



# **Strategic Direction for Safety in Railway Tunnels 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 Safety in Rail Tunnels (SRT) TSI and what GB aims to achieve with this TSI.

## **2 Background**

### **2.1 Responsibilities**

- This strategic direction has been developed by GB SRT Mirror Group and is intended for use by those within GB involved in the development of the SRT TSI.
- The GB SRT Mirror Group is a sub-group of both the Rolling Stock Standards committee and the Infrastructure Standards Committee who will receive reports of progress from time to time.

### **2.2 ERA mandate**

- ERA mandate C(2010)2576 of 29.4.2010 sets out the scope of the changes to the TSI. This strategic direction therefore covers the following technical areas:
  - Implications of an extension of scope off the TENs routes
  - Issues associated with splitting (or not) the requirements into the applicable sub-systems
  - Issues arising from the implementation of the published SRT TSI and technical progress, particularly recent Euronorm development
  - Closure of open points and the correction of errors
  - Integration of Technical Opinions given by the ERA

### **2.3 Key stages in the development of the TSI**

- The project commenced in May 2011 with an initial scope or areas to be addressed due by Autumn 2011. Working party meetings during the remainder of 2011 will develop the scope of the project and produce an initial revised draft.
- The preliminary report and the development of the Specific Cases will be addressed during the first two quarters of 2012 with the final draft in Q3 2012.
- The Final report and recommendations to the Commission are planned during Q2 2013.
- The GB SRT TSI Mirror Group will meet ahead of each planned ERA Working Party meeting.

## 2.4 Period of validity of the strategic direction

- 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 2012 if RISC has not voted by then.

## 3 Guidance for developing the TSI

### 3.1 Documents

- The following documents should be used by the GB Mirror Group members in developing the TSI:
  - a) A 'Guide for persons involved in the development of TSIs' [TSI Guidance](#) 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' [TSI Drafting Checklist](#) 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', [Technical checklist](#) 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

- 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'*.
- 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.
- The TSI should therefore be drafted on the assumption that the 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

- 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.'*
- 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.
- 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.
- As an example, a reference to an EN was necessary in the CR INF TSI: the capability requirements for structures are defined by a parameter called (misleadingly) 'Line Category'. EN 15528:2008 is referenced simply to define what a Line Category is, and the method of deriving it (a matter too detailed to be specified in the TSI). However, EN 15528:2008 was not referenced as a way of specifying the TSI requirement – it simply permits that requirement to be expressed unambiguously.

### 3.4 National rules

- 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 are common in TSIs drafted under AEIF but are not usually present in TSIs drafted under ERA.
- If the TSI intends to cover a point, but there is no agreed requirement, this should be identified as an open point.
- 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.
- The SRT TSI has a section (7.4) dealing with national, bilateral, multilateral or multinational agreements. In order to stimulate greater inter-operability, this strategic direction supports the incorporation of such agreements into the core requirements of the SRT TSI. The TSI should not allow for separate and 'hidden' agreements that are outside the scope of the Interoperability Directive.

## 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 build economic and cost effective rail tunnels.
- b) Achieve a specification that allows GB to procure economic and cost effective rolling stock.
- c) Produce a specification that delivers the essential requirements but is not too prescriptive
- d) Produce a specification that does not inhibit innovation
- e) Produce a specification that is aligned with the main structural sub-system TSIs
- f) Produce a specification that has a well structured relationship with the wider field of European standards and specifications
- g) Produce a standard that is fit for purpose within GB requirements and structure gauge
- 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(s) **x** to **y** below as the TSI is developed.

