20-005 – Driver's cab design

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

Version:	6.00		
Purpose:	Approval to proceed to consultation		
Authors:	Darren Fitzgerald – Principal Electrical and Systems RST Engineer		
Sponsor:	Mark Oakley – Professional Head of Rolling Stock		
Lead industry committee:	Rolling Stock Standards Committee (RST SC)	**Date:**	07 December 2023
Supporting industry committee:	Traffic Operation and Management Standards Committee (TOM SC)	**Date:**	05 December 2023
Supporting industry committee:	Control, Command and Signalling Standards Committee (CCS SC)	**Date:**	16 November 2023
Supporting industry committee:	Plant Standards Committee (PLT SC)	**Date:**	09 November 2023

Decision

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

DECIDE if the proposed new issue of RIS-2761-RST delivers the intentions of the proposal for change.

DECIDE if the proposed new issue of RIS-2761-RST is in a suitable state for consultation.

APPROVE that the proposed new issue of RIS-2761-RST is consulted on.

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

Traffic Operation and Management Committee (TOM SC), Control, Command and Signalling Standards Committee (CCS SC) and Plant Standards Committee (PLT SC) are asked to:

DECIDE if the proposed new issue of RIS-2761-RST delivers the intentions of the proposal for change.

DECIDE if the proposed new issue of RIS-2761-RST is in a suitable state for consultation.

SUPPORT that the proposed new issue of RIS-2761-RST is consulted on.

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

20-005 – Driver's cab design

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 revised document(s)

Number	Title	Issue
RIS-2761-RST	Rail Industry Standard for Driving Cabs	Two

Proposed superseded documents

Number	Title	Issue
RIS-2761-RST	Rail Industry Standard for Driving Cabs	1.1

Summary

Background and change

Stakeholders have identified that driver's cab design requirements and guidance contain potential gaps which have led to differences in cab designs, with the opportunity to introduce some poorly designed cabs. This had the potential to result in discomfort and injury to drivers leading to operational and human factor risks, where train stop-shorts, station over runs, differing stop car markers, various methods of dispatch and awkward viewing angles can result in sub-optimal operational performance and induce musculoskeletal issues in train crew.

There are currently five deviations against GERT8000-TW1 and GERT8000-SS1 where certain fleets operating in a degraded mode could not dispatch trains in accordance with the Rule Book, due to the design of their driver's cabs.

Two requests for help, 21-REQ-019 and 21-REQ-021, that relate to human factors aspects of cab design, including a lack of space for the driver and poor cab design resulting in musculoskeletal injuries, will be addressed in the revision to the standard.

Where reference is made in this business case for change to the standards gap analysis paper on design criteria for driving cabs, this paper was noted by RST SC (minute number 22/10/RST/10.2).

Industry impact due to changes

Impact areas	Scale of impact	Estimated value £'s
A. Legal compliance and assurance	N/A	-
B. Health, safety and security	High	£1,047,500 over five years
C. Reliability and operational performance	Medium	£42,850 over five years
D. Design and maintenance	(Medium)	-£362,500 over five years
E. People, process and systems	N/A	-
F. Environment and sustainability	Low	Not proportionate to quantify
G. Customer experience and industry reputation	Neutral	No benefit claimed
Total value of industry opportunity =		**£727,850 over five years**

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 were the objectives associated with this change?

Objective 1 – Give guidance and reference sources of information on cab design good practice

1.1 This objective will be addressed by incorporating the recommendations of the standards gap analysis paper on design criteria for driving cabs for:

a) Soundproofing of the cab;

b) Alarms and alerts;

c) Drinks holders; and

d) Second persons seats.

1.2 Additionally, in-cab amenities, such as stowage space for a driver's personal belongings, contributes to a clean work environment and reduces the risk of tripping hazards inside the cab and guidance needs to be given on this subject.

Objective 2 – Improve the ability for drivers to move through the cab

1.3 This objective will be addressed by incorporating the recommendations for space for the driver from the standards gap analysis paper on design criteria for driving cabs.

