


Making the railway system
work better for society.

Guide for the application of the TSI OPE

In accordance with Article 19(3) of Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016

	<i>Drafted by</i>	<i>Validated by</i>	<i>Approved by</i>
<i>Name</i>	Beatrijs Claeys Karen Davies Georgios Kouparousos Emanuele Mastrodonato Roberto Mele Ellen Rogghé Elzbieta Sieczkowska	Pio Guido	Pio Guido
<i>Position</i>	Project Officers	Head of SAFO unit	Head of RSY department
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<i>Signature</i>			

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1 Scope of this guide

1.1 Content of the guide

Guidance on the application of the technical specification for interoperability relating to the operation and traffic management subsystem of the rail system in the European Union by railway undertakings and infrastructure managers.

1.2 Reference documents

<i>DOCUMENT REFERENCE</i>	<i>OFFICIAL JOURNAL</i>
[1] Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016 on the European Union Agency for Railways	L 138, 26.5.2016, p. 1-43
[2] Directive (EU) 2016/797 of the European Parliament and of the Council of 11 May 2016 on the interoperability of the rail system within the European Union	L 138, 26.5.2016, p. 44-101
[3] Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety	L 138, 26.5.2016, p. 102-149
[4] Directive 2012/34/EU of the European Parliament and of the Council of 21 November 2012 establishing a single European railway area	L 343, 14.12.2012, p. 32-77
[5] Directive 2007/59/EC of the European Parliament and of the Council on the certification of train drivers operating locomotives and trains on the railway system in the Community	L 315, 03.12.2007, p. 51-78
[6] Regulation (EU) 2015/995 on the technical specification for interoperability relating to the operation and traffic management subsystem of the rail system in the European Union △ Art. 5 : Appendixes A and C of the Annex to Decision 2012/757/EU may continue to apply by 16 June 2024 at the latest	L 165, 30.06.2015, p. 1-69
[7] Regulation (EC) No 402/2013 on the common safety method for risk evaluation and assessment as referred to in Article 6(3)(a) of Directive 2004/49/EC of the European Parliament and of the Council	L 121, 03.05.2013, p. 8-25
[8] Decision (EU) 2018/1614 laying down specifications for the vehicle registers referred to in Article 47 of Directive (EU) 2016/797	L 268, 26.10.2018, p. 53-91
[9] Regulation (EU) 2018/762 establishing common safety methods on safety management system requirements	L 129, 25.05.2018, p. 26-48
[10] Regulation (EU) 2012/1078 on a common safety method for monitoring to be applied by railway undertakings, infrastructure managers after receiving a safety certificate or safety authorisation and by entities in charge of maintenance	L320, 17.11.2012, p. 8-13

<i>DOCUMENT REFERENCE</i>	<i>OFFICIAL JOURNAL</i>
[11] Regulation (EU) 2023/1695 on the technical specification for interoperability relating to the ‘control-command and signalling’ subsystems of the rail system in the European Union	L 222, 8.9.2023, p. 380-560
[12] Regulation (EU) 2019/773 on the technical specification for interoperability relating to the operation and traffic management subsystem of the rail system within the European Union	L 139I, 27.05.2019, p. 5-88
[13] Regulation (EU) 2023/1693 amending Implementing Regulation (EU) 2019/773 on the technical specification for interoperability relating to the operation and traffic management subsystem of the rail system within the European Union	L 222, 8.9.2023, p. 1-87
[14] Regulation (EU) 2019/777 on the common specifications for the register of railway infrastructure	L 139I, 27.5.2019, p. 312-355
[15] Directive 2008/68/EC on the inland transport of dangerous goods	L 260, 30.9.2008, p. 13–59

1.3 Definitions and abbreviations

The tables with definitions and abbreviations are available in the general “Guide for the application of the Technical Specifications for Interoperability”. This guide is accessible from the common page of all TSIs [Technical Specifications for Interoperability | European Union Agency for Railways \(europa.eu\)](https://www.era.europa.eu/technical-specifications-for-interoperability).

