

20-022 - Engineering Requirements for Steam Locomotives and other Heritage Rail Vehicles

[This page should be deleted at the publication stage of the project]

Version:	2.00		
Purpose:	Approval to proceed to consultation		
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Sponsor:	Mark Oakley – Head of RST Standards		
Lead industry committee:	Rolling Stock Standards Committee (RST SC)	Date:	09 March 2023
Supporting industry committee:	Control, Command and Signalling Standards Committee (CCS SC)	Date:	09 March 2023
Supporting industry committee:	Infrastructure Standards Committee (INS SC)	Date:	14 March 2023

Decision

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

DECIDE if the proposed standard delivers the intentions of the proposal for change.

DECIDE if the proposed standard is in a suitable state for consultation.

APPROVE that the proposed standard is consulted on.

IDENTIFY any specific organisations or individuals to be included in the consultation.

Control, Command and Signalling Standards Committee (CCS SC) is asked to:

DECIDE if the proposed standard delivers the intentions of the proposal for change.

DECIDE if that the proposed standard is in a suitable state for consultation.

SUPPORT that the proposed standard is consulted on.

Infrastructure Standards Committee (INS SC) is asked to:

DECIDE if the proposed standard delivers the intentions of the proposal for change.

DECIDE if that the proposed standard is in a suitable state for consultation.

SUPPORT that the proposed standard is consulted on.

20-022 - Engineering Requirements for Steam Locomotives and other Heritage 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-4472-RST	Engineering Requirements for Steam Locomotives and other Heritage Rail Vehicles	Two

Superseded documents

Number	Title	Issue
RIS-4472-RST	Engineering Requirements for Steam Locomotives and other Heritage Rail Vehicles	One

Summary

Background and change

RIS-4472-RST issue one Engineering Requirements for Steam Locomotives and other Heritage Rail Vehicles sets out the bespoke engineering requirements and guidance for heritage rail vehicles operating on the GB mainline railway. The 12-month review of RIS-4472-RST issue one identified that amendments to the standard were necessary; these amendments do not change the intent of the standard but improve the clarity of the guidance.

To keep RIS-4472-RST up to date the guidance relating to persons of reduced mobility has been updated to take account of how DfT is now managing the application of the Rail Vehicle Accessibility Regulations (RVAR) to heritage rail vehicles that operate on the GB mainline railway. In addition, guidance has been included to address the new guidance on the application of the Railway Safety Regulations 1999 (RSR99) issued by the ORR in July 2021 which includes the conditions for the granting of future exemptions under which the use of MkI and non-central door locking (CDL) fitted coaching stock can continue to be operated by the mainline heritage sector.

Other changes will update the guidance concerning the fitment of ETCS cab equipment to heritage traction units and clarify the responsibilities as an Entity in Charge of Maintenance (ECM) when operating within the mainline heritage sector. Issue two also introduces the role of Heritage Train Risk Group (HTRG) in overseeing the risk profile of the mainline heritage sector.

Full details of the changes between issue one and issue two of RIS-4472-RST are included in the disposition table in Appendix A.

Industry impact due to changes

Impact areas	Scale of impact	Estimated value £ 000's
A. Legal compliance and assurance	Low	Not proportionate to quantify
B. Health, safety and security	Low	Not proportionate to quantify
C. Reliability and operational performance	N/A	-
D. Design and maintenance	Low	Not proportionate to quantify
E. People, process and systems	N/A	-
F. Environment and sustainability	N/A	-
G. Customer experience and industry reputation	N/A	-
Total value of industry opportunity =		Not proportionate to quantify
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 – Provide references and additional guidance to reflect industry developments affecting the mainline heritage sector

- 1.1 Since the issue of RIS-4472-RST issue one, Network Rail have initiated a project within the East Coast Digital Programme (ECDP) to develop a practical specification for the fitment of on-board ETCS signalling equipment to heritage traction units. Clause 3.9.3 currently refers to this as a probable future initiative and also refers to a National Operating System Specification which was under development at the time. Hence it is considered necessary to update this information accordingly.
- 1.2 The ECM Regulations (Commission Implementing Regulation (EU) 2019/779 laying down detailed provisions on a system of certification of entities in charge of maintenance of vehicles pursuant to Directive (EU) 2016/798 partially revoked by (EU Exit) Regulations (SI 2020/786) are deemed not to be directly applicable to heritage rail vehicles operating on the GB mainline railway. As a consequence of the Railways and Other Guided Transport Systems Regulations ('ROGS') exclusion statement for such vehicles (post-Brexit, the text of the ECM Regulations is included as Schedule 9 and 10 of ROGS). HTRG has had discussions with ORR regarding how the equivalent maintenance system for the mainline heritage sector, as explained in the guidance in Part 7 of RIS-4472-RST issue one, provides the same level of assurance. It is considered that it will be useful to update this guidance in the light of these discussions and the post-Brexit situation with the ECM Regulations.
- 1.3 Since the issue of RIS-4472-RST issue one, Heritage Train Risk Group (HTRG) has been established to analyse and develop the risk profile of the mainline heritage sector. It will be useful to add reference to the role of HTRG within the standard.

