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Analysis of the feasibility of developing specific UTP requirements for vehicles that can be used freely in international traffic

1. INTRODUCTION

At its 14th session (Bern, 14-15 June 2022), the Committee of Technical Experts (CTE) decided, inter alia, that for the next session an analysis of the feasibility of developing specific UTPs, or parts thereof, dedicated to vehicles that can be used freely in international traffic (to replace the former technical provisions of RIC) should be prepared. This document provides a preliminary proposal for the analysis requested by CTE.

1.1 VEHICLES SUITABLE FOR FREE CIRCULATION

A vehicle suitable for free circulation means that its admission to international traffic is valid in all Contracting States. With regard to free circulation, Article 6 § 3 of the ATMF UR lays down the following:

Without prejudice to Article 3a an admission to operation issued for a vehicle which is in conformity with all applicable UTP shall be valid on the territories of other Contracting States provided that

- a) all essential requirements are covered in these UTP and*
- b) the vehicle is not subject to*
 - a specific case which affects the technical compatibility with the network of the Contracting State concerned, or*
 - open points in the UTP that are related to technical compatibility with the infrastructure, or*
 - a derogation.*

The conditions for the free circulation may also be specified in the relevant UTP.

Within the scope and aims of COTIF, it is important that vehicles can be used in free circulation in international traffic. Free circulation does not mean that the vehicle can literally be used on every line of each network; it always remains subject to route compatibility checks. These checks are in the responsibility of the railway undertaking that uses the vehicle, on the basis of information provided by the infrastructure manager.

1.2 VEHICLES SUITABLE FOR GENERAL OPERATION

Free circulation does not guarantee that a vehicle can be easily exchanged between railway undertakings. For particular use cases, harmonised inter-vehicle interfaces are required. Most freight wagons and, to a certain extent, passenger coaches as well, have harmonised inter-vehicle interfaces so that they can be easily integrated into trains, together with other vehicles with similar interfaces.

Point 2.2.1 of the UTP concerning locomotives and passenger rolling stock (LOC&PAS) defines that *a unit is designed for general operation when the unit is intended to be coupled with other unit(s) in a train formation which is not defined at design stage*. Point 4.2.4.3 of the same UTP adds that *general operation concerns various formations of vehicles from different origins; train formation not defined at design stage*.

1.3 FROM RIV AND RIC TO COTIF

For roughly 100 years, the construction and use of passenger coaches for general operation was governed by the “Regolamento Internazionale delle Carrozze” (RIC) and the construction and use of freight wagons for general operation by the “Regolamento Internazionale Veicoli” (RIV). The RIV agreement

no longer exists and the RIC agreement is no longer a basis on which authorities approve vehicles. The technical provisions for RIC and RIV have been replaced by the COTIF provisions.

In particular, Article 11 § 2 of the APTU UR states as follows:

With the entry into force of the UTP, adopted by the Committee of Technical Experts in accordance with Article 6 § 1, these Uniform Rules as well as the technical standards and the UTP, shall take precedence, in the Contracting States, over the technical provisions

- a) *of the Regulation governing the reciprocal use of carriages and brake vans in international traffic (RIC),*
- b) *of the Regulation governing the reciprocal use of wagons in international traffic (RIV).*

On that basis, the COTIF provisions, in particular the UTP WAG, the UTP LOC&PAS, the UTP Noise and the UTP PRM are the legal successors to the technical provisions of RIC and RIV.

2. THE EXISTING UTP REQUIREMENTS

2.1 THE UTP FOR FREIGHT WAGONS

The UTP for freight wagons (UTP WAG) is based on the EU TSI for freight wagons (TSI WAG). Therefore, to understand the rationale of the structure of the UTP, it is relevant to look back at some of the discussions that took place at EU level concerning the TSI,

At the development stages of the TSI WAG at EU level, over a decade ago, there was debate as to whether the specifications for inter-vehicle interfaces (i.e. compatibility within the rolling stock subsystem) belonged in the legal (TSI) domain or rather in the domain of voluntary standards/harmonisation, which is controlled by the sector. One of the arguments against legally mandating interfaces within a subsystem (i.e. between vehicles) in the TSI was that these were not strictly necessary for interoperability. A compromise was found by specifying three layers of requirements:

1. The **basic parameters** set out in chapters 4 (for subsystems) and 5 (for interoperability constituents) of the TSI and sometimes referred to as the 'core TSI'. Basic parameters set out the requirements that are strictly necessary for interoperability. However, they do not form a comprehensive description of how to design or construct a vehicle. Compliance with these basic parameters is compulsory. These basic parameters are, where possible, defined by functional/performance requirements, or, where necessary, by technical solutions.
2. Specifications for **free circulation** described in section 7.1.2 of the TSI concerning the mutual recognition of the first authorisation of placing in service (later renamed to first authorisation of placing on the market). Chapter 7.1.2 lists technical solutions that ensure compliance with some of the provisions of chapter 4.2 of the TSI (the functional and technical specifications of the subsystem). Compliance with chapter 7.1.2 is optional; however, if the applicant chooses to apply the provisions of Chapter 7.1.2, it must be applied in its entirety.
3. Specifications for **general operation** are described in appendix C of the TSI that sets out additional optional provisions, which are mainly intended to facilitate the exchange of wagons between railway undertakings. Applying Appendix C allows new wagons to be used in a pool together with older wagons built in accordance with the former RIV agreement.