1.4 It was identified in TOM SC (minute number 21/TOM/10/12.2) that guidance on the trade-offs that occur between providing additional space in the passenger area and a reduction in the space for the driver in the driving cab is needed in RIS-2761-RST. This guidance will improve the cab design process and consideration of the implications for the end user. In addition, guidance on the driver's seat is needed to provide an awareness that using fixed seats that do not swivel can make moving from the seat awkward and that armrests can restrict access to the cab as can positioning the seat too far towards the rear of the cab. Guidance will also be provided on other in-cab features which impact on cab design.

Objective 3 – Reduce the risk of driver's distraction and injury

1.5 This objective will be addressed by incorporating the recommendations of the standards gap analysis paper on design criteria for driving cabs relating to RIS-2761-RST by including requirements and guidance for air quality, control and temperature.

1.6 It has been identified from RAIB report 02/2023: "Train driver struck by a train near West Worthing Middle Siding, West Sussex, 1 February 2022" that tripping hazards, such as detached conductor rail boards, can be difficult for drivers to see when climbing down from the driving cab. RIS-2761-RST will address mitigating this hazard.

Objective 4 – Facilitate the readability of driver's cab display screens

1.7 This objective will be addressed by incorporating the recommendations of the standards gap analysis paper on design criteria for driving cabs relating to RIS-2761-RST by including guidance for lighting, reflections and glare.

Objective 5 – Reduce injuries that occur from driver's safety devices (DSD)

1.8 This objective will be addressed by incorporating the recommendations of the standards gap analysis paper on design criteria for driving cabs relating to RIS-2761-RST by including guidance on driver's safety devices.

Objective 6 – Support the whole driving task with improved exterior visibility

1.9 This objective will be addressed by incorporating the recommendations of the standards gap analysis paper on design criteria for driving cabs relating to RIS-2761-RST by including requirements and guidance for side visibility and window opening force.

1.10 To facilitate the operational requirements for trains to stop at car markers so that all passenger doors intended for use are accommodated on the platform it was agreed at TOM SC (minute number 19/TOM/12/235) to include a requirement in RIS-2761-RST for cab side glazing.

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

Objective 1 – Give guidance and reference sources of information on cab design good practice

2.1 Guidance on the application of standards and findings from research project related to noise will be given with reference to the Noise (NOI) National Technical Specification Notice (NTSN), the Locomotive and Passenger (LOC&PAS) NTSN and RSSB research projects T326 (2006) and T1273 (2022) to help industry reduce the impact of noise as a distraction to drivers.

2.2 Guidance will be given for in-cab amenities including optimal placement of cup holders to prevent scalds or burns to drivers, facilities to support mobile technologies and personal item stowage space.

2.3 Guidance will be given on features of second persons seats that can reduce the impact of musculoskeletal injuries.

Objective 2 – Improve the ability for drivers to move through the cab

2.4 Guidance on general driver's cab human factors will be given with reference to standards BS EN ISO 15537:2022, the BS EN 16186 series standards and UIC 651, and RSSB research project T698 (2008), which will help vehicle designers in applying human factors good practice for driver's cab design.

2.5 The guidance will give information to industry on drivers' access into and movement within cabs, in particular in relation to getting to and from the driver's seat and the use of a consistent anthropometric index.

Objective 3 – Reduce the risk of driver's distraction and injury

2.6 Requirements will be set out in a new section for air conditioning systems with reference to BS EN 14813-1:2006.

2.7 Requirements will be set out in a new section for illuminating cab steps considering the findings of RAIB report 02/2023 to support a reduction in the impact of tripping hazards.

Objective 4 – Facilitate the readability of driver's cab display screens

2.8 Guidance will be provided on lighting conditions and positioning of display screens to reduce the impact of internal and external glare and reflections that affects the readability of display screens with reference to standards BS 857:1967, the BS EN 12464 series standards, BS EN 15152:2019 and BS EN 16186-3:2022, as well as RSSB research project S329 (2018) and an ergonomic report from DCA Design International and Hitachi Rail Europe on applied ergonomics which assist industry in developing ways to mitigate reflections and glare that can result in illegible driver's cab display screens.

Objective 5 – Reduce injuries that occur from driver's safety devices (DSD)

2.9 Guidance on general DSD design and maintenance good practice will be given with reference to two Gary Davis Associates reports for the British Railways Board in 1994, as well as an ORR report on DSD pedals, all of which contain information relating to optimal DSD pedal design considering the driver, such as the weight of a resting foot.