Objective 2 – Update guidance on the interpretation of the Rail Vehicle Accessibility Regulations (RVAR) for heritage rail vehicles operating on the GB mainline railway

- 1.4 Following the issue of RIS-4472-RST issue one, it has been identified that the guidance to 6.6 relating to the application of RVAR to heritage vehicles intended for operation on the GB mainline railway is currently misleading and needs further clarification. Alternative text has been provided by DfT to reflect how the application of the Rail Vehicle Accessibility Regulations to heritage rail vehicles that operate on the GB mainline railway is being managed; this will be used to update the guidance accordingly.

Objective 3 – Provide guidance on the provision of exemptions to RSR99 post-March 2023 in relation to crashworthiness and central door locking (CDL)

- 1.5 Since the issue of RIS-4472-RST issue one, ORR has issued its latest guidance (July 2021) on the application of the Railway Safety Regulations 1999 (RSR99), and the considerations for exemptions covering the continued use of Mk1 and non-central door locking (CDL) fitted coaching stock. The existing exemptions for such vehicles are due to expire in March 2023.

- 1.6 For crashworthiness, the rolling stock owners will have to more clearly demonstrate to the ORR that the structural integrity of the vehicles is at least as good as the original design state condition of future exemption. This is to minimise the risk to passengers and staff arising during a derailment or collision from overriding or crushing.
- 1.7 For CDL the existing, manually operated sliding door bolt arrangement is no longer considered acceptable by the ORR as the default solution due to the residual risk of doors not being locked at the due time. Rolling stock owners will have to demonstrate they have installed some form of CDL or, where this is not possible or desirable, a risk-based justification has been made as a condition of any future exemption.

2. **How does the content in the standard need to change to achieve the objective?**

Full details of the changes made from issue one to issue two to achieve the objectives are included in the disposition table (Appendix A).

Objective 1 – Provide references and additional guidance to reflect industry developments affecting the mainline heritage sector

- 2.1 The guidance in 3.9.3 has been updated and transferred into section 3.9.1 to reflect the status of ERTMS/ETCS as a live signalling system and refer to the practical specification for the fitment of on-board ETCS signalling equipment to heritage traction units being developed by Network Rail.
- 2.2 Additional guidance has been provided in Part 7 to provide greater clarity and explanation of how the mainline heritage sector delivers a system of maintenance that provides equivalence to the application of the Entities in Charge of Maintenance (ECM) Regulations.
- 2.3 A reference was added in 2.2.2 covering the role of HTRG in analysing heritage rolling stock engineering and operational risk issues for the safe continued operation of heritage rail vehicles on the GB mainline railway.

Objective 2 – Update guidance on the interpretation of the Rail Vehicle Accessibility Regulations (RVAR) for heritage rail vehicles operating on the GB mainline railway

- 2.4 The guidance in 6.6 was amended to include the alternative text provided by DfT to reflect how the application of the Rail Vehicle Accessibility Regulations (RVAR) to heritage rail vehicles that operate on the GB mainline railway is being managed.

Objective 3 – Provide guidance on the provision of exemptions to RSR99 post-March 2023 in relation to crashworthiness and Central Door Locking (CDL)

- 2.5 The guidance in 6.2.1 was reviewed and updated to reflect the importance of demonstrating the structural integrity of the vehicles (in particular crash pillars, vehicle underframe and body shell) to at least as good as their original design state as condition of exemption post-2023.
- 2.6 The requirements and guidance in 6.3.2 were reviewed and updated to reflect the need for fitment of some form of CDL as the preferred option post-2023; where this is not achievable

or desirable, guidance was provided on the provision of a suitable risk-based justification to support an exemption.

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

- 3.1 Industry had placed no urgency to change the standard, however, it was considered that early publication would be helpful to provide the updated guidance in time for the March 2023 RSR99 exemption renewals.

