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Commission d'experts techniques
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Committee of Technical Experts

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EXCHANGEABLE PASSENGER COACHES

Discussion document for WG TECH 23

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1. BACKGROUND AND INTRODUCTION

As the UTP LOC&PAS, which is scheduled to enter into force on 1.1.2015, will take precedence over the technical provisions of RIC (in accordance with APTU Art.11 § 2a), it is important that coaches meeting certain defined conditions have the same 'free circulation' as RIC coaches have had for many decades (RIC has existed since 1922).

In order to achieve this aim, two objectives have to be met:

- Unique admission objective: development of regulations including all requirements necessary for a single admission valid in all Contracting States in accordance with ATMF Article 6 § 3.
- Standardisation objective: a harmonised definition of inter-vehicle interfaces, allowing railway undertakings to couple together coaches from different origins in a train.

2. UNIQUE ADMISSION OBJECTIVE

With the adoption of the UTP LOC&PAS, which is equivalent to the forthcoming LOC&PAS TSI, from 1.1.2015 there will be an equivalent set of rules applicable to all OTIF Contacting States. This will create the basis for the application of ATMF Article 3a §§ 1 and 2 and ATMF Article 6 § 3, which set out the requirements for the admission to operation of vehicles that apply in all Contracting States.

In addition to the precondition of equivalence between the UTP and TSI and the full application of the UTP/TSI without derogations, some additional criteria have to be met to permit unique admission, in particular:

- The vehicle must not be subject to specific cases which affect compatibility with the network, and
- There should be no open points in the UTP/TSI which are related to compatibility with the infrastructure.

Due to the open points listed in Appendix I of the TSI/UTP, vehicles which it may be suitable to design and build to be exchangeable should not be subject to any open point which is related to compatibility with the network. The open points that relate to technical compatibility between the vehicle and the network are listed below:

Element of the Rolling Stock sub-system	**Clause of TSI LOC&PAS**	**Technical aspect not covered by this TSI LOC&PAS**	**Comments**
Compatibility with train detection systems	4.2.3.3.1	See specification referenced in Annex J-2, index 1.	Open points also identified in the TSI CCS.
Running dynamic behaviour for 1520 mm track gauge system	4.2.3.4.2 4.2.3.4.3	Running dynamic behaviour. Equivalent conicity.	Normative documents referred to in the TSI are based on experience gained on the 1435 mm system.

Braking system independent of adhesion conditions	4.2.4.8.3	Eddy current track brake.	Equipment not mandatory. Compatibility with relevant network to be checked.
Aerodynamic effects for 1520 mm, 1524 mm and 1668 mm track gauge systems	4.2.6.2	Limit values and conformity assessment.	Normative documents referred to in the TSI are based on experience gained on the 1435 mm system.
Aerodynamic effect on ballasted track for RST of design speed ≥ 190 km/h	4.2.6.2.5	Limit value and conformity assessment in order to limit risks induced by the projection of ballast.	On-going work within CEN. Open point also in TSI INF.

The table above indicates that narrowing down the scope to:

- Coaches for the 1435 mm network
- With a maximum operating speed of <190 km/h and
- Not fitted with an eddy current brake,

will only have an open point related to compatibility with the network for train detection systems. If in addition the coach is not fitted with a driving cab or pantograph and does not have variable-gauge wheel sets, the open points which are not related to compatibility with the network do not apply either.

The ERA LOC&PAS working party on unique authorisation is analysing the closure of the train detection open point. In accordance with Article 3 of the Administrative Arrangements between OTIF, DG MOVE and ERA, OTIF should be kept informed of recommendations and draft EU legal provisions.

The information received from ERA and DG MOVE will be forwarded to the OTIF Working Group Technology and/or the Committee of Technical Experts, where the necessary steps to amend OTIF legal provisions will be decided upon.

3. STANDARDISATION OBJECTIVE

Two elements seem indispensible for exchangeable coaches: retrospective compatibility with RIC coaches and compliance with the TSIs.

Retrospective compatibility should ensure that when a new exchangeable coach is integrated into a train with traditional RIC coaches, the train should at least function as if all the coaches were traditional RIC coaches. Some TSI functions which are new compared to the RIC agreement might not work at train level, e.g. the passenger alarm and door-traction interlock.

