CER
The Voice of European Railways

POSITION PAPER Version 4.0

Revision of the Technical Specification for Interoperability / Safety in Railway Tunnels (SRT)

Brussels, September 26th, 2012

COMMUNITY OF EUROPEAN RAILWAY AND INFRASTRUCTURE COMPANIES - COMMUNAUTÉ EUROPÉENNE DU RAIL ET DES COMPAGNIES D'INFRASTRUCTURE - GEMEINSCHAFT DER EUROPÄISCHEN BAHNEN UND INFRASTRUKTURGESELLSCHAFTEN

CER aisbl Avenue des Arts, 53 B-1000 Bruxelles Tel: +32 2 213 08 70 Fax: +32 2 512 52 31 contact@cer.be www.cer.be

1. REFERENCE DOCUMENT

UNION RAIL SYSTEM - SUBSYSTEMS INFRASTRUCTURE, ENERGY AND ROLLING STOCK
TSI "SAFETY IN RAILWAY TUNNELS"
IU-SRT_TSI
Version **2.0**
Date 26/06/2012
Edited by : Antoine Defossez

2. INTRODUCTION

This Position Paper makes public the official CER beliefs and recommendations on and for the Technical Specification for Interoperability TSI "Safety in Railway Tunnels (SRT)" - Version 2.0. It recommends changes and amendments to be done, ensuring the deployment of a safe, sustainable, cost-efficient and reliable railway system with all its subsystems included.

3. GENERAL COMMENTS

- The number of references to other legal documents, the number of references to other parts of the same document, the number of quotations from other legal documents and repeated information in this document will inevitably cause a huge effort for maintaining this document in future. Future revisions of this document will be highly time- and budget consuming. We propose to create general requirements (policy) for creating legal documents leading to simplification.
- CER disagrees with the transfer of SRT requirements from the SRT TSI to other TSIs. It is contradictory to the ERA report itself named "Item 08 - IU-ExtScope-Studies-Merging-and-Splitting-03-02-2011-FinalReport-V1[1].0.zip" presented to the RIS in its meeting of March 2011 and approved by the EC and RISC members in its meeting of June 2011: look at:
  - The last sentence of §6.6.6 page 47 of the final report, not questioned by the EC or the RISC in its March and June 2011 meetings: ""As a result from the above analysis, the Agency suggests retaining the SRT TSI".
  - Its §8 Conclusion and table 9 in which it is written: "Retaining SRT TSI" and nothing about SRT in other RST, INF or ENE TSIs.

  The version 1.3 of the Loc & Pas TSI of 5/09/2012 introduces the SRT requirements for RST in the Loc & Pas TSI. At the next revision, the system view will be lost and it is very dangerous!

- All used abbreviations need to be fully explained, allowing a proper and correct understanding of this TSI.
- With fulfilling the requirements of TSI a huge number of mandatory standards is to be fulfilled accordingly. A new breakthrough approach is needed to make these standards fully public and available free of charge.
- Consistency with definitions of the Infrastructure and Loc&Pas TSIs needs to be ensured.

A cost benefit analysis of the changes to the existing SRT TSI and of the effect of geographic scope extension is not available at the moment of providing these comments.

4. DETAILED COMMENTS

Instruction to the reader:

- **Chapter numbers and headlines are underlined and bold**
- "TSI text is shown in inverted commas"
- *Comments and justifications are shown in Italics*
- Proposals for amendments are underlined
- ~~Proposals for deletion are shown using the "strikethrough" function~~

CHAPTER 1.1

~~"Whereas this TSI contains no direct requirement for the subsystem control-command ('CCS'), it contains requirements applicable to components of the subsystem and is interfaced with it."~~
This sentence means nothing. If a component of the subsystem is concerned, the subsystem is concerned. And CCS, both trackside and on-board, are concerned (for materials at least)
Delete this sentence and modify the previous sentence:

"This TSI contains requirements for the following subsystems infrastructure ('INF'), energy ('ENE'), operation ('OPE'), ~~and~~ rolling stock ('RST'), **trackside and on board control-command and signalling ('CCS')** as defined in Directive 2008/57/EC".

"It shall permit free movement of vehicles which are in compliance with this TSI to run under harmonised safety conditions in railway tunnels**, which are in the scope of this TSI.**
Justification: ensure consistency with § 1.1.1 of this TSI. This TSI cannot prejudge of such possibility in existing tunnels not taken into account in the SRT TSI to-day in force (tunnels longer than 20km): see its § 1.1.2.

CHAPTER 1.1.2

"This TSI applies to **new, upgraded and renewed** rolling stock which is in the scope of the LOC&PAS TSI."
Justification: ensure consistency with §7.1.1.1 and 7.1.2 of the Loc & Pas TSI and compliance with article 6 §9 2nd sentence of Directive 2008/57/EC.

CHAPTER 1.1.3

"This TSI applies to the operation of all **new, upgraded and renewed** trains which are running in tunnels which are in the scope of this TSI.
Justification: ensure compliance with article 6 §9 2nd sentence of Directive 2008/57/EC.

CHAPTER 1.1.4

"A freight train is a train composed of one or more locomotive(s) and one or more wagon(s) **as defined in the WAG TSI**."
Justification: make clear that wagons included in OTM definition are not concerned by this §.

"When each vehicle of a freight train complies with the structural TSIs which apply to it (LOC&PAS, WAG, SRT, NOI **and CCS**) and when …"
Justification: ensure consistency with § 1.1 as modified as above.

