



Strategic Direction for revised Locomotive and Passenger Rolling Stock (LOC&PAS) TSI

Issue 1.0

**Approved by the
Industry Standards Coordination Committee**

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1 Purpose

- 1.1 This document sets out the strategic direction for GB involvement in the development of the LOC&PAS TSI and what GB aims to achieve with this TSI.

2 Background

2.1 Responsibilities

- 2.1.1 This strategic direction has been developed by the GB mirror group to the LOC&PAS TSI, endorsed by the Rolling Stock Standards Committee (RST SC) and is intended for use by those involved in the design, procurement, building, certification and authorisation of the rolling stock sub-system.

2.2 ERA mandate

- 2.2.1 The European Rail Agency (ERA) mandate No 1335/2008 sets out the scope of the changes to the TSI. This strategic direction therefore covers the following technical areas:

- Closure of open points (in conjunction with ERA working party DYN – vehicle / track dynamics interaction).
- Clarify possible inconsistencies between the High Speed (HS) RST TSI and CR LOC&PAS TSI, in order to allow the application of both TSIs to rolling stock without any ambiguity.
- Merge these two TSIs if determined appropriate following the complementary study launched by the ERA on this subject.
- Extend the scope of the HS RST TSI and CR LOC&PAS TSI, with consideration of the extended scope that will be defined in the complementary study launched by the ERA on this subject.

- 2.2.2 The following topics are not in the scope of work and the ERA will make further proposals regarding the work:

- Safety in railway tunnels.
- Accessibility for persons with reduced mobility.
- Noise.
- 1520 system (specific case / open point).

2.3 Key stages in the development of the TSI

- 2.3.1 The programme of work for the ERA Working Group will take place during 2011 and 2012 and include consideration of studies undertaken by the ERA.

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|---|------------|
| • Complementary studies (merging HS & CR) | Nov 2010 |
| • Complementary studies (scope ext.) | April 2011 |
| • Complementary studies (spare parts) | April 2011 |
| • Mid term review / intermediate report | April 2011 |
| • Preliminary draft revised TSIs | April 2012 |
| • Final draft revised TSIs | Oct 2012 |

2.4 Period of validity of the strategic direction

- 2.4.1 This strategic direction is valid until the vote at Railway Interoperability and Safety Committee (RISC) has taken place. There will be a review of the strategic direction in December 2011 if RISC has not voted by then.

3 Guidance for developing the TSI

3.1 Documents

- 3.1.1 The following documents are available on the [RSSB website](#) and should be used by all GB representatives involved in the development of the LOC&PAS TSI:
- a) A [‘Guide for persons involved in the development of TSIs’](#) which has been developed by the Industry Standards Coordination Committee (ISCC) to provide guidance to individuals from the GB railway community who are involved, in some way, in the development of TSIs. The guide is supported by a [‘checklist of factors’](#) which should be borne in mind when a TSI is being drafted, either for the first time or as a revision.
 - b) A [‘technical check list for TSIs’](#) which covers structural sub-systems (Infrastructure, Energy, Rolling Stock, Control-Command and Signalling) is intended to ensure, as far as possible, that the technical review of TSIs and specific cases is thorough.

3.2 Scope extension of TSIs

- 3.2.1 Article 1(4) of the Interoperability Directive, 2008/57/EC, requires that *‘The scope of the TSIs shall be progressively extended in accordance with Article 8 to the whole rail system, including track access to terminals and main port facilities serving or potentially serving more than one user, without prejudice to the derogations to the application of TSIs as listed in Article 9’*.
- 3.2.2 The way in which TSIs are written must depend on the way the term *‘the whole railway system’* is interpreted. If the interpretation is too wide, the TSI becomes impossible to write as it would need to cover a very wide diversity of odd systems.
- 3.2.3 The TSI should therefore be drafted on assumption that Member States adopt the exclusions set out in Article 1(3) of the Directive which states that:
- ‘3. Member States may exclude from the measures they adopt in implementation of this Directive:*
- a) *metros, trams and other light rail systems;*
 - b) *networks that are functionally separate from the rest of the railway system and intended only for the operation of local, urban or suburban passenger services, as well as railway undertakings operating solely on these networks;*

- c) *privately owned railway infrastructure and vehicles exclusively used on such infrastructure that exist solely for use by the owner for its own freight operations;*
- d) *infrastructure and vehicles reserved for a strictly local, historical or touristic use.'*