Objective 6 – Support the whole driving task with improved exterior visibility

2.10 Requirements will be set out for the position of side glazing in a driver's cab to facilitate alignment of trains with stop car markers and take into account variations in driver's positions, such as for seat adjustment.

2.11 Guidance will be given with reference to other RSSB standards that support determining the size of side glazing.

2.12 Guidance on side glazing and windows will be included to address:

a. Window size and opening methods;

b. Sightlines and the application of anthropometric data;

c. Opacity, tinting and filming;

d. Maintenance;

e. RSSB research project T1175 (2021); and

f. BS EN 16186-1:2014+A1:2018.

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

3.1 No priority is set for this change, but early publication will realise the benefits earlier.

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 These changes are not directly relevant to legal compliance and assurance.

B. Health, safety and security

4.2 Poor cab design leads to operational and human factor risks, where train stop-shorts and over-runs, differing stop car markers, various methods of dispatch, non-standard control layouts and awkward viewing angles can combine to result in increased operational safety risk, poor operational performance, and musculoskeletal issues.

4.3 Station over-runs and stop short door release (SSDR) incidents, due to cab designs that do not consider the whole driving task, can occur as a result of inconsistent designs of cabs that drivers are expected to operate.

4.4 SSDR events increase the risk of injury to passengers. This is due to the train stopping in the incorrect position on a platform, before a stop car marker, with the rear end of the train occupying the space beyond the rear end of the platform. Opening doors in this area and stepping out would result in a significant drop to track level, where no platform is present to alight on to.

4.5 The Safety Risk Model (SRM) hazardous event code HEM-09E Fatality Weight Index (FWI) value for 'Passenger alighting from train not at a platform' is 0.00948. The value associated with this hazard, found by multiplying the FWI value by the Value for Preventing a Fatality (VPF) of £2,100,000, the hazard represents a cost to industry of approximately £20,000 per year or £100,000 over a five-year period.

4.6 If the changes to the standard contribute and help the industry in reducing SSDR safety incidents by 10% then that would be equivalent to a benefit of £10,000 over a five-year period.

4.7 SMIS data shows that injuries sustained to drivers because of poor design or maintenance of driver's cab windows that open, such as requiring an awkward motion to close a window or excessive force to close a particularly stiff window, cost the industry approximately £190,000 over the three-year period between 2019-2021, which extrapolates to £315,000 over five-years. If the enhancement to guidance on good practice relating to window maintenance and design in the standard contribute and help the industry in reducing injuries caused by driver's cab windows by 10%, then that would represent a benefit of £31,500 over a five-year period.

4.8 SMIS data shows that injuries relating to poor design of train controls costs the industry approximately £70,000 over a three-year period, which extrapolates to £115,000 over five-years. If the enhancement to guidance on good practice relating to DSD pedal design and

maintenance, and general cab layout, helps in reducing the injuries caused by driver's cab controls by 10%, then that would represent a benefit of £11,500 over a five-year period.

4.9 SMIS data shows that injuries to drivers due to a scald or burn costs the industry approximately £5,000 per year, which is equivalent to £25,000 over a five-year period. If the changes to the standard contribute and help the industry in reducing drivers' injuries caused by scalding by 10% then that would be equivalent to a benefit of £2,500 over a five-year period.

4.10 RSSB research report 'Rail Industry Health and Wellbeing Performance Indicators Report Quarter 4, 2021-22' identifies that the rail industry's average cost of sickness absence is £2,329 annually per employee and 14% (£326) are associated with musculoskeletal problems, excluding the back but including the neck.

4.11 If the changes to the standard contribute and help the industry in reducing musculoskeletal injuries to drivers by a notional 5%, that would be equivalent to an average benefit of approximately £16 per driver, per year. Office of Rail and Road (ORR) statistics show that there are approximately 62,000 full time employees in the rail industry as of March 2022 therefore assuming that 20% of these employees are train drivers, this would represent 12,400 train drivers across the UK. At a benefit of £16 per driver, per year, this would be £198,400 per year, which is equivalent to £992,000 over a five-year period ((326 x 0.05) x (12400 x 5) = 992,000)

4.12 By giving enhanced guidance on human factors in RIS-2761-RST it is estimated that the total cost benefit to industry Health, Safety & Security could be £1,047,500 (£1000+£31500+£11500+£2500+£992000) over a five year period.

