Guide for persons involved in the development of Technical Specifications for Interoperability

Issue Three

Approved by the
Industry Standards Coordination Committee

18 June 2010

ISCC/004

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## Issue Record

<table>
<thead>
<tr>
<th>Issue</th>
<th>Effective Date</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>19 June 2009</td>
<td>Issue One produced to provide guidance to individuals from the British railway community who are involved, in some way, in the development of European Technical Specifications for Interoperability.</td>
</tr>
<tr>
<td>Two</td>
<td>18 June 2010</td>
<td>Additional advice on referencing Euronorms in TSIs added to section 14.9.</td>
</tr>
<tr>
<td>Three</td>
<td>4 October 2010</td>
<td>Issue Two amended at paragraph 1.6 to reflect the change of name of the responsible person in RSSB</td>
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1 Introduction

1.1 This document has been developed by the Industry Standards Coordination Committee (ISCC) to provide guidance to individuals from the British railway community who are involved, in some way, in the development of European Technical Specifications for Interoperability (TSIs).

1.2 It 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.

1.3 A number of related documents have previously been agreed at a European level, particularly:

- 96/48-DV16 Guideline for drafting TSIs
- 01/16 DV05 Guidelines for drafting TSIs
- AEIF Coordination System Group (2004), The Scope and Content of Conventional TSIs, Issue 1

1.4 These documents provide information about the European context within which TSIs must be written and some detail regarding what the TSIs should cover. However, none of them provide the detailed level of information which is required by the people who are involved in drafting the TSIs. The current document has been written to try to fill this apparent gap in European guidance related to the TSIs. Through the establishment of such guidance, it is hoped that the effectiveness of the TSI drafting process will improve, as those individuals who are involved to represent the GB rail industry will be better informed as to their role in the process and what they are trying to achieve.

1.5 TSIs are written by the European Railway Agency (ERA) on the basis of a mandate issued by the European Commission. For each TSI, the ERA establishes a ‘working party’ which involves representatives from each of the European sector organisations, together with a representative from each national safety authority. While this guidance has been written for industry representatives who attend the sector organisations and who may, or may not, be directly involved on the ERA working parties, it may also be of interest and relevance to representatives of the national safety authorities who are involved in TSI drafting (who have the wider remit of representing the UK including HS1, Northern Ireland and Channel Tunnel in addition to the GB mainline railway).

1.6 Any comments on potential additions or improvements to this document should be submitted to RSSB via the RSSB Enquiry Desk, email enquirydesk@rssb.co.uk, marked for the attention of the Head of Standards Policy.
2 Support available to representatives of the railway community involved in TSI development

2.1 GB rail industry involvement in the development of the TSIs is essential to delivering high quality TSIs which provide maximum economic benefit to the industry at both European and national level over the medium to long term while mitigating the potential for negative impacts on the national railway in the short term. Providing support to those individuals who are involved in TSI development is therefore given a high priority by RSSB and the cross-industry committees which RSSB facilitates.

2.2 The role of representing a sector of the GB (or UK) railway in the drafting of a TSI is a demanding one. This is true where that representation is to a European sector organisation but even more so in those circumstances where an individual is then successful in being nominated to represent a sector organisation at an ERA working party. From a GB perspective, key elements of the role include:

a) The need to read and amend the minutes of various meetings associated with drafting the TSI
b) Monitoring and commenting on the draft text of the TSI and the supporting economic evaluation
c) ‘Networking’ with European colleagues also working on the TSI to establish sector or industry positions on the draft text
d) Highlighting to colleagues in the UK railway organisations any issues with the draft text which may cause difficulties in this country
e) Obtaining input from colleagues in the UK railway organisations on the evolving draft, particularly where there may be subsequent difficulties in achieving conformity with the TSI
f) Identifying the potential need for UK specific cases, communicating and explaining that need to the Department for Transport (DfT) and relevant UK railway organisations and working with them to develop the detail of the specific cases with supporting economic evaluation.

2.3 In order to support industry representatives with the above tasks, the Standards Committees facilitated by RSSB provide a forum where representatives of the industry including the DfT and Office of Rail Regulation (ORR) can exchange information and views on European standards-related activities. This is typically through subgroups of the Standards Committees which are established to focus on a particular TSI.

2.4 In addition, ISCC is available to advise on particular issues of concern, particularly related to alignment with wider industry strategy.

2.5 When an individual is nominated to be involved in TSI development in some way, one of their first activities should be to establish communications links with the relevant supporting ‘mirror’ group in GB, or to request RSSB to establish such a group to if it is not already.
2.6 Where a particular issue is proving challenging to resolve satisfactorily within an ERA working party or via a sector organisation group, then it may be appropriate to ask RSSB to convene a meeting directly with the ERA project officer or Head of Unit to better explain and understand the issue. It is also possible to ask the ORR to raise the issue at the NSA network, and to inform the DfT who represent the UK at the Railway Interoperability and Safety Committee, which oversees the development of TSIs and is where the TSIs are eventually approved by the Member States prior to translation by the European Commission.

3 The purpose of the TSIs

3.1 The Interoperability Directive 2008/57/EC does not explicitly define a purpose for the TSIs themselves, as TSIs are one of several complementary mechanisms through which the objectives of the directive are delivered.

3.2 Article 1 of the Interoperability Directive states:

1. *This Directive sets out to establish the conditions to be met to achieve interoperability within the Community rail system in a manner compatible with the provisions of Directive 2004/49/EC on safety on the Community's railways. These conditions concern the design, construction, placing in service, upgrading, renewal, operation and maintenance of the parts of this system as well as the professional qualifications and health and safety conditions of the staff who contribute to its operation and maintenance.*

2. *The pursuit of this objective must lead to the definition of an optimal level of technical harmonisation and make it possible to:*

   (a) *facilitate, improve and develop international rail transport services within the European Union and with third countries;*

   (b) *contribute to the progressive creation of the internal market in equipment and services for the construction, renewal, upgrading and operation of the rail system within the Community;*

   (c) *contribute to the interoperability of the rail system within the Community.*

3.3 On the basis of Article 1(2), the following is proposed as a working understanding:

   **The purpose of the TSIs should be to specify an optimum level of technical harmonisation of the target railway system and to deliver:**

   a) *Common standards for the opening of the market for operations and the supply of goods and services and facilitating international operation*

   b) *More competitive railway services.*

3.4 Note that an optimum level of technical harmonisation is not the same as perfect harmonisation; do not try and standardise everything, only what is necessary to deliver the purpose of the directive.
3.5 This purpose is fundamentally about improving the competitive position of the railway (particularly by reducing the cost base) through reduced barriers to the free trade of components and subsystems and the free movement of vehicles between Member States.

3.6 In order to deliver this purpose in managing the shared railway system, a TSI needs to define the basic parameters of the railway system that need to be the same (that is, involve more than one actor) sufficient to encompass the essential requirements for the railway system (as listed in Annex III of the directive) and deliver interoperability.

3.7 In dealing with any TSI-related issues ISCC would, and would expect GB participants, to take the above objectives as decision criteria in relation to determining whether something should be contained within a TSI and at what level of detail.

4 The role of TSIs in an open, shared railway system

4.1 The TSIs are central to the management of an open, shared European railway system in which trains can come from anywhere and go anywhere while operating over infrastructure which may be owned by different infrastructure managers in different countries. The efficient and safe management of such a shared system can only be delivered through the development of common standards that define the interfaces between the various parts of the system managed by the numerous actors followed by compliance with those standards once they are in place.

4.2 It is important to recognise that a TSI is a standard, it is not a design handbook. A railway asset cannot be designed solely to the TSI; much more work is needed. A TSI merely tells you the conditions you must comply with in order to meet the essential requirements and deliver interoperability for a specific subsystem. It is then up to competent designers, engineers, builders and operators, depending on the subsystem to deliver those conditions.

