

22-021 – Non-destructive Testing (NDT) Processes on Rail Vehicles

Version:	1.05		
Purpose:	Approval to publish		
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Lead industry committee:	Rolling Stock Standards Committee (RST SC)	Date:	18 April 2024
Supporting industry committee:	Plant Standards Committee (PLT SC)	Date:	01 May 2024

Decision

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

APPROVE the document(s) for publication.

In approving the document(s) for publication the SC has:

APPROVED with or without modification the proposed responses to comments received during consultation.

APPROVED the new issue of RIS-2701-RST for publication.

Plant Standards Committee (PLT SC) is asked to:

SUPPORT the document(s) for publication.

In supporting the document(s) for publication the SC has:

SUPPORTED with or without modification the proposed responses to comments received during consultation.

SUPPORTED the new issue of RIS-2701-RST for publication.

22-021 – Non-destructive Testing (NDT) Processes on Rail Vehicles

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

Proposed documents

Number	Title	Issue
RIS-2701-RST	NDT Processes on Rail Vehicles	Two

Proposed Superseded documents

Number	Title	Issue
RIS-2701-RST	NDT Processes on Rail Vehicles	One

Summary

Background and change

RIS-2701-RST issue one was published in March 2011. It sets out requirements and gives guidance on non-destructive testing (NDT), including the certification of operatives, equipment and facilities.

RIS-2701-RST issue one was created from clauses in GMRT2005 issue three, *Certification Processes for NDT Operatives, Equipment and Facilities Used for Inspecting Rail Vehicles*, which did not form National Technical Rules (NTRs).

- Requirements identified as industry good practice in GMRT2005 issue three and other withdrawn standards were transferred to RIS-2701-RST issue one.
- NTRs from GMRT2005 were incorporated into GMRT2004 issue four, *Rail Vehicle Maintenance*, along with NTRs formerly in GMRT2030 issue two, *Axle Bearing Maintenance*, and GMRT2455 issue one, *Freight Vehicle In-Service Inspections*. These standards were withdrawn on issue of GMRT2004 issue four, itself superseded by RIS-2004-RST.

RIS-2701-RST issue one has been reviewed for fitness for purpose at its 10-year review. The 10-year review supported the findings from the initial five-year review, that the content of RIS-2701-RST was still relevant and valid, but many of the referenced external documents should be revised to reflect updates and current versions.

The 10-year review also identified that RIS-2701-RST is not in the current format for RSSB standards. Bringing the standard into the current format will improve traceability and maintainability of the document and will allow it to be redrafted into the up-to-date document style and structure, notably including rationale.

Industry impact due to changes

Impact areas	Scale of impact	Estimated value £ 000's
A. Legal compliance and assurance	Neutral	No benefit claimed
B. Health, safety and security	Low	Not proportionate to quantify
C. Reliability and operational performance	Low	Not proportionate to quantify
D. Design and maintenance	Low	Not proportionate to quantify
E. People, process and systems	Low	Not proportionate to quantify
F. Environment and sustainability	N/A	No benefit claimed
G. Customer experience and industry reputation	Low	Not proportionate to quantify
Total value of industry opportunity =		No benefit claimed
The standards change contribution to the total value of industry opportunity		
<input type="checkbox"/> None or low	<input checked="" type="checkbox"/> Minor but useful	<input type="checkbox"/> Moderate
		<input type="checkbox"/> Important / essential
		<input type="checkbox"/> Urgent / critical

Detail

1. What are the objectives associated with this change?

Objective 1 – Update the external references in RIS-2701-RST, and incorporate appropriate recent research

- 1.1 Implement the findings of the 10-year review of RIS-2701-RST issue one.
- 1.2 RIS-2701-RST specifies requirements for the following:
 - The approval and use of NDT procedures, including new NDT techniques
 - The certification of NDT equipment
 - The certification of NDT facilities
 - The certification of NDT operatives
- 1.3 In RIS-2701-RST issue one the detailed requirements of these are set out in appendices and refer to several external documents. All of the references to external documents are out of date.
- 1.4 RIS-2701-RST depends on these referenced standards to ensure compliance with its requirements. As the references are out of date, the standard no longer represented current good practice.
- 1.5 The referenced external standards and documents themselves will need to be reviewed, to ensure they remain the correct documents to be referenced.
- 1.6 The relevant findings from two research projects need to be taken into account:
 - T060c, *Review of techniques for rail axle inspection*
 - T774, *Research investigating the value, reliability and effectiveness of axle inspection techniques.*

Objective 2 – Improve the overall layout and content of the standard

- 1.7 RIS-2701-RST needs to be updated to the current format for RSSB standards.
- 1.8 The requirements within the standard need to be reviewed and revised to align with RSSB's current editorial guidelines. This includes the incorporation of clear rationale.
- 1.9 RIS-2701-RST needs to be reviewed and revised to remove, rewrite, and merge its requirements as appropriate.
- 1.10 The structure of RIS-2701-RST needs to be reviewed and the sequence of clauses reorganised to aid the readability of the standard.