Compliance with the TSIs would mean that each technical solution should be compatible or compliant with the TSI/UTP requirements and when a train is composed of new coaches, all TSI functions should work.

The TSIs/UTPs do not define exhaustively all inter-vehicle interfaces that would be necessary to ensure compatibility between coaches. On the one hand, there are justified reasons for this, e.g. legislation should give the railway sector the freedom to agree on the most suitable

solutions for their business needs. On the other hand, some harmonisation of technical solutions would be required in order to allow for the exchange of coaches in international traffic. It is debatable whether such harmonisation would best be included in (international) legislation or in (railway industry) standards.

In the scope of COTIF, the exchange of vehicles at border-crossing stations remains the only type of international passenger traffic for many of the non-EU Contracting States. For that reason the inter-vehicle interfaces are very important for OTIF.

As a result of the ERA/OTIF workshop held in Bonn on 6 February 2014, CER was sent a letter in which it was invited to provide information regarding passenger coaches with respect to the subjects listed below:

1. *Inventory of market needs for harmonised/standardised inter-vehicle interfaces and a description of the present organisation of passenger transport using coaches.*
2. *A list of all requirements (already existing or not) needed by the sector to support:*
    - *The transport mentioned in point 1 and*
    - *Simplification to meet operational constraints and responsibilities (SMS).*
3. *An inventory of requirements listed in 2, which already exist, where they exist (TSI, EN, RIC, UIC, etc) and how they are assessed/applied today.*
4. *With respect to the requirements in point 2 and in particular those which, according to CER, do not yet exist in the correct form:*
    - *Where should these requirements be specified (TSI, EN, application guide, RIC update)*
    - *Who should check/assess the correct application of each requirement?*
5. *Following point 4, definition of the need to develop standards, UIC leaflets, (application) guidelines, etc.*
6. *Analysis of the need for specific markings.*

CER replied in a letter dated 25.6.2014, which is attached to this document.

In addition to meeting the requirements for unique admission, the definition of standardised technical solutions necessary to facilitate the exchange of coaches in international traffic can be divided into three categories of standardisation:

Category 1: Selection of TSI/UTP options

This category concerns a selection of options described in the TSI/UTP, e.g. the coach should have:

- A manual coupling system of the UIC type in accordance with TSI/UTP 4.2.2.2.3.
- A UIC brake system in accordance with TSI/UTP 4.2.4.3(1).
- A specific gauge in accordance with TSI/UTP 4.2.3.1, e.g. gauge G1.

- The category for fire safety in accordance with TSI/UTP 4.1.4, e.g. category B.

The selection of these options can be documented in the Technical File.

Category 2: Standardised solutions for meeting legal requirements

This category concerns the definition of a set of technical solutions in order to meet legal requirements in a harmonised manner. This category is the typical domain of harmonised standards, e.g. to define:

- Dimensions of the physical inter-vehicle interfaces, such as connectors, hoses, gangways, etc.
- Power distribution and signal transmission in order to allow for the TSI/UTP required functioning of e.g. audible communication, passenger alarm, exterior door control, tail lamps, etc.

Most of these technical solutions are already covered by standards or UIC leaflets.

Category 3: Additional harmonisation

This category concerns additional specifications, which are not directly related to legal requirements, but to business, operational, or organisational needs. Such specifications could include, for example:

- Additional specifications to ensure retrospective compatibility with RIC coaches.
- Specific markings in addition to the legally required markings.
- Footsteps and handrails for staff.
- Requirements related to auxiliary power supply.

As these specifications have no origin in TSI/UTP requirements, harmonisation may be achieved at sector/business level in the form of multilateral agreements.

4. ROADMAP

As mentioned in section 2 of this paper, ERA is working on the specifications which would enable the unique admission of passenger coaches. In parallel, there needs to be standardisation as set out in section 3 of this paper.

Step 1: technical definition

For each of the above-mentioned categories of standardisation, the requirements should be specified. As a first step, the sector (e.g. led by CER and/or by UIC) should collect and define a comprehensive set of specifications for each of the three categories.