C. Reliability and operation performance

4.13 A reduction in the number of station over-runs and SSDR incidents, where cab design may be a contributory reason for their occurrence, will improve reliability and operational performance of the railway.

4.14 The Control Centre Incident Log (CCIL) gives 128 instances of SSDRs between 2019 and 2022, averaging 1,300 delay minutes each year as a result, and a potential cost to industry of £65,000 per year at £50 per delay minute, which is equivalent to £325,000 over a five-year period. If the changes to the standard contribute and help the industry in reducing SSDR performance incidents by 10% then that would represent a benefit of £32,500 over a five-year period.

4.15 CCIL gives 87 reports of drivers' feet slipping off Drivers Safety Device (DSD) pedals between 2019 and 2022, averaging 150 delay minutes each year as a result or five minutes per event, with a potential cost to industry of £7,500 per year or £37,500 over a five-year period. If the changes to the standard contribute and help the industry in reducing these DSD performance incidents by 10% then that would be equivalent to a benefit of £3,750 over a five-year period.

4.16 The temperature and air conditioning in the driver's cab can impact on driving performance. SMIS data shows that thirty signals were passed at danger (SPAD) with fatigue, health and

wellbeing given as a contributing factor between 2018 and 2023. If SPADs as a result of fatigue were reduced by 5%, this could result in 1.5 fewer SPADs occurring over a five-year period. Safety risk model v8.5 indicates that the overall risk from SPADs is around 0.67FWI/year with around 324 SPADs per year. This gives an average FWI per event of 0.67/324 = 0.0021FWI/SPAD. Reducing the number of SPADs occurring by 5% over a five-year period could therefore result in a saving to the industry of £6,600 based on the VPF value of £2,100,000.

4.17 The estimated benefit to reliability and operation performance from the standards change is estimated to be £42,850 (£32,500+£3,750+£6,600) over a five year period.

D. Design and maintenance

4.18 It is not possible to quantify the benefits of the requirements and guidance that are associated with the design of driver's cab as these design costs are typically considered as part of the train carriage design.

4.19 An increase in requirements associated with driving cabs will result in an increase in driving cab maintenance. If it is assumed that labour for maintenance costs £800 per day, and that maintenance of new cab features introduced by the changes to the standard, such as the changing of driving cab footstep illumination bulbs and air conditioning testing, result in an additional half an hour of maintenance per year, the cost of the additional maintenance for one train per year is estimated to be £50 or £250 over five years. A report from R2 indicates that 2,340 driving vehicles have been introduced into service since January 2015, based on authorisation letters issued by the Office of Rail and Road (ORR), which extrapolates to approximately 290 driving vehicles per year. Using this value to estimate carriage introduction for the next five years, this is approximately 1,450 cabs introduced over a five-year period. This will result in an additional maintenance cost of £362,500 (1450 x 250 = 362,500). No new freight fleets are known to be introduced in the next five years and have therefore not been included in this calculation.

4.20 The setting out of requirements for driving cab glazing will result in manufacturers needing to further consider the requirements set out in the LOC&PAS NTSN with reference to the BS EN 12663 series standards, where a change to a vehicle design platform to include a driving cab side glazing may adversely affect crashworthiness. The impact of the changes associated with crashworthiness approvals following the inclusion of side glazing in the design of a cab are expected to be moderate, but not possible to quantify as crashworthiness assessments are performed on an entire vehicle structure, not the individual elements such as the cab or passenger areas.

E. People, process and systems

4.21 The benefits for people, process and systems have been claimed in other sections. Where the installation of a side window may impact process for example, and mitigate SSDRs, this is claimed in 4.14. Therefore no benefits are claimed in this section to avoid benefit duplication.

F. Environment and sustainability

4.22 The impact of the changes associated with inefficiencies in air conditioning when a window is opened are considered to be low and it has been judged not proportionate to quantify a value.

G. Customer experience and industry reputation

4.23 An improvement in customer experience and industry reputation will be recognised through the mitigation of station over-runs and SSDR events, where the performance of the railway is improved by the lack of having to manage station over-runs and SSDR events in accordance with GERT8000-TW7 – 'Wrong Direction Movements'. This is already claimed as a benefit in section C.