"… the freight train operated according to the requirements of the OPE TSI shall be allowed to circulate in all tunnels **defined in § 1.1.1**".
Justification: ensure consistency with § 1.1.1 and compliance with article 6 §9 2nd sentence of Directive 2008/57/EC. This TSI cannot prejudge of such possibility in existing tunnels not taken into account in the SRT TSI to-day in force (tunnels longer than 20km): see its § 1.1.2.

CHAPTER 1.1.4 BIS: SCOPE RELATED TO CCS ON-BOARD AND TRACKSIDE
"This TSI applies to new, upgraded and renewed CCS which is in the scope of the CCS TSI."
Justification: such a § and a sentence shall be added. Look at the modification proposed in §1.1. Ensure consistency with materials requirements (cables for fixed installations for instance). Vehicles are the sum of RST and CCS.

CHAPTER 1.2
(c) Other parts of the Union rail network, ~~following~~ **as this TSI achieves** the extension of scope **process** as described in Annex I section 4 of Directive 2008/57/EC.
Justification: make it clear that the extension of scope is done through this TSI.

CHAPTER 2.1 GENERAL
"A major feature of railways is their inherent ability to prevent accidents through the traffic running on a guide-way and being controlled and regulated using a signalling system."

Comment: Please consider that there will be still routes without technical signalling systems (mostly secondary local lines, substantially verbal communication)

CHAPTER 2.2.1 HOT INCIDENTS: FIRE, EXPLOSION FOLLOWED BY FIRE, EMISSION OF TOXIC SMOKE OR GAS
"… Whenever possible the train **should** leave the tunnel.
If the train comes to a stop at a designated stopping point, passengers are evacuated, directed by the train crew, or by self-rescue, to a safe area…."

Justification: to emphasize stronger

CHAPTER 2.2.4 EXCLUSIONS
The reference to chapter 1.1.7 in chapter 2.2.4 is incorrect. This chapter should be referenced to chapter 1.1.5.

CHAPTER 2.3 THE ROLE OF EMERGENCY RESPONSE SERVICES
We recommend amending the text of chapter 2.3 as follows:

"In a 'hot' incident type

- […]
- "Fight a fire ~~insofar as required~~ ~~to protect themselves and people caught in the incident~~"

***Justification**: The fire fighting in railway tunnels always leads to protect lives. Fire fighting also protects the leaves of infrastructure manager's staff by preventing the damage of tunnel*

structure likely to jeopardize them when inspecting the tunnel after any hot incident. There is no reason to stop the fire fighting when there is no need to protect the emergency response service staff and people caught in the accident.

CHAPTER 2.4 DEFINITIONS

The following new terms shall be used consistently throughout the TSI:

- "Intervention point" – replacing "~~fire fighting point~~"
- "Intervention & evacuation point" – replacing "~~rescue station~~"

We consider 2 new definitions to be useful, if consistently applied across the TSI:

- "emergency exits: An emergency exit is a lateral or vertical subsurface structure enabling self rescue.
- access point: An access point is a designated exit from the tunnel to a safe area and an access to the related emergency exit."

The SRT TSI should apply to tunnels longer than 500m instead of 100m. Below this length no theoretical or experimental proofs establish that an event should be important as it happen in a confined space like a tunnel. With a view to the scope extension, an impact assessment has to be carried out if shorter length is proposed by ERA. DB identified an increasing of 260 tunnel segments fallen under this 0,1 km definition we propose to apply the TSI SRT for tunnels beginning from 0,5 km length. Our proposal is in line with the existing TSI. The definition should therefore be changed as follows:

> "Railway tunnel: A railway tunnel is an excavation or a construction around the track provided to allow the railway to pass ~~under~~, for example higher land, buildings or water. The length of a tunnel is defined as the length of the fully enclosed section, measured at rail level. A tunnel in the context of this TSI is ~~0.1~~ 0,5km or longer. In case different thresholds apply for certain requirements, they are mentioned in the respective clauses."

*Remark: **SNCF** objects that the definition of "consecutive tunnels" had been deleted. As a consequence chapter "4.2.1.7 Designated stopping points" might be misinterpreted and mistranslated.*

CHAPTER 3 ESSENTIAL REQUIREMENTS

Comment: Table numbering is incorrect!

Chapter 4.2.1.1. Prevent unauthorised access to emergency exits and technical rooms

"This specification applies to all tunnels of more than 1 km in length.

(a) Unauthorised access to technical rooms shall be prevented.

(b) Where emergency exits are locked for security purposes, it shall always be possible to open them from inside."

Justification: The scope of requirement is changed.

In the previous revision this requirement was for tunnel longer than 1000 m.

It is not clear the reason for which tunnels shorter than 1000 m have to comply with this requirement.

Tunnels shorter than 1000 m usually have no exit and no technical rooms for safety equipment.

CHAPTER 4.2.1.1.5 ESCAPE SIGNAGE

"(a) The escape signage indicates the emergency exits~~, the distance~~ and the direction to a safe area."

Justification: Marking of distance on the escape signage is not used everywhere and it is not mandatory according to Annex II Chapter 3.4 of Directive 92/58/EC.

CHAPTER 4.2.1.2 FIRE RESISTANCE OF TUNNEL STRUCTURES

(a) In the event of fire, the integrity of the tunnel lining shall be maintained for a period of time sufficiently long to permit self-rescue, evacuation of passengers and staff and intervention of emergency response services according to 2.3.

This objective is attained when it is demonstrated that the tunnel lining satisfies the ultimate limit state ~~integrity of the tunnel lining is maintained~~ under a gas temperature of 450°C at ceiling level during and 250 °C for passengers' self-rescue the same period of time, which shall be in accordance to the evacuation scenario and reported in the Emergency Plan.