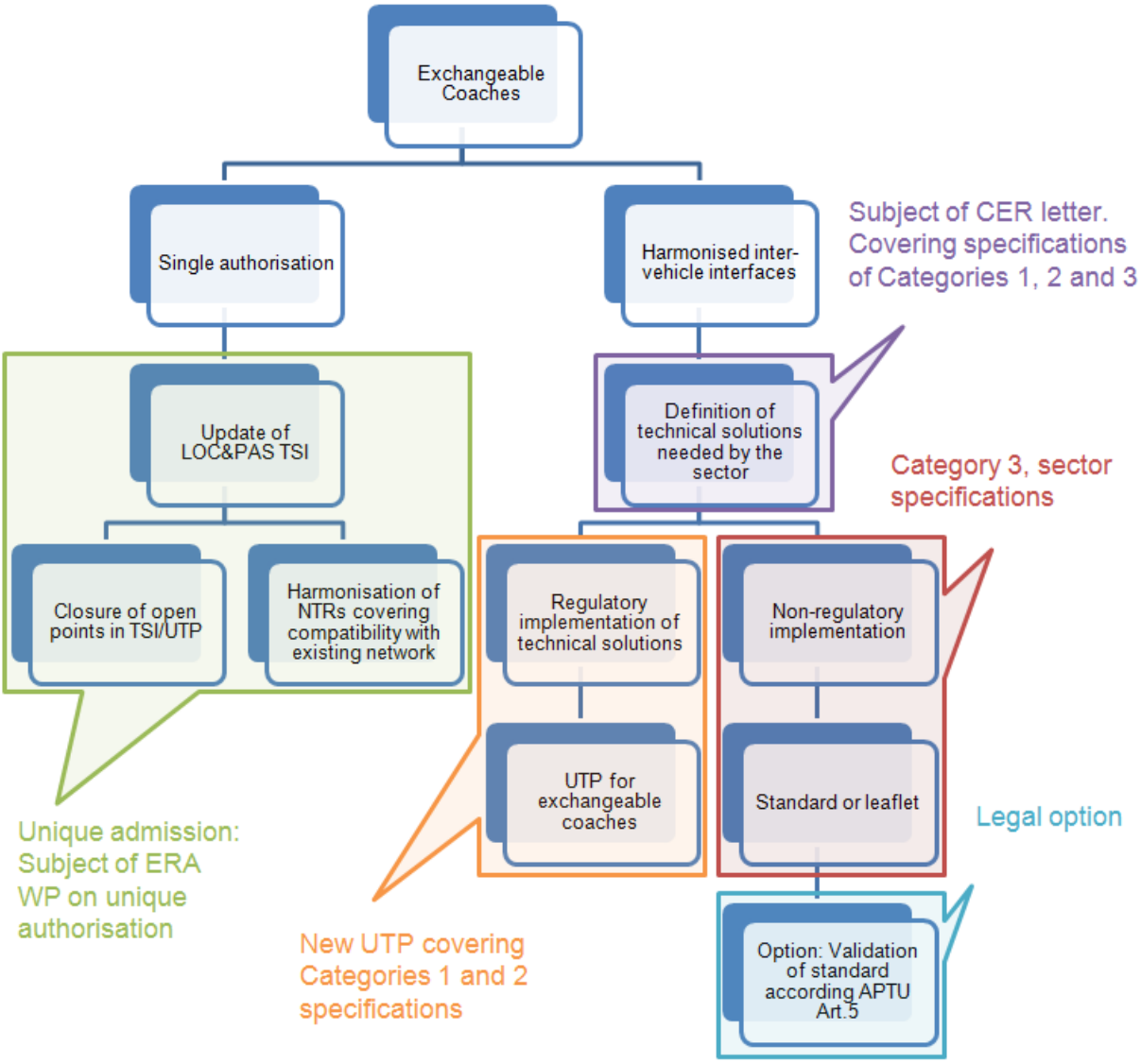
Only if the first step is completed may these technical solutions be implemented in the legal framework as a second step.