4.24 Station over-runs and SSDR events result in crowds gathering if alternative actions to GERT8000-TW7 are taken (as for example, no wrong direction movement taking place and only the front ten coaches opening on a twelve coach vehicle). Reducing station over-runs and SSDR events will reduce crowds gathering and improve customer experience. A reduction in over-runs and SSDR events are a benefit, but it is considered that its effect on industry reputation would be low and not proportionate to quantify.

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

5.1 The creation of standard cab design will align manufacturers' and operators' expectations of cab features and ensure that future vehicle builds and modifications for GB rolling stock align with operational requirements.

5.2 Cab design requirements and guidance are expected to reduce the number of station over runs, SSDRs and injuries sustained by drivers through the operation of trains. This will have a direct impact on passenger service from both safety and performance perspectives and improve the wellbeing of drivers through a reduction in musculoskeletal injuries.

5.3 The change will permit a closer alignment with operational requirements as set out in GERT8000 and should reduce the number of deviations or derogations submitted against it.

5.4 There are benefits in developing this content in a timely manner to support any new designs of vehicles that may occur, especially rolling stock powered by alternative energy sources that may be introduced in the next five years.

5.5 The changes to RIS-2761-RST are considered to be capable of providing a benefit to industry of £727,850 over a five-year period. Owing to the potential operational and health benefits, the contribution to industry opportunity is categorised as 'important/essential'.

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

6.1 The project is led by a principal technical specialist from the rolling stock standards team, supported by specialists from the traffic operations and management, human factors and risk and safety intelligence disciplines, together with a project manager.

6.2 An industry working group is established to help develop and review the content.

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

7.1 Resources are available to meet a target publication date of December 2024. This change does not impact any stakeholder projects at present.

8. How will the industry implement the change?

8.1 Stakeholders in the industry will be expected to implement and comply with the requirements on driver's cabs in new rolling stock and consider the guidance on good practice in their design.

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

9.1 To address whether the objectives are being achieved, the following will be monitored:

a. The number of deviations, derogations and Requests for Help relating to cab design and operation which will indicate whether the change is achieving the objectives.

b. The number of enquiries to the Customer Relationship Manager (CRM) portal which will indicate whether the change is achieving the objectives.

Feedback on the application of the standard from industry groups will be sought from industry at the 12-month review.

Appendix A Disposition Table

Table A1: RIS-2761-RST issue 1.1 to RIS-2761-RST issue two and new content to RIS-2761-RST issue two

From RIS-2761-RST issue 1.1	To RIS-2761-RST issue two	Way forward	Comments	Objective
1.1	1.1	No change	No comments	
1.2	1.2	No change	No comments	
1.3	1.3	New	Global reuse topic changes from health and safety responsibilities to user's responsibilities	1
1.4	1.4	No change	No comments	
1.5	1.5	Redrafted	Updated to include new approval and authorisation dates	1
G 2.1.1 – G 2.1.4	G 2.1.1 – G 2.1.4	No change	No comments	
N/A	G 2.1.5	New	Good practice added which gives guidance to create a target audience description prior to starting cab design work.	1
G 2.1.5	G 2.1.6	No change	No comments (renumbered only)	
G 2.1.6	G 2.1.7	Revised	New list items added to the list of controls and instruments that are located to be operable and/or viewable by a driver.	1
N/A	G 2.1.8	New	Guidance added for RSSB research project T698 (2008).	5
G 2.1.7	G 2.1.9	Redrafted	For clarity only. Specific consequence added regarding poor cab design (human error).	2
G 2.1.8	G 2.1.10	Redrafted	Reference changed from PeopleSize 2008 to PeopleSize 2020.	1
G 2.1.9	G 2.1.11	No change	No comments (renumbered only)	
G 2.1.10	G 2.1.12	No change	No comments (renumbered only)	
G 2.1.11	G 2.1.13	No change	No comments (renumbered only)	
G 2.1.12	G 2.1.14	No change	No comments (renumbered only)	
N/A	G 2.1.15	New	Guidance added for RSSB research project T1273 (2022).	1
Section 2.2	Section 2.2	No change	No comments	
3.2.1 – G 3.2.8	3.2.1 – G 3.2.8	No change	No comments	
G 3.2.9	G 3.2.9	Redrafted	Removal of 'Section 7' against rule book module GERT8000-TW5	1