4.3 For most subsystems, the TSIs set out to define a system architecture very similar to that which already exists. However, because at both national and European level the railway system has moved from a ‘closed’ status (ie, managed by one monopoly legal entity) to ‘open’ status (managed by many independent entities) the manner in which the TSIs do this is very different from how most people are used to working. The transition to an open system means that people and processes need to change and move from a regime that people are familiar with and comfortable working with to one where things are managed and specified in a way that is novel and unusual to those with long service in the railway industry (but very similar to the regime in place in other open shared systems).

4.4 The concept that it is possible to both specify and subsequently verify the fixed and mobile elements independently of each other, whilst common practice in other industries is novel and challenging for many people in the railway sector. However, this is what must be done for a shared system to work efficiently.
5 The scope of activities in which an ERA TSI working party may be involved

5.1 Overview

5.1.1 There are a number of different outputs from the TSI drafting process, all of which need to be written by (or would benefit from significant input by) the ERA working party for the TSI if they are to be consistent and aligned in their technical content:

a) The TSI itself
b) The Report of Presentation (which includes the economic evaluation)
c) The Application Guide
d) Mandates to European standardisation bodies for Euronorms (ENs) to support a TSI

5.1.2 The following sections provide an overview of each of these documents. More detailed information about the TSI document is then set out in part 6 onwards.

5.2 The Technical Specification for Interoperability

5.2.1 There are three elements of ‘scope’ which must be clearly established by ERA and the working party at the outset of the drafting process for a TSI: technical scope, geographic scope and the scope of the drafting activity.

Technical scope

5.2.2 A clear and agreed statement of the exact technical scope that the TSI applies to is essential; being clear within the working party as to the technical scope that a TSI is intended to cover will bring greater clarity to subsequent discussions about detailed technical content, as well as improving the likelihood of the TSI being delivered on time. It is not widely understood that a TSI, particularly the first version of a TSI for a given subsystem, does not need to apply to absolutely everything for a given subsystem. Furthermore, it is normally impractical to try to do so. For example, if a working party is drafting a TSI for freight wagons, is the technical scope ‘freight wagons with axle loads up to 25 tonne’? Up to 25.5 tonne? Up to 30 tonne? It is insufficient to declare the scope is ‘freight wagons’. Similarly, the scope of a passenger rolling stock TSI might be ‘rolling stock intended for the carriage of passengers with an axle load of more than a 12.5 tonnes and less than 25 tonnes’.

5.2.3 It is important that a TSI should be a permissive document; that is, it standardises what is necessary to meet the objectives and the essential requirements, but that out of scope items are always permitted. The alternative would be a restrictive document which prohibits anything not in scope, which is not the intent of the TSIs or the Interoperability Directive.
5.2.4 Therefore, just because something is not covered by the technical scope of a TSI, it is not banned from being built or used. It is just that either there is no need for it to be covered by a TSI, or the TSIs (or part of the TSI) which applies to the design and authorisation into use of that particular asset is not yet in place.

**Geographic scope**

5.2.5 The geographic scope to which the TSI will apply is also important. Is the TSI to apply only to the trans-European network (TEN), or is it to apply to the ‘railway system’, in accordance with the 2008 revision to the Interoperability Directive? The selection of geographic scope will have significant implications for the development of the technical content of the TSI and the technical diversity that the TSI may need to address. However, it must be borne in mind that the TEN already includes significant diversity of scope including heavy freight only lines, intensively used mix traffic lines, dedicated high speed lines and rural branch lines and the TSIs need to allow for this.

5.2.6 As an example, the UK map of the TEN includes Shrewsbury to Aberystwyth via Dovey Junction, hence the TSIs already apply to this route. In extending the TSIs to the railway system, is there any merit in imposing a different set of specifications to the route section Dovey Junction to Pwelli? If it is asserted that to extend the scope of application of a TSI would be expensive one must always establish first whether this is because the TSI contains inappropriate requirements for routes and assets within its existing scope. If this is the case then pressure should be brought to bear to change the TSI content.

**Scope of the drafting activity**

5.2.7 The scope of the drafting activity is particularly important for a revision to an existing TSI where the work should start with closing open points, resolving errors (critical or otherwise) in the current TSI, addressing issues in the relationship between TSIs and, where practicable, reducing the need for specific cases. It is in this activity that requirements that are considered as too onerous for particular circumstances and/or types of operation should be addressed.

5.2.8 In drafting a TSI, it may help to bring clarity to the thinking of the working party by distinguishing between those items of content which are required to deliver technical compatibility of the railway subsystems or system, and those items which are specified purely for economic benefit (eg, because they prevent barriers being erected to the movement of vehicles between Member States).

5.2.9 In order to determine which TSI a particular requirement should be published in, it will help to think about the content of each TSI in terms of who has to comply with it, not who has to specify it. It must be possible to assess conformity of a vehicle with the rolling stock TSI independently of those elements of the railway system which are ‘fixed to the ground’, and vice-versa.
5.2.10 As an example, the rolling stock TSI needs to describe everything (that is within scope of the TSIs) that is physically attached to a train. This includes the pantograph and should include the train-borne radio and signalling equipment.

5.2.11 A key part of drafting a TSI is the consultation with the ‘social partners’ and preparing a response to any comments raised during this process. The volume of work associated with this part of the drafting process varies significantly from TSI to TSI.

5.3 The Report of Presentation

5.3.1 The Report of Presentation has two primary audiences:

a) The European Commission, for whom the Report of Presentation describes how ERA have fulfilled their mandate for the drafting of the TSI

b) The working party who will draft any subsequent revision to the TSI, for whom the Report of Presentation describes how the TSI ended up as it did.

5.3.2 In order to deliver for both of these audiences, it is very important that the Report of Presentation is used to record the explicit decisions of the working party, especially those regarding what is in scope and what has deliberately been left out of scope. The Report of Presentation needs to be the place that one can go to understand how the TSI ended up looking like it did. For example, decisions about issues that the TSI should remain silent on need to be documented in order to prevent unnecessary rework later on. Concerns about existing ENs which would not deliver what is required by the TSI also need documenting so that users of the TSI are better able to take informed decisions. It also needs to clearly describe the economic evaluation supporting the TSI, while a clear description of the issues that the working party could not resolve and which now remain to be resolved would assist with the next revision to the TSI.

5.3.3 In all cases, the decisions of the working party and ERA are required to be supported by a suitably robust economic evaluation, which needs recording in the Report of Presentation. However, there is a significant challenge in describing the results of the economic evaluation in such a way that it can be understood by readers who have not been party to the evaluation itself. RSSB has specialists in this field who can provide advice and support when required. The economic evaluation of the Safety in Railway Tunnels TSI is one of the only examples where the evaluation worked as intended and influenced the decision making process regarding the content of the TSI. The Report of Presentation for this TSI provides a potential model for the degree of clarity regarding the reporting of the evaluation against which other TSIs may be compared.

5.3.4 The Report of Presentation could also describe what work is needed, in the view of the working party, in order to close an open point, as this would give ERA and the European Commission guidance as to future work (especially if
research is needed). This should include situations where a new EN is required to be developed and subsequently harmonised against the TSI on a particular issue.

5.3.5 Where the working party has been unable to reach a consensus on an issue and the ERA has ‘decided’ the TSI content related to that issue (rather than declare an open point) then the fact that this has occurred should be explicitly identified in the Report of Presentation and the differing positions of the protagonists and the ERA and rationale behind them should be clearly documented.

5.3.6 For technically complicated issues (eg, equivalent conicity), the Report of Presentation should be used to describe the background to why the TSI says what it says.

5.3.7 Representatives who are native English speakers can play a significant role in delivering a TSI and accompanying Report of Presentation which are written in clear English. Amending these documents so they are clear and consistent in their use of the English language will also greatly assist the subsequent translation into other European languages.