3.3 General consideration of references to ENs in TSIs

3.3.1 Article 5(8) of Directive 2008/57/EC states:

'TSIs may make an explicit, clearly identified reference to European or international standards or specifications or technical documents published by the Agency where this is strictly necessary in order to achieve the objective of this Directive. In such case, these standards or specifications (or the relevant parts) or technical documents shall be regarded as annexes to the TSI concerned and shall become mandatory from the moment the TSI is applicable. In the absence of such standards or specifications or technical documents and pending their development, reference may be made to other clearly identified normative documents; in such case, this shall concern documents that are easily accessible and in the public domain.'

3.3.2 Making an explicit reference to ENs is therefore only permitted 'where this is strictly necessary in order to achieve the objective of this Directive'. Article 5(8) should be read as a prohibition on including explicit references to ENs in TSIs, with a permitted exception under the specified circumstances. It should not be read as a general permission to include references to ENs under the specified circumstances.

3.3.3 Generally, ENs should only be referenced as ways of defining something (such as gauges). They should not be references as a way of imposing a requirement, as any necessary requirements should be set out in the TSI itself.

3.3.4 As an example, a reference to an EN was necessary in the CR LOC&PAS TSI: contains requirements applicable to varying load conditions. EN 15563:2009 is referenced simply to define what is included within a specific load condition, and the method of deriving it (a matter too detailed to be specified in the TSI). However, EN 15563:2009 was not referenced as a way of specifying the TSI requirement – it simply permits that requirement to be expressed unambiguously.

3.4 National rules

3.4.1 The TSI should be drafted to eliminate references to the use of national rules as a way of meeting an essential requirement (other than as a specific case in chapter 7). Such references were common in TSIs drafted under AEIF but are not usually present in TSIs drafted under ERA, although the CR LOC&PAS TSI does contain such a reference.

- 3.4.2 If the TSI intends to cover a point, but there is no agreed requirement, this should be identified as an open point.
- 3.4.3 If the TSI has nothing to say about a point, it should remain silent. It does not need to say that the issue is dealt with by application of national rules.

4 Principles for developing the TSI

- 4.1 The overall aims for GB in developing the TSI shall be to:
- a) Achieve a specification that allows GB to procure economic and cost effective rolling stock.
 - b) Produce a specification that delivers the essential requirements but is not too prescriptive.
 - c) Produce a specification that does not inhibit innovation.
 - d) Produce a specification that is aligned with the all other TSIs.
 - e) Produce a specification that has well structured relationship with the wider field of European standards and specifications.
 - f) Produce a standard that is fit for purpose within GB requirements and structure gauge.
 - g) Produce a standard that, where specific limits are applied, that those limits are optimised across an interface to ensure the most cost effective solutions can be implemented.
 - h) Ensure that there is no reduction in existing overall levels of safety.
 - i) Enable the achievement of a cost effective transition to conformity with TSI target subsystems, to the extent that GB intends to do so.
- 4.2 Each of these principles is to be applied to the GB specific technical issues in section 5 below as the TSI is developed.

5 GB specific issues

This section sets out the specific GB issues that must be addressed when drafting the TSI. It applies the principles in section 4 to each issue.

5.1 List of different GB practices

5.1.1 The CR LOC&PAS TSI mandates arrangements for when a combined power/brake controller is installed in a vehicle cab and in particular, the direction of that controller for when either power or brake application is required. It is unfortunate and a matter of history that the GB approach is, typically, the opposite direction to that mandated in the TSI. The existing GB specific case does not mandate the GB opposite approach, but allows for the duty holder to determine the arrangement such that where the solution may be more appropriate to maintain the existing GB practice (for example, compatibility with driving existing rolling stock) this is allowed. It is proposed that the TSI should not mandate a specific solution, but should set out the objective of consistency of approach.

5.2 Temporary specific cases

5.2.1 For rolling stock dynamic behaviour, the CR LOC&PAS TSI mandates the adoption of testing methodologies set out in EN14363. However the Euronorm constrains the approach to a limited range of vehicle types when using one of the three methods (Method 3). GB has extensive experience of the use of Method 3 for all vehicle types and therefore the limitation set out in EN14363 should not apply. GB is actively engaged in the development of revisions to EN14363 and, in particular, the removal of the current limitation. A temporary specific case is required until the revision of the EN is implemented.

