only	
G 2.1.4.1	2.1.4.1	Redrafted	Redrafted as a requirement	1
G 2.1.4.2	G 2.1.4.2	Redrafted	This is now rationale and clause updated for greater clarity	1
	G 2.1.4.3	New	New guidance	1

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
	G 2.1.4.4	New	New guidance	1
2.2 Derivation of RA numbers of infrastructure route sections	2.2 Derivation of RA numbers of infrastructure route sections		Title only	
2.2.1 RA number: Permissible speed of an infrastructure route section	2.2.1 RA number: Permissible speed of an infrastructure route section		Title only	
2.2.1.1	2.2.1.1	Redrafted	Updated to be clearer	1
2.2.1.2	2.2.1.2	No change		
	2.2.1.3	New requirement		1
2.2.1.3	2.2.1.4	Redrafted	Updated to be clearer	1
G 2.2.1.4	G 2.2.1.5	Redrafted	Updated to be clearer	1
G 2.2.1.5	G 2.2.1.6	No change		
G 2.2.1.6	G 2.2.1.7	No change		
G 2.2.1.7	G 2.2.1.8	Redrafted	Updated to be clearer	1
G 2.2.1.8	G 2.2.1.9	Redrafted	Updated to be clearer	1
G 2.2.1.9	G 2.2.1.10	No change		
G 2.2.1.10	G 2.2.1.11	No change		
G 2.2.1.11	G 2.2.2.1.12	No change		

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
2.3 Review and maintenance of data on RA number of bridges and infrastructure route sections	2.3 Review and maintenance of data on RA number of bridges and infrastructure route sections		Title only	
G 2.3.1	G 2.3.1	No change		
G 2.3.2	G 2.3.2	No change		
G 2.3.3	G 2.3.3	No change		
G 2.3.4	G 2.3.4	No change		
G 2.3.5	G 2.3.5	No change		
G 2.3.6	G 2.3.6	Redrafted	Updated to be clearer	1
G 2.3.7	G 2.3.7	No change		
G 2.3.8	G 2.3.8	No change		
G 2.3.9	G 2.3.9	Redrafted	Updated to include CS permissible speeds.	1
G 2.3.10	G 2.3.10	Redrafted	To exclude CS permissible speeds	1
Part 3 Requirements for Static Load Characteristics of Rail Vehicles			Title only	

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
3.1 Requirements for Static Load Characteristics of Rail Vehicles			Title only	
3.1.1 Derivation of RA number: Rail vehicle type			Title only	
3.1.1.1	3.1.1.1	No change		
G 3.1.1.2	G 3.1.1.2	No change		
G 3.1.1.3	G 3.1.1.3	Redrafted	Additional pertinent information added	1
G 3.1.1.4	G 3.1.1.4	No change		
3.1.2 Derivation of RA number: Vehicle load condition excluding freight vehicles			Title only	
3.1.2.1	3.1.2.1	No change		
G 3.1.2.2	G 3.1.2.2	No change		
G 3.1.2.3	G 3.1.2.3	Redrafted	Redrafted to be clearer	1
G 3.1.2.4	G 3.1.2.4	No change		
3.1.3 Derivation of RA number: Vehicle load condition for freight vehicles			Title only	

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
3.1.3.1	3.1.3.1	No change		
G 3.1.3.2	G 3.1.3.2	No change		
G 3.1.3.3	G 3.1.3.3	No change		
G 3.1.3.4	G 3.1.3.4	No change		
G 3.1.3.5	G 3.1.3.5	No change		
G 3.1.3.6		Withdrawn	Withdrawn as new section on freight added	
G 3.1.3.7		Withdrawn	Withdrawn as new section on freight added	
	3.1.4 Derivation of RA number: Vehicle load condition for locomotives and similar powered vehicles		Title only	
	3.1.4.1	New	Added to be more specific for locomotives and similar powered vehicles	1
	G 3.1.4.2	New	Added to be more specific for locomotives and similar powered vehicles	1
	G 3.1.4.3	New	Added to be more specific for locomotives and similar powered vehicles	1
	G 3.1.4.4	New	Added to be more specific for locomotives and similar powered vehicles	1
	3.1.3 Derivation of RA number: Vehicle load condition for other vehicles		Title only	
	3.1.5.1	New	Added to be more specific for other vehicles	1