5.4 The Application Guide

5.4.1 If a TSI says ‘achieve X’, then it should also state, in each case under consideration, which procedures are to be used in order to assess the ‘EC’ verification of the subsystems or the conformity and/or the suitability for use of the interoperability constituents. However, non-mandatory harmonised ENs may be used to describe in detail a particular solution for ‘how to deliver X’ or ‘how to assess X’. The Application Guide should then be the mechanism which states whether or not using a published EN will deliver the TSI requirements and confer a presumption of conformity with the TSI. An advantage of this approach is that the Application Guide may then be updated as ENs evolve without having to change the TSI.

5.4.2 This means that the Application Guide needs to be written (or at least very carefully reviewed) by someone who understands and was involved in the TSI drafting. The relevant ENs also need to be reviewed by the same person(s) to check that they do cover the necessary content before they are declared as delivering the requirements of the TSI.

5.4.3 An example is the generic guide for the first set of high speed TSIs; the ENs listed in the back of the guide do not appear to have been compared with the TSIs themselves to establish whether they deliver the requirements of the TSI. The guide is therefore potentially misleading at best.

5.4.4 Historically, it was the Commission who wrote the Application Guide. This is now ERA, but the ERA working party is not (yet) involved. The ideal (future) position is that the ERA working party writing the TSI also produces the technical content for the Application Guide.
5.5 Mandates to European standardisation bodies for Euronorms to be mandated by a TSI or to complement a TSI

5.5.1 Where there is a need for the development of a new EN or an amendment to an existing EN to be referenced by a TSI or to describe a means of achieving conformity with the TSI, the working party should be involved in developing a ‘Request for Standard’ which can then be passed to the relevant European standardisation body so that the EN can be developed.

5.5.2 Existing ENs may not always deliver what is needed by the TSI, even if they address the same subject area, as they will have been developed in a different context and for a different purpose. In particular, they will have been developed as ‘voluntary’ rather than mandatory specifications, will not have been based on the essential requirements and will not have been decided upon on the basis of economic evaluation. Note also that where ENs exist it is common practice for the EN to contain a variety of options rather than a single requirement or to be significantly wider in scope than the relevant part of the TSI. It is also common practice for Member States to ‘cherry pick’ or ‘interpret’ the content and thus only apply parts of the EN. This means that where it is asserted that ‘everybody works to EN nnnnn’ there may in fact be very different requirements in use in each country and some parts of the EN may be applied nowhere. For vehicle related parameters, it is hoped the evaluation of equivalence of national rules in the Reference Document will make this phenomenon more transparent.

5.5.3 In these circumstances, the working party should resist any pressure to use the existing document ‘because it exists’ and should press for the necessary changes to be made. There may also be benefits from recording the reasons why that existing EN is not suitable in the Report of Presentation.

6 The need to address the ‘essential requirements’ in the TSIs

6.1 The Interoperability Directive 2008/57/EC states:

“essential requirements” means all the conditions set out in Annex III which must be met by the rail system, the subsystems, and the interoperability constituents, including interfaces’

6.2 Annex III then lists a number of general requirements to be met by all subsystems, and then a series of requirements specific to each subsystem. It could be argued (on the principle that what is not included is excluded) that ‘the conditions set out in Annex III’, and only those conditions, constitute essential requirements.

6.3 Taken at face value, the essential requirements appear to be rather obvious and straightforward. However, the essential requirements are rather more difficult to deal with than is often realised. In particular, there are several examples of essential requirements that are not addressed by the TSIs and, pragmatically, should not be addressed by the TSIs. Examples include:

1.3. Health
1.3.1. Materials likely, by virtue of the way they are used, to constitute a health hazard to those having access to them must not be used in trains and railway infrastructure.

This is reasonable as an essential requirement. However, such materials should not be used anywhere, and general legislation, where it applies to railways, is normally sufficient to deal with this issue. Such legislation may or may not exist at a pan-European level but, in any case, there is nothing railway-specific for the TSIs to say.

In fact recent guidance from the European Commission has made it clear that while the directive requires the TSIs to address all of the essential requirements, if a parameter is covered by a horizontal directive then there is no need to specify these parameters or to repeat the directive in the TSI. The check by the Notified Body that the subsystem ‘complies with the other regulations deriving from the Treaty, and may be put into operation’ prescribed by Annex VI of the directive delivers the required coverage of the essential requirements in these circumstances.

However if the horizontal directive is inappropriate or needs to be supplemented then the TSI must cover the issue. Thus the TSIs do not need to deal with EMC issues between the railway system and neighbours but must cover EMC issues between train detection systems and vehicle traction systems.

2.1. Infrastructure

2.1.1. Safety

Appropriate steps must be taken to prevent access to or undesirable intrusions into installations.

Again, very reasonable as an essential requirement for the railway system, but the conventional rail infrastructure TSI has absolutely nothing to say on the subject, as what needed to be done could only be determined on the basis of a risk assessment, taking into account local conditions (a railway through a Swiss pasture would require a different solution to a railway through Camden). In this case the word ‘appropriate’ seems to offer the flexibility needed to deliver proportionate approaches.
6.4 Extrapolating from the above examples, TSIs should prescribe the technical requirements necessary to:

a) Meet the essential requirements (as set out in Annex III of the directive) to the extent that the parameter is not, or could not be, addressed elsewhere, for example, in general legislation (as in the case of the first example above) or the safety management system of an Infrastructure Manager or Railway Undertaking (as in the case of the second example above). Where the requirement was known to be addressed elsewhere, the TSIs should remain silent.

b) Deliver interoperability, and

c) Deliver an optimum level of harmonisation. It is in this category that component specifications (interoperability constituents) fall. It is also the case that there is currently much debate regarding the degree of (mandatory) harmonisation that constitutes 'optimum'. One would expect this to be driven case by case by economic analysis.

6.5 In applying these principles, consideration should be given to when it is necessary to do something different from general requirements, to address a railway specific issue; or where it is necessary to say something to prevent a potential barrier to interoperability.

6.6 Some current TSIs refer, in various ways, to the use of 'national rules' to indicate issues where there is no requirement to do something different to general requirements which may or may not be defined elsewhere. This is a mistake and should not be done in future TSIs, as it is potentially ambiguous; for each issue within its scope a TSI should either:

a) Define a technical requirement, where the issue needs to be harmonised

b) State that the issue is an open point, where the issue needs to be harmonised but there is no agreement as to what needs to be defined, or

c) Say nothing about the issue, which means that there is no requirement at European level (and Member States may not impose mandatory requirements at national level) because a requirement addressing that parameter is not necessary to meet the essential requirements and Member States may not restrict or prohibit subsystems (or interoperability constituents) that meet the essential requirements.

6.7 Items which should not be covered by a TSI but left to be addressed in safety management systems include those things for which there is no need for a single, universal railway specific answer (eg, the design of bridge columns or earth embankments) or no need for harmonisation.

6.8 In order to test whether something should be left to safety management systems, it may help to draw a parallel with other shared systems such as road, sea or air transport or power and water supply systems. Imagine the safety and efficiency of a road system that relied upon a process of
cooperation at junctions; deciding who goes first is clearly something that must be covered by rules of the road. Similarly, rather than requiring a risk assessment from each washing machine buyer integrating a washing machine into the power and water supply and sewage systems, it is significantly more efficient to establish interface specifications defining form, fit and function of the connections and the compatibility requirements for voltage, current, pressure etc.

6.9 Consideration should be given to stating in the Report of Presentation how it was expected an essential requirement would be delivered, if it was not explicitly covered by the TSI. This would usually be by compliance with existing, more general, legislation (eg, the Construction Products Directive for fire resistance of materials used in station buildings).

6.10 TSIs are, by definition, required to address compliance with the essential requirements. If the definition of the essential requirements needs clarifying in light of the development of the TSIs, then we should promote such amendments in future revisions of the Interoperability Directive. In the meantime, it is necessary to work within the limits of the current directive.

7 Language

7.1 The precise use of language is important in any specification. It is perhaps even more important in TSIs, which are developed in English and then translated into the other languages of the European Union. Clear and consistent language will reduce the ambiguity in the drafted TSI, leading to a document which is easier to understand and easier to translate as a result.