For OTIF, not only the first, but also the second and third levels of these specifications serve the core purpose of the Organisation; to facilitate international traffic by rail. All three levels have been included in the UTP WAG.

Below is a summary of the provisions for levels two and three.

Provisions for free circulation in section 7.1.2 of the UTP WAG include requirements for:

- Forged and rolled wheels;
- Recording in the technical file whether or not there is compatibility with line side axle bearing monitoring;
- Gauge G1, GA, GB or GC;
- Compatibility with train detection systems based on track circuits, on axle counters and on loop equipment;
- The coupling system;
- The brake system;
- Marking.

Provisions for general operation from Appendix C of the UTP WAG include requirements for:

- Standardised buffer and draw gear (this will in future be complemented or replaced by the specifications for the digital automatic coupler);
- Standardised footsteps and handrails;
- Ability to be hump shunted;
- Free space under lifting points;
- Marking;
- The vehicle fitting within the G1 gauge;
- Tests concerning longitudinal compressive forces;
- Standardised brake system and interfaces;
- Location of the parking brake handle;
- Temperature ranges for air reservoirs, hoses and grease;
- Welding standards;
- Compatibility with 1435 mm track gauge;
- Thermal capacity of the brake system;
- Wheel properties;
- Tow hooks;
- Protective devices on protruding parts;
- Label holders and attachment devices for rear end signal;
- Compatibility with line side axle bearing monitoring;
- Running dynamic behaviour.

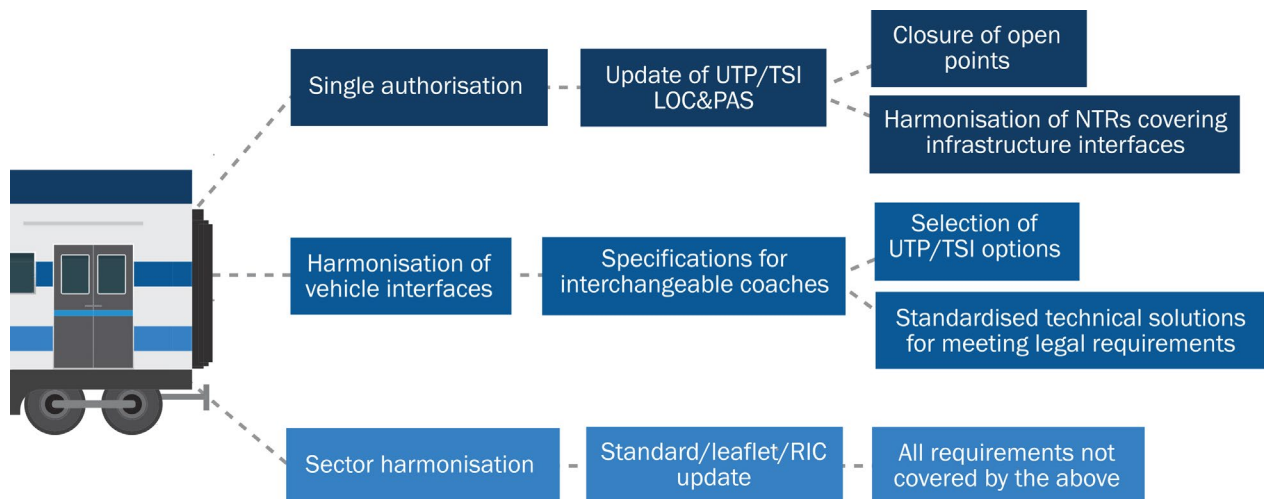
2.2 THE UTP FOR LOCOMOTIVES AND PASSENGER ROLLING STOCK

The UTP LOC&PAS is based on the EU TSI LOC&PAS. From its inception, the UTP LOC&PAS did not provide the full specifications needed for free circulation or general operation. Firstly, the UTP LOC&PAS contains open points and specific cases that prevent admission in all CSs. Secondly, the UTP LOC&PAS does not yet contain provisions that standardise the interfaces and protocols for train-level communication. Without such provisions, it will not be possible to compose a train with random coaches for general operation that will fulfil all required functions at train level (e.g. for passenger alarm).