5.2.2 The introduction of a number of fleets of rolling stock with train horns compliant to equivalent European standards led to a number of issues associated with the environment and health of those neighbours in close proximity to the railway. This led to a revision of the GB national technical rule. The GB requirements are to be incorporated into an applicable Euronorm. Until this is achieved a temporary specific case is required.

5.2.3 GB has, for many years adopted a closed system for re-fuelling its fleet of diesel powered rolling stock. Open type re-fuelling is typical across mainland Europe. The ERA has issued a requirement for a standard in this area which is likely to adopt the GB approach. Until this is achieved a temporary specific case is required.

5.3 Permanent specific cases

5.3.1 The applicable Rolling Stock TSIs developed, and either published or awaiting publication, contain a number of specific cases. These specific cases have been obtained and need to be retained. Of these, several are as a result of the GB infrastructure gauge being smaller than that of mainland Europe. To ensure the most economic exploitation of the limited size of the gauge, a number of innovative solutions or approaches have been developed to ensure the largest vehicle can fit through the smallest hole.

- 5.3.2 There is a need to continue to use such solutions and the continued use of existing proven national technical rules is essential. In parallel, GB is actively engaged with European colleagues to incorporate such techniques in Euronorms, however until this is achieved, a number of specific cases are required in the area of vehicle dynamic (including pantograph) gauging.
- 5.3.3 Directly linked to the GB infrastructure gauge is the matter of aerodynamic effects, both for passengers on platforms due to the much higher platform height, and head pressure pulse due to the smaller track centre spacing. For both of these effects an alternative but directly compatible value is required.
- 5.3.4 The range of the overhead line wire height in GB varies further than that experienced across mainland Europe, in particular with lower tunnel heights and this has a direct consequence on both the working range of the pantograph and the contact force testing regime. Therefore for compatibility with the existing GB Overhead Line Equipment (OLE), GB specific cases are necessary.
- 5.3.5 The constrained GB infrastructure gauge limits the design of the OLE and the arrangements for neutral sections. This results in the need to exploit the full width of the pantograph head negating the option to exploit insulated horns. To maintain compatibility with the existing GB non-conformant OLE, a GB specific case is required to continue to use the GB pantograph head geometry.
- 5.3.6 Associated with the limited GB infrastructure gauge is the ability to provide adequate sightlines from a vehicle cab to the lineside signals and signs. GB has developed a methodology that enables the use of gangway fitted cabs that provides a degree of flexibility that is unnecessary with a more generous infrastructure gauge. Thus the specific case to use a national technical rule is required.
- 5.3.7 As described in 5.1.1 above, the GB approach to the directional arrangements for the combined power/brake controller is to place the responsibility with the duty holder to determine and should be out of scope of the TSI. However, should the TSI continue to mandate a prescriptive approach, a GB specific case will be required to enable GB to continue to adopt its flexible approach.
- 5.3.8 GB has an extensive 650 – 750 v DC network which has not been included within the range of target systems listed in the Energy (ENE) TSI. In order to enable the continued procurement of 650 – 750 v DC only rolling stock a GB specific case is essential. This is particularly applicable when the scope of the TSI is extended to all main line routes where certain types of rolling stock may never traverse routes fitted with the 25kv ac principle target system.

- 5.3.9 The dimensional arrangements for wheelsets set out in the existing rolling stock TSIs mandate a minimum wheel rim width of 133mm. One of the cases to justify this minimum value is the compatibility with rail mounted axle counter train detection systems. GB has for many years operated rolling stock with a minimum wheel rim width down to 127mm, to reduce wheelset mass and optimise brake pad life. A GB specific case is required to permit this arrangement to continue. It is hoped that, in due course, further studies will demonstrate that GB arrangements are suitable for adoption across Europe.

5.4 Changes to GB practices

- 5.4.1 GB is extensively engaged in the development of Euronorms that are necessary to demonstrate conformity with functional requirements mandated by TSIs. This is essential to ensure that they are fit for purpose when GB application is necessary. By adoption of the Euronorm approach, a change may be necessary, in part, to existing GB practices.
- 5.4.2 GB will adopt the EN approach within its national technical rules and this will facilitate the migration to a common European approach, with the economic benefits that this will deliver.
- 5.4.3 The existing TSIs for both Rolling Stock and Infrastructure have developed and implemented the concept of equivalent conicity. This is not a direct measure that GB has previously required; however it provides a direct interface assessment and is therefore an appropriate approach. GB will incorporate this concept when the opportunity arises to revise the applicable national technical rules.