7.2 It is most important to remember that although the TSIs are written in English 95% of the readers will not be native English speakers.

7.3 The TSIs are European documents and, European English (just like American or Australian English) is not exactly the same as UK English. In particular it contains some words and meanings derived from French. Note that:

a) Some European words do not exist in English; few native English speakers recognise the word *beamer* (a digital projector)

b) Some words have different meanings in different versions of English and should thus be avoided. For example, *competence* nearly always means ‘the authority to decide’ rather than ‘possessing the appropriate knowledge and skills’. Thus, the Members of the Railways Interoperability and Safety Committee are ‘competent’ to approve TSIs even though they have no competence in the technical content. They are therefore simultaneously competent and incompetent.

c) The European English vocabulary is much smaller than UK English.
The following general steps can contribute significantly to delivering clarity of meaning and understanding:

a) Keep the vocabulary simple (use common words).

b) Avoid nuances and subtleties; 95% of the readers will not recognise them and they will not be translated correctly.

c) Remember other languages often have a different word order. Avoid long sentences with references forward and backwards. Convey one idea in one sentence.

d) Avoid using words with multiple meanings, particularly in sentences where the meaning can only be discerned from the context.

e) Avoid using words that have different meanings in UK and European English (eg, use EN rather than ‘standard’).

f) Remember the audience: do not try to force UK English into documents (imagine insisting that Americans use pavement or footpath instead of sidewalk). Instead use words that have a common and widespread meaning.

Below are some specific examples of ways in which the language used in the TSIs can be improved:

a) Avoid the use of the word and to join two distinctly separate ideas. In writing a TSI, it is almost always the case that where the word and appears the sentence should be split into two different sentences, each one containing a single concept.

b) Consistency in the use of certain terminology. In particular, TSI requirements should always use the word shall, and never use should, must, may or will. The meaning of the words should or may, for example, varies enormously depending on the context.

c) Avoid the use of terms which are ambiguous to either European or native English speakers, as this may result in confusion as to what is actually required. For example, the word new can mean either unused or novel depending on the context, so new should not be used.

d) Where different countries use different terms for the same piece of equipment, dedicated effort may be needed to deliver a common understanding of the various terms and to agree which ones to use prior to trying to write the TSI.

e) The working party should think carefully about how individual clauses will be translated, perhaps making use of members of the working party who are able to speak other European languages. The key question is ‘will the translated text mean the same thing or can the meaning be changed by the act of translation?’ A good test is to translate into French or German and then back to English; if the meaning is still clear on re-translation the text is robust.
f) Where interfaces between two or more subsystems are being discussed, be clear that the two groups have the same understanding of how words or specific terms are used, such as ‘limit value’, ‘tolerance’, ‘design value’ and ‘installation value’. For example, rolling stock engineers and civil engineers or energy engineers do not treat these words in the same manner. Similarly, be sure that the concepts being discussed are commonly understood. Labelled diagrams are enormously helpful in this context.

7.6 Guidance related to the use of specific terms where it is felt that clarity in their usage would significantly improve the content of the TSIs and their legibility is provided in Table 1 below.

**Table 1: Guidance on the use of terminology in TSIs.**

<table>
<thead>
<tr>
<th>Specific term</th>
<th>Guidance on how each term should be used in TSIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shall</td>
<td>The verb <em>shall</em> is the only equivalent term that should be used in writing mandatory requirements in Chapters 4, 5, 6 or 7 of a TSI.</td>
</tr>
<tr>
<td>Must</td>
<td>Each of these terms tended to be used in drafting the first set of TSIs to indicate a requirement, but there are too many alternative meanings to these words to be clear whether something is a requirement or not. As a result, none of these terms should be used in expressing any requirement in Chapters 4, 5, 6 or 7 of a TSI. Only the term <em>shall</em> should be used for this purpose.</td>
</tr>
<tr>
<td>Will</td>
<td></td>
</tr>
<tr>
<td>Could</td>
<td></td>
</tr>
<tr>
<td>Would</td>
<td></td>
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<td>Might</td>
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<tr>
<td>Should</td>
<td></td>
</tr>
<tr>
<td>Can</td>
<td></td>
</tr>
<tr>
<td>May</td>
<td></td>
</tr>
<tr>
<td>Need</td>
<td><em>Need</em> has sometimes been used to indicate a mandatory requirement instead of <em>shall</em> but it is not sufficiently clear that it places a requirement on the user. Use <em>shall</em> instead, when expressing a requirement in Chapters 4, 5, 6 or 7 of a TSI.</td>
</tr>
<tr>
<td>Are</td>
<td><em>Are</em> has sometimes been used when TSI authors are trying to say that it is a requirement to do something. However, this is unclear and open to mis-interpretation. Use <em>shall</em> instead, when expressing a requirement in Chapters 4, 5, 6 or 7 of a TSI.</td>
</tr>
<tr>
<td>Until</td>
<td><em>Until</em> is sometimes used, incorrectly, by non-native English speakers to mean <em>since</em>, which then makes the subsequent translation activities more difficult and prone to error.</td>
</tr>
<tr>
<td>Have</td>
<td><em>Have</em> has sometimes been used to indicate a mandatory requirement instead of <em>shall</em> but it is not sufficiently clear that it places a requirement on the user. Use <em>shall</em> instead, when expressing a requirement in Chapters 4, 5, 6 or 7 of a TSI.</td>
</tr>
<tr>
<td>Specific term</td>
<td>Guidance on how each term should be used in TSIs</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------------------</td>
</tr>
</tbody>
</table>
| Interoperability | There are at least five meanings of the word *interoperability*:  
1) That which is delivered by the Interoperability Directive:  
a) Common (Safety) Acceptance procedure  
b) Common Standards – TSIs delivering  
i) Market opening  
ii) International Operation  
iii) Interoperability  
c) Registers  
2) The meaning of 1a)iii) above as defined in the Directive  
3) Conformity with all TSIs  
4) Conformity with a particular TSI  
5) Interworking across borders (however expensively!), for example:  
a) Multi system locos  
b) Specifying common interfaces capable of working with different infrastructure systems (eg ERTMS)  
As a result of these different meanings, the term *interoperability* should be used sparingly in a TSI and, ideally, should not be used at all (other than in referring to an *interoperability constituent*). |
<p>| Interoperable | <em>Interoperable</em> is not defined anywhere. It tends to be used when the author really means <em>TSI conforming</em>. However, until a line is TSI conforming in all respects it cannot be considered interoperable, and similarly for vehicles. Due to a lack of any consistent definition, <em>interoperable</em> should not be used in a TSI. |
| Adjudicating entity | This term appeared in the first round of the HS TSIs and was taken out during the subsequent revision of most of them (but perhaps not all?). The term <em>Contracting Entity</em> is now used in its place. |
| Guaranteed | It is not possible for anything to be <em>guaranteed</em> in the strict legal sense (and the TSIs effectively have the force of law). A possible alternative is <em>assure</em> depending on the context, but efforts should normally be made to re-word any clauses which use the terms <em>guarantee</em>, <em>ensure</em> or <em>assure</em> so as to eliminate the need for such a term in the first place. |
| Prove | The term <em>prove</em> has a specific sense and may be overly prescriptive; replacing it with <em>demonstrate</em> (with any suitable rewording of the clause) allows a variety of methods to be used and is generally preferred. |
| Reference is made | This phrase is sometimes used to state a mandatory reference to a clause. However, it should not be used at all, as it is not sufficiently instructive to the user of the TSI. |
| Defined | <em>Defined</em> is sometimes used, incorrectly, in place of <em>stated</em>, eg, ‘XXXX is defined in the infrastructure register’. |</p>
<table>
<thead>
<tr>
<th>Specific term</th>
<th>Guidance on how each term should be used in TSIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal / principle</td>
<td><em>Principal</em> and <em>principle</em> are often confused but have no meanings in common. <em>Principle</em> is a noun and usually refers to a rule or standard. <em>Principal</em> is both a noun and an adjective. As a noun, it has specialised meanings in law and finance, but in general usage it refers to a person who holds a high position or plays an important role (eg, a meeting among all the principals in the transaction). As an adjective it has the sense of ‘chief’ or ‘leading’ (eg, The coach’s principal concern is the goalkeeper’s health).</td>
</tr>
<tr>
<td>Their/There</td>
<td><em>Their</em> and <em>there</em> are pronounced the same but have different meanings: <em>There</em> is used as an introductory subject in sentences with ‘There is’ and ‘There are’. It is also used as an adverb of place meaning ‘in that place’ (eg, ‘There are many people in that room.’ or ‘That's my house over there.’) <em>Their</em> is the possessive pronoun form. This form is used to express that ‘they’ have a specific quality, or that something belongs to ‘them’ (eg, ‘Their house is in Los Angeles.’ or ‘He liked their looks.’)</td>
</tr>
<tr>
<td>Capitalisation of ‘infrastructure manager’</td>
<td>The term <em>infrastructure manager</em> should not be capitilised, as there is no one ‘Infrastructure Manager’, there are many infrastructure managers.</td>
</tr>
<tr>
<td>Capitalisation of ‘railway undertaking’</td>
<td>The term <em>railway undertaking</em> should not be capitilised, as there is no one ‘Railway Undertaking’, there are many railway undertakings.</td>
</tr>
</tbody>
</table>