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

Objective 1 – Update the external references in RIS-2701-RST, and incorporate appropriate recent research

- 2.1 The principal finding of the 10-year review was to correct the references to the standards that support the requirements, test methods, and procedures in the appendices.
- 2.2 The technical content of RIS-2701-RST remains relevant and generally fit for purpose. The technology to perform NDT has only moved on in evolutionary steps. However, the standard relies on externally referenced documents to achieve compliance.
- 2.3 RIS-2701-RST issue one referred to the following standards:

Referenced standard	Status
GMRT2004 issue four <i>Rail Vehicle Maintenance</i>	Withdrawn. Replaced by RIS-2004-RST issue one
GMRT2466 issue three <i>Railway Wheelsets</i>	Updated to GMRT2466 issue five but NDT requirements are set out in RIS-2766-RST issue two
BS EN 473:2008 <i>Non-destructive testing. Qualification and certification of NDT personnel – General Principles</i>	Withdrawn. Replaced with BS EN ISO 9712:2022 <i>Non-destructive testing. Qualification and certification of NDT personnel</i>
BS EN 12668 series <i>Non-destructive testing - Characterisation and verification of ultrasonic examination equipment</i>	Withdrawn. Replaced with BS EN ISO 22232 <i>Non-destructive testing — Characterization and verification of ultrasonic test equipment</i> Part 1 replaced with BS EN ISO 22232-1:2020 <i>Part 1: Instruments</i> Part 2 replaced with BS EN ISO 22232-2:2020 <i>Part 2: Probes</i> Part 3 replaced with BS EN ISO 22232-3:2020 <i>Part 3: Combined Equipment</i>
BS EN ISO / IEC 17021:2006 <i>Conformity assessment - Requirements for bodies providing audit and certification of management systems</i>	Withdrawn. Replaced with 14 revised parts published between 2013 and 2022, some of which are currently under review
BS EN ISO / IEC 17024:2003 <i>Conformity assessment - General requirements for bodies operating certification of persons</i>	Withdrawn. Replaced by BS EN ISO/IEC 17024:2012, which is currently under review
SNT-TC-1A:2006 <i>Personnel Qualification and Certification in Non-destructive Testing</i>	Withdrawn. Replaced by SNT-TC-1A:2020 BS EN ISO 9712:2022 <i>Non-destructive testing. Qualification and certification of NDT personnel</i> , may be a more appropriate reference.

- 2.4 All standards referenced by RIS-2701-RST issue one had been superseded. Anyone following the RIS would be following old and out of date processes and practices through

these referenced standards. RIS-2701-RST was therefore not effective in maintaining industry good practice. To maintain industry good practice, RIS-2701-RST issue two now refers to updated and most relevant standards.

2.5 Research projects identified as being relevant were reviewed.

- T060c may contain useful supporting evidence for guidance in RIS-2701-RST (GN03), such as that “any limitations of the methods to be used should also be identified”.
- T774 may contain useful supporting evidence for guidance in RIS-2701-RST (GN55), for example that “the application of the process and analysis of outputs should take into consideration human factors”.

These research projects are wheelset specific, and it was found that any relevant findings from them were addressed by updating the references to external standards identified in 2.3.

Objective 2 – Improve the overall layout and content of the standard

2.6 The content of RIS-2701-RST has been reviewed to keep it up to date and fit for purpose.

2.7 The format and style of RIS-2701-RST has been updated to the current format for RSSB standards.

2.8 Where a single requirement followed a heading, it has been deleted or merged into other clauses.

2.9 Requirements have been reviewed and put into the format of requirement, rationale, and guidance.

2.10 Requirements have been reviewed and revised to keep them correct and fit-for-purpose.

2.11 The GNxx guidance clauses have been reviewed and revised to remove any ambiguity as to whether they are requirements or guidance.

2.12 The fundamental content and impact to the industry has not changed significantly, although the document has improved in terms of alignment with RSSB style and the requirements have been set out more clearly.

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

3.1 The length of time since the last revision has been noted. Expressions have been made by industry that a review of the standard be carried out urgently.

3.2 There is currently a problem within the industry in relation to the training, reassessment, and retention of NDT operatives. NDT specialists have advised that they are addressing this problem and looking to develop a new training programme. This will take time, but they are hopeful that they will be on top of this before the end of 2024, and the revision of the standard will go some way to helping this.