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 Amending clause 6.6 'Persons of Reduced Mobility' using the text suggested by DfT will provide greater clarity over how to comply with the accessibility regulations (RVAR) in terms of heritage vehicles operating on the GB mainline railway.
- 4.2 Updating the guidance within Part 7 will provide greater clarity and explanation on how the mainline heritage sector operates a system of maintenance for heritage rail vehicles in comparison to the ECM regulations.
- 4.3 The benefits of providing additional explanation and clarity in these instances are not proportionate to quantify, since there is no measurable relationship between the clarity of information provided and the degree of compliance achieved.

B. Health, safety and security

- 4.4 Updating the content of clause 6.3.2 to reflect ORR's new RSR99 guidance on the fitment of CDL to slam door coaching stock is supporting a positive safety benefit. The potential for harm is evident in the historic precedent of the spate of fatalities that led to the original fitment of CDL to slam door stock from the mid-1990s onwards.
- 4.5 Part of the current mitigation for the non-fitment of CDL is the reliance on train stewards, including such persons acting in a voluntary capacity. Moving towards a situation where fitment of a form of CDL is more typical thereby places less reliance on stewards for a safety critical role.
- 4.6 HTRG is a LHSBR risk group. Adding reference in 2.2.2 to the work of HTRG in overseeing the risk profile of the mainline heritage sector will be helpful in increasing awareness and understanding; otherwise, the benefits of such an explanation are not proportionate to quantify.

C. Reliability and operation performance

- 4.7 These changes are not directly relevant to reliability and operational performance.

D. Design and maintenance

- 4.8 A benefit of updating the guidance within Part 7 on how the mainline heritage sector operates a system of maintenance for heritage rail vehicles is the avoidance of the additional cost of any unnecessary application of the ECM Regulations.
- 4.9 Updating the content of clause 6.2.1 will emphasise the maintenance requirements for the structural integrity of crash pillars, vehicle underframe and body shell for the continued operation of Mk1 coaching stock beyond its intended design life, thereby supporting ORR's new guidance for exemptions to RSR99 post-2023. In the absence of data, it is considered not proportionate to quantify the benefit of the changes associated with design and maintenance.

E. People, process and systems

- 4.10 There are no changes directly relevant to people, process and systems.

F. Environment and sustainability

- 4.11 There are no changes directly relevant to Environment and sustainability.

G. Customer experience and industry reputation

- 4.12 There are no changes directly relevant to customer experience and industry reputation.

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

- 5.1 The changes to RIS-4472-RST provide benefits in terms of additional clarity and explanation. Some specific benefits are identified, such as reduced reliance on the use of train stewards following the fitment of CDL but the associated cost benefit is not considered proportionate to quantify. The categorisation of the contribution to the total value of industry opportunity is judged to be minor but useful.

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

- 6.1 The project required the resources of a mainline heritage vehicle specialist supported by a project manager and administrative support as necessary.

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

- 7.1 The project is on schedule to meet the publication date of December 2023.

8. How will the industry implement the change?

- 8.1 There are no material changes to the requirements and it is therefore not expected that industry will have to do anything differently because of the changes.

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

- 9.1 RSSB will seek feedback on RIS-4472-RST issue two via HTRG and a 12-month review of its application will be undertaken following publication.

Appendix A Disposition Table

A.1.1 A disposition table maps changes between old and new documents.

A.1.2 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-4472-RST issue one to RIS-4472-RST issue two

From RIS-4472-RST issue one	To RIS-4472-RST issue two	Way forward	Comments	Objective
Part 1 Purpose and Introduction				
1.1 Purpose	1.1 Purpose	No change		
1.2 Scope and application of RIS-4472-RST	1.2 Scope and application of RIS-4472-RST	Redrafted	The rolling stock library is now referred to by its contemporary reference of R2, and the list of applicable types of heritage vehicle is reworded for clarity.	1
1.3 Application of this document	1.3 Application of this document	No change		
1.4 Health and safety responsibilities	1.4 Health and safety responsibilities	No change		
1.5 Structure of this document	1.5 Structure of this document	No change		
1.6 Approval and Authorisation	1.6 Approval and Authorisation	Revised	Dates of approval and authorisation revised to reflect those pertaining to issue two.	NA
Part 2 Introduction and Principles for Heritage Vehicles				