7.7 In addition to the use of specific terms, the issue of correct clause numbering and cross-referencing is central to developing a well-structured and well-written TSI. Some of the ERA Project Officers are more adept than others at ensuring that internal references to clause numbers in the same document are maintained as drafting progresses, often depending on their knowledge of the use of Word as a software package. This highlights the need for robust quality checking of the document before it is signed off.

8 Cultural challenges in drafting a TSI

8.1 Each member of a working party will have their own professional background and culture based on the national railway or specialist technical field with which they are most familiar and the type of expertise that they possess. This brings challenges to the work of the working party in trying to develop a single target subsystem to be defined in a TSI because:

a) ‘Experts’ may typically advocate more of whatever their area of expertise is or that ‘my way is best’, because that is what they are familiar with

b) Working party members may not fully understand how the existing systems in various national railways work to deliver a safe railway (because the design was implemented many years previously) but they know that they do

c) Not very many railway technical experts are knowledgeable about financial or other evaluation techniques, hence may lack a common
analytical language to use to determine what the target subsystem should be and struggle to respond to questionnaires in this area.

8.2 The result of the above issues, all of which are entirely normal and understandable, is that ‘expert judgement’ generally prevails for decision making leading to a TSI which can be extremely conservative and does not deliver the cost reductions which should come from a single system in use across the European railway sector.

8.3 Experience has also shown that the biggest cultural barriers tend to exist not so much between nations or sectors of industry (ie, infrastructure managers, railway undertakings, suppliers, regulators) but between specialisms of expertise (eg, operations, rolling stock, signalling, safety) and these groups of experts tend to work in isolation from each other. Unfortunately, almost every organisation (including ERA) is organised along these functional lines.

8.4 A significant challenge is, therefore, how to move to transparency and predictability in the content of the TSIs and the proceedings of the ERA working parties. The key is to try to get everyone involved in writing the TSIs to recognise that the TSIs are all about managing a shared system across all nations and functional specialisms. Therefore, different national or functional solutions or interpretations will not work either efficiently or effectively, and nor will project-based system specifications.

8.5 The economic evaluation process should be used to inform the decisions that are taken about both the selection of basic parameters and then the manner in which they are defined in the TSIs (including the implementation arrangements in chapter seven). Ideally, the economic evaluation would enable evidence-based decisions to be taken regarding the TSI content, which can help to address the cultural challenges described in 8.1. In practice, this has not happened very effectively due to the absence of a meaningful economic evaluation (partly as a result of a lack of data).

8.6 TSIs are often published and found to contain errors when applied. There are several potential reasons for this:

a) There appears to be no peer review of the TSI by ERA prior to publication

b) There does not appear to be sufficient cross-checking of references to other TSIs

c) Any review will never identify all the errors compared to when a project tries to apply the TSI in detail.

8.7 The above are compounded by the fact that TSIs are developed to very compressed timescales compared to other standards such as ENs.

8.8 Ongoing review of the TSI draft text is the responsibility of the working party members and their mirror groups in their own Member States and it is important to bring as many different points of view as possible to the examination of the draft TSIs to maximise the likelihood of errors being identified prior to publication.
9 Economic evaluation

9.1 Each member of a working party or a sector organisation mirror group will have their own views on what should be included in the TSI they are working on. One of the mechanisms available to address these differing perspectives and to introduce some evidence into the decision taking process is through the economic evaluation of the TSI.

9.2 The directive requires that the economic evaluation be performed in two stages, in support of the TSI drafting process, as set out in Article 6 (underlining added):

3. Each draft TSI shall be drawn up in two stages.
   - Firstly, the Agency shall identify the basic parameters for the TSI as well as the interfaces with the other subsystems and any other specific cases that may be necessary. The most viable alternative solutions accompanied by technical and economic justification shall be put forward for each of these parameters and interfaces.
   - Secondly, the Agency shall draw up the draft TSI on the basis of these basic parameters. Where appropriate, the Agency shall take account of technical progress, of standardisation work already carried out, of working parties already in place and of acknowledged research work. An overall assessment of the estimated costs and benefits of the implementation of the TSIs shall be attached to the draft TSI; this assessment shall indicate the likely impact for all the operators and economic agents involved.

4. The drafting, adoption and review of each TSI (including the basic parameters) shall take account of the estimated costs and benefits of all the technical solutions considered, together with the interfaces between them, so as to establish and implement the most viable solutions. The Member States shall participate in this assessment by providing the requisite data.

9.3 Unfortunately, with the exception of the economic evaluation for the Safety in Railway Tunnels TSI, the aspirations of the directive in this area have never been realised and the economic evaluation has played little or no part in influencing decision taking with regards to the content of the TSI. The selection of basic parameters phase has been particularly prone to a complete lack of meaningful evaluation.

9.4 The responsibility for the economic evaluation of a TSI rests with the working party producing that TSI, with support provided by the ERA staff. A key role for each member of the working party is to review the economic evaluation and question the methodologies or conclusions being reached where these do not appear logical. At a domestic level, there is also a role in encouraging industry colleagues to provide the necessary data when requested by ERA so that the economic evaluations can be meaningful and have a sound foundation.
9.5 RSSB has established a subgroup of ISCC which looks at the economic evaluation work undertaken by ERA and can provide advice and assistance with reviewing the economic evaluations as they evolve.

9.6 Where the UK is seeking the inclusion of a specific case in a TSI, then this must be supported by a comprehensive economic evaluation if it is to be acceptable to ERA. RSSB is able to provide the necessary technical support to the preparation of such evaluations and the UK has been praised by ERA for the quality of the specific case applications which have been submitted in recent years.

10 Overview of the structure of a TSI

10.1 Article 5 of the Interoperability Directive describes the general content which shall be covered by the TSIs. This has, in turn, led to the establishment of a model structure for each TSI, as defined in 01/16-DV03 Model structure for the drafting of a Technical Specification for Interoperability.

10.2 Within the model structure, each chapter of a TSI is written for a different purpose and a different audience, as described in Table 2. Sections 11 to 17 set out further information relevant to each chapter of a TSI.

Table 2: The structure of a TSI.