5.5 Development of the specific cases

- 5.5.1 All the specific cases set out in sections 5.2 and 5.3 have previously existed in either the HS RST TSI or the CR LOC&PAS TSI. The extension of scope does not introduce a need for further specific cases. The previous arguments used to justify the specific cases are still valid and will be used to justify the continuing need for them.

6 General issues

- 6.1.1 In addition to the specific technical issues, there are a number of general issues that need to be considered in shaping the TSI to produce a good quality document.
- 6.1.2 A key task of the merging the HS RST TSI with the CR LOC&PAS TSI is to address inconsistencies in approach by the two TSIs. In a number of cases, the HS RST TSI applies a proven solution approach, for example the mandating of a particular design of auto-coupler. GB will continue to press for functional requirements instead of solutions, unless there is consensus that a proven solution is the most cost effective.

- 6.1.3 A further example of a proven solution approach in the HS RST TSI is the mandatory requirement for specifying a fixed train length. The matter of train length is purely a commercially driven decision and does not fall within the scope of the TSI. Removal of the requirement will lead to the withdrawal of the need for a GB specific case, currently in place in the HS RST TSI.
- 6.1.4 In parallel with the work to merge HS and CR TSIs, the ERA has initiated projects to review the transverse TSIs – Noise, Persons of Reduced Mobility and Safety in Rail Tunnels. GB will continue to press for the disaggregation of the requirements in these (revised) TSIs to the Structural sub-system TSIs when ever the opportunity arises.
- 6.1.5 Interface with CCS TSI. CCS TSI, via Index 77, contains requirements (in the form of solutions) applicable to Rolling Stock that interface with train detection systems. These should be contained within a RST TSI. In addition, the text is unclear on the compliance arrangements, this should be clarified further.
- 6.1.6 The ERA study relating to Interchangeable Parts will be reviewed when it is published and a view formed on the benefits that any proposals that are made will deliver. In addition, the issue of Interoperability Constituents (ICs) will be kept under review to ensure that the concept of ICs is not of detriment to GB, in particular if further ICs are proposed.

6.2 Identifying Inconsistencies between the HS RST TSI and the CR LOC&PAS TSI

- 6.2.1 The ERA has initiated, as an early phase of the project to merge the HS RST TSI and the CR LOC&PAS TSI, a study of the differences between the two applicable TSIs. A proposal will be produced setting out the revised text to be adopted. Each stage of this work is reviewed by the GB Mirror Group and either endorsed or commented on.

6.3 Changes required for extension in scope

- 6.3.1 The extension of scope to the whole railway system (see 3.2.3) will have no effect on the rolling stock operating over the GB mainline network. Currently all rolling stock within the scope of the HS RST TSI and the CR LOC&PAS TSI will, at some stage, traverse or operate on either a HS or TENS route and is therefore currently required, when procured, to be TSI compliant. An extension of scope will therefore have no effect on the technical requirements.
- 6.3.2 However, the extension of scope could provide opportunities to optimise rolling stock, should the commercial need arise, to a specific type of route. It is anticipated that the revised INF TSI will expand on the line categorisations available and the revised LOC&PAS TSI should not prevent the opportunity to optimise the design of rolling stock to a single or limited range of line categories.

6.4 Technical corrections

- 6.4.1 Whilst there are no known areas where the currently applicable TSIs need changing technically, there are opportunities to provide greater clarity in the requirements. Ambiguities within the text will be addressed as part of the revision process.
- 6.4.2 In GB, a control has existed to manage rail head damage through control of the contact stresses that can arise of high axle load vehicles fitted with small diameter wheels. A simple ratio rule exists, known as Q/D and this is mandated in GM/TT0088. There is no known equivalent in widely available European standards. The equivalent Infrastructure control on the other side of the interface is through requirements for rail steels. There is a need to fully understand whether an equivalent control exists such that the GB control can be withdrawn or, more likely, whether the revised LOC&PAS TSI should address this missing requirement.