2.2.1 PROVISIONS FOR PASSENGER COACHES

The UTP LOC&PAS contains several provisions which specifically apply to units for use of vehicles in general operation. The UTP does not limit the concept of general operation to coaches only, but in practice, only vehicles without a cab and without traction, i.e. coaches, can meet the requirements. In 2014 and 2015 OTIF promoted the development of further provisions for the general operation and free circulation of coaches. The latest update on these efforts were described in working document [TECH-16012](#), which was prepared for the 9th session of the Committee of Technical Experts in 2016. The working document identified the following three levels of harmonisation required for passenger coaches in order for them to be suitable for general operation:

1. Unique admission/authorisation: the vehicle must not be subject to specific cases which affect compatibility with the network, and
2. Harmonised inter-vehicle interfaces: there should be no open points in the UTP/TSI relating to compatibility with the infrastructure, and
3. Agreements between railway undertakings and/or manufacturers to use, e.g., harmonised operational and communications concepts.



As a result of the discussions at OTIF level, the subject was placed on the EU agenda for inclusion in the TSI. Commission Implementing Regulation (EU) 2019/776 of 16 May 2019 added a new section 6.2.7a to the TSI LOC&PAS, which lists optional requirements for units intended to be used in general operation. On 1 January 2022, a revised versions of the UTP LOC&PAS entered into force, which also contains section 6.2.7a.

Section 6.2.7a of the UTP LOC&PAS includes requirements for:

- A manual coupling system;
- A standardised brake system;
- A temperature range within which the vehicle should function;
- Fixed tail lights;
- A gangway, if one is fitted on the vehicle;
- Power supply;
- Standardised 18-conductor cable at the interfaces with other vehicles;

- Marking.

Discussions at EU level are still ongoing to include further specifications that will facilitate or enable the free circulation of passenger coaches. The OTIF Secretariat is involved in these discussions and supports the objectives. Once these specifications are ready, the Secretariat will prepare proposals to include them in the UTP LOC&PAS.

2.2.2 PROVISIONS FOR LOCOMOTIVES AND MULTIPLE-UNITS (TRAINSETS)

Vehicles with electric traction and driving cabs have additional and more complex interfaces with the infrastructure (signalling, traction power supply, electromagnetic compatibility) than wagons and coaches have. Currently, it is not feasible to define a comprehensive set of requirements that would make locomotives or trainsets suitable for free circulation.

Nevertheless, there are currently several examples of locomotives and trainsets that operate in cross border traffic between several Contracting States. Efforts could be made to capture the technical solutions selected for such locomotives and trainsets and list them as optional requirements in a UTP.

The proposed concept is possibly best illustrated by an example of how the requirement could be formulated:

Requirements A, B and C are optional and compliance with them shall be additional to compliance with the requirements in the UTP LOC&PAS. If requirements A, B and C are complied with, the area of use of the vehicle will include States X, Y and Z.

Some of the technical solutions may be intellectual property of the manufacturer, which could stand in the way of describing the solutions in UTPs. This is why such optional specifications should be defined with help of the sector (e.g. UIC, CER, UNIFE).

It is worth noting that proposals for UTPs can be made by the Secretary General, Contracting States, Regional Organisations (i.e. the EU) and *by representative international association for whose members the existence of UTP relating to railway material is indispensable for reasons of safety and economy in the exercise of their activity.*

3. IDEAS FOR A NEW UTP

In accordance with the considerations in this paper, vehicles that can be easily used or exchanged in international traffic are of major importance to the scope and aims of OTIF. The UTPs are the legal instruments of OTIF to ensure this. In the current structure of the UTPs, the provisions allowing vehicles free circulation and the provisions allowing them to be used in general operation are either not prominent, incomplete or do not exist.

It is therefore proposed to give more prominence in COTIF to the provisions for free circulation and to the specifications that facilitate the use of vehicles in general operation.

For these reasons, the **Secretariat suggests creating a new UTP for vehicles suitable for free circulation and for vehicles suitable for general operation.** The new UTP should cover all types of vehicles; wagons, passenger rolling stock and locomotives. This new UTP should contain the existing provisions from section 7.1.2 of the UTP WAG and from section 7.2.6a of the UTP LOC&PAS, but also anticipate the development of further new provisions.

The new UTP could contain two levels of optional specifications for each type of rolling stock; one level for free circulation, allowing a wide area of use during the first admission of a vehicle and one level for general operation, facilitating the use and exchange of vehicles by railway undertakings.

Currently, a full set of specifications for both free circulation and general operation is only available for freight wagons. It is suggested that these provisions be moved to the new UTP.

Application of the optional provisions should always be additional to compliance with the other applicable UTPs. Compliance with either the UTP WAG or the UTP LOC&PAS therefore remains the basis. There should be cross references between the new UTP and the applicable relevant UTPs.

The relevant specifications for passenger coaches are being drafted at EU level. A full set of specifications for locomotives and trainsets is pending. The new UTP would therefore be subject to gradual completion.

The new UTP would bring several benefits:

- Underline the importance of these rules for free circulation and general operation of vehicles;
- The structure of the rules would be clearer for (aspirant) non-EU Contracting States, which do not currently implement full interoperability;
- The UTP could be complemented by harmonised optional provisions at the request of the sector, to cover elements that would not normally be covered in TSIs at EU level. It is usually faster to update a UTP than to create or amend an international standard.