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Purpose and audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>Briefly outlines the technical and geographic scope of the TSI, together with the content of the rest of the document.</td>
</tr>
<tr>
<td>2</td>
<td>Definition of subsystem/scope</td>
<td>Describes in detail the intended geographic and technical scope of the TSI.</td>
</tr>
<tr>
<td>3</td>
<td>Essential requirements</td>
<td>Informative chapter which duplicates the essential requirements from the Directive and identifies how they are addressed by the TSI. Does not contain any mandatory requirements.</td>
</tr>
<tr>
<td>4</td>
<td>Characterisation of the subsystem</td>
<td>Defines the mandatory requirements for the subsystem which must be complied with by contracting entities.</td>
</tr>
<tr>
<td>5</td>
<td>Interoperability constituents</td>
<td>Defines the mandatory requirements for any interoperability constituents which must be complied with by manufacturers or their agents (includes IM/RU)</td>
</tr>
<tr>
<td>6</td>
<td>Assessment of conformity and/or suitability for use of the constituents and verification of the subsystems</td>
<td>Defines the process for conformity assessment, not what is done. Primarily written for the Notified Bodies, although also of interest to contracting entities and manufacturers or their agents.</td>
</tr>
<tr>
<td>7</td>
<td>Implementation</td>
<td>Defines the specific cases and implementation plan for the TSI and is aimed at both Member States and contracting entities.</td>
</tr>
</tbody>
</table>
11 TSI chapter one – Introduction

11.1 The introduction to each TSI should be kept brief and to the point, as otherwise it will only end up duplicating text from other parts of the document. 01/16-DV03\(^1\) sets out a suitable volume of text for inclusion in chapter one of a TSI.

12 TSI chapter two – Definition of subsystem/scope

12.1 Chapter two of a TSI needs to describe in detail the technical and the geographic scope to which the TSI applies. This chapter should be one of the first to be written during the drafting process, as agreement on the scope will provide an essential framework within which the technical content of the TSI can then be developed.

12.2 For the technical scope, the issues to be addressed include which subsystem(s) or part of a subsystem is covered by the TSI. As noted in paragraph 5.2.1, a TSI, particularly the first version of a TSI for a given subsystem, does not need to apply to absolutely everything for a given subsystem.

12.3 The question of the geographical scope to which a TSI applies is crucial under 2008/57/EC. Is the TSI describing basic parameters which only apply to the trans-European network (the TEN), or has the application of some/all technical requirements to the non-TEN routes been shown to be beneficial by a supporting economic evaluation? Whatever the answer, this needs to be very clearly described in this chapter of the TSI.

13 TSI chapter three – Essential requirements

13.1 The model structure for a TSI states that chapter three of the TSI reproduces the essential requirements which are to be addressed by the TSI from the Interoperability Directive. This appears to be of little real benefit and often leads to confusion with users of the TSIs who occasionally try to apply the requirements of chapter three directly.

13.2 In addition to reproducing the essential requirements, this chapter also includes details of how they are addressed by the content of the TSI. This is typically achieved through the use of a relatively high-level mapping exercise between the essential requirements of safety, reliability and availability, technical compatibility, environmental protection and health and the content of chapter four (and the specific cases from chapter seven), although this has not been done consistently across all of the published TSIs.

\(^1\) DV03 was written in 2002 and would benefit from revision in light of the lessons learned from the past seven years of TSI drafting, particularly with the freight wagons TSI, but it is still applicable in its current form to most TSIs without significant difficulty.
13.3 At no point should chapter three define any mandatory requirements. This chapter is for information only.

13.4 Ultimately, it would be preferable for the content of chapter three of the TSI to be addressed by the Report of Presentation rather than the TSI itself, because it is not needed as part of the design or conformity assessment process involved in applying a TSI. However, unless or until the model structure is amended, this chapter must remain.

14 TSI chapter four – Characterisation of the subsystem

14.1 The role of ‘basic parameters’

14.1.1 ‘Basic parameters’ are the building blocks of the TSIs – essentially, the things that need to be specified to allow subsystems to work together safely and economically. Generally, if a requirement for one subsystem requires a corresponding requirement in another subsystem, then it is a basic parameter that should be specified in the TSIs (the classic example being the distance between wheels and the corresponding distance between rails).

14.1.2 A useful way of thinking about this is that the TSI should define all of those parameters of the railway system that need to be the same, that is, that involve more than one party to agree what the requirements are. Beyond that, everything else is managed by individual parties through their respective safety management systems.

14.1.3 In some instances, it is beneficial for a TSI to define requirements which do not relate to managing interfaces but which establish what is ‘mutually acceptable’ between Member States. This essentially relates to rolling stock and anything which is attached to it where such requirements are necessary to establish a ‘level playing field’ in the market, or to prevent Member States imposing additional requirements that could form a barrier to the free movement of TSI-compliant rolling stock from one Member State to another. Examples include the requirements for interior crashworthiness and the fire resistance of on-board materials. Basically, if a national safety authority could say ‘no’ regarding a particular parameter, then it is an issue that should be addressed in the TSI. Such basic parameters that go beyond the management of interfaces should be carefully examined to determine that there is a realisable benefit from their inclusion, which should be explicitly reflected in the economic evaluation.

14.1.4 It is useful to recognise that often a specification is required simply to document an agreed, but arbitrary (often historically determined) value, where a designer is not free to choose. For example, 1435 mm track gauge was arbitrary (it could equally have been 1453 mm) or ‘red means stop’ (it could have been orange). However, having agreed to these values, they must be applied consistently by all parties if the railway system is to function.

14.1.5 Requirements for the different subsystems are specified in different TSIs, and conformity with these requirements must be able to be assessed independently of the other subsystems. The interfaces need to be clearly
defined, particularly for interoperability constituent boundaries where the ability to integrate these constituents into a safe and working railway must be considered.

14.2 The content of TSIs should be ‘railway specific’

14.2.1 ‘Railway specific’ means that the TSIs should only define requirements where it is known that more general requirements do not apply or are not appropriate, and the railway has unique features not covered by the applicable general requirements related to the provision of a transport service. The TSIs are developed under railway specific legislation and it is therefore inappropriate for them to regulate non-railway specific things.

14.2.2 For the TSIs, the test of what is ‘railway specific’ can be related back to Annexes II and III of the Interoperability Directive 2008/57/EC which define the subsystems and the essential requirements, respectively. If a basic parameter cannot be directly related to the definition of the subsystem and meeting the essential requirements, then it must not be included in a TSI.

14.2.3 It is important that TSIs do not result in the position where two sets of potentially conflicting requirements could apply to any element of the railway system. This is particularly true for those essentially non-railway specific elements of infrastructure such as at stations (with the obvious exception of the platform-train interface) where any basic parameters should be subject to careful scrutiny and economic evaluation to determine whether there is a legitimate need for their inclusion in a TSI. Remember, the purpose of the TSIs is to reduce the cost base of the railway; if a basic parameter does not contribute to delivering this, it should not be included in the TSI.

14.2.4 In practice, it is sometimes difficult to say where the non-railway specific elements of a station end and the outside world begins – for example, where a station is integrated into an airport. While the boundaries could be established on a contractual basis for the purposes of managing the station, as with power supplies, maintenance requirements, etc, there may still remain difficulties in interpreting requirements in a TSI which effectively have the force of law. In such circumstances, it would be better to exclude such requirements from the TSI rather than introducing unnecessary cost burdens on the railway as a result of difficult or complex conformity assessment requirements.

14.3 TSIs define a ‘harmonised’ set of requirements

14.3.1 TSIs define ‘harmonised’ requirements rather than ‘minimum’ requirements, although the situation differs slightly for each subsystem. Some general comments are included in the following paragraphs.

14.3.2 For vehicles (RST, onboard CCS and ENE), the TSI requirements must be harmonised requirements, not minimum requirements that the Member State can add to in order to define what all vehicles must have, or the presence or absence of these additional requirements could be used by other Member States as a barrier to the movement of these vehicles. Note that this does not
restrict individual Member States from requiring special features on vehicles that are to be used on a functionally separate network or for strictly local use (e.g., an oversized and extremely heavy freight line) but they cannot expect such vehicles to be automatically accepted for use elsewhere.