Justification:

- *Applying the term integrity may cause uncertainties during project conformity assessment. Integrity may be related with spalling phenomena.*
- *Assessing temperature load in the lining needs clear input parameters. Temperature load in the cross section of the lining is different with input gas temperature or temperature at the concrete surface.*

Fire protection requirement should be assessed coherently with experiences and studies already made in this field. We propose to add the temperature of 250 °C at the ceiling for passengers' self rescue (unprotect person).(b) In the cases of inundating tunnels (e.g. underwater tunnels) as an effect of failure of tunnel lining~~immersed tunnels~~ and tunnels which can cause the collapse of important neighbouring structures, the tunnel main structure shall withstand the temperature of the fire for a period of time allowing evacuation of the endangered tunnel zones and neighbouring buildings and structures. This period of time shall be agreed in the emergency plan. The 'temperature-time curve' for the evaluation of the resistance of the tunnel structure shall be chosen by the IM according to the characteristics of the tunnel, the considered traffic and the neighbourhood. This verification is not needed for rock tunnels without additional support.

Justification:

- *The stipulated EUREKA – curve can be used for tunnels for passenger traffic only. Freight traffic demands different types of curves. Durations of fires in tunnels for mixed (passenger AND freight traffic) traffic or freight traffic only were observed up to several hours in the past years (e.g. Simplon Tunnel 12 hours). A cooling down phase after 60min in the EUREKA curve is not a realistic input for structural analysis.*
- *Therefore fire loads should/shall be derived from open curves such as the HC_{1200} curve. For material tests a temperature-range between HC and the HC_{inc} may be proposed.*

- *Minimising impacts on the environment or minimising the expenditures necessary for the proper maintenance of the tunnel may require pressure-tight tunnel linings. In this case failing linings cause marginal influx to the tunnel. So passengers and train staff are not endangered to drown.*
- *According to EUROCODE the ultimate limit state design has to verify that effect of action is smaller or equal to the corresponding resistance → $E_d < R_d$.*
- *Time-temperature-curves as EUREKA curve are first of all necessary to determine the fire load on the construction and the corresponding effect of action (E_d). On the other hand the resistance (R_d) is influenced widely by material properties and less by the time-temperature-curve.*
- *A definition of "important neighbouring structures" would be helpful.*

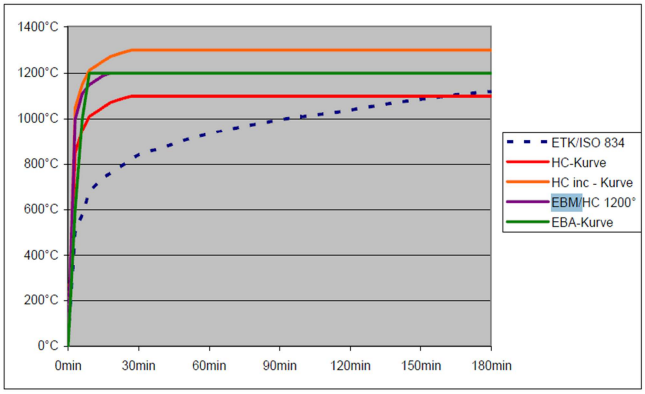

Figure 1: http://www.bahnonline.ch/wp/34318/brand-gueterzug-simplontunnel-brig-iselle-di-trasquera.htm. Date: 10.11.2011

CHAPTER 4.2.1.3 FIRE REACTION OF BUILDING MATERIAL

This specification applies to all tunnels.
(a) Building material and installations inside tunnels shall have low flammability, be non-flammable or be shielded against the effects of fire.
(b) Tunnel building material shall fulfil the requirements of classification A2 of EN 13501-1:2002. Non-structural panels and other equipment shall fulfil the requirements of classification B of EN 13501-1:2002.

In this text passage some problems occur:

In the first part of the text passage, characteristics like *low flammability* and *non-flammable* are mentioned, which are not clearly defined, neither exists a reference to a standard. Furthermore there do not exist any limits, so it is not assessable in practice.
Apparently only the definition to be shielded against the effects of fire is assessable and therefore it is a sufficient description.

In the second part of the clause, the European standard *EN 13501-1:2002* is referenced. If this standard is furthermore part of the revised SRT TSI text, it shall be referenced on the latest edition *EN 13501-1:2009*.

Related to fire reaction, the tunnel main structure is regulated in **4.2.1.2. Fire resistance of tunnel structures**, consequently just construction products and building elements should be mentioned in this text passage.
The European standard *EN 13501-1:2009* deals with all kinds of building materials and construction products, but it does not cover different types of materials (synthetic, liquids or glass), which are used for equipment like power supply, railway switch drives and so on. Further also the amount of these special materials plays an important role related to their fire behaviour.
The Austrian Federal Railway, business unit Engineering Services, department Line and Station Design has investigated tunnel equipment, installations and their components and tried to classify them. The results show, that it is very difficult to classify tunnel equipment and installations, because both are always compositions of different materials, so it depends on the producer what kind of materials are used. This leads to a large range of materials which have to be determined. Furthermore Notified Bodies have problems with these materials during the assessment of conformity, because of missing certifications.

For better understanding some examples are provided below:

Example 1: Switch drives:
Switch drives are made of sheet plates, screws, plastic isolators, rubber seals, hydraulic oil and so on. Regarding to the text passage of the SRT TSI draft 2.0 (26th of June 2012) it would be necessary to classify every single material. Every certification has to fulfil the European regulation EN 13501-1:2009. A switch drive is therefore a good example for tunnel equipment, which consists of many different materials. Further it begs the question, if small items, like e.g. screws, really affect the fire behaviour of the whole switch drives. This example shows that an irrelevance limit would be helpful for classifying tunnel equipment.