Direct link to the general guide is here:

https://www.era.europa.eu/system/files/2023-12/TSI_General_Guide.pdf?t=1712001377

2 Guidance on the application of the TSI OPE

2.1 Introduction

2.1.1 The purpose of this document is to provide guidance on certain concepts and procedures referred to in Directive (EU) 2016/797 on the interoperability of the rail system within the European Union and the related technical specifications for interoperability (TSI) for Operation and Traffic Management (OPE) subsystem. The Guide also provides links to the requirements for the Safety Management System (SMS) contained in Directive (EU) 2016/798 on operational safety. Although the TSI OPE is about delivering interoperability, operational safety is also a key element. The TSI OPE is different to structural TSIs in that it must be considered in the RU's and IM's SMSs (operational) process(es) and this is verified through the assessment to issue the single safety certificates and safety authorisations.

2.1.2 This application guide has been developed with the contribution of the TSI OPE Working Party.

This application guide gives an overview of the OPE-subsystem and indicates where to locate in the TSI the principles of the application of the TSI OPE. It gives additional information and explanation on specific requirements contained within the TSI OPE **and explains how these requirements are linked to** the Common Safety Method for Safety Management System Requirements, which RUs and IMs must comply with. This Guide and CSM on SMS requirements provides explanation on procedures for operations, which are consistent with the requirements in the TSI OPE. To provide further clarification, TSI OPE contains fundamental operational principles (FOPs), which set high-level requirements for ensuring safe operation. These principles should be used as a basis for reviewing and developing operational requirements in the SMS.

2.1.3 This guide is presented so that the reader can understand how the TSI OPE links to the operational elements to be covered in the SMS. Importantly, it provides guidance on how to develop those elements into operational procedures and rules, to ensure the safe operation of the train from start to finish. The first part of the document provides the background to the TSI OPE and the development of Fundamental Operational Principles and how they link to the SMS criteria. This will be important when developing the operational element of the SMS and the shift from national rules mandated at Member State level to risk based company rules. The second part is the Annexes that deal with practical guidance on the TSI OPE. In particular, Annex 1 sets out the FOPs and the relevant guidance in relation to certain parts of the TSI OPE and the related SMS criteria, enabling the RU and IM to develop their approach on this basis.

2.1.4 All applicable legislation must be taken into account by operators. This document is a guide and is therefore not legally binding. However, it clarifies certain concepts and procedures as stated above and will therefore support the common understanding and application of the TSI OPE.

2.2 Scope of the TSI OPE

2.2.1 The scope of the Interoperability Directive [1] covers the entire rail system of the European Union. This TSI covers the whole European rail network within the scope of the Interoperability Directive (Article 1 (3) sets out the scope). However, Member States are permitted to exclude those parts of the rail network from the scope of TSI OPE where the Interoperability Directive itself does not apply. The parameters in which this is possible are set out in Article 1(4) of the Interoperability Directive. RUs using both parts of the network included by the Directive and those that are excluded, are encouraged to use the TSI OPE in order to facilitate consistency and to avoid different systems within companies operating on lines in and out of the scope of TSI OPE. It is also necessary to note that the same logic applies to an RU's or IM's Safety Management System which itself is the means of compliance with the TSI OPE.

2.2.2 Requirements in the TSI OPE that refer to structural subsystems (section 2.2.3) and are listed in the interfaces (section 4.3) are assessed under the conditions defined in each relevant structural TSI.

2.2.3 None of the provisions of the TSI OPE can be used as a justification for a national rule (except for the cases listed under Appendix I).

2.3 TSI OPE rules for implementation

2.3.1 TSI OPE 2019 is fully applicable since 16 June 2021 with exception for 4.2.2.1.3.2 on Train visibility – rear end – freight trains (rear end signal by means of two reflective plates), Appendix A version 5 on ERTMS operational principles and rules (App A) and Appendix C on communication (App C).

2.3.2 TSI OPE 2023 is published as amendments to 2019 version and it entered into force 28 September 2023 (20 days after publication).

2.3.3 RUs and IMs shall adapt their SMSs to consider the changes introduced with 2023 version within 9 month after entering into force of the TSI.

2.3.4 Rear end signals of freight trains by means of two reflective plates shall be accepted with the following phase out:

- From 1 January 2022, along the rail freight corridors with the following exception:
 - (a) 1 January 2026 for Belgium and France;
 - (b) 1 January 2025 for Portugal and Spain.
- From 1 January 2026, in the whole European Union rail network.