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
	3.1.5.2	New	Added to be more specific for other vehicles	1
	3.1.5.3	New	Added to be more specific for other vehicles	1
	G 3.1.5.4	New	Added to be more specific for other vehicles	1
	G 3.1.5.5	New	Added to be more specific for other vehicles	1
	G 3.1.5.6	New	Added to be more specific for other vehicles	1
	G 3.1.5.7	New	Added to be more specific for other vehicles	1
3.2 Derivation of RA numbers of a rail vehicle			Title only	
3.2.1 Relevant rail vehicle data				
G 3.2.1.1	3.2.1.1	Redrafted	Redrafted as requirement	1
G 3.2.1.2	G 3.2.1.2	No change	Now rationale	1
G 3.2.1.3	G 3.2.1.3	No change		
G 3.2.1.4	G 3.2.1.4	No change		
G 3.2.1.5	G 3.2.1.5	No change		
G 3.2.1.6	G 3.2.1.6	No change		
3.2.2 Rail vehicle data: Vehicle end			Title only	
3.2.2.1	3.2.2.1	No change		
G 3.2.2.2	G 3.2.2.2	No change		

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
G 3.2.2.3	G 3.2.2.3	No change		
3.3 Review and maintenance of data on RA number of rail vehicles			Title only	
G 3.3.1	G 3.3.1	No change		
G 3.3.2	G 3.3.2	No change		
G 3.3.3	G 3.3.3	Redrafted	Additional guidance added	1
G 3.3.4	G 3.3.4	No change		
Part 4 Application of this document			Title only	
4.1 Scope			Title only	
4.1.1	4.1.1	No change		
4.1.2	4.1.2	No change		
4.1.3	4.1.3	Redrafted	Additional pertinent information added	
4.2 Exclusions from scope			Title only	
4.2.1	4.2.1	No change		
4.3 General enter into force date			Title only	
4.3.1	4.3.1	No change		

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
4.4 Exceptions to general enter into force date			Title only	
4.4.1	4.4.1	No change		
4.5 Applicability of requirements for projects already underway			Title only	
4.5.1	4.5.1	No change		
4.6 Deviations			Title only	
4.6.1	4.6.1	No change		
4.6.2	4.6.2	No change		
4.7 Health and safety responsibilities			Title only	
4.7.1	4.7.1	No change		
Appendix A Method for Derivation of RA numbers			Title only	
A.1 Limits of validity			Title only	
A.1.1	A.1.1	Redrafted	Updated with additional considerations	1
G A.1.2	G A.1.2	No change		
G A.1.3	G A.1.3	No change		

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
G A.1.4	G A.1.4	No change		
G A.1.5	G A.1.5	No change		
G A.1.6	G A.1.6	No change		
G A.1.7	G A.1.7	No change		
	G A.1.8	New	Added to give more guidance	1
A.2 Derivation of RA number of an underline bridge			Title only	
A.2.1 Derivation of RA number: Load model and its application			Title only	
A.2.1.1	A 2.1.1	No change		
	A.2.1.2	New		1
G A.2.1.2	G A.2.1.3	No change	Clause number changed due to new requirement in section	
G A.2.1.3	G A.2.1.4	No change	Clause number changed due to new requirement in section	
A.2.2 Derivation of RA number: Application of load model to continuous bridges	A.2.2 Derivation of RA number: Application of load model to continuous bridges and continuous bridge elements	Redrafted	Title only Updated to be more specific	1

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
A.2.2.1	A 2.2.1	Redrafted	Redrafted for clarity	1
	A.2.2.2	New	Added requirement to ensure relevant information is collated.	1
A.2.2.2	A.2.2.3	Redrafted	Redrafted for clarity and clause number changed due to new requirement in section	1
G A.2.2.3	G A.2.2.4	No change	Clause number changed due to new requirement in section	
G A.2.2.4	G A.2.2.5	Redrafted	Updated to provide more information and clause number changed due to new requirement in section	1
A.2.3 Derivation of RA number : Determination of maximum number of units			Title only	
A.2.3.1	A.2.3.1	Redrafted	Updated to be clearer	1
	A.2.3.2	New	Added to take into account structural elements within the underline bridge	1
	A.2.3.3	New	Added to ensure the correct value is taken	1
A.2.3.2	A.2.3.4	No change	Clause number changed due to new requirement in section	
A.2.3.3	A.2.3.5	No change	Clause number changed due to new requirement in section	
G A.2.3.4	G A.2.3.6	No change	Clause number changed due to new requirement in section	
G A.2.3.5	G A.2.3.7	No change	Clause number changed due to new requirement in section	
G A.2.3.6	G A.2.3.8	No change	Clause number changed due to new requirement in section	

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
A.3 Derivation of RA number of a rail vehicle			Title only	
A.3.1 Derivation of RA number: Rail vehicle formation			Title only	
A 3.1.1	A 3.1.1	No change		
	A 3.1.2	New	To take into account fixed formation that are shorter than 100 m	1
	A 3.1.3	New	To take into account fixed formation that are longer than 100 m	1
G A.3.1.2	G A.3.1.4	No change	Clause number changed due to new requirement in section	
	G A.3.1.5	New	?	1
G A.3.1.3	G A.3.1.6	No change	Clause number changed due to new requirement in section	
A.3.2 Derivation of RA number: Formation of rail vehicles with asymmetric axle spacing or axle loads			Title only	
A.3.2.1	A.3.2.1	No change		
G A.3.2.2	G A.3.2.2	No change		
G A.3.2.3	G A.3.2.3	No change		