Example 2: Power supply (sockets, distributors, fuse boxes…)
Power equipment is necessary for fire fighting and maintenance work, but it is not possible to shield all power equipment against direct fire. Control cabinets are also made of several different materials. The detailed composition of all these different materials depends exclusively on the producer. In conclusion also this case shows that an irrelevance limit would be helpful, because power supply equipment consists of many different materials.

Example 3: Signage:
Signs are necessary and essential for self-rescue and technical information. Nearly all signs are made of plastic and dimensioned a few centimetres wide and high and approximately 2 mm thick. According to EN 13501-1:2009, plastic is classified as class E. Therefore an installation of this kind of materials is not allowed in tunnels. This example also shows that an irrelevance limit would be helpful.

Regarding to these arguments a new text passage for TSI SRT is proposed:

CER requests to properly define "building materials", "installations" and "other equipment". Definition should be in line with the Directive 89/106/EC.

"4.2.1.3 Fire reaction of material
This specification applies to all tunnels.

Construction products and building elements shall fulfil the requirements of classification B of EN 13501-1:2009 or shielded against the effects of fire. No fire resistance of shielded materials is requested."

justification:

- *"construction products and building elements" are defined in EN 13'501-1 (= title of EN 13'501-1)*
- *further consideration relating to irrelevance limits would be worthwhile, otherwise it seems better to skip point c) referring to "all other items".*

4.2.1.4. Fire detection in technical rooms

"This specification applies to all tunnels of more than 1 km in length.

(a) Technical rooms (no shelters or technical cabinets) are enclosed spaces with doors for access/egress inside or outside the tunnel with safety installations which are necessary for at least one of the following functions: self-rescue, evacuation, emergency communication, rescue and fire fighting, signalling and communication equipment, and traction power supply.

(b) Technical rooms shall be equipped with detectors which alert the infrastructure manager in case of fire."

Justification: clarification

CHAPTER 4.2.1.5.1 SAFE AREA

"This specification applies to all tunnels of more than ~~1~~ 5 km in length.

(a) A safe area shall allow for the evacuation of trains that use the tunnel and may be located adjacent to the tunnel. It shall have a capacity corresponding to the maximum capacity of the trains planned to be operated on the line where the tunnel is located.

(b) The safe area shall maintain survivable conditions for unprotected persons during the time needed for the complete evacuation from the safe area ~~(away from the accident scene, e.g. to the surface)~~.

(c) In case of underground/ undersea safe areas, the provisions shall allow people to move from the safe area to the surface without having to re-enter the affected tunnel tube."

Comment:

In line with our comment on 4.2.1.5.2, we propose to modify the threshold for this requirement.

Comparing the area dimension of 4.2.1.7.2. (e) with the maximum train capacity, operation in tunnels has to be limited to special train types or the capacity of safe areas has to increase to a sizeable amount. In our opinion this conditions for safe areas are not practicable, in economic as well as in operating ways.

The explanation in brackets is not needed and confusing

Remark: The change request is not supported by SNCF.

CHAPTER 4.2.1.5.2 ACCESS TO THE SAFE AREA

"This specification applies to all tunnels of more than ~~1~~ 5 km in length.

(a) Safe areas shall be accessible for people who commence self-evacuation from the train as well as for emergency response services. Access to a safe area shall be available at least every 5000 m. This is the distance between the outer edges of the access points measured at walkway level (internal side of the arch).

(b) One of the following solutions shall be selected for access points from a train to the safe areas:

(1) Lateral and/or vertical emergency exits to the surface, where the surface is a safe area.

(2) Cross-passages to an adjacent independent tunnel or to another dedicated safe area.

(3) Alternative measures with an equivalent level of safety are allowed; the equivalent level of safety to passengers and staff shall be demonstrated using the Common Safety Methods on risk assessment.

~~(c) An access point to a safe area shall be available at least every 1000m in a multiple track tunnel. In a single track tunnel, an access point shall be available at least every 500m.~~

~~(d)For points (b) and (c) above, alternative measures with an equivalent level of safety are allowed; the equivalent level of safety to passengers and staff shall be demonstrated using the Common Safety Methods on risk assessment.~~

(e) Doors giving access from the escape walkway to the safe area shall have a minimum clear opening of 1,4m wide and 2,0m high, alternatively it is permitted to use multiple doors next to

each other which are less wide as long as the flow capacity of people is demonstrated to be equivalent or higher.

(f) After passing the doors, the clear width shall continue to be at least 1,5m wide and 2,3m high.

(g). The way the emergency response services access the safe area shall be described in the emergency plan."

Justification:

- *Measurement of the stated distance has to be clarified.*
- *About "Access to the safe area" requirement clause b), the new SRT TSI sets specific rolling stock and infrastructure requirements for the management of the hot incidents. During a hot incident, that is fire on board, a train haven't to stop inside tunnel as its running capability of 20 km for category B train (5 km for category A train) makes the train able to run to an appropriate stopping point ("designated stopping point") where passengers can swift evacuate (as the train is damaged) and where train can the treated by rescue service.*
- *The emergency exits explained at clause (b) are hence set for the cold incidents' management (collision and derailment) for which as defined at point 2.2.2., "there is no constraint due to the presence of a hostle environment created by a fire"; the confined space is not critical for the passengers' evacuation rather for the access of rescue service . For these cases, in consideration of the very expensive investment for the access building (at about 60 M€ for km), we propose, for one bore tunnel, to set emergency exits at distance of about 5 km or more.*
- *At clause f), the high of the clear width is changed. No explanations about this changing are provided.*

Remark: The change request is not supported by SNCF.

