

MEETING: Energy Standards Committee
Rolling stock standards committee
Plant standards committee
Infrastructure standards committee

DATE: 01/09/2022

SUBJECT: Five-year review of GLRT1212 issue one and GLGN1612 issue one - dc Conductor Rail Energy Subsystem and Interfaces to Rolling Stock Subsystem (RGS and its Guidance Note)

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1. Purpose of the paper

- 1.1 This paper sets out the findings following the five-year fitness for purpose review of the railway group standard GLRT1212 issue one and associated guidance note GLGN 1612 issue one. It [has been updated following industry consultation \(see section 4.2\) and](#) seeks standards committee approval on the recommendations and way forward [\(see section 5\)](#).

2. Background

- 2.1 GLRT1212 issue one and GLGN1612 issue one were published in September 2015. GLRT1212 specifies requirements for the dc energy subsystem, relating to the interface with rolling stock. It also specifies safety requirements for the dc energy subsystem. GLGN1612 provides guidance on the requirements in GLRT1212.
- 2.2 GLRT1212 consolidates existing practice for 750 V dc electrified railways and specifies requirements in line with the Railway Interoperability Regulations (RIR) and supports migration towards a uniform system for the Great Britain (GB) mainline 750 V dc electrified railway, whilst maintaining compatibility with existing rolling stock.
- 2.3 It provides requirements for the energy subsystem where a 750 V dc top contact ground level conductor rail system is used. This electrification system is not specified in the ENE NTSN, however there is a specific case in clause 7.4.2.9.1 of the ENE NTSN for the dc voltage on the GB mainline railway.
- 2.4 The complementary standard for the rolling stock subsystem is GMRT2113 (Rolling Stock Subsystem and Interfaces to DC Conductor Rail Energy Subsystem). Both these standards (GLRT1212 and GMRT2113) will be revised together (if it is decided to do so) to maintain coherence between them.

3. Impacts of the documents following publication/entering into force

- 3.1 Consideration has been given to the following during the assessment:
- a Business Case for Change (BCfC)– Not applicable (publication pre-dated these documents).
 - b Deviations – There are no deviations against GLRT1212.

- c Current projects or proposals being processed – A new rail industry standard on ‘Provision of Signage at Power Changeover Locations’ (RIS-3784-TOM issue one) is programmed to be published in early 2022 and will set out requirements for the positioning of signs to be displayed near power changeover locations. The corresponding signage requirements in clause 2.11.1 of GLRT1212 issue one will therefore need to be withdrawn to avoid duplication.
- d Limited change release – None.
- e Amendments and clarifications – None.
- f Enquiries –

In the requirements in 2.2.1 that read: ‘The maximum prospective sustained short circuit fault level at the track shall not exceed 200 kA. The short circuit fault level when broken at 20 ms shall not exceed 64 kA.’ it is not clear what is meant by ‘when broken at 20 ms’ and it is proposed to provide clarification.

An amendment has been requested by Network Rail to 2.3.2 which currently requires that: ‘The disconnection time for the energy subsystem equipment under short circuit fault conditions at the contact line shall be within the range 10 ms to 200 ms with the electrical protection system operating normally. An additional 500 ms time delay is permissible on infrequent occasions under conditions where back-up protection operates’. The reason for the proposed amendment to 2.3.2 is that Network Rail cannot demonstrate that in all conditions fault clearance times will be within the range of 10 ms to 200 ms.

A better definition has been requested by Network Rail of the maximum allowable train current to be applied which is referred to in the requirements in 2.5.1 and 2.5.2 which read: ‘The energy subsystem shall be designed to operate with a maximum allowable train current for each train of not less than 6.8 kA’ and ‘where it is designated that the route is to be designed to a lower value of maximum allowable train current for each train, this shall be published in the Register of Infrastructure’. This change for a better definition of the maximum allowable train current to be applied is proposed because the current requirement regarding maximum allowable train current implies that every train that runs in that section could draw up to the maximum current stated which is not the case.