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
A.3.3 Derivation of RA number: Rail vehicle loading conditions			Title only	
A.3.3.1	A.3.3.1	Redrafted	Updated with new references	1
G A.3.3.2	G A.3.3.2	No change		
G A.3.3.3	G A.3.3.3	No change		
A.3.4 Derivation of RA number: Bending moment and end shear determination for train of rail vehicles			Title only	
A.3.4.1	A.3.4.1	No change		
G A.3.4.2	G A.3.4.2	No change		
G A.3.4.3	G A.3.4.3	No change		
G A.3.4.4	G A.3.4.4	No change		
G A.3.4.5	G A.3.4.5	No change		
A.3.5 Derivation of RA number: Equivalent Uniformly Distributed Load (EUDL) calculation for train of rail vehicles			Title only	

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
A.3.5.1	A.3.5.1	No change		
G A.3.5.2	G A.3.5.2	No change		
G A.3.5.3	G A.3.5.3	No change		
A.3.6 Derivation of RA number: Bending moment and end shear determination for static model			Title only	
A.3.6.1	A.3.6.1	No change		
	A.3.6.2	New requirement	?	1
G A.3.6.2	G A.3.6.3	No change	Clause number changed due to new requirement in section	
G A.3.6.3	G A.3.6.4	No change	Clause number changed due to new requirement in section	
	G A.3.6.5	New	Guidance added for new requirement	1
A.3.7 Derivation of RA number: EUDL calculation for static model			Title only	
A.3.7.1	A.3.7.1	No change		
G A.3.7.2	G A.3.7.2	No change		
G A.3.7.3	G A.3.7.3	No change		
G A.3.7.4	G A.3.7.4	No change		

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
A.3.8 Derivation of RA number: Number of load model units representing train of rail vehicles			Title only	
A.3.8.1	A.3.8.1	No change		
G A.3.8.2	G A.3.8.2	No change		
G A.3.8.3	G A.3.8.3	No change		
A.3.9 Derivation of RA number: Determination of RA number of rail vehicle			Title only	
A.3.9.1	A.3.9.1	No change		
A.3.9.2	A.3.9.2	No change		
A.3.9.3	A.3.9.3	No change		
G A.3.9.4	G A.3.9.4	No change		
G A.3.9.5	G A.3.9.5	No change		
A.4 Load model for deriving RA number using imperial units			Title only	
Figure 1: Load model for other than short loaded lengths	Figure 1: Load model for other than short loaded lengths	No change	Title only	

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
Figure 2: Load model for short loaded lengths	Figure 2: Load model for short loaded lengths	No change	Title only	
A.5 Load model for deriving RA number using load in A.4 converted to metric units (kilonewtons/metres)			Title only	
Figure 3: Load model for other than short loaded lengths	Figure 3: Load model for other than short loaded lengths	No change	Title only	
Figure 4: Load model for short loaded lengths	Figure 4: Load model for short loaded lengths	No change	Title only	
Appendix B Guidance on the interpretation of BS EN 15663:2017 + A1:2018 for GB rail applications			Title only	
B.1 Design masses			Title only	
G B.1.1	G B.1.1	No change		
G B.1.2	G B.1.2	redrafted	Updated with new references	1

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
B.2 Design mass in working order and normal payload: BS EN 15663:2017 + A1:2018			Title only	
G B.2.1	G B.2.1	No change		
G B.2.2	G B.2.2	Redrafted	Additional information, taking into account new knowledge, has been added.	1
B.3 Design mass under exceptional payload			Title only	
B.3.1 Design mass under exceptional payload: According to type of rolling stock			Title only	
G B.3.1.1	G B.3.1.1	No change		
B.3.2 Design mass under exceptional payload: Passenger loading in seated and standing areas			Title only	
G B.3.2.1	G B.3.2.1	No change		
B.3.3 Design mass under exceptional payload: Equivalent GB train category			Title only	

From GERT8006 issue 3	To GERT8006 issue 4	Way forward	Comments	Objective
G B.3.3.1	G B.3.3.1	No change		
B.3.4 Design mass under exceptional payload: GB value for high-speed/ long distance passenger loading			Title only	
G B.3.4.1	G B.3.4.1	No change		
B.3.5 Design mass under exceptional payload: GB passenger loading value for trains other than high-speed/long distance			Title only	
G B.3.5.1	G B.3.5.1	Redrafted	Guidance has been split into G B.3.5.1 and G B.3.5.2	1
	G B.3.5.2	New	Guidance has been split into G B.3.5.1 and G B.3.5.2	1
	G B.3.5.3	New	?	1
B.3.6 Design mass under exceptional payload: passenger loading for tip up seat areas			Title only	
G B.3.6.1	G B.3.6.1	No change		