CHAPTER 4.2.1.5.4 EMERGENCY LIGHTING ON ESCAPE ROUTES

"(b) (2) Double-track tube: on both sides of the tunnel

(b)(3) Position of lights: above the walkway, ~~as low as possible, so as not to interfere with the free space for the passage of persons,~~ shall be at a minimum height of 2,50 m or built into the handrails."

Justification:

- *B2: clarification*
- *B3: Our proposal is in line with EN 1838*

4.2.1.6. Escape walkways

"This specification applies to all tunnels of more than 0,5 km in length.

(a) Walkways shall be constructed in a single track tunnel on at least one side of the track and in a multiple track tunnel on both sides of the tunnel. In tunnels with more than two tracks, access to a walkway shall be possible from each track.

(1) The width of the walkway shall be at least 0.8 m.

(2) The minimum vertical clearance above the walkway shall be ~~2,3~~ 2,0 m."

Justification:

The high of the clear width is changed. No explanations and justification about this changing are provided by ERA.

Some national standards plan the high at 2.00 m.

4.2.1.7 Designated stopping points

"The following paragraphs 4.2.1.7.1 and 4.2.1.7.2 apply to tunnels considered individually. Where lines are fitted with several tunnels, it is required that a designated stopping point is available at a maximum distance of 5 km - or 20 km - from the portal of any tunnel, according to the category of rolling stock that is planned to be operated, like is summarized in the table below at point 4.2.1.7.2 (b).

The distribution of designated stopping points on a line shall be justified in the Emergency Plan."

Justification:

The acceptance of the whole 4.2.1.7 requirement is linked to the adoption of 4.2.1.5.2 Access to the safe area comments.

Clarification of the sentence: "it is required that a designated stopping point is available at a maximum distance of 5 km (resp: 20 km) from the portal of any tunnel".

CHAPTER 4.2.1.7.1. ~~FIRE FIGHTING~~ INTERVENTION POINTS

This chapter needs to be revised~~. Emergency communication is needed also in tunnels less than 1 km in length. E.g. stopping of trains on adjacent tracks, isolation of overhead contact line and similar issues.~~

4.2.1.7.2 Rescue station

"This specification applies to all tunnels of more than 5 km in length.
(a) A rescue station shall be available at a maximum distance of 5 km or 20 km from the entry portal of the tunnel and from any other rescue station, according to the category of rolling stock that is planned to be operated.
(b) This is summarized in the table below:

Maximum distance from the portals to a rescue station and between rescue stations	Rolling stock category according to paragraph 4.2.3.3.1
5 km	Category A
20 km	Category B

(c) The intended stopping position of the affected train shall be indicated to the train driver. This shall not require specific on-board equipment (all TSI compliant trains must be able to use the tunnel)
(d) A safe area shall be accessible from the stopping position of the train. **Dimensions** of the evacuation route to the safe area shall take into consideration the evacuation time (as specified in § 4.2.3.4.1 (b) (2)) and the planned capacity of the trains (referred to in § 4.2.1.5.1 (b)) intended to be operated in the tunnel. The adequacy of the sizing of the evacuation route shall be ~~**demonstrated**~~ in the Emergency Plan.

e) The safe area that is paired with the rescue station shall offer a standing surface of at least ~~0,5~~ 0,33 m² per person.
Application guide: toilets, water, seats, etc. shall be according to the waiting time derived from the evacuation scenarios defined in the Emergency Plan
(f) The rescue station shall be equipped with water supply (minimum 800l/min during 2 hours) close to the intended stopping point of the train. The method of supplying the water to a stopped train shall be described in the emergency plan.
(g) It shall be possible to switch off the traction energy supply and earth the electrical installation of rescue stations.
(h) The rescue station shall be equipped with access for emergency response services as defined in the emergency plan. (road access or rescue train for example)
~~(i)There shall be an access to the affected train for emergency response services without going through the safe area.~~
~~(j) The lay-out of an underground rescue station and its equipment shall take into account the control of smoke, in particular to protect people who use the self-evacuation facilities to access the safe area.~~"

Justification:

- *The acceptance of the whole 4.2.1.7 requirement is linked to the adoption of 4.2.1.5.2 Access to the safe area comments.*
- *At clause (d) the reference to the dimensions should be erased since they are explained at 4.2.1.5.2 (f) requirement,*
- *At clause (e) the value of 0,5 m² per person should be too expensive for underground rescue station. We propose to fix this value to 0.33 mq/persons.*
- *We suggest to erase the clause (i) because in case of double bore tunnels the requirement should not be easily complied*
- *There is a mistake in the clause numbering.*
- *The point (j) of the rescue station requirement is translated into safe area requirements as it is more appropriate to prevent that smoke can access in the way to safe area.*

CHAPTER 4.2.1.8 EMERGENCY COMMUNICATION

This specification applies to all tunnels of more than 1 km in length.
(a) Radio communication between the train and the control centre shall be provided in each tunnel with GSM-R or other communication modes.
(b) Radio continuity shall be provided for permitting the emergency response services to communicate with their on-site command facilities. The system shall allow the emergency response services to use their own communication equipment.

Comment: There will be still lines without GSM-R and with alternative communication systems (train radio), this should be possible under the conditions of the revised SRT TSI.