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 RIS-2701-RST sets out requirements for procedures, equipment, and operatives for non-destructive testing that is undertaken as part of rail vehicle maintenance to ensure the ongoing safety of GB mainline rail vehicles.
- 4.2 There is no direct impact on the Railway Undertaking's (RU) obligations under The Railways & Other Guided Transport Systems (Safety) Regulations (ROGS) 2006, as amended 2011. The revision of RIS-2701-RST will contribute to clarifying RU's obligations by setting out industry's expectations of what is required in a clearer way and removing the contradictions that have arisen from referring to obsolete versions of external standards.

B. Health, safety and security

- 4.3 It is not claimed that there are measurable increases in health, safety, or security. Although it is not possible to quantify, it is assumed that referencing revised and updated standards will improve these areas.

C. Reliability and operation performance

- 4.4 The referenced standards have been developed and updated based on the return of experience from use on the operational railway, as well as expert knowledge and changes in technology. The purpose of updating any standard is to generate improvement. Although it is not possible to quantify, it is assumed that adopting the new methodologies from the updated references will improve the robustness of and confidence in the processes.

D. Design and maintenance

- 4.5 RIS-2701-RST sets out requirements for maintenance processes using NDT methods. Updating the references in the standard to the most up to date external documents will directly benefit rail vehicle maintenance, although it is not possible to quantify this as part of this business case.

E. People, process and systems

- 4.6 RIS-2701-RST sets out requirements for preparing test procedures, the approval of new NDT techniques, the certification of equipment and facilities, and the certification of operatives. Revision of the standard should result in improvements to these procedures in organisations conducting the maintenance, with the aim of introducing efficiencies, new techniques, and improving overall safety, but it is not possible to quantify these as part of this business case.

F. Environment and sustainability

- 4.7 No benefit is claimed directly by the revision of RIS-2701-RST.

G. Customer experience and industry reputation

- 4.8 Both customer experience and industry reputation would improve if the changes to RIS-2701-RST brought about improved fleet reliability. The degree to which this may happen is not possible to quantify.
- 5. What is the contribution of this standards change in realising the value to industry opportunity?**
- 5.1 Updating RIS-2701-RST is key to ensuring that the most up-to-date methodologies for non-destructive testing are followed. Providing effective, correct, and up-to-date guidance to industry will improve safety, efficiency, and reliability.
- 6. What was the effort required by RSSB to make the change?**
- 6.1 Implementing change to RIS-2701-RST has required a rolling stock technical expert to review the standard, in particular the referenced documents to ensure the appropriateness and correctness of the references. The rolling stock technical expert was supported by a RSSB project manager.
- 7. Did RSSB deliver against industry's expected timescales?**
- 7.1 There are no concerns about meeting industry's timescales.
- 8. How will the industry implement the change?**
- 8.1 Changes made to the content of the standard will not directly result in altering the way that the document is implemented in practice, and the substance of the standard will remain broadly familiar. Where the content of the referenced standards has changed, this may resolve contradictions that may exist from utilising out of date references.
- 8.2 RUs and bodies responsible for maintenance will need to assure themselves that the correct and most up-to-date processes are applied.
- 9. How will RSSB assess whether the change is achieving the objectives?**
- 9.1 RIS-2701-RST will be reviewed 12 months after the publication of the revised issue. The effectiveness of the change can be partially assessed by indirect measures such as the number of enquiries that are received about its content. Similarly, monitoring approaches to Standards Committees or RSSB for advice may also provide an indication of the standard's effectiveness.
- 9.2 This could also include monitoring National Incident Reports or Rail Accident Investigation Branch reports to understand if there are implications for NDT and whether they are related to the update of RIS-2701-RST.
- 9.3 RSSB may proactively seek feedback on the document from appropriate stakeholders.

Appendix A Disposition Table

Table A1: RIS-2701-RST issue 1 to RIS-2701-RST issue 2

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
Part 1	Part 1	Revised	New title 'Purpose and Introduction', in accordance with current template.	2
1.1	1.1	Revised	New title 'Purpose', in accordance with current template.	2
1.1.1	1.1.1	Revised	Reworded in accordance with current template.	2
1.1.2	1.1.2	Revised	The second paragraph 'Specific responsibilities and compliance requirements are set out in 3.2.1 of GM/RT2004' has been withdrawn.	2
1.1.3	1.1.3	Revised	Reworded to further describe the content of the standard.	2
-	1.1.4	New	Post-consultation: Entered the following text "Requirements in this document are largely specific to ultrasonic axle testing and may not be relevant to other forms of NDT, such as dye penetrant testing. An assessment may be undertaken to determine which requirements apply to other methods. " in response to consultation comment 1.	2
	1.1.5	New	Post-consultation: Entered the following text "This standard is targeted at individuals and organisations that undertake NDT on railway vehicles, NDT operative training, preparation of NDT procedures, and validate and authorise NDT procedures, equipment and facilities. It is also aimed at organisations that own, operate, or maintain rolling stock that requires NDT to be performed on it." In response to consultation comment 2.	2
1.2	1.2	No change	n/a	2