From RIS-2761-RST issue 1.1	To RIS-2761-RST issue two	Way forward	Comments	Objective
G 3.2.10 – G 3.2.12	G 3.2.10 – G 3.2.12	No change	No comments	
Section 3.3	Section 3.3	No change	No comments	
Section 3.4	Section 3.4	No change	No comments	
4.1	4.1	Title only	Changed to reflect that the section now only gives general guidance on DCO and DOO equipment	
G 4.1.3		Withdrawn	Guidance indicated that the term DCO replaces DOO, when these are two different modes of operation, and has therefore been withdrawn as it could cause confusion	1
G 4.1.4	G 4.1.1	Redrafted	Renumbered and redrafted to include both DCO and DOO terms.	1
G 4.1.5	G 4.1.2	No change	Renumbered and redrafted to include both DCO and DOO terms.	1
G 4.1.6	G 4.1.3	No change	Renumbered and redrafted to include both DCO and DOO terms.	1
4.2	4.2	Title only	Updated to include reference to both DCO and DOO equipment	1
4.2.1	4.2.1	Redrafted	Updated to include reference to both DCO and DOO equipment	
G 4.2.2 – G 4.2.5	G 4.2.2 – G 4.2.5	No change	No comments	
G 5.1.1 – G 5.1.4	G 5.1.1 – G 5.1.4	No change	No comments	
N/A	G 5.1.5	New	Guidance added on how door / traction interlock can be problematic for drivers.	1
N/A	5.2	New	Title only.	3
N/A	5.2.1	New	Requirement added for cab steps and the ballast below the steps to be illuminated.	3
N/A	G 5.2.2	New	Rationale added on why having illuminated drivers steps is a useful addition to a vehicle.	
N/A	G 5.2.3	New	Rationale added with reference to RAIB report 02/2023.	3
N/A	G 5.2.4	New	Guidance added to support lux level assessments of cab steps and ballast.	3
N/A	G 5.2.5	New	Guidance added to prevent light sources being directed towards other trains.	3

From RIS-2761-RST issue 1.1	To RIS-2761-RST issue two	Way forward	Comments	Objective
N/A	G 5.2.6	New	Guidance added on off-train illumination limitations.	3
Part 6	Part 6	No change	No comments	
N/A	Part 7	New	Title only.	6
N/A	7.1	New	Sub-title only.	6
N/A	G 7.1.1	New	Guidance given on historic practice.	6
N/A	G 7.1.2	New	Guidance given on the difference between glazing and windows.	6
N/A	G 7.1.3	New	Signpost to Figure 1.	6
N/A	Figure 1	New	Typical cab side glazing or window location.	6
N/A	7.2	New	Title only.	6
N/A	7.2.1	New	Requirement for each driver's cab to have glazing installed on the left and right side of the driver.	6
4.1.1	7.2.2	No change	No comments. Moved from section 4.	6
N/A	G 7.2.3	New	Rationale added for why side glazing is necessary.	6
4.1.2	G 7.2.4	Redrafted	Rationale moved from previous section on Driver Controlled Operation (DCO) and to provide clarity that the requirements apply to stopping a train.	6
N/A	G 7.2.5	New	Guidance added to support the design requirements of side glazing.	6
N/A	G 7.2.6	New	Guidance added with reference to BS EN 15152:2019 for light transmittance.	6
N/A	G 7.2.7	New	Guidance added on how anthropometric data may support appropriate side glazing design.	6
N/A	G 7.2.8	New	Guidance added with the typical reasons side glazing is used by drivers.	6
N/A	G 7.2.9	New	Guidance added to identify the objects that may be necessary to view through side glazing, and their different heights.	6
N/A	G 7.2.10	New	Guidance added to signpost to other standards that can help when determining the size of side glazing.	6
N/A	G 7.2.11	New	Guidance added for RSSB research project T1175 (2021).	6