From RIS-4472-RST issue one	To RIS-4472-RST issue two	Way forward	Comments	Objective
2.1 Heritage rail vehicles operating on the GB mainline railway	2.1 Heritage rail vehicles operating on the GB mainline railway	Revised	Figure one previously referred to TSIs, and now refers to NTSNs, and has also had minor redrafting undertaken.	1
2.2 Characteristics of heritage rail vehicles	2.2 Characteristics of heritage rail vehicles	Revised	Reference to TSIs changed to NTSNs, new clause referring to Heritage Train Risk Group added (G 2.2.2.7), extension of categorisation in table one, correction of section references in table two. Minor textual changes generally undertaken to improve readability.	1
Part 3 Requirements for all Heritage Rail Vehicles				
3.1 Overall vehicle condition	3.1 Overall vehicle condition	No change		
3.2 Track interaction and gauging	3.2 Track interaction and gauging	Redrafted	Minor reference updates to reflect the update to the gauging standards suite and those for route availability since issue one (technical requirements unaffected). Section reference in note corrected.	1
3.3 Wheelsets and bearings	3.3 Wheelsets and bearings	Redrafted	Minor change to reference MT276 directly due to change in GMRT2466.	1
3.4 Vehicle ride	3.4 Vehicle ride	Redrafted	Minor reference update to reflect requirements formerly in GMTT008 being incorporated in GMRT2141 since issue one.	1
3.5 Heritage rail vehicle speed	3.5 Heritage rail vehicle speed	Redrafted	Minor textual changes to improve readability, make use of consistent terminology and improve clarity of approach in updating Appendix D (normal standards update process).	1
3.6 Braking	3.6 Braking	Redrafted	Minor reference update to correct version of GMRT2045 which retains information on the vacuum brake.	1
3.7 External lights and other visible / audible warning devices	3.7 External lights and other visible / audible warning devices	Redrafted	Minor textual updates in guidance to conform to style guide in referencing and add omitted case to justify provision of rear lamp bracket.	1

From RIS-4472-RST issue one	To RIS-4472-RST issue two	Way forward	Comments	Objective
3.8 Driver's cab and controls	3.8 Driver's cab and controls	Redrafted	Minor updates to reflect transfer of requirements from GMRT2160 to GMRT2161, GMRT2453 to RIS-2453-RST and the reapportionment of requirements formerly in GMRT2161, GMRT2162 and GMRT2176 into GMRT2161 (national technical rules) and RIS-2761-RST (all other requirements) since issue one.	1
3.9 Train safety systems	3.9 Train safety systems	Revised	Reference added to ETCS (clause G 3.9.1.6), and update / addition of relevant standard references.	1
3.10 Electrical safety	3.10 Electrical safety	Redrafted	References to AC electrification suite of standards changed to reflect standards update; reference to GEGN8575 added in note referring to compliance with Electricity at Work. References adjusted to cover electro-magnetic compatibility requirements formerly covered in GERT8015.	1
3.11 Other requirements affecting all heritage rail vehicles	3.11 Other requirements affecting all heritage rail vehicles	Redrafted	Reference to requirements formerly in GMRT2100 and GMRT2130 now made to RIS-2780-RST and RIS-2730-RST; guidance provided for sanding and winterisation (GMRT2461 and GEGN8628 respectively).	1
Part 4 Specific Requirements for Steam Locomotives				
4.1 Steam locomotive boilers	4.1 Steam locomotive boilers	Revised	Reference to legislation pertaining to new boilers updated to reflect the coming into force of the Pressure Equipment (Safety) Regulation since issue one.	1
4.2 Steam locomotive cylinders, motion and valve gear	4.2 Steam locomotive cylinders, motion and valve gear	Redrafted	Section cross-references corrected.	1
4.3 Fire safety performance for steam	4.3 Fire safety performance for steam	Redrafted	Minor update to GMRT2130 reference for fire compliance and textual amendment for readability.	1

From RIS-4472-RST issue one	To RIS-4472-RST issue two	Way forward	Comments	Objective
Part 5 Specific Requirements for Heritage Diesel and Electric Locomotives / Multiple Units				
5.1 Compliance with Standards	5.1 Compliance with Standards	No change		
5.2 Diesel engines	5.2 Diesel engines	Redrafted	Reference to GMRT2130 amended to GMRT2130 and RIS-2730-RST, following transfer of requirements not forming national technical rules.	1
5.3 Electric power supply	5.3 Electric power supply	Redrafted	References to AC electrification suite of standards changed to reflect standards update; reference to GEGN8575 added in note referring to compliance with Electricity at Work. References adjusted to cover electro-magnetic compatibility requirements formerly covered in GERT8015.	1
5.4 Transformers and generators	5.4 Transformers and generators	Redrafted	Reference to GMRT2130 amended to GMRT2130 and RIS-2730-RST, following transfer of requirements not forming national technical rules.	1
5.5 Traction motors, transmissions and final drives	5.5 Traction motors, transmissions and final drives	Redrafted	Reference to RIS-2780-RST appended to GMRT2100 issue five (withdrawn), to reflect transfer of guidance.	1
5.6 Fire safety performance for diesel and electric	5.6 Fire safety performance for diesel and electric	Redrafted	Reference to GMRT2130 amended to RIS-2730-RST, following transfer of requirements not forming national technical rules.	1
Part 6 Specific Requirements for Heritage Passenger Vehicles				
6.1 Risk profile of a heritage passenger vehicle	6.1 Risk profile of a heritage passenger vehicle	No change		