An amendment to the requirement 2.6.1 that currently reads: ‘The maximum total DC traction current flowing in the running rails beneath a train shall not exceed 9 kA’ has been requested by Network Rail because they cannot demonstrate the current flowing through sections of the dc negative return circuit does not exceed 9 kA due to the complexity of bonding and unlimited potential variables.

Network Rail have also identified that they cannot demonstrate compliance to the requirement in 2.6.2 that reads: ‘The maximum DC traction load current flowing in an across track cable, or cables grouped together at a single location, over which any train may pass, shall not exceed 10 kA’. The reason for not being able to demonstrate compliance is that the requirement does not provide a definition of an ‘across track cable’ which is assumed to be a cable in track bed or in a cable management sleeper and therefore excludes undertrack crossing etc. The requirement also does not specify the duration of the current to be considered or define what meant by ‘grouped’ and

whether this includes being in the same track bed or in cable management sleeper etc.

g Research projects and changes in technology

- RSSB research project T1214 (21st Century DC electrification infill) which is expected to be completed early 2022 is being undertaken to fill the knowledge gap that currently prohibits further third rail electrification. The findings from the research will be reviewed for addressing in terms of new technologies and processes which may also impact contents of these documents.
- RSSB research project T1185 (Current Limit at Stand Still) which is expected to be completed early 2022 is being undertaken regarding the maximum current that can be specified for overhead line and third rail at a standstill which will be used to charge batteries.
- Increasing deployment of multi-mode rolling stock on the network is likely to introduce new technology and might impact contents of these documents going forward.

h Regulations – Post EU exit legislative changes, EN standards with Annex ZZ do not provide a presumption of conformity. However, this does not warrant any amendment to GLRT1212. There is no impact on GLRT1212 due to introduction of NTSNs.

i National Technical Specification Notices and European Standards – A revision to the ENE TSI is expected in 2022 and any changes to the ENE NTSN that might follow will be reviewed and addressed where they impact on the GLRT1212. References to TSIs are still present within both documents and require changing to NTSN.

j Standards referred to in GLRT1212 and GLGN1612- Following standards referred to in these documents have undergone revision/replacement however on inspection there are no implications on these documents. These documents need to refer to current versions of those standards.

- GC/RT5212 replaced by GIRT7073 issue two
- GI/RT7033 has changed title to 'Lineside Operational Signs – Product Requirements'
- BS7671:2008+A1:2011 is replaced by BS7671:2018+A1:2020
- BS EN 50122-1:2011+A1:2011 is replaced by BS EN 50122-1:2011+A4:2017
- BS EN 50124-1:2001 is replaced by BS EN 50124-1:2017
- BS EN 50163:2004+A1:2007 is replaced by BS EN 50163:2004+A2:2020
- GE/RT8015 is replaced by RIS-0725-CCS issue 1.1
- GI/RT7016 is replaced by RIS-7016-INS issue 1.2
- GI/RT7073 issue two is published and the title is 'Requirements for the Position of Infrastructure and for Defining and Maintaining Clearances'.
- GK/RT0045 is replaced by RIS-0713-CCS issue 1.1 – 'Lineside Signalling Layout Driveability Assessment Requirements'
- GK/RT0058 is replaced by RIS-0758-CCS issue 1.1 – 'Lineside Signal Aspects and Indications'.

- GL/RT1253 was withdrawn in 2013.
 - GM/RT2130 has changed title to 'Vehicle Fire Safety'.
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- GM/RT2149 is replaced by GMRT2173 issue three – 'Size of Vehicles and Position of Equipment'.
 - GK/GN0658 is replaced by RIS-0758-CCS issue 1.1 – 'Lineside Signal Aspects and Indications'.
 - GM/RC2514 issue three was withdrawn in 2015.
 - GM/RC2532 is replaced by RIS-2730-RST issue 1.1 – 'Vehicle Fire Safety and Evacuation'.
 - BS 2754:1976+A1:1977 was withdrawn in 1976.
 - BS EN 50122-2 should be :2010 and not :2011
 - BS EN 50153:2002 is replaced by BS EN 50153:2014+A2:2020
 - IEC 60479 is now four parts 1, 2, 4 and 5.
 - NR/GN/ELP/27010 was withdrawn in 2018
 - Railway Safety and Principles and Guidance, Part 2, section C is withdrawn
- k Published list of NTRs – There have been no changes to the NTR since publication of these documents. Therefore, no impact on these documents.
- l Any other observations – ORR's Policy on Third Rail DC Electrification Systems which postdates publication of GLRT1212 and GLGN1612 precludes any new 3rd rail DC installation. However, more clarity is expected with outcome of RSSB research project T1214 (21st Century DC electrification infill) especially in terms of electrifying last mile and diesel island areas within 3rd rail dc zones.