Step 2: implementation in legal framework

The OTIF Secretariat proposes the implementation of harmonisation at two levels:

1. A new UTP for passenger coaches intended to be exchanged in international traffic, covering the standardisation for Categories 1 and 2, and

2. A sector agreement (e.g. an update of the RIC agreement), to complement the UTP to cover Category 3.



As a precondition for its application, the new UTP would be fully compliant with the UTP/TSI LOC&PAS in such way that the vehicle is authorised in all MSs. The UTP should make reference to a catalogue of technical specifications referred to in this paper as Category 1 and Category 2. The UTP will define a comprehensive set of inter-vehicle interfaces including the train-wide data and signal transfer. The correct functioning at train level of these interface functions relies partly on technical solutions and partly on operational aspects (correct coupling, maintenance, etc.). It should be made clear who bears which responsibility for the application of the standards for vehicle interfaces. Therefore, a UTP could indicate relevant operating rules in section 4.4.

The UTP would only be mandatory for passenger coaches which are designated by the applicant as being exchangeable (to be indicated in the Technical File). All other types of vehicles, including coaches not designated as being exchangeable, would not be subject to the application of the new UTP.

It might not be necessary for the EU to adopt equivalent provisions, as the provisions would be voluntary in their application and if they were to be applied they would also be valid/recognised in the EU through the OTIF UTP. Therefore, a coach complying with the provisions would be recognised as being exchangeable in international traffic by all OTIF Contracting States, including those which are also EU MS.

The Category 3 specifications defined as being necessary for the successful exchange of coaches, but which are not covered by the above-mentioned new UTP, could be included in a sector agreement.

5. CONCLUSIONS

The OTIF Secretariat suggests that WG TECH should adopt the following conclusions:

1. WG TECH should monitor the activities and conclusions of the ERA LOC&PAS working party on 'unique authorisation' and invites ERA to provide regular updates in this respect.

2. If amendments to the LOC&PAS TSI are envisaged, WG TECH should also analyse these amendments for the UTP LOC&PAS, with a view to maintaining full equivalence between the TSI and UTP.

3. The railway undertakings, led by CER, should provide a comprehensive list of specifications needed for the exchange of coaches in international traffic, such that these coaches are retrospectively compatible with (a particular fleet of) RIC coaches.

4. After the specifications have been provided by the sector, these should be categorised by WG TECH in accordance with the three categories set out in section 3 of this paper.

5. The specifications which fall under Categories 1 and 2 set out in section 3 of this paper should be referred to in a dedicated draft new UTP for exchangeable coaches, to be proposed for adoption to the CTE.

6. The specifications which fall under Category 3 set out in section 3 of this paper should be set out in a sector agreement, e.g. an update to the RIC agreement.

ANNEX: COPY OF CER LETTER OF 25.6.2014

CER

The Voice of European Railways

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Brussels, 25 June 2014

Inter-vehicle interfaces for passenger coaches

Dear Ms Gigantino, Dear Mr Davenne,

CER is glad to participate in the work initiated by OTIF to achieve international authorisation and refine the requirements applicable to interchangeable passenger carriages.

A single authorisation valid in all Member States in Europe and for all COTIF contracting states would certainly decrease the cost and the time for delivery of new vehicles placed into service. It is an important step forward in reaching the general objective of having TSIs with no open points and no specific cases, and should follow the example of the TSI WAG, which demonstrates the feasibility of "Go Everywhere" and "Compatible Wagons".

However, CER stresses that priority should be given to the study of "basic" passenger carriages without driving cabs or pantographs and running at a speed lower than 200 km/h. The final aim should be to achieve international authorisation and interchangeability for all types of rolling stock in the scope of the TSI LOC&PAS, but as a first step it seems that focusing on passenger carriages is much simpler and could allow quick wins for the sector. Considering the

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technical standards available and the experience gained from wagons, CER believes that there are no obstacles to defining new provisions, in the short term, for TSI LOC&PAS, similar to clause 7.1.2 and Annex C of the TSI WAG. The annex to this letter gives the list of requirements needed by the sector to support business needs and simplify operational constraints (e.g. update of SMS). The scope is comparable to Annex C of the TSI WAG; including requirements for the interface with the TSI CCS. All requirements proposed in this annex exist today and are in the public domain; they are applied on a voluntary basis (part of the tender process) and a number of them that are related to functions defined in the TSI are assessed by NoBo.

An approach to international authorisation and coach interchangeability should be incorporated into the TSI LOC&PAS and the "confidence principle" should be replaced by third party assessment, as for wagons. Today only the cross acceptance principle is applied leading to the significant risk that the assessment of some requirements covered by the first authorisation of a vehicle would be required more than once (i.e. duplicated).The TSI should therefore include all the details necessary to achieve an international authorisation (i.e. the application guide cannot solve the problem).