CHAPTER 4.2.3.1.1. MATERIAL REQUIREMENTS

Section (b)

Materials used to construct rolling stock shall comply with EN 45545-2**: 201X**

Justification: References shall be dated (DV44). ***But nobody knows whether the TSI will be able to refer to such EN now submitted for vote, as there is a critical error in it!***

Section (c)

This requirement seems to be too strict as compliance may also be ensured by implementing an appropriate quality management system.

~~Proposal: "An appropriate quality management system shall ensure that all material complies to the requirements set out in this chapter."~~

CHAPTER 4.2.3.1.4 ELECTRIC FREIGHT LOCOMOTIVES

Such a reference would need the year of the standard in the reference to ensure that the correct version/requirement is referred to. Also, see the requirements for transformers and their coolants in EN 50553.

CHAPTER 4.2.3.2.3 AUTOMATIC FIRE EXTINGUISHING FOR FREIGHT LOCOMOTIVES

Section (a)

We object to the limitation of the application to diesel and not electric freight locos only. We further object to running capability not being permitted.

We recommend to add "…unless they are compliant to chapter 4.2.3.3.1 Running capability."

4.2.3.2.4 Fire spreading protection measures for passenger rolling stock (FPSM)

"(c) If FSPM are used instead of full cross section partitions, it shall be demonstrated that:

(1) They ensure that ~~fire and~~ smoke, toxic gases and high temperature will not extend in dangerous concentrations over a length of more than 30m within the passenger/staff areas inside a unit, for at least 15 minutes after the start of a fire. The assessment of this parameter is an open point*.

(2) They are installed in each vehicle of the unit, which is intended to carry passengers and/or staff"

Comment:
A fire is characterized by the production of smoke, toxic gases and high temperatures as a result of heat released by the flame. Then the effluents of a fire are not only smoke but also on other variables reported above

* The following is proposed to close the open point about the assessment:
The assessment of this parameter following the implementation of active safety methods, such as fire extinguishing systems, shall be applied using the test protocol following below:
- ignition source equal to that required by the model of ignition of 5 CEN / TS 45545-1 Annex A
- peak of heat release (HRR) at 5 min = 285 kW.

The parameters to be detected and their acceptance limits are the following:
(1) temperature <= 80 ° C
(2) residual transmittance> = 70%
(3) toxic gas expressed by the parameters "Fractional Dose Effect" (FED) and FEC "Fractional Effect Concentration" (FEC) (acceptable limits and their evaluation not yet defined , still under discussion within the TRANSFEU)

The time available for evacuation (ASET) shall be greater than the time required for the evacuation (RSET).

CHAPTER 4.2.3.3.1 RUNNING CAPABILITY

The problem with the statements made here is that electric freight locomotives are not required to have a fire extinguishing system in accordance with 4.2.3.2.3 and here it is to be read that neither are they required to have running capability. This therefore means that they could be abandoned in the tunnel and left to burn quite freely.

It is not understood why running capability is not permitted for freight locos, either electric or diesel.

Is it appropriate that the Driver should abandon the train (surely the fire should be out if there is an extinguishing system on board) and shouldn't this be left to the Emergency Plan ~~or the RU's operating rules~~?

Providing Running Capability (or the option of fire extinguishing for electric locos) would be a safer, and cheaper, than allowing a train to burn in the tunnel and expecting emergency services to fight the fire in the tunnel and all the damage that would occur.

CHAPTER 4.2.3.4.1 PASSENGER EMERGENCY EXISTS

Section (b) - Requirements

Some of the deleted text is useful and should be re-added:

"(1) Emergency exits shall be provided and indicated.
(2) An emergency exit shall be able to be opened by a passenger from inside the train.
(5) All external passenger doors shall be equipped with emergency opening devices allowing them to be used as emergency exits.
(10) Each vehicle designed to contain up to 40 passengers shall have at least two emergency exits.
(11) Each vehicle designed to contain more than 40 passengers shall have at least three emergency exits.
(12) Each vehicle intended to carry passengers shall have at least one emergency exit on each vehicle side."

CHAPTER 4.4 OPERATING RULES AND 4.5 MAINTENANCE RULES

We recommend revising the content of chapters 4.4 and 4.5 to reflect the responsibility of designer and manufacturer – supplier for provision of all relevant requirements on the operation and maintenance to be included into operational rules and maintenance rules.

Justification: Designer and manufacturer – supplier shall be responsible for provision of all relevant design specific requirements on the operation and maintenance to be included into operational rules and maintenance rules of infrastructure manager.

4.4.1 Emergency rule

"These rules apply to tunnels of more than 0.5 km length.

In light of the essential requirements in Chapter 3, the operating rules specific to tunnel safety are:

(a) ~~The operational rule is to monitor the train condition before entering a tunnel in order to prevent a defective train from entering a tunnel. This can be done through line side hot axle box detection or other predictive equipment or through on-board equipment.~~ If a hot axle box is detected:

- The defective train shall stop as soon as possible at an appropriate place ahead of the tunnel(s).
- The IM shall be informed of the location where the train stops immediately
- The defective parts shall be checked by the train crew
- The RU shall have rules to permit safe operation to continue under the resulting degraded conditions.

(b) In case of an incident outside the tunnel, the operational rule is to stop the train before entering a tunnel.

(c) In case of an incident the operational rule is to drive the train out of the tunnel or to the next rescue station."

Justification:

In reference to clause a), the requirement of the current TSI seems to be clearer. We propose to adopt it.

4.4.3 Exercises

These rules apply to tunnels of > ~~1~~ 5km.

(a) Prior to opening of a single tunnel or a series of tunnels, an ~~full-scale~~ exercise comprising evacuation and rescue procedures~~, involving all categories of personnel defined within the emergency plan,~~ shall take place.