4. Discussion

4.1 Review assessment

- 4.1.1 GLRT1212 issue one is not in the current RSSB style for railway group standards and will be developed to include rationales and guidance to support the requirements. The associated guidance note GLGN1612 issue one will be withdrawn and the guidance included in the new RGS.
- 4.1.2 Signage related requirements in 2.11.1 of GLRT1212 issue one will be withdrawn to avoid duplication with RIS-3784-TOM issue one.
- 4.1.3 Output of RSSB research projects T1214 and T1185 will be reviewed for their implications on GLRT1212.
- 4.1.4 Increasing deployment of multi-mode rolling stock on the network might impact contents of these documents going forward.
- 4.1.5 Some of the references in GLRT1212 and GLGN1612 have undergone revision/replacement and will be updated as appropriate.
- 4.1.6 Any changes to the ENE NTSN following the update to the ENE TSI which is expected in 2022 will be reviewed for their implications on GLRT1212
- 4.1.7 The issues with the requirements in 2.2.1, 2.3.2, 2.5.1, 2.5.2, 2.6.1 and 2.6.2 identified in 3.1f above will be addressed.

4.2. Consultation

- 4.2.1. Consultation with the industry was undertaken during June 2022.
- 4.2.2. Three organisations have responded to the consultation and all of them support the review findings. They have no additional comments.
- 4.2.3. In view of the above, it is concluded that industry is supportive of the original review assessment to withdraw GLRT1212 and GLGN1612 and create a new RGS to retain requirements that remain valid to the industry.

5. Recommendations

5.1 The Energy Standards Committee is asked to:

- a **DISCUSS** the outcome of the consultation and the following recommendation:
 - Initiate a standards change project to withdraw GLRT1212 and GLGN1612 and the creation of a new RGS.
- b **APPROVE** the recommendation.

5.2 Supporting standards committees are asked to:

- a **DISCUSS** the outcome of the consultation and the following recommendation:
 - Initiate a standards change project to withdraw GLRT1212 and GLGN1612 and the creation of a new RGS.
- b **SUPPORT** the recommendation.

RSSB completion: [\[do not delete\]](#)

<i>Lead Standards Committee</i>	<i>Meeting date</i>	<i>Recommendation approved</i>	<i>Minute numbers</i>		<i>Next review date</i>
			<i>Pre-consultation review</i>	<i>Post-consultation review</i>	
Energy	03/03/2022				

Appendix A Disposition table for document(s) recommended for withdrawal

A.1 Document number, title, issue [\[one table per document\]](#)

Clause number	Clause title	Way forward	Comments
		Withdraw	Why the clause is no longer needed

Appendix B Associated information to support the review

The information in this appendix is provided by the industry groups information manager to assist with the review. This appendix should be deleted prior to submitting the review form to the SCs.

Deviations	List current deviations: Nil	List deviations in progress: Nil
Request for Help	Yes	
Proposals	List approved proposals: 18-016	List proposals not yet approved by the standards committee: Nil
7. RSSB Standards Programme	This document is currently not on the RSP.	
Amendments or clarifications	Nil	
Limited change releases	Nil	
Enquiries	There are currently no enquiries recorded against this document in the CRM. Please confirm with all Technical Specialists.	
Business case for change	15 IA14	
Information from RMDB Note: update RMDB to reflect action/decision	This document is not listed in the RMDB ENE sub-system, therefore there is no file 'Considerations for revisions' relating to this guidance note. Please confirm with the TS/PM if there is anything to record. If not, this can be marked Nil.	

Related documents:

Process procedure for the 12 month and five-year review of Railway Group Standards and other documents