## 5 GB specific issues

### 5.1 List of different GB practices

- The SRT TSI categorises tunnels by their length; those less than 5km long, those up to 20km and those greater than 20km. The fire performance characteristics of rolling stock also vary according to tunnel length. Different and more onerous requirements apply to rolling stock operating through tunnels of greater than 5km in length. There are only two tunnels on the GB mainline network (Severn Tunnel and Trolley Tunnel) which are greater than 5km. However with the objective to procure 'go anywhere' rolling stock, this would place a requirement for all future rolling stock to meet the more onerous requirements. GB will seek to facilitate a more flexible approach in defining categorisation of long tunnels as is permitted in clauses 1.1.3.3 and 1.1.4, of the current TSI. It should be noted that the two tunnels on HS1 (North Downs - 3.2km and Thames - 2.5km) have been included in this analysis of existing GB tunnels. Further, under the current TSI, the Crossrail project is unlikely to have tunnels which fall within the definition of long tunnels as there are permitted exemptions in clauses 1.1.3.3 and 1.1.4. Tunnels on the Thameslink project and on Glasgow underground network may also benefit from the exemptions in clauses 1.1.3.3 and 1.1.4.
- In parallel with the revision of the SRT TSI, CEN/CENELEC is revising TS45545 to produce EN45545. This document consists of 7 parts and there is currently one GB concern relating to the testing of seats set out in EN45545-2. Evidence exists to show that the test in the EN is less onerous than the current GB requirements and concern exists that adopting the EN (or the TS) would result in a less safe situation. Until such time until EN45545-2 is satisfactorily resolved, the ability to continue to use 'National Rules' must be allowed to continue.
- The current draft of the SRT TSI (4.2.2.6.5) permits an alternative approach to full compliance with the TSI in respect of the means of escape from a tunnel, which matches the practice generally adopted in GB. This includes the need for consultation with the relevant fire authorities. The revised TSI currently requires the adequacy of any alternative approach to be demonstrated by application of the Common Safety Method (CSM). The CSM requires the adequacy of the alternative measures to be assessed by an Assessment Body (AsBo). There is no formal requirement for consultation with the Fire Authority under this approach which must be addressed.

## 5.2 Changes to GB practices

- In clause 4.2.2.8 of the current draft of the SRT TSI, the concept of 'Rescue stations' being a mandatory requirement for all tunnels > 1km in length has been introduced. For > 1 km, 'Rescue stations' are required adjacent to each portal. The terminology 'Rescue stations' is actually misleading, because it implies a purpose built 'station' but is actually intended as an 'appropriate stopping point for trains during an emergency', but with the addition of facilities such as access to safe areas, a water supply of 800l/min, switch facilities for traction power and access for emergency response teams. In GB, such facilities are only provided where necessary for specific projects.

## 5.3 Temporary specific cases

- The published SRT TSI contains no Specific Cases. However, it does provide for the use of bi-lateral agreements which could be interpreted as specific cases.
- Should EN45545 (or TS45545) be mandated without a change to the requirements applicable to seat performance, GB would seek to mandate a national technical rule on the grounds that the changes introduced in EN45545-2 (or TS45545) are not acceptable to GB. The recent EU and RSSB funded research has not been incorporated into the EN.

## 5.4 Permanent specific case

- The published SRT TSI contains no Specific Cases. However, it does provide for the use of bi-lateral agreements which could be interpreted as specific cases
- If no flexibility is provided within the SRT TSI regarding the 5km boundary, GB will seek a Specific Case to exclude rolling stock operating through Severn and Totley tunnels needing to comply with Category B type requirements. This may also be necessary for Crossrail, Thameslink and Glasgow Tunnels.

## 5.5 Development of the specific cases

- There are no GB specific Cases in the current published SRT TSI.

## 6 General issues

- 6.1 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.

- In parallel with the revision of the SRT TSI, work is also underway by the ERA to revise and combine the High Speed and Conventional TSIs for Infrastructure, and Rolling Stock. Whilst the development of the requirements in the respective TSIs should continue in parallel – with some interface meetings as required – the opportunity should be taken to rationalise the number of published TSIs. The requirements in the finalised draft SRT TSI should be dis-aggregated to the relevant structural sub-system TSI as an editorial activity at the end of the SRT TSI revision process.
- The SRT TSI produces a categorisation of the infrastructure and of the rolling stock in terms of fire safety. It is important that these two categorisations are kept separated (as in the final EN 45545-1 draft) as restricted access infrastructure (viaducts for example) are also categorised for fire safety (e.g. Loc & Pas TSI 4.2.10.1.1). With existing non-conforming infrastructure (Merseyrail for example), judgements will be required as to the applicable category to be required for that infrastructure. The complementary RS requirements can then all be placed in the revised RS TSI and from there make reference to EN 45545 (or temporary annexes embodying the parts thereof if necessary).
- The SRT TSI also includes a number of Operational Rules. These should be transferred to the OPE TSI, however the timing is likely to be incompatible with the OPE TSI revision and should as an interim, be either retained as an Annex to a revised SRT TSI or transferred via the Omnibus procedure (a procedure available for interim revisions to TSIs).
- A list of all issues identified to be considered in the drafting of the revised SRT TSI will be developed and collated from a number of sources. These issues will be considered regularly by the GB SRT Mirror Group.
- The SRT TSI does not address requirements for ventilation or smoke control due to being unable to mandate when such a solution should be applied. This could be identified as a missing Open Point – see 6.6. Alternatively if the TSI is to remain silent on the point, it is the case that smoke control in the tunnel using ventilation remains a project decision. The Application Guide should state that there was no agreement on requiring ventilation to be used for this purpose during drafting of the current TSI, principally because there was no economic case for it to be used everywhere.