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
1.2.1	1.2.1	Revised	Reworded in accordance with current template.	2
1.2.2	1.2.2	Revised	Reworded in accordance with current template.	2
1.3	1.3	Revised	New title 'User's responsibilities', in accordance with current template.	2
1.3.1	1.3.1	Revised	Reworded in accordance with current template.	2
n/a	1.3.2	New	New clause in the current template.	2
n/a	1.3.3	New	New clause in the current template.	2
n/a	1.3.4	New	New clause in the current template.	2
1.4	1.4	Revised	New title 'Structure of this document', in accordance with current template. The paragraphs with respect to copyright have been moved to the front page.	2
1.4.1	1.4.1	Revised	Reworded in respect of the document structure in accordance with current template. The paragraph on copyright has been moved to the front page.	2
1.4.2	1.4.2	Revised	Reworded in respect of the document structure in accordance with current template. The paragraph on copyright has been moved to the front page.	2
1.4.3	n/a	Revised	The paragraph on copyright has been moved to the front page.	2
1.5	1.5	No change	n/a	2
1.5.1	1.5.1	No change	n/a	2

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
1.5.2	1.5.2	No change	n/a	2
Part 2	Part 2	No change	The title of Part 2 remains unchanged.	2
2.1	2.1	No change	The title of 2.1 remains unchanged.	2
2.1.1	2.1.1	No change	The title of 2.1.1 remains unchanged.	2
2.1.1.1	2.1.1.1	No change	The content of 2.1.1.1 remains unchanged.	2
n/a	2.1.1.2	New	The text is taken from 2.1.3 GN03 and revised to make it a requirement and remove the responsibility resting with the RU. Post consultation: part of the requirement about the periodicities of inspection have been removed.	2
n/a	2.1.1.3	New	The text is taken from the first sentence of 2.1.3 GN02 and revised to make it a requirement.	2
n/a	2.1.1.4	New	The text is taken from the second sentence of 2.1.3 GN02 and revised to make it a requirement.	2
n/a	2.1.1.5	New	The text is taken from the last sentence of 2.1.3 GN03 and revised to make it a requirement.	2
n/a	G2.1.1.6	New	New Rationale added.	2
2.1.2	n/a	Withdrawn	Title for 'Qualification of Author' deleted.	2
2.1.2.1	2.1.2.1	No change	Remains as 2.1.2.1, requirement updated to reflect new referenced standard BS EN ISO 9712:2022.	1

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
GN01	G2.1.3.7	Revised	Guidance moved to G2.1.3.7 and revised to refer to 4.1.	2
2.1.3	n/a	Withdrawn	Title for 'Scope of NDT Procedure' deleted.	2
GN02	2.1.1.3 2.1.1.4	Revised	The first sentence of GN02 was moved to create new requirement 2.1.1.3 and the second sentence of GN02 was moved to create new requirement 2.1.1.4.	2
GN03	2.1.1.2 2.1.1.5	Revised	The guidance was moved to create new requirements 2.1.1.2, with the last sentence of GN03 becoming 2.1.1.5.	2
2.1.4	2.1.2	No change	Moved to clause 2.1.2, no change made to the title.	2
GN04	2.1.2.2	Revised	Guidance GN04 has been moved to 2.1.2.2 and amended to become a requirement.	2
n/a	2.1.2.3	New	New clause added to support 2.1.2.2.	2
n/a	G2.1.2.4	New	New Rationale added.	2
n/a	G2.1.2.5	New	New guidance clause added.	2
n/a	G2.1.2.6	New	Post Consultation: New guidance added to reflect that NDT procedures are prepared by people qualified to Level 3.	2
n/a	G2.1.2.7	New	Post Consultation: New guidance added to clarify that written instructions may be prepared by people qualified to Level 2.	2
GN05	G2.1.2.8	Revised	GN05 moved to G2.1.2.5 and revised to reflect new standard RIS-2766-RST for testing of axles. Post Consultation: This guidance has been moved to become G2.1.2.8.	1