2.3.5 Appendices A and C

2.3.5.1 Legal provisions

- Appendices A and C from Decision 2012/757/EU may continue to apply by 16 June 2024 (ref. to Reg 2019/773 art 5);
- Appendices A and C from TSI OPE 2019 apply from 16 June 2024 at latest (ref. to Reg 2019/773 art 6);
- Appendices A and C from TSI OPE 2023 apply from 28 September 2023 (ref. to Reg 2023/1693 Art 2). An IM may postpone, in coordination with the railway undertakings operating on their networks and in accordance with Annex II point 5.1.1 of Commission Delegated Regulation (EU) 2018/762, the Appendices A and C implementation to 16 December 2025 at the latest. This is subject to the conditions set out in the annex point 7.1.1, of the TSI OPE 2019/773 regulation (ref. to Reg 2023/1693 point 7.1.1).

To clarify some questions about this implementation plan raised by the stakeholders, the paragraph below (2.3.5.2) provides the information that should be included in it. This recommendation is the result of multiple discussions in the WP TSI OPE meetings and should give all stakeholders guidance on its content, without prejudice to the involved NSA's legal authority for a request for additional information.

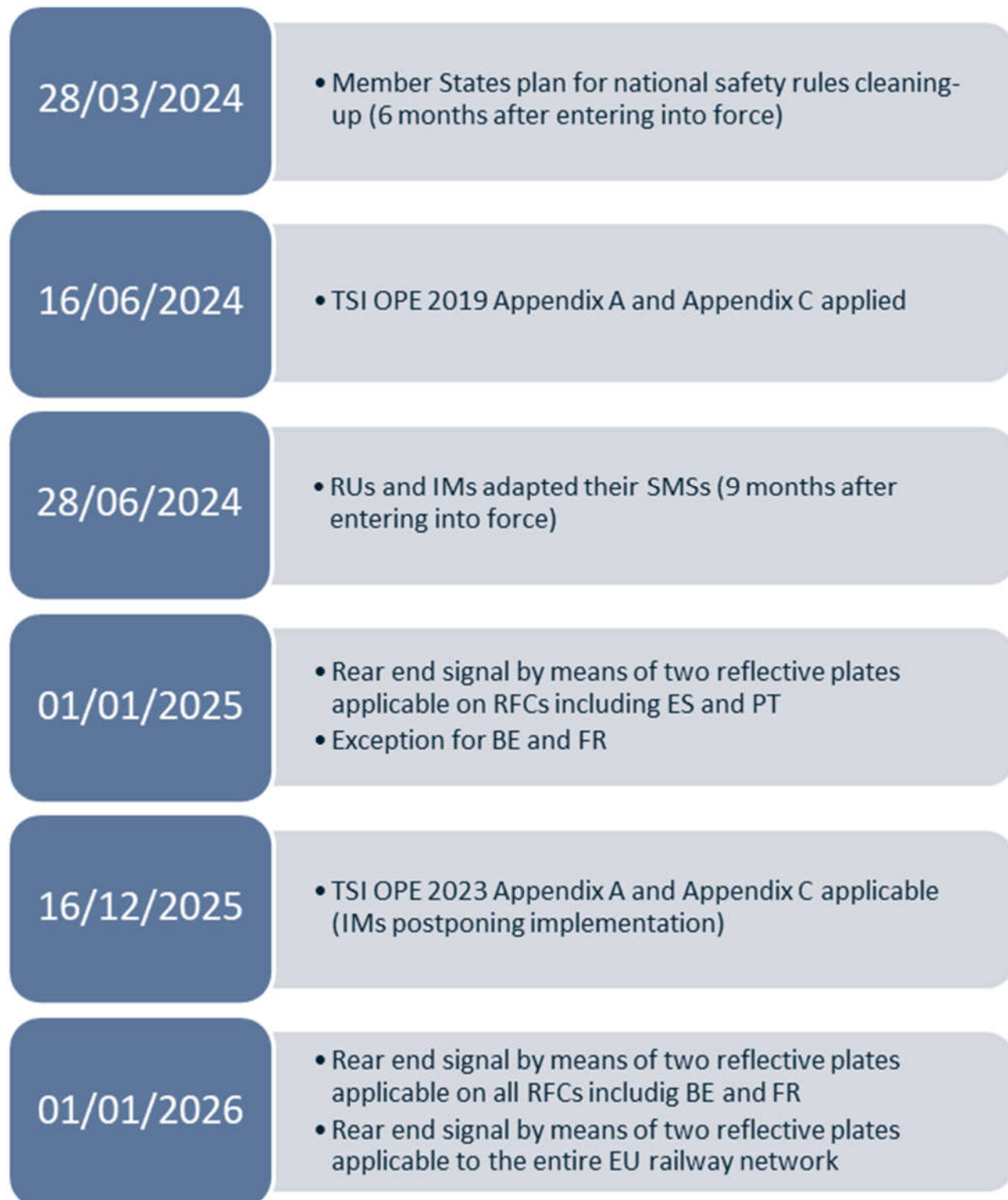
2.3.5.2 Recommendation for the IM's implementation plan for postponement of Appendices A and C