- In the current revision of the TSI (clause 4.2.2.3 Fire Resistance of Structures), the referenced EUREKA fire curve (also referenced in the existing published SRT TSI) is for a 50MW fire being a worst case for an HGV freight fire. Using this curve can lead to very expensive tunnels for railways which then may not find it economic to allow freight traffic to use the tunnel. An alternative approach should be to say that the tunnel structure should remain structurally sound during a fire for the time it would take to evacuate all the passengers plus a safety margin. The size of the fire curve would depend on the fire loading of rolling stock allowed to use the railway.

## **6.2 Identifying inconsistencies between HS and CR TSIs**

- Requirements applicable to running through tunnels are set out in the main structural sub-system TSIs, in particular HS INF TSI and HS RST TSI as well as the current published SRT TSI. In addition, there are further cross references in the recently published CR LOC&PAS TSI. A key objective of the revised SRT TSI will be to ensure alignment and remove any duplication in the final set of requirements.

## **6.3 Changes required for extension in scope**

- The development of EN45545 includes within Part 1 a categorisation for rail vehicles dependent on the type of operation and risks. The SRT TSI contains a separate train categorisation (category A and B) and there is a need to produce a single categorisation system. GB proposes to adopt those set out in the draft EN 45545.

## **6.4 Technical corrections**

- The SRT TSI defines a tunnel as being longer than 100 metres and states that the scope is for tunnels longer than 1km. However, it also contains requirements applicable to tunnels longer than 500 metres. This aspect should be clarified.
- The SRT TSI (clause 4.2.2.7(3)) refers to 'Escape walkways' in tunnels, but does not specify clearly a height of the walkway. Reference to walkways of a height that is compatible with PRM requirements would be more appropriate.
- The minimum walkway width in clause 4.2.2.7(1) is 0.75m which is unchanged from the current TSI. For consistency, this should be compatible with the minimum width in the PRM TSI.

## **6.5 Closing out open points**

- There are no declared Open Points that will require addressing in the revised SRT TSI. The single Open Point regarding Maintenance has now been overtaken with the revised Interoperability and Safety Directives

## 6.6 Additional open points

- The SRT TSI should address requirements for ventilation and smoke control, setting a threshold for when such requirements apply. If not it should be identified as an Open Point.

## 6.7 TSI issue log

- There are no issues posted in the TSI Issues log and therefore none that require closing out.

## 6.8 Changes to minimise references to ENs

- The ERA has published a list of related documents called up in the published SRT TSI. The aim is to minimise the number of documents referenced from the revised SRT TSI, those critical to the SRT TSI development are EN 45545 and EN 50553.

## 6.9 Changes to eliminate the use of national rules

- The SRT TSI contains reference to national rules in the following clauses:

- 1.1.4. Underground stations

In respect of railway subsystems, stations that are in tunnels shall fulfil the relevant specifications of this TSI. In addition, parts of the station open to the public shall be in conformity with the national fire safety rules.

- 4.2.2.6.5. Alternative technical solutions

Alternative technical solutions providing a safe area with a minimum equivalent safety level are permitted. A technical study shall be undertaken to justify the alternative solution which must be agreed by the Relevant National Authority.

- 7.4. Exceptions for national, bilateral, multilateral or multinational agreements, these examples are all outside the scope of the SRT TSI and should be removed

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

- There are no IC's or ISPs referenced in the published SRT TSI, the GB SRT TSI Mirror Group can see no benefit in including any in the revised SRT TSI.

## 7 Feedback to ISCC

7.1 Reports will be made to ISCC on progress with the development of the TSI. Reports may be appropriate when:

- a) The preliminary draft of the TSI is available
- b) The GB specific case(s) has/have been developed

- c) Presentations by ERA are due to be made to RISC
- d) 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, the GB SRT TSI Mirror group shall report to ISCC on the issues with recommendations on any further action that needs to be taken.