(b) The emergency plan shall define how all organisations involved can be familiarised with the infrastructure and how often visits to the tunnel and table top or other exercises have to take place.

Justification:

The experience reached shows that, by reason of emergency response service' s busy schedule, prior to opening a tunnel a full scale exercises shall not take place.

Moreover, considering the great employment to comply the requirement, it should be applied only for tunnel longer than 5 km.

4.4.4. Isolation and Earthing procedures:

"If the emergency response services require disconnection of the traction power supply, they shall receive a guarantee that the relevant sections of catenaries or conductor rails have been disconnected before entering the tunnel or a section of the tunnel."

Comment:

This requirement should be specified by examples, e.g. verbally by IM or by technical solutions with signal lamps

4.4.6 Operational rules related to trains in tunnels

"~~(4) OTMs shall be deemed to comply with the tunnel safety requirements for rolling stock all lines.~~"

Justification: The operational aspect for OTM´s is quite different to other vehicles. OTM´s are not planned as normal train services. Please delete!

4.5.1 Maintenance rule – Infrastructure:

"…(4) Necessary periodic checks and servicing activities to ensure the proper functioning of the parts and systems under (3) to ensure permanent compliance with the present TSI in accordance with the maintenance plan."

Comment:

- *We need a clear answer on this the maintenance activities of an IM follow the condition of the tunnel that means over the life time the respective concept will apply. We do not want to inform continuously the certification body about our adaptable concepts. Please also have in mind the European tunnel is now defined as 0,1km or longer that means the number of tunnels managed under the TSI SRT will increase => more formalistic work. Please delete (4) !!!*
- *Moreover the requirement of the current TSI seems to be clearer. We propose to adopt a text like that: "In the maintenance plan the following inspection rules have to be taken into account:*

  — ~~annual~~ visual inspections carried out by the IM

  — detailed inspections according to the IM's maintenance plan

  — special inspections after accidents, natural events that may have affected the tunnel condition

  — after and during implementation of renewal and/or upgrading works and before restoring train operation in a tunnel, an inspection has to be undertaken, with appropriate means, to ensure that the stability of the structure is guaranteed ~~and that there are no infringements of the gauge.~~"

CHAPTER 4.5.2. Maintenance of rolling stock

"The maintenance requirements for rolling stock are set out in the LOC&PAS TSI. ~~Maintenance activities shall ensure that compliance with the present TSI is permanently maintained.~~"

Comment: the first sentence is sufficient!

CHAPTER 4.8.1 REGISTER OF INFRASTRUCTURE AND 4.8.2 ~~ROLLING STOCK REGISTER~~ ERATV

We recommend to revise the text of chapter 4.8.1 and 4.8.2.

***Justification**: There is a reference to non-existing Annexes A and B.*

Note: The data to be provided for register of infrastructure are those indicated in Commission Implementing Decision 2011/633/EU.

6.2.7.2 Fire protection requirements for structures

"The Notified Body shall assess conformity with the fire protection requirements for structures, defined in 4.2.1.2~~, by using the results of calculations made by the applicant~~."

Comment:

National rules might allow other equivalent solutions.

CHAPTER 6.2.7.3 FACILITIES FOR SELF-RESCUE, RESCUE AND EVACUATION IN THE EVENT OF AN INCIDENT

The Notified Body shall check that the solution adopted is clearly identified by a statement in the technical file and is in conformity with the requirements of 4.2.1.5. ~~For assessing the evolution of the conditions in the safe area during an incident, the Notified Body shall verify that t~~The doors and structures separating the safe area from the tunnel ~~can~~ shall withstand the elevation of temperature in the closest tube. Conditions in that tube are determined by the temperature-time curve ~~chosen~~ in § 4.2.1.2 (b) or, if that clause is not applicable, by a representative temperature-time curve.

Justification:

- *Airtight assessments of conditions in the safe area according to the state of the art are not possible as yet.*
- *According to 4.2.1.2 (b) of version 2.0 the time-temperature-curve cannot be chosen.*

7 IMPLEMENTATION

"This section defines the implementation strategy for the SRT TSI.

This TSI does not require modifications of subsystems which are already in service unless they are upgraded or renewed.

If not defined otherwise in section 7.5 'Specific Cases', all new TSI compliant category B rolling stock is deemed to achieve a higher fire and tunnel safety level than non-TSI compliant rolling stock. This assumption is used to justify the safe operation of new TSI-compliant rolling stock in old non-TSI compliant tunnels. Therefore, all TSI compliant category B trains are deemed to be suitable for the safe integration in accordance with Article 15(1) of Directive 2008/57/EC with all non-TSI compliant tunnels within the geographical scope of this TSI. ~~**In addition, the checks related to technical compatibility as referred to in Directive 2008/57/EC in Articles 15(1), 22(2)(b) and 23(4), shall not concern basic parameters defined for rolling stock in this TSI."**~~

Comment:

- *There is no common European approach existing about what is meant by upgrade or renewal for the tunnel infrastructure. In most cases at national level the decision depends on budgets and this cannot be a criterion to apply the TSI SRT.*
- *The whole paragraph after the deleted one is not understood and needs clarification.*

This TSI completely forgets the transition between the existing SRT, HS RST and Loc & Pas TSIs in force to-day and this draft TSI. This shall be carefully studied and phases A and B of the HS RST and of Loc & Pas TSI shall be introduced for RST in the new SRT TSI.

CHAPTER 7.1.2.1 PARTICULAR TRANSITIONAL RULES FOR MATERIAL REQUIREMENTS

"This paragraph is applicable to all units of rolling stock for which a contract is signed during a period of ~~2~~ 6 years after entry into force of this TSI.