The implementation plan should meet the following essentials:

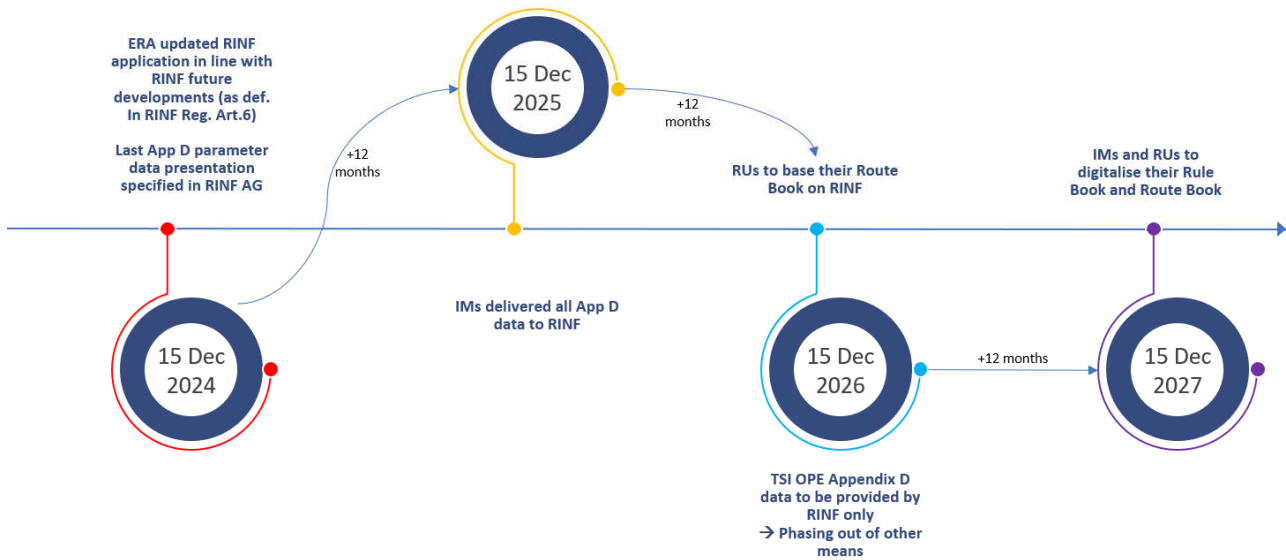
- One notification per IM addressed to the concerned NSA and the Agency. Any additional information should always be exchanged between these 3 involved parties;
- Concisely explains how the IM collaborated with RUs to define it;
- Its content should cover the following aspects:
 - The objective(s) / reason(s) for postponement;
 - A roadmap describing the approach including a training schedule;
 - Detailed plan for changes / modifications / implementations of the appropriate IT tools, when relevant.

Signature of the top management confirming the commitment for the delivering of the activities defined in the plan with the relevant resources allocated (this should also be reflected in the documents mentioned in the requirements 3.2.3 and 3.2.4 of the CSM on SMS).

Overview of milestones over time



2.4 Future developments on “information exchange between IMs and RUs, including information for staff executing safety critical tasks” as developed in the TSI OPEv2023 annex point 4.2.1.2 regarding RINF, digitalisation of route book and rule book



The figure above is a representation of the timeline for future developments as described in the TSI OPEv2023, annex, point 4.2.1.2. ERA will work on the set of parameters in RINF and publish it in one/two batches. When a batch is launched the application guide will be updated accordingly. The last batch will start running by Dec '24.

3 Responsibilities in the field of operations and traffic management

3.1 Infrastructure Manager and Railway Undertaking

3.1.1 According to Article 4.1 (d) of the Safety Directive, “*the responsibility for the safe operation of the Union rail system and the control of risks associated with it is laid upon the Infrastructure Managers and Railway Undertakings, each for its part of the system*” and not upon the National Safety Authorities. IMs and RUs are required to establish safety management systems, identify risks, implement necessary risk control measures and apply Union rules (such as TSI OPE), national rules and standards. CSM on SMS requirements sets out the main requirements to be taken into account by RUs and IMs when developing their SMS, including operational requirements. Regulation (EU) 2018/763 sets out the practical arrangements for obtaining a single safety certificate.