From RIS-2761-RST issue 1.1	To RIS-2761-RST issue two	Way forward	Comments	Objective
N/A	G 7.2.12	New	Guidance added for the cab seat reference point.	6
4.1.7	G 7.2.13	No change	No comments. Moved from section 4.	
N/A	7.3	New	Title only.	6
N/A	G 7.3.1	New	Guidance added to support LOC&PAS NTSN clause 4.2.9.1.3.2.	6
N/A	G 7.3.2	New	Guidance added to support LOC&PAS NTSN clause 4.2.9.1.3.2.	6
N/A	G 7.3.3	New	Guidance added giving the historic risk presented to drivers through injury by side windows.	6
N/A	G 7.3.4	New	Guidance added to signpost to BS EN 45545-3:2013 when considering a side window for emergency evacuation purposes.	6
N/A	G 7.3.5	New	Guidance added for typical types of window opening style.	6
N/A	G 7.3.6	New	Guidance added to highlight the risks of having side-sliding style openable side windows	6
N/A	G 7.3.7	New	Guidance added on new practice in industry where windows can be openable inwards.	6
N/A	G 7.3.8	New	Guidance added to indicate the impact openable windows may have on heating, ventilation and air conditioning (HVAC) systems.	6
N/A	G 7.3.9	New	Guidance added to highlight the risks of having an openable side window	6
N/A	G 7.3.10	New	Guidance added to highlight the risks of having droplight style openable side windows	6
N/A	8.1	New	Title only.	3
N/A	G 8.1.1	New	Guidance added for the explanation of thermal comfort.	3
N/A	G 8.1.2	New	Guidance added on Health and Safety Executive advise on feeling uncomfortably hot or cold.	3
N/A	G 8.1.3	New	Guidance added to signpost to Health and Safety Executive information on assessing thermal comfort.	3
N/A	G 8.1.4	New	Guidance added for RSSB research project S359 (2021).	3

From RIS-2761-RST issue 1.1	To RIS-2761-RST issue two	Way forward	Comments	Objective
N/A	8.2	New	Title only.	3
N/A	8.2.1	New	Requirement added for air conditioning, with reference to BS EN 14813-1:2006.	3
N/A	G 8.2.2	New	Rationale added with an explanation on the purpose of BS EN 14813-1:2006.	3
N/A	G 8.2.3	New	Rationale added with an explanation on why BS EN 14813-1:2006 has been set out as a requirement.	3
N/A	G 8.2.4	New	Guidance added on typical cab HVAC operation.	3
N/A	G 8.2.5	New	Guidance added to support the design of air conditioning vents.	3
Appendix A	Appendix A	Redrafted	Updated to include G prefix to appendix guidance clauses	1
Appendix B	Appendix B	Redrafted	Updated to include G prefix to appendix guidance clauses	1
N/A	Appendix C	New	Title only.	
N/A	C.1	New	Title only.	1
N/A	G C.1.1	New	Guidance added with reference to the NOI NTSN and HSE good practice.	1
N/A	G C.1.2	New	Guidance added for RSSB research project T326 (2006).	1
N/A	G C.1.3	New	Guidance added to support LOC&PAS NTSN clause 4.2.9.3.4(5).	1
N/A	G C.1.4	New	Guidance added for considering the audibility of detonators in driving cabs.	1
N/A	G C.1.5	New	Guidance added for RSSB research project T1273 (2022).	1
N/A	C.2	New	Title only.	2
N/A	G C.2.1	New	Guidance added to identify various anthropometric data sets that are available.	2
N/A	G C.2.2	New	Guidance added on ranges to be used from anthropometric data sets.	2
N/A	G C.2.3	New	Guidance added to support LOC&PAS NTSN clause 4.2.9.1.2.2.	2
N/A	G C.2.4	New	Guidance added for drivers cab dimensions.	2