From RIS-4472-RST issue one	To RIS-4472-RST issue two	Way forward	Comments	Objective
6.2 Vehicle types	6.2 Vehicle types	New, Redrafted	New guidance to reflect requirements from ORR for continued operation of Mk1 vehicles (G 6.2.1.3); minor textual amendments to reflect update of GMRT2000, reference to the rolling stock library as R2.	3
6.3 Exterior doors for heritage passenger vehicles	6.3 Exterior doors for heritage passenger vehicles	New, Redrafted	New guidance taking into account work on and requirement for central door locking for heritage vehicles since issue one (G 6.3.2.3 – G 6.3.2.6), minor reference change following update to GMRT2100.	3
6.4 Bodyside windows	6.4 Bodyside windows	Redrafted	Minor reference change to reflect update of GMRT2100 and dissemination of non-national technical rules to RIS-2780-RST.	1
6.5 Vehicle interiors	6.5 Vehicle interiors	Redrafted	Minor reference change to reflect transfer of non-national technical rules from GMRT2130 to RIS-2730-RST.	1
6.6 Persons of reduced mobility	6.6 Persons of reduced mobility	Revised	Amended form of words from issue one, following feedback and legal advice from the Department for Transport on the question of rail vehicle accessibility.	2
6.7 Interior systems	6.7 Interior systems	Redrafted	Minor reference change to reflect transfer of non-national technical rules from GMRT2130 to RIS-2730-RST.	1
6.8 Fire and evacuation for heritage passenger vehicles	6.8 Fire and evacuation for heritage passenger vehicles	Redrafted	Minor reference change to reflect transfer of non-national technical rules from GMRT2130 to RIS-2730-RST.	1
Part 7 Maintenance Requirements for Heritage Rail Vehicles				
7.1 Documented maintenance plan	7.1 Documented maintenance plan	Redrafted	Minor textual amendments to improve readability	1

From RIS-4472-RST issue one	To RIS-4472-RST issue two	Way forward	Comments	Objective
7.2 Delivery of maintenance	7.2 Delivery of maintenance	New, Revised	Section added on Entities in Charge of Maintenance (7.2.4), arising from request from the ORR for this to be reflected in the standard. Amended text referring to procurement and reverse engineering to separate concepts into difference guidance clauses, clarified guidance on the definition of a heritage train operation.	1
Part 8 Competence Requirements for Personnel Working on Heritage Rail Vehicles				
8.1 Competence Requirements	8.1 Competence Requirements	Redrafted	Minor correction to cross-reference.	1
8.2 Competence management arrangements	8.2 Competence management arrangements	No change		
Appendices				
Appendix A Guidance on Vehicle Dynamics	Appendix A Guidance on Vehicle Dynamics	Revised	Update to cross reference GMRT2141 following transfer of requirements from GMIT0088. Values cited updated to reflect those current in the former document. General update to current Requirements / Rationale / Guidance format.	1
Appendix B Method for Managing Increased Speed Limits	Appendix B Method for Managing Increased Speed Limits	Redrafted	Minor change to cross-reference, and also to text describing degradation of parts to improve readability. General update to current Requirements / Rationale / Guidance format.	1
Appendix C Steam Locomotive Gauging	Appendix C Steam Locomotive Gauging	Revised	List of items to consider in gauging revised and extended to ensure adequate coverage of ferro equine physique, along with changes to reference of the gauging suite of standards following update. General update to current Requirements / Rationale / Guidance format.	1
Appendix D Steam Locomotive Speeds	Appendix D Steam Locomotive Speeds	Redrafted	General update to current Requirements / Rationale / Guidance format.	1

From RIS-4472-RST issue one	To RIS-4472-RST issue two	Way forward	Comments	Objective
Acronyms and Abbreviations	Acronyms and Abbreviations	Redrafted	Updated to reflect changes consequent on the updates to the main document clauses.	1
Definitions	Definitions	Redrafted	Updated to reflect changes consequent on the updates to the main document clauses.	1
References	References	Redrafted	Updated to reflect changes consequent on the updates to the main document clauses.	1