3.1.2 To develop their SMS, the IM and RU should take an overview of the rail system and identify the interfaces between IM and RU as well as between different functions, job profiles and people within their organisations. All processes and procedures should be organised and defined, taking care of these interfaces between different functions, be it within their company or in connection with partners (driver – on-board staff, driver – signaller). The development and implementation of these tasks results (under the application of the SMS) in the operational rules and procedures. In particular, for some TSI OPE Common Operational Rules (CORs) and requirements that are related to the operation of its infrastructure, the IM may need to develop further instructions that have to be applied by all RUs.

3.1.3 However, it should be understood that, although several interfaces exist and need to be covered by a common approach, the IM and RU are separate organisations in the SERA, each one responsible for its own field of business. The SMS provides a framework for managing safety and should be adapted to the RUs and IMs operational needs.

3.2 National Safety Authority and European Union Agency for Railways

3.2.1 According to Article 10 (5) to Article 10 (7) of Safety Directive, one of the tasks of ERA is to issue single safety certificates to RUs having an area of operation in one or more Member States. According to Article 10 (8), the NSA can issue a single safety certificate, where the area of operation is limited to one Member State and when the applicant requests it. Article 12, states that the IM shall obtain a safety authorisation from the NSA in the Member State where the rail infrastructure is located. Article 11 of the Safety Directive requires co-operation between the NSAs and ERA. This means for the TSI OPE that the safety certification body (ERA or NSAs) should assess if the TSI OPE is taken into account in the IM’s and RU’s SMS. Furthermore, it means if the TSI OPE requires a certain procedure to be put in place, the IM or RU are free to choose the most appropriate way for its own organisation taking into account the requirements for risk assessment in the SMS.

3.2.2 Following the issuing of an SSC or safety authorisation the involved NSA(s) must supervise that the IMs or RUs internal processes, procedures and rules are implemented and applied as described in the SMS

alongside the appropriate safety culture to deliver the required safety outcomes. For more information on SMS-assessment, please see CSM on SMS requirements.

4. OPE subsystem

4.1 TSI OPE and connection to other relevant rules and regulation

4.1.1 The TSI OPE does not provide a complete description of Railway Operations. It should therefore not be read or applied in isolation. It should be used in connection with all other relevant legislative documents setting out requirements on the business of operating railways. For example, although TSI OPE stipulates operational requirements, it does not cover all the elements necessary to ensure the complete safe operation of the railways, which is a requirement of the safety management system as set out in Articles 4 and 9 of the Safety Directive. The TSI OPE sets out the high-level requirements that should be used to develop safe operational procedures as part of the SMS. Where NRs are permitted, they can also be used to provide more detailed information on the operational requirements. In such circumstances, the NR and how it is applied should be referenced in the SMS.

4.1.2 The relevant legislative documents that need to be considered in the SMS of the RU and IM include at least:

- Safety Directive (EU) 2016/798;
- Interoperability Directive (EU) 2016/797;
- Train Drivers Directive 2007/59/EC;
- Other Technical Specifications for Interoperability (TSIs);
- Regulation (EU) 2012/1078 on a Common Safety Method for Monitoring;
- Regulation (EU) 2018/762 on a Common Safety Method for Safety Management Systems Requirements; and
- Regulation (EU) 402/2013 on a Common Safety Method for risk evaluation and assessment.

4.1.3 The objective of the TSI OPE is to provide a link to all the operational preparations required which will ensure the continued safe operation of passenger and freight trains from start to finish, in line with the RU and IMs responsibilities under their SMS.

4.1.4 The operation of the railway comprises several parts:

A general part:

- 1) An organisation/company should be established.
The organisation should develop a safety management system as a part of their overall Management System. The SMS covers several elements related to the TSI OPE including a risk assessment process and a competence management system.
- 2) Suitable resources, including human capital, should be organised (purchased, leased).

- 3) Following the systematic approach described in the SMS, all risks should be controlled. In order to do this, the relevant rules and procedures for each level of operation should be identified and developed; specific and detailed rules and procedures should be put in place. This includes also the interfaces to (sub-) contractors. For more details, see the Safety Directive.
- 4) For all the steps listed, the relevant approvals (licence, Safety Certificate, authorisations for placing in service of the different structural subsystems and placing on the market of the vehicles) should be obtained from the national safety authorities of the Member States or the European Union Agency for Railways.