From RIS-2761-RST issue 1.1	To RIS-2761-RST issue two	Way forward	Comments	Objective
N/A	G C.2.5	New	Guidance added with good practice on the placement of drivers seats.	2
N/A	G C.2.6	New	Guidance added to support the addition of armrests to drivers seats.	2
N/A	G C.2.7	New	Guidance added to highlight that the LOC&PAS NTSN requires vehicles to be operated in both the seated and standing positions.	2
N/A	G C.2.8	New	Guidance added to promote a central driving position.	2
N/A	C.3	New	Title only.	1
N/A	G C.3.1	New	Guidance added on cup holder placement in cabs to prevent injury occurring to drivers.	1
N/A	G C.3.2	New	Guidance added for the inclusion of charging points in cabs for mobile and other devices.	1
N/A	G C.3.3	New	Guidance added to support LOC&PAS NTSN clauses 4.2.9.1.6(2) and 4.2.9.1.8(2).	1
N/A	G C.3.4	New	Guidance added to promote the installation of mounting points for mobile devices for when they are used as a driving aid.	1
N/A	G C.3.5	New	Guidance added on additional, useful welfare facilities for drivers.	1
N/A	C.4	New	Title only.	4
N/A	G C.4.1	New	Guidance added on the reason to assess visual discomfort, including signposting to RSSB research project S329 (2018).	4
N/A	G C.4.2	New	Guidance added to support LOC&PAS NTSN clause 4.2.9.1.8.	4
N/A	G C.4.3	New	Guidance added on why lighting in stowage areas can be beneficial to drivers.	4
N/A	G C.4.4	New	Guidance added on illuminating emergency equipment.	4
N/A	C.5	New	Title only.	4
N/A	G C.5.1	New	Guidance added on the location and specification of display screens.	4
N/A	G C.5.2	New	Guidance added to signpost to BS EN 16186-3:2022.	4
N/A	G C.5.3	New	Guidance added on the quantity of display screens in driver's cabs.	4

From RIS-2761-RST issue 1.1	To RIS-2761-RST issue two	Way forward	Comments	Objective
N/A	C.6	New	Title only.	4
N/A	G C.6.1	New	Guidance added on how window tinting can improve cab thermal comfort.	4
N/A	G C.6.2	New	Guidance added on how window tinting can prevent ultraviolet radiation from entering the cab.	4
N/A	G C.6.3	New	Guidance added on the most effective tint for reducing glare.	4
N/A	G C.6.4	New	Guidance added on different types of tints that are available and their properties.	4
N/A	G C.6.5	New	Guidance added on how window tinting can create a shift in the perceived colour of a signal with a signpost to BS EN 15152:2019.	4
N/A	G C.6.6	New	Guidance added with a signpost to BS 857:1967.	4
N/A	G C.6.7	New	Guidance added to highlight how window tinting can affect wireless signals being transmitted or received in the cab.	4
N/A	C.7	New	Title only.	4
N/A	G C.7.1	New	Guidance added on why a methodology for assessing glare is beneficial.	4
N/A	G C.7.2	New	Guidance added on potential positions to measure glare in the cab.	4
N/A	G C.7.3	New	Guidance added on how glare can be assessed considering driver's discomfort.	4
N/A	G C.7.4	New	Guidance added with signposting to a technical report on light sources for measuring glare.	4
N/A	G C.7.5	New	Guidance added to highlight that simulation software is available to measure glare.	4
N/A	G C.7.6	New	Guidance added to signpost to the BS EN 12464 series of standards.	4
N/A	G C.7.7	New	Guidance added on reflections and their causes.	4
N/A	C.8	New	Title only.	5
N/A	G C.8.1	New	Guidance added on risks to drivers if using drivers safety device (DSD) pedals for extended periods, with a signpost to an ORR report on DSD pedal injuries.	5

From RIS-2761-RST issue 1.1	To RIS-2761-RST issue two	Way forward	Comments	Objective
N/A	G C.8.2	New	Guidance added on the relationship between the drivers seat and DSD pedal including a signpost to a technical report.	5
N/A	G C.8.3	New	Guidance added on how height adjustable DSD pedals can be beneficial including a signpost to a technical report.	5
N/A	G C.8.4	New	Guidance added on adjustable DSD pedals.	5
N/A	G C.8.5	New	Guidance added for the maintenance of DSD pedals.	5
N/A	C.9	New	Title only.	1
N/A	G C.9.1	New	Guidance added on the reasons why second persons seats may be installed in a cab.	1
N/A	G C.9.2	New	Guidance added to highlight what functionalities the person in the second seat may need.	1
N/A	G C.9.3	New	Guidance added with good practice on second persons seat design.	1
N/A	G C.9.4	New	Guidance added to promote the inclusion of provisions for second screens in driver's cabs.	1
N/A	G C.9.5	New	Guidance added on second persons seat cleanliness and separation from the primary seat.	1