~~For those units, it is permitted to meet the requirements of Section 4.2.3.1.1 Material Requirements by using materials which are compliant with one of the following sets of standards:~~
Pending publication of EN 45545-2 one of the following sets of standards shall be applied:

- The British standards BS6853, GM/RT2130 issue 3;
- The French standards NF F 16-101:1988 and NF F 16-102/1992;
- The German standard DIN 5510-2:2009 including toxicity measurements.
- The Italian standards UNI CEI 11170-1:2005 and UNI CEI 11170-3:2005.
- The Polish standards PN-K-02511:2000 and PN-K-02502:1992
- TS 45545-2:2009

~~During this period, it is permitted to substitute individual materials by materials which are compliant with EN 45545, or in case EN 45545 is not available TS 45545-2:2009.~~
~~After publication of EN 45545-2, it shall be permitted to use national standards & TS 45545-2 for the transition period defined in EN 45545-2.~~"

Comment:

- *The application of EN 45545-2 is generally considered to be a major industry effort as many suppliers are not yet prepared to comply with the new standard. That's why a reasonable transition period shall be defined~~, probably 36 months~~. Phase A and B are much better!!!*

CER states that two transitions are unacceptable; if the EN 45545-2 is not ready, we should not use the TS, as the result would be that when the EN is ready, a second transition would be required. If the EN is not ready, we should persist with the TSI only.

CHAPTER 7.1.3 NEW INFRASTRUCTURE

All tunnel projects, for of which the project approval procedure (public consultation) commences after publication of this TSI, shall be realised in compliance with this TSI. Exceptions can be made for projects whose planning/design stage has reached a point where a change in the technical specification would lead to unacceptable delays and/or costs

Comment:

- *The TSI should always be applied to all new tunnel projects. Exceptions should refer on Article 9 of Directive 2008/58/EC. An additional term for exceptions will lead to misunderstandings and will support a "free" non-application of the TSI SRT. The question if a project is at an advanced stage or not should always be answered in the course of the 2008/57/EC process. Reference to Directive 2008/57 article 2 t) has to be made.*
- *The definition of new/upgraded/renewed must be in line with the definition of the Infrastructure TSI!*

7.2

General rule for:

- **RST and CCS on board subsystems**
- **INF, ENE and CCS trackside**

Assemblies and components that are not included in the scope of a particular upgrade or renewal programme do not have to be made compliant at the time of such a programme.

In the event that a subsystem relevant to tunnel safety is re-assessed against any other TSI as a result of renewal or upgrading works, it shall only require re-assessment against this TSI in respect of those systems and components directly affected by the works.

Justification: very important sentences to be added. Look at § 7.2.1, 7.2.2 and 7.2.3 of the SRT TSI in force! If the ERA does not wish to agree on such a sentence, it shall prove by a CBA it is possible not to write this; and I am sure they cannot prove it!

7.2.2. Upgrade and renewal measures for tunnels

The requirement of the current TSI seems to be clearer. A new text is proposed. In any case the definition must be in line with the Infrastructure TSI:

New text proposal:

"7.2.2. Upgrade and renewal measures for tunnels

Taking into consideration Directive 2008/57/EC, Article 20(1), any modification of the basic parameters of the structural subsystems as set out in this TSI is deemed to affect the overall safety level of the infrastructure subsystem concerned. Therefore, Member States shall decide to which extend this TSI needs to be applied to the project.If the Member State doesn't give instructions about the compliance of a upgrading or renewal project to this TSI, following measures shall be implemented for tunnel longer than 1000 m

INS

— 4.5.1 Inspection of tunnel condition (responsible entity: IM)

— 4.2.2.2 Prevent unauthorised access to emergency exits and equipment rooms (responsible entity: IM)

— 4.2.2.4 Fire safety requirements for building materials (only for the new material to be installed.

Responsible entity: IM, procurement entity)

— 4.2.2.9 Escape signage (responsible entity: IM)

— 4.2.2.10 Emergency communication (responsible entity: IM)

ENE

4.2.3.4 Requirements for electrical cables in tunnels, when replacing cables (responsible entity: IM)

If not defined otherwise in section 7.5 'Specific Cases', the result of renewal or upgrade works shall ensure compatibility of the fixed installations with SRT TSI compliant rolling stock.

Guidance to Member States: In case of upgrade and renewal of existing tunnels, this TSI shall be implemented as far as feasible within the project constraints. If a TSI requirement cannot be fully met, it is permitted to improve the original situation towards the TSI defined performance. During upgrade or renewal the safety level of the fixed tunnel installations shall be maintained or improved.

Application guide: a reference will be made to UNECE (TRANS/AC.9/9, 01.12.2003) that says in part E 'There are a great many tunnels already in service. Many of them were built when safety considerations were less stringent than today. Obviously they cannot be adapted at reasonable cost to the dimensions suggested for new tunnels. But safety in railway tunnels does not depend only on structural measures — it can be enhanced also through rolling stock and operational measures. Therefore, the Group recommends that safety plans (2) for existing tunnels should be established, assessing their safety level and proposing to raise this level, if necessary, through measures that could be realized at reasonable costs. The Group expects these measures to be selected among the minimal standard measures for new tunnels, the first priority being given to non-structural measures.'"

Disclaimer

Community of European Railway and Infrastructure Companies (CER) AISBL

Avenue des Arts 53
B-1000 Brussels
Belgium

Tel +32 2 213 08 70
Fax +32 2 512 52 31
contact@cer.be