A part specific for each train:

- 1) Train path allocation:
The request for a path as well as the allocation has to be done under the rules applying the “*Directive establishing a single European railway area*” 2012/34/EC and under respect of (EU) 454/2011 (TSI TAP) and (EU) 1305/2014 (TSI TAF).
- 2) Train operation:
Train operation can start when the train path was confirmed by the RU towards the IM according to (EU) 454/2011 and (EU) 1305/2014. The train operation includes the preparation of the train and the train running. The operation of the train is in the scope of the TSI OPE.

4.1.5 All necessary preparations should be done before the train can start to run. Some of these are linked to last minute train preparation before departure (like checks and tests before departure, see TSI OPE point 4.2.3.3.1). Other elements require more time and organisation. For example, the IMs and RUs have to ensure that all the staff operating trains (driver and other train crew members for the RU; signaller, and all other relevant staff of the IM even if not mentioned in the TSI OPE like dispatchers, level crossing operators) know what to do, how to do it and when to do it. This includes the steps already mentioned, setting up the rules and ensuring that the staff are competent for the tasks.

4.1.6 The TSI OPE focuses on the aspects, including interfaces, that are relevant for interoperability as defined in the Interoperability Directive (the safe and uninterrupted movement of trains) and defines the responsibilities of the actors. Some aspects between IM and RU are not considered relevant for interoperability and therefore are not covered by the TSI OPE; nevertheless, these interfaces might be relevant for safety.

4.1.7 Although not every operational risk is covered by the TSI OPE, it is a requirement under the CSM on Safety Management System Requirements that IMs and RUs should control the risks relevant to the type, extent and area of their operations. The IM and RU should set up procedures for the exchange of information (or perhaps even materials) to fulfil their obligations. For more details on the SMS requirements and guidance, see https://www.era.europa.eu/domains/common-safety-methods/safety-management-system-requirements-csm_en.

4.1.8 Besides the scope of TSI OPE, it is recommended that IMs and RUs when performing other functions (e.g. IM operating maintenance vehicles between stations in train configuration, meaning the machines are not working) apply the requirements set out in the TSI OPE to ensure internal consistent application of these parts of the processes.

More specifically, in the case of the above example, the transfer of such maintenance trains and other OTMs should be performed by an RU with an SSC or an IM being authorised such movements of trains. In other words, an IM operating a maintenance train / OTM between two stations should apply the same rules as a RU.

4.2 TSI OPE Fundamental operational principles and the SMS

4.2.1 A key part of the application guide is the explanation of the Fundamental Operational Principles and how they relate to the Safety Management System of the RU and IM. The Fundamental Operational Principles are a set of principles that describe the main high-level requirements for train operation and in particular the interfaces between the RU and IM and what is needed in order to deliver and maintain safe operation. The FOPs set out 'what' operational elements of the SMS need to be developed but not the 'how' which should be based on the individual requirements for the RU and IM taking into account their risk assessment based on their operational needs.

In relation to the TSI OPE, there are very clear links between the operational processes in the SMS. In fact the development of the SMS operational processes should build on the requirements in the TSI OPE and be informed by the National Rules (where relevant). The starting point is the Fundamental operational principles that set out the framework which needs to be considered under the SMS requirements (EU Regulation 2018/762) and Annex 1 of this Application Guide sets out more information. The output from this is usually specific risk-based company processes and/or rules.

4.3 Assessment of compliance with the OPE TSI and the development of the SMS

4.3.1 The subsystem operation and traffic management is a functional subsystem. The assessment principles are laid down in chapter 6.2 of TSI OPE. The TSI OPE defines requirements on processes and procedures to be established by IMs respectively RUs under their SMS.

4.3.2 There are interfaces with structural TSIs and the technical requirements and this is set out in Chapter 4.3 of the TSI OPE. This means that these technical requirements are not to be assessed against the TSI OPE. They are to be assessed by the Notified Bodies during the process for the authorisation for placing into service of structural subsystems as described in the relevant structural TSIs. Vehicles which are on the market but do not fulfil the requirements in 4.2.2.1.2 can continue to be used if the risk is managed through the SMS. When such vehicles are replaced or upgraded, the application of the Interoperability Directive (EU) 2016/797 needs to be considered.