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
n/a		New	New guidance added to draw attention to additional information that may be found in BS EN 16910-1:2018. Post Consultation: This guidance has been removed.	1
2.1.5	2.1.3	No change	Moved to clause 2.1.3, no change made to the title.	2
2.1.5.1	2.1.3.2	Revised	Revised to reference standard BS EN ISO 9712:2022.	1
GN06	G2.1.3.5	Revised	Guidance revised to reflect current style and format for guidance. Cross-references amended to reflect changes to the standard.	2
2.1.5.2	2.1.3.1	Revised	Moved to clause 2.1.3.2 and revised to reflect that the person validating the procedure, as well as the person approving it, shall not be the author.	2
n/a	G2.1.3.3	New	New rationale clause added.	2
n/a	G2.1.3.4	New	New Rationale clause added.	2
n/a	G2.1.3.6	New	New guidance clause added.	2
n/a	G2.1.3.7	New	New guidance added to draw attention to additional information that may be found in BS EN 16910-1:2018.	1
2.1.6	2.1.4	No change	Moved to clause 2.1.4, no change made to the title.	2
GN07	2.1.4.1	Revised	Clause revised for readability and to change the guidance to a requirement.	2
GN08	2.1.4.2	Revised	Clause revised to change the guidance to a requirement.	2
n/a	G2.1.4.3	New	New Rationale added.	2
GN09	G2.1.4.4	Revised	Guidance revised for readability.	2

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
GN10	G2.1.4.5	Revised	Guidance revised for readability.	2
2.1.7	2.1.5	No change	Moved to clause 2.1.5, no change made to the title.	2
GN11	2.1.5.1	Revised	Revised to change the guidance into a requirement and to clarify 'technically competent authority' as a 'competent person', in accordance with current style and terminology.	2
n/a	G2.1.5.2	New	New Rationale added.	2
n/a	G2.1.5.3	New	New guidance clause added.	2
GN12	G2.1.5.4 G2.1.5.5	Revised	The first part of GN12 has been moved to G2.1.5.4 and revised to reference BS EN ISO 9712:2022 as it is an internationally accepted standard. The second part of GN12 has been moved to G2.1.5.5 and revised to remove the word 'should' to reflect current editorial guidelines, so that it remains guidance.	1 2
2.2	2.2	No change	No change.	2
2.2.1	2.2.1	No change	No change.	2
2.2.1.1	2.2.1.1	Revised	The wording of 2.2.1.1 has been revised to make it more succinct and to reflect the change in terminology from Technically Competent Authority to competent person.	2
n/a	G2.2.1.8	New	New Rationale added.	2
n/a	G2.2.1.9	New	New guidance clause added.	2
n/a	G2.2.2.4	New	New Rationale added.	2
n/a	G2.2. 2.5	New	New Guidance clause added.	2

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
n/a	G2.2. 3.7	New	New Guidance clause added.	2
n/a	2.2.4.1	New	New clause added following consultation: “The setting up of NDT equipment shall be in accordance with the NDT equipment manufacturers instructions.”.	2
n/a	G2.2.4.7	New	New Rationale added.	2
n/a	G2.2.4.9	New	New Guidance clause added.	2
n/a	G2.2.4.10	New	New Guidance clause added.	2
n/a	G2.2.5.3	New	New Rationale added.	2
n/a	G2.2.5.4	New	New Guidance clause added.	2
n/a	2.2.6.3	New	New requirement added to provide more detail on the requirements for the report.	2
n/a	2.2.6.4	New	New requirement added to provide more detail on the requirements for the report.	2
n/a	G2.2.6.5	New	New Rationale added.	2
n/a	G2.2.6.6	New	New Guidance clause added.	2
n/a	G2.2.6.7	New	New Guidance clause added.	2
n/a	G2.3.1.3	New	New Rationale added.	2
n/a	G2.3.2.2	New	New Rationale added.	2
Part 3	Part 3	Revised	Title of Part 3 amended to allow it a broader scope.	2
3.1	3.1	Revised	Title of section renamed Specification reflecting how the content of the new Part 3 has been organised.	2

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
3.1.1	3.1.1 3.1.2	Revised	3.1.1 has been split to separate the requirement for equipment to be manufactured to relevant standards from the requirement to be compatible with the validation documentation.	2
GN13	n/a	Withdrawn	The contents of Appendix A have been brought into Part 3 and the appendix deleted.	2
3.2	n/a	Withdrawn	Section 3.2 has been merged with 3.1.	2
3.2.1	G3.1.5	No change	3.2.1 has been moved to G3.1.5 and rewritten as guidance..	2
GN14	n/a	Withdrawn	The contents of Appendix B have been brought into Part 3 and the appendix deleted.	2
n/a	G3.1.3	New	New Rationale added.	2
n/a	G3.2.6	New	New Rationale added.	2
n/a	G3.2.8	New	New Rationale added.	2
n/a	G3.2.15	New	New guidance clause added.	2
n/a	3.3	New	New section added, 'Certification of NDT facilities', to accommodate content from Annex B.	2
n/a	G3.3.5	New	New Rationale added.	2
n/a	G3.3.6	New	New guidance added to clarify the intent of "competent person" in 3.3.3.	1
Part 4	Part 4	No change	The title of Part 4 remains unchanged.	2
4.1	4.1	Revised	Title of 4.1 revised to improve readability.	2