14.3.3 For **INF and trackside CCS**, the requirements can be minimum requirements – that is, the minimum required to allow TSI-conforming rolling stock to operate at their intended level of performance. In the case of INF, the Member State could, if it so wished (though it should not need to), impose additional requirements provided these did not inhibit the operation of TSI-conforming RST. For example, the SRT TSI permits additional infrastructure requirements for safety in rail tunnels to be imposed. A railway line could be developed for particularly heavy freight vehicles requiring measures beyond what is in the INF TSI, which is perfectly acceptable, provided that line is still compatible with TSI-compliant RST (unless it is functionally separate from the rest of the European rail network).

14.3.4 For **trackside ENE**, the TSI can only define harmonised requirements up to a point because the system which is actually built will vary depending on the intended use of a particular route. The interface with the vehicle (i.e., the position of the wire) will be within the TSI bounds, but the capability of the system will depend on whether the route is to be used by, for example, two small passenger vehicles or ten heavy freight trains per hour.

14.4 **TSIs requirements for design and in-service limits**

14.4.1 TSI requirements typically relate to design limits because they are concerned with the bringing into service of subsystems.

14.4.2 However, to manage continuing compatibility between subsystems, some in-service limits need to be specified. For example, the design limit for track twist is usually taken as 1:400, but specifying an in-service limit of (expressed simplistically) 1:90 is more important as this more directly relates to the track that vehicles will run over for the majority of the time.

14.4.3 The TSIs should not specify how the in-service limit should be delivered. It should not say, for example, how or how often the track is inspected in order to maintain compliance with the in-service twist limit.

14.5 **TSIs and the competence of people applying the TSIs**

14.5.1 TSIs should (and can) only be written on the basis that the people applying them are competent to do so, and are honest and wish to comply with their obligations. The TSIs should never say anything about the competence of the people applying the TSIs.

14.5.2 TSIs, like other standards, are not design manuals, and it is perfectly possible to build a standards-compliant asset that performs very badly and does not deliver the client’s expectations. Compliance with standards does not and cannot substitute for competent design.
14.5.3 Note that in some circumstances, it is entirely appropriate for a TSI to specify competence requirements that must be met before any individual could fulfil an identified operational role (eg, signaller or train driver) but this is a different issue from the competence of the people applying the TSIs.

14.6 How do I know if a particular issue should be included in a TSI?

14.6.1 If we consider that the TSI must deliver interoperability (safe and uninterrupted movement of trains) and the essential requirement of safety a good test for should something be in or out of a TSI is to ask ‘Has a national safety authority grounds to say ‘no’ on this issue?’ If the national safety authority can say ‘no’ then the issue should be covered by the TSI. If the national safety authority cannot say ‘no’ then a second test can be applied – does covering this issue by a mandatory specification contribute to the objectives (eg. because it delivers the optimal level of harmonisation to deliver maximum economic benefit)?

14.6.2 In order to determine whether a particular issue, ‘X’, should be positively included in a TSI it may be helpful for the working party to ask whether each member of the working party has a rule about ‘X’ in their Member State. If the answer is yes, and those different rules are generally covering the same thing, then the fact that a majority of Member States have developed a national rule on ‘X’ might suggest that it is reasonable thing to include in a TSI. However, where those different rules are each very different in content, this may suggest that it does not matter how the issue is addressed in each Member State and that it does not need to be covered by the TSI.

14.6.3 Where there is existing European legislation this may be a reason for excluding an issue from a TSI unless there is a clear need to specify a railway-specific requirement.

14.6.4 Specific questions which the working party could ask to aid the discussion about particular issues include:

a) Does the issue map directly to the scope of the subsystem and the essential requirements?

b) What are the benefits of any harmonised ‘specifications’? What are the technical ‘must haves’ to achieve compatibility through harmonisation?

c) Does the issue relate to an interface?

d) Is the issue one where the lack of a harmonised requirement would lead to national safety authorities demanding unique solutions in each Member State and, potentially, using this as a barrier to the free movement of vehicles?
14.7 The role of ‘open points’

14.7.1 The Interoperability Directive article 5(6) states:  
*If certain technical aspects corresponding to the essential requirements cannot be explicitly covered in a TSI, they shall be clearly identified in an annex to the TSI as open points. Article 17(3) shall apply to these aspects.*

14.7.2 An open point should be declared when the working party agrees that a particular basic parameter is within scope of the TSI and should be covered, but where it is not possible to agree what the technical specification for that basic parameter should be. This may be because there is significant variability in existing European practice and there is insufficient time within the TSI drafting programme to determine what the appropriate target specification is, or because research is needed to gather additional information to inform the development of the technical specification.

14.7.3 Where a basic parameter is unable to be specified at a European level, it will normally need to be addressed at a Member State level through the notification of national technical rules in accordance with article 17(3), in order that the subsequent assets authorised against the TSI will deliver the essential requirements. This is not an issue for the TSI working party directly, although it is an issue for ERA in their cross acceptance work. These notified national technical rules may also be useful in informing the subsequent revision of the TSI regarding how each open point may be closed.

14.7.4 All of the open points should be clearly identified in the relevant part of Chapter 4, 5, 6 or 7 of the TSI, as well as in an Annex to the TSI. Unfortunately, the quality checking of the TSI in the past has not been adequate and there have been discrepancies between the open points in the body of the document and those listed in the Annex. This is important because a strict interpretation of article 5(6) would suggest that if an open point exists in the body of the TSI but is not listed in the annex then that open point has no status, article 17(3) does not apply and no national technical rules need be notified.

14.7.5 For each declared open point, the Report of Presentation should provide a detailed description of the nature of the open point and of the views of the working party as to what will need to be done in order to close the open point. This information will be useful to the working party which produces the subsequent revision to the TSI, as well as to the Member States in identifying the appropriate national technical rules to be notified to close the open point in the meantime.

14.8 Features that need to be recorded about your assets (in a register)

14.8.1 The role of the Register of Infrastructure (previously referred to as the Infrastructure Register) or the Vehicle Type Register (previously referred to as the Rolling Stock Register) has varied considerably over the years since TSIs first started being written. These registers are also the subject of a significant level of debate at a European level at the present time. Until there
is some clarity and an agreement as to the purpose of these registers, it is not possible to provide guidance on this subject. This issue will be addressed in a subsequent version of this guidance.

14.9 Referencing Euronorms in TSIs

14.9.1 This issue is covered in detail in 96/48-DV37 Reference to Standards and Other Directives in the TSIs (Technical Specifications For Interoperability) Under Directives 96/48/EC and 01/16/EC.

14.9.2 The key idea is that unless absolutely necessary a TSI should not directly refer to a specific EN, UIC leaflet or other document because, once the TSI is published, that document effectively forms part of the TSI and has the same force. It also means that if the EN is subsequently amended then the new version cannot be used with the TSI until such time as the TSI is amended and the reference changed. Any need to reference specific ENs should be left to the Application Guide accompanying each TSI, rather than being put in the TSI itself.

14.9.3 In other words, an EN is either a part of the TSI by being directly referenced and thus made mandatory or it is one ‘voluntary’ way of achieving and demonstrating conformity, in which case it should be mentioned in the Application Guide as a harmonised EN and not mentioned in the TSI. The latter approach is preferable in almost all circumstances.

14.9.4 However, if it is decided that a specific EN needs to be referred to in a TSI (for example, to avoid repeating a large volume of technical detail in the TSI itself), the TSI should refer to relevant specific clauses within the EN, and not to the EN as a whole. This is to avoid inadvertently making the informative parts of the EN mandatory.

14.9.5 For example, rather than say ‘Traction and braking forces shall be taken into account in the design of structures as set out in EN 1991-2:2003’, reference the required clauses: ‘Traction and braking forces shall be taken into account in the design of structures as set out in EN 1991-2:2003 paragraphs 6.5.3 (2)P, (4), (5) and (6)’ (Example taken from the draft Conventional Rail Infrastructure TSI, version 4.0). Another example of good practice (from the draft Conventional Rail Locomotive and Passenger Vehicles TSI, version 4.0) is ‘The luminous intensity of marker lamps shall be in accordance with EN 15153-1:2007, clause 5.4.4’.