6.5 Closing out open points

- 6.5.1 A key element of the mandate placed on the ERA for the revision of the HS RST TSI and merged with the CR LOC&PAS TSI is the removal of open points. To resolve a number of these, EU funded research (TrioTrain) is underway to provide a more efficient homologation method to demonstrate conformity in the areas of running dynamics, aerodynamics and vehicle pantograph / OLE compatibility. This research is specifically aimed at closing a number of key open points.
- 6.5.2 To achieve closure of the open points requires the input of a number of technical specialists and these are providing significant input to the TrioTrain project. It is important that the programme of ERA activities does not dilute the effort already underway and therefore GB will continue to press the ERA to follow the TrioTrain project and use its outputs to close out a number of open points.
- 6.5.3 Another important specific open point relates to safety related functions where the requirements of the functions are not covered by technical specifications. The ERA is proposing to set a target level for each safety related function, however this is in conflict with the Safety Directive and in particular, the principles described in the Common Safety Method (CSM) on Risk Assessment (RA). GB will continue to press for inclusion of clear functional requirements for which the application of the CSM on RA can be applied.

- 6.5.4 On 'Interior Passive Safety' the GB position is that it is a requirement that fulfils part of the essential requirement, Safety. The HS RST TSI and the CR LOC&PAS TSI both recognise that structural integrity is necessary to maintain survival space; ensuring that injuries following an accident are also minimised is a complementary element. Studies examining means of minimising the effects of the risks from terrorist attacks have also shown that elements of interior design that follow interior passive safety principles are beneficial. Therefore the GB believes that, as a minimum, the revised LOC&PAS TSI should recognise the concept of Interior Passive Safety and include it within its scope.

6.6 Additional open points

- 6.6.1 The mechanical behaviour of wheels set out in the CR RST TSI mandates requirements defined in a suite of Euronorms. However these requirements only apply to forged and rolled wheels. The TSI states:

'Other types of wheels are permitted for vehicles restricted to national use. In that case the decision criteria and the fatigue stress criteria shall be specified in national rules. Those national rules shall be notified by Member States in accordance with Article 3.'

This is a disguised open point in that there is no agreement on the requirements for other wheel types, for example cast wheels. The key aim for GB is to remove the mandatory reference to the specified suite of Euronorms within the section on wheelset requirements and list within the Application Guide, those Euronorms compliance with which is a presumption of conformity. This would provide the opportunity to remove this open point.

6.7 TSI issue log

- 6.7.1 At present, there are no items in the TSI Issue Log applicable to the existing published HS RST TSI and the CR LOC&PAS TSI is not yet published.

6.8 Changes to minimise references to ENs

- 6.8.1 Section 6.6.1 is one example where inclusion of a clear functional requirement removes the need to mandate application of specific Euronorms. In the CR RST TSI there are currently 34 mandatory Euronorms referenced and each one will be carefully considered and a justification for its inclusion sought. The objective is to include a prescribed functional requirement, with compliance by a referenced Euronorm being a presumption of conformity.

6.9 Changes to eliminate the use of national rules

- 6.9.1 See 6.4

6.10 Interoperability Constituents (ICs) and Interchangeable Spare Parts (ISPs)

6.10.1 The Mirror Group will continue to seek clarification of both the requirements for Interoperability Constituents and Interchangeable Spare Parts and only support their inclusion within the LOC&PAS TSI where a clear benefit can be demonstrated.

6.11 A TSI that does not inhibit innovation

6.11.1 Clarity of the purpose of the TSI is required; detailed prescriptive requirements are only one way to fulfil the essential requirements. The TSI process allows for the adoption of “novel solutions” but if it means changing the TSI to incorporate those novel solutions, this is neither easy or quick.

6.11.2 Because the GB railway is constrained by its small loading gauge, together with other embedded practices and features that are inherently difficult and expensive to alter, it may be necessary to adopt “novel solutions” in order to allow the economic benefits of electrification to be applied to the GB railway. The GB Technical Strategy Leadership Group (TSLG) is researching possible novel approaches for the future. These solutions may need to be developed as specific cases.

7 Feedback to ISCC

7.1 Regular reports will be made to ISCC at specific milestones within the project to produce the LOC&PAS TSI, including when:

- The preliminary draft of the TSI is available.
- The GB Specific Cases are developed.
- Presentations by the ERA are due to be made to RISC.
- The Final draft is submitted to RISC for vote.

7.2 Where it appears that the development of the TSI is at risk of deviating significantly from the direction set out in this document, a report shall be provided to ISCC on the issues with recommendations on any further action that needs to be taken.