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
4.1.1	4.4.1	No change	The title of 4.1.1 remains unchanged.	2
4.1.1.1	4.1.1.1	Revised	The first part of 4.1.1.1 has been retained covering the training aspect and adding the need for the training to cover the relevant components. The second part of 4.1.1.1 has also been retained in 4.1.1.1 and revised to cover the examination part of the original 4.1.1.1, and to update the external reference to BS EN ISO 9712:2022.	1 2
GN15	G4.1.1.9	Revised	GN15 has been moved to G4.1.1.9 and is retained as guidance but has been updated for improved readability.	2
4.1.1.2	4.1.1.2 G4.1.1.13	Revised	The first part of 4.1.1.2, which includes the list of minimum requirements for the training programme, has remained as 4.1.1.4. The content remains unchanged. The second part of 4.1.1.2, has been moved to G4.1.1.12 and rewritten as guidance, and for improved readability.	2
4.1.1.3	G4.1.1.12	No change	The content of 4.1.1.3 has been rewritten as guidance and moved to G4.1.1.11.	2
GN16	G4.1.1.10	Revised	GN16 has been moved to G4.1.1.10 and revised to improve readability.	2
4.1.1.4	4.1.1.3	Revised	4.1.1.4 has been moved to 4.1.1.3 and revised to make it a requirement and to change 'technically competent authority' to 'competent person'.	2
GN17	4.1.1.3 4.1.1.4	Revised	Most of GN17 has been moved to 4.1.1.3 which has been revised to make it a requirement and to update the referenced standard to BS EN ISO 9712:2022. The last part of GN17 has been moved to 4.1.1.4 to make it a stand-alone requirement.	1 2
n/a	G4.1.1.5	New	New Rationale added.	2

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
n/a	G4.1.1.6	New	New Rationale added.	2
n/a	G4.1.1.7	New	New Rationale added.	2
n/a	G4.1.1.8	New	New Rationale added.	2
n/a	G4.1.1.11	New	New Guidance added to explain what is meant by the PCN Manual.	
n/a	G4.1.1.14	New	New Guidance added.	1 2
n/a	G4.1.1.15	New	New Guidance added.	1 2
4.1.2	4.1.2	No change	The title of 4.1.2 remains unchanged.	2
4.1.2.1	4.1.2.1	No change	The content of 4.1.2.1 remains unchanged except for a minor spelling correction.	2
4.1.2.2	4.1.2.2	No change	The content of 4.1.2.2 remains unchanged.	2
4.1.2.3 4.1.2.4 4.1.2.5 4.1.2.6	4.1.2.3 4.1.2.4 4.1.2.5 4.1.2.6	Revised	4.1.2.3 has been split into three parts to separate out the individual requirements for Level 1 and Level 2 operatives, and the re-assessor. The content remains unchanged except for updating 'operators' to 'operatives' for consistency. 4.1.2.5 is a new requirement to cover the identified gap of reassessing Level 3 operatives.	2
n/a	G4.1.2.7	New	New Rationale added.	2
n/a	G4.1.2.8	New	New Rationale added.	2

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
n/a	G4.1.2.9	New	New Guidance clause added.	2
4.1.3	4.1.3	No change	The title of 4.1.3 remains unchanged.	2
4.1.3.1	4.1.3.1	Revised	The main requirement text remains unchanged. Lines a) and b) have been revised to improve readability. Line c) has been brought in from 4.1.4.1 and the referenced standard in the requirement has been updated to BS EN ISO 9712:2023.	1 2
n/a	G4.1.3.5	New	New Rationale added.	2
GN18	G4.1.3.6	No change	The content of GN18 has moved to G4.1.3.6 and remains unchanged.	2
GN19	4.1.3.2 4.1.3.3 4.1.3.4	Revised	GN19 has been split into three parts to separate out the individual requirements. Each requirement has been revised to change 'should' to 'shall', in accordance with current editorial guidelines, 'operator' to 'operative' for consistency, and to change 'technically competent authority' to 'competent person'.	2
4.1.4	n/a	Withdrawn	The title of 4.1.4 'Recertification periodicity' has been deleted and the content under 4.1.4 has been merged into 4.1.3.	2
4.1.4.1	4.1.3.1 c)	Revised	4.1.4.1 has been moved to 4.1.3.1 c) and the referenced standard in the requirement has been updated to BS EN ISO 9712:2023.	1
4.2	4.2	No change	The title of 4.2 remains unchanged.	2