14.9.6 A TSI should never refer to an EN that is still being drafted, known as a prEN, because that document is unlikely to contain stable text, hence the requirements may change to something other than that which the TSI drafters intended. Additionally the legal reference would be to the prEN, so the subsequently published EN would have no standing in reference to the TSI.

14.9.7 In general, a TSI should specify what must be achieved but not how it is to be achieved in order that, if there is more than one way of doing something, the TSI does not unnecessarily restrict the available options. In other words, the
TSI should contain the necessary functional requirements and interface specifications for each subject but should not specify the technical solution. A EN could then be produced to define a particular way of meeting the requirements that can (but not must) deliver the TSI specification and be conferred a presumption of conformity with the TSI specification. This enables innovative solutions to be implemented to deliver the requirements of the TSI, which may not be possible if the TSI also specified the ‘how’.

15  TSI chapter five – Interoperability constituents

15.1 The way in which interoperability constituents should be defined and used is currently the subject of a significant level of debate at a European level. Until there is some clarity and an agreement regarding these issues it is not possible to provide guidance on this subject. Interoperability constituents will be addressed in a subsequent version of this guidance.

16  TSI chapter six – Assessment of conformity and/or suitability for use of the constituents and verification of the subsystems

16.1 Chapter six defines the rules by which a particular subsystem or interoperability constituent will be assessed in order to determine that it conforms to the relevant requirements of chapter 4 or chapter 5 of the TSI respectively and thus delivers the essential requirements. Chapter six is therefore divided into two parts: one for the subsystem and one for interoperability constituents.

16.2 A range of pre-defined generic ‘modules of conformity’ exist and the task of the working party is to select the assessment procedures and modules which are appropriate to the assessment of the subsystem or the interoperability constituents defined in their TSI. In every case, the TSI must allow a choice between at least two modules, one module for manufacturers without a quality management system and one module for manufacturers with a quality management system.

16.3 For the conformity assessment process to work efficiently and cost effectively, it must be possible to complete the conformity assessment process for a particular subsystem independently of the other subsystems. However, this is not always easy to achieve in practice. For example, the relationship between the pantograph and the overhead line is not yet clear; currently a new pantograph must be tested on a TSI compliant overhead line and new overhead line must be tested on a TSI compliant pantograph! It is not yet clear how this ‘chicken and egg’ situation can be overcome in practice.

16.4 Sometimes it is not possible to directly specify requirements. In this case the independence of assessment can be most economically achieved by testing against a ‘reference’ (eg, by checking a piece of infrastructure for compatibility against a reference train it will be established that it is compatible against all trains).
16.5 In addition, for each interoperability constituent, it is necessary for the working party to determine whether that constituent should be subject to an assessment of conformity against the requirements of chapter five, or an assessment of conformity and a declaration of suitability for use. Note that it is not possible to require only a declaration of suitability for use. Module V (requiring a declaration of suitability for use) should be used if:

a) The constituent is critical to the safety or availability of the subsystem

b) The performance of the constituent has a large financial impact on the subsystem

c) The constituent is a new design, is in some way novel, or is used in a new fields of application (although these conditions have not been precisely defined at a European level)

d) The constituent cannot be assessed independently of the subsystem.

16.6 Working party members need to familiarise themselves with the detailed content of the various modules before trying to determine which modules should be identified in the TSI. There is a cost to the rail industry associated with the conformity assessment process, a cost which could increase significantly if an inappropriate or unnecessary module were applied in a particular TSI.

16.7 The assessment modules are generic and are intended to be suitable for application to any industry, not just railways. As a result, it will often be necessary to specify the conditions in which the modules should be used. For example, module V related to the assessment of suitability for use of an interoperability constituent involves in-service testing and it may be necessary to define the railway-specific parameters within which this testing is to take place (the number of operating hours, etc).

16.8 ERA has a conformity assessment group which should be consulted for advice on specific issues where the working party is unsure about the application of a particular module.


17 TSI chapter seven – Implementation

17.1 Chapter seven of each TSI is intended to define the implementation strategy for that TSI. Occasionally, such as in the CCS TSIs, chapter seven requires the development and notification of national implementation plans which set out how the new technology is to be ‘rolled out’ in each Member State. However, for the majority of TSIs, the purpose of chapter seven is to define:

a) Application of the TSI to new lines/rolling stock
b) Application of the TSI to existing lines/rolling stock

c) What may constitute an upgrade and what a renewal

d) Specific cases

17.2 Occasionally, chapter seven may also describe time-related step changes in what is required (eg, in the Noise TSI) although this is not common.

17.3 In defining the application of the TSI to existing subsystems, it needs to be recognised that each subsystem (infrastructure, rolling stock, control command and signalling, energy, etc) is fundamentally different when it comes to upgrade and renewal. Some subsystems come in discrete packages, some have very predictable service lives, others are subject to continuous maintenance intervention and have indeterminate service lives. It is important to match the requirements of the Chapter seven implementation to the nature of the asset under consideration.

17.4 It will generally not be cost-effective or logical to require the TSI to be applied to small 'islands' of a network, particularly when considering the need to maintain compatibility with the existing network. As a result, there is a need to build in sensible and reasonable flexibility in chapter seven which allows decisions to be taken regarding what is reasonably practicable for specific upgrades and renewals.

17.5 The role of specific cases is particularly important when it comes to determining an appropriate implementation plan for the TSIs. A specific case is a special provision which is defined in chapter seven of a TSI that applies to a part of the railway system because of geographical, topographical or urban environment constraints; or to maintain compatibility with the existing system. A specific case may be either temporary or permanent.

17.6 A key role for the individuals from the British railway community who are involved, in some way, in the development of TSIs is to examine the proposed basic parameters in chapter four and to identify those parameters which would cause difficulty in GB, either because they would be impractical to conform to, or because conformity could be achieved but the cost would be in excess of the benefits delivered. Where such basic parameters are identified, the preferred option is to propose amendments to the chapter four requirements such that they no longer cause difficulty in GB.

17.7 However, there will be situations where the chapter four requirement is 'correct' for a pan-European standard but where alternative requirements are needed to suit the needs of the GB mainline railway (or other UK railways), particularly for upgrade or renewal. In such cases, it is necessary to develop a suitable specific case with supporting economic evaluation and to propose this to ERA. RSSB, ISCC and the Standards Committees can and do assist with the development of such specific cases, once the need has been identified.

17.8 In order for a specific case to be proposed, it must be based upon a genuine difference between GB and the rest of Europe that has serious economic or
compatibility consequences. A specific case should not be proposed simply 'because we do things differently' or 'know best' or 'we have always done it that way'. As a guide, remember that:

a) The specific case must refer to the 'target subsystem', that is, it will be necessary to produce a rationale for why it is not reasonably practicable to comply with the TSI in future new works, upgrades or renewals.

b) All GB specific cases to date have been the result of the long-term distinctive features of the GB network (primarily but not exclusively gauge), in respective of upgrades and renewals, but not new works.

c) A specific case should not be an opportunity for preferential engineering or 'bespoking' products for GB.

17.9 It is important to understand that as specific cases will need to be developed in parallel to the TSI text, there will need to be a significant degree of interaction between the two processes so that the proposed specific cases and the basic parameters in chapter four remain aligned. Draft specific cases may influence the way in which the basic parameters are expressed which may, in turn, determine the manner in which the specific case is expressed or whether the specific case is still required at all.

18 Summary list of reference documents for further reading

- 96/48-DV16 Guideline for drafting TSIs
- 96/48-DV37 Reference to Standards and Other Directives in the TSIs (Technical Specifications For Interoperability) Under Directives 96/48/EC and 01/16/EC
- 01/16-DV03 Model structure for the drafting of a Technical Specification for Interoperability.
- 01/16 DV05 Guidelines for drafting TSIs
- AEIF Coordination System Group (2004), The Scope and Content of Conventional TSIs, Issue 1
- European Regulation no 881/2004/EC establishing a European Railway Agency
- European Regulation no 1335/2008/EC which amends 881/2004/EC