Without full compatibility with the list of requirements presented in Annex 1 (applied on a voluntary basis), the coupling of two types of vehicles requires specific verification. The authorization process should include these requirements in order to facilitate free and flexible operation while composing a train with different types of coaches. Therefore, the TSI is the best place to define the provisions applicable for the authorization of international and interoperable rolling stock.

Best Regards,

CER

Annex 1

List of requirements for new TSI LOC&PAS annex comparable to annex C of TSI WAG

Introduction

Harmonising key technical parameters and achieving international authorisation for passenger carriages would be of great value to the sector. It would contribute to opening the market for suppliers as well as operators. Moreover the remaining value of such vehicles when they get older, would increase, if the carriages could be coupled to each other. Only technical characteristics based on UIC code for RIC can ensure maximum operational flexibility in line with the demands of the passenger market of today (one cannot predict when a vehicle is produced where it will be operated during its entire life cycle).

In the past, the vast majority of passenger carriages were compliant with the "RIC-based specification". Since the introduction of the TSI LOC&PAS, no such coherent approach exists, and no definition of an "interoperable and interchangeable coach" exists. The current focus on interoperability (line access) and interchangeability (coupling) has led to the numerous requirements defined in the prescriptive UIC code for RIC carriages being limited.

An annex to the TSI, applied on a voluntary basis, can solve this problem. Today, only the legal requirements (TSI & NNTR) are assessed by an independent body. The scope of authorization should include all technical parameters requested in this annex for full technical compatibility (interchangeability) to facilitate the free and flexible operation of passenger carriages in train compositions.

The application of the wagon TSI for newly authorised vehicles demonstrates the market success of a voluntary annex shaping harmonised requirements for interoperable and interchangeable vehicles.

General:

Most of the content of TSI WAG Annex C can be reused for passenger carriages (covering for example brake pipes - EN 15807, coupling - EN 15566, mechanical clearances, handles, steps - EN 16116-1, buffers - EN 15551).

The following requirements proposed to be included in the TSI LOC&PAS Annex have to be understood as a first checklist to be discussed and validated. CER will be glad to support ERA and OTIF in fine-tuning it.

Gangways:

EN 16286-1 - Annexes A and B

Brake:
In TSI WAG Annex C, to be completed by EN 14198, 15179

Electric Power supply (for HVAC …):
UIC 550 and 552 (to be transformed into a new EN)

Train-wide information and control:
Before, RIC required UIC 558 (Information System – interoperable cable / plug for RIC basic information and control functions between passenger carriages such as lighting …)

In addition to the previous RIC, TSI PRM and TSI LOC&PAS require new functions. Reference to UIC 541-6 is needed for the train-wide data communication. Data formats should be standardised for the following functions:

- Call for aid devices (EN 16683);
- Communication devices (EN 16683);
- Door control (EN 14752);
- Dynamic visible information;
- Dynamic audible information;
- Fire detection systems;
- Passenger alarm devices (EN 16334).

NOTE: The cabling according to UIC 541-6 may be replaced by "radio communication" in the future, but the data format should also be set.

Structure of the vehicle:
EN 12663-1 Category PI

Coupling:
Buffers EN 15551 – stroke 110 mm + § 2.2.4 of UIC 567
Draw gear EN 15566 + UIC 567-3+ Height between buffer and Draw hook

Note that additional parts of UIC567 will have to be considered (§1.2.1 (capability for running on horizontal curves), §1.5.2 and § 2.1.4 (compatibility with embarkation onto ferry-boats – UIC 569)): to be discussed

Marking:
EN 15877-2 (perhaps complimented by UIC 580) + TSI OPE

And add new specific markings:
EN 15877-2, perhaps complimented by UIC 580, and marking in accordance with TSI WAG Annex C for coaches (like GE and CW for TSI WAG)

Gauge:
Kinematic G1 + GI2 in load condition "design exceptional mass"
GI1 for passing over marshalling humps in load condition "working order"

Fixed electric signal lamps + Signal Lamp brackets:
UIC 532

Compatibility with train detection system:
Maximum length between two adjacent axles to be set

Wheels:
Only forged and rolled wheels