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
4.2.1	4.2.1	Revised	<p>The main paragraph of the requirement is unchanged.</p> <p>Line a) has been revised for readability and to update the referenced standard to BS EN ISO 9712:2022. The second sentence has been deleted as it is no longer relevant.</p> <p>Line b) is unchanged.</p> <p>Line c) has been revised for additional clarity and to emphasise the need to have knowledge of rail vehicle wheelset axles.</p> <p>Line d) is unchanged.</p>	1 2
n/a	G4.2.2	New	New Rationale added.	2
n/a	G4.2.3	New	New guidance added in response to consultation comments.	2
GN20	n/a	Withdrawn	GN20 has been deleted as it is no longer relevant.	2
4.3	4.3	Revised	The title of 4.3 has been updated to 'NDT of other rail vehicle components'.	2
4.3.1	4.3.1 4.3.2	Revised	<p>The first part of 4.3.1 is retained as 4.3.1 but has been revised to improve readability and to update the referenced documents to the PCN or BS EN ISO 9712:2022.</p> <p>The second part of 4.3.1 has been revised to make the requirement simpler and more straight forward, and to remove the obsolete document reference.</p>	1 2
GN21	4.3.3	Revised	GN21 has been moved to 4.3.3 and revised to make it a requirement by replacing 'should' with 'shall', and the document reference has been updated to BS EN ISO 9712:2022.	1 2
n/a	G4.3.4	New	New Rationale added.	2
n/a	G4.3.5	New	New Guidance clause added.	2

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
Appendix A	n/a	Withdrawn	The relevant content of Appendix A has been moved to Part 3 and the appendix has been deleted.	2
A.1	3.2	Revised	The title from A.1 has been moved to 3.2 and the wording revised to reflect the adoption of the guidance as requirements.	2
GN22	3.2.1 3.2.2 3.2.3	Revised	Guidance GN22 has been separated into three distinct requirements. The wording has been revised to aid clarity of the individual requirements and to change 'should' to 'shall' in accordance with current editorial guidelines.	2
GN23	n/a	Withdrawn	This guidance has been deleted.	2
GN24	G3.2.10	Revised	Guidance GN24 has been moved to G3.2.10 and revised to remove the word 'should' in accordance with current editorial guidelines.	2
GN25	3.2.4 G3.2.7 G3.2.11	Revised	The first sentence of GN25 has been moved to 3.2.11 and the text revised. The second sentence has been split and part moved to 3.2.4 and rewritten as a requirement and the other part has been moved to G3.2.7. The third sentence has been deleted as these details are covered elsewhere.	2
GN26	G3.2.9	Revised	GN26 has been moved to G3.2.9 and revised to remove the word 'should' in accordance with current editorial guidelines.	2
GN27	G3.2.12	Revised	GN27 has been moved to G3.2.12 and the wording revised to improve readability.	2
GN28	G3.2.13	Revised	Guidance moved to G3.2.13 and reworded to improve readability.	2
GN29	G3.1.4	Revised	Guidance moved to G3.1.4 and revised to remove the word 'should' in accordance with current editorial guidelines.	2

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
GN30	n/a	Withdrawn	GN30 deleted as it was deemed unnecessary.	2
GN31	3.2.5	Revised	Guidance moved to 3.2.5 and rewritten as a requirement.	2
GN32	G4.1.1.8	Revised	Retained as guidance but reworded to improve clarity.	2
Appendix B	n/a	Withdrawn	Annex B has been deleted. Its content has been moved to section 3.3.	2
B.1	3.3	Revised	Moved to 3.3 and the title modified to remove 'Recommendations for...' because the new section contains requirements.	2
GN33	3.3.1	Revised	Guidance GN33 has been moved to 3.3.1 and revised to change 'should' to 'shall' to make it a requirement, and also to update the reference to BS EN ISO/IEC 17024:2012.	1 2
GN34	n/a	Withdrawn	GN34 has been deleted as the content is addressed elsewhere.	2
GN35	3.3.2	Revised	GN35 has been moved to 3.3.2 and revised by changing 'should' to 'shall' to make it a requirement.	2
GN36	3.3.3	Revised	GN36 has been moved to 3.3.3 and revised by changing 'should' to 'shall' to make it a requirement, and 'technically competent authority' follows the style 'competent person' in accordance with current editorial guidelines.	2
GN37	3.3.4	Revised	GN37 has been moved to 3.3.4 and revised by changing 'should' to 'shall' to make it a requirement.	2
Appendix C	n/a	Withdrawn	Appendix C has been deleted and the relevant requirements and guidance moved into clause 2.2.	2
C.1	2.2	No change	Section title moved to 2.2.	2

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
C.1.1	2.2.1	No change	Section title moved to 2.2.1.	2
GN38	2.2.1.1	Revised	The content of GN38 duplicates that of 2.2.1.1 and is reflected in new clause 2.2.1.1	2
C.1.2	n/a	Withdrawn	The title of C1.2 has been deleted.	2
GN39	2.2.1.2 2.2.1.3	Revised	The content of GN39 has been split into two new requirements and revised to change the guidance into requirements.	2
GN40	2.2.1.4	Revised	GN40 has been revised to change the guidance to a requirement.	2
GN41	n/a	Withdrawn	This guidance is covered by other requirements.	2
GN42	2.2.1.5	Revised	Guidance revised for readability and to change it to a requirement.	2
GN43	2.2.1.6 2.2.1.7	Revised	The content of GN43 has been split into two new requirements and the text revised to reflect this.	2
C.1.3	2.2. 2	No change	Section title moved to 2.2. 2.	2
GN44	2.2.2.1	Revised	The guidance GN44 has been revised to improve readability and to change the guidance to a requirement.	2
GN45	2.2.2.2 2.2.2.3	Revised	The content of GN45 has been split into two new requirements and the text revised to reflect this.	2
C.1.4	2.2. 3	Revised	Section title moved to 2.2. 3 and slightly amended.	2

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
GN46	2.2. 3.1 G2.2. 3.6	Revised	The first part of GN46 has been moved to 2.2. 3.1 and redrafted as a requirement. The second part of the paragraph, including the list of factors, has been moved to G2.2. 3.6.	2
GN47	2.2. 3.2 2.2. 3.3	Revised	The first part of GN46 has been moved to 2.2. 3.2 and redrafted as a requirement. The second part of the paragraph has been moved to 2.2. 3.3 and redrafted as a requirement and to improve readability.	2
GN48	G2.2. 3.4	Redrafted	Guidance GN48 has been moved to G2.2.1.3.4 and redrafted as a Rationale.	2
C.1.5	2.2. 4	Revised	Title C.1.5 has been combined with C.1.6 and moved to 2.2. 4.	2
GN49	2.2. 4.2	Revised	Guidance moved to 2.2.1.4 and reworded as a requirement.	2
C.1.6	2.2. 4	Revised	Title C.1.6 has been combined with C.1.5 and moved to 2.2. 4.	2
GN50	n/a	Withdrawn	Guidance deleted.	2
GN51	2.2. 4.3	Revised	Guidance GN51 was combined with GN52, moved to 2.2. 4.2 and reworded as a requirement.	2
GN52	2.2. 4.3	Revised	Guidance GN52 was combined with GN51, moved to 2.2. 4.2 and reworded as a requirement.	2
GN53	2.2. 4.4	Revised	Moved to 2.2. 4.3 and changed from guidance to a requirement.	2
GN54	2.2. 4.5	Revised	Moved to 2.2. 4.4 and reworded to change to a requirement and to improve readability. 'Operator' changed to 'operative' for consistency and subjective wording, such as 'sufficient' removed.	2

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
GN55	G2.2. 4.8	Revised	Retained as guidance and reworded for improved readability.	2
GN56	G3.1.5	Revised	Retained as guidance and reworded to improved readability.	2
GN57	n/a	Withdrawn	Guidance deleted as considered not necessary.	2
C.1.7	2.2. 5	No change	Moved to 2.2. 5, title unchanged.	2
GN58	2.2. 5.1 2.2. 5.2	Revised	The first part of GN58 has been moved to 2.2. 5.1 and redrafted as a requirement. The second part of the paragraph has been moved to 2.2. 5.2 and redrafted as a requirement and to improve readability.	2
C.1.8	n/a	Withdrawn	Title deleted.	2
GN59	2.2. 4.6	Revised	Moved to 2.2. 4.5 and revised to change to a requirement.	2
C.1.9	2.2. 6	No change	Moved to 2.2. 6, title unchanged.	2
GN60	2.2. 6.1 2.2. 6.2	Revised	The guidance in GN60 has been split between 2.2. 6.1 and 2.2. 6.2 which have both been rewritten as requirements and to improve readability.	2
C.2	2.3	No change	Moved to 2.3, title unchanged.	2
C.2.1	2.3.1	Revised	Moved to 2.3.1 and title changed to better reflect the content of the requirements.	2
GN61	2.3.1.1 2.3.1.2	Revised	The guidance in GN61 has been split between 2.3.1.1 and 2.3.1.2 which have both been rewritten as requirements and to improve the clarity of the requirements.	2
C.2.2	2.3.2	No change	Moved to 2.3.2, title unchanged.	2

From RIS-2701-RST issue 1	To RIS-2701- RST issue 2	Way forward	Comments	Objective
GN62	2.3.2.1	Revised	Guidance GN62 moved to 2.3.2.1 and rewritten as a requirement and to improve clarity and readability.	2