4.3.3 Compliance with the TSI OPE cannot be assessed in the same way as that of a structural subsystem. The EC verification procedure is not applicable. The procedures and processes required by the TSI OPE should become part of operational processes, procedures and rules [whether permitted National Rules (see information under each Fundamental Operational Principle) or company rules]. They also become a part of the IM's / RU's SMS. Compliance with the TSI OPE should be demonstrated when the safety certification body (NSA or ERA for the single safety certificate) assesses the SMS before granting the *safety authorisation/single safety certificate*. Further checks of compliance with TSI OPE may be done when the NSA performs supervision and inspections. The safety certification body should also check that the requirements of the TSI OPE are fulfilled by verifying that the relevant operational rules of the RU/IM meet the requirements in the

TSI OPE. In addition, Regulation (EU) 1078/2012 requires that RUs and IMs set out processes and procedures to effectively monitor the effectiveness of the SMS and the delivery of it through their operational activities (i.e. for the RU the operation of the train and for the IM the control of the infrastructure).

4.3.4 The SMS requirements specifically address the elements necessary for Operational planning and control (requirement 5.1) for both the RU and IM. The requirement is as follows:

[Regulation (EU) 2018/762 Annex 1 5.1.1]. *When planning, developing, implementing and reviewing its operational processes, the organisation shall ensure that during operation:*

- *risk acceptance criteria and safety measures are applied (see 3.1.1. Risk assessment);*
- *plan(s) to achieve the safety objectives are delivered (see 3.2. Safety objectives and planning);*
- *information is collected to measure the correct application and effectiveness of the operational arrangements (see 6.1. Monitoring).*

[Regulation EU) 2018/762 Annex 1 5.1.2]. *The organisation shall ensure that its operational arrangements conform to the safety-related requirements of applicable Technical Specifications for Interoperability and relevant national rules and any other relevant requirements (see 1.1. Organisation, context and scope of the safety management system).*

4.3.5 This means that the TSI OPE requirements for staff, trains and their operation should be used as a key input into the development and assessment of the SMS. The FOPs and the common operating rules (CORs) are a key element of delivering the requirements for operational planning and control. Assessment of compliance by the safety certification body will need to consider how the FOPs and CORs are a specific input into the development of the operational part of the RUs and IMs SMS particularly in the identification of processes and company rules and how National Rules (where applicable) are taken into account in the SMS. The assessment will need to cover the requirements for operational competence (Staff requirements) in TSI OPE. These should be reviewed against the requirements in the SMS of the RU and IM under the Operational planning and control (Regulation EU) 2018/762 Annex 1 points 5.1.4, 5.1.5 and 5.1.6 of the CSM of SMS). The assessment will also need to cover the specifications relating to train operation (FOPs 1 to 6) and the SMS requirements for operational arrangements and control of risks (Regulation EU 2018/762 Annex 1 points 5.1.2 and 5.1.3). This is set out in further detail in Annex 1 of this Guide.

4.4 Fundamental Operational Principles and Common Operational Rules

4.4.1 Appendix B of the TSI OPE sets out the Fundamental Operational Principles (FOP) and Common Operational Rules (COR) which should be used following the scope of TSI OPE and in the prescribed situations. They are valid for both ETCS and class B systems. This means that these FOPs and CORs are applicable regardless of the CCS system used.

4.4.2. There are six FOPs in TSI OPE:

Fundamental Operational Principle N°1:

“The method of authorising a train movement shall maintain a safe interval between trains”.

Fundamental Operational Principle N°2:

“A train shall only operate over a portion of line if the train composition is compatible with the infrastructure”.

Fundamental Operational Principle N°3:

“Before a train begins or continues its journey, it shall be ensured that passengers, staff and goods are carried safely”.

Fundamental Operational Principle N°4:

“Before a train is allowed to start or continue its movement, it shall have an authority to move and all necessary information to define the conditions of that authority”.

Fundamental Operational Principle N°5:

“A train shall be prevented from proceeding onto a portion of line if it is known or suspected that it would not be safe for the train to pass until measures have been taken to allow the train to continue safely”.

Fundamental Operational Principle N°6:

“A train shall not continue to operate after it has been found to be unsafe in any respect, until measures have been taken to allow the train to continue safely”.

4.4.3 Because the FOPs are high level and set the target of what should be achieved in order to ensure safe operation, there can be no derogation from them. It is up to the RU and IM to decide how this principle should be achieved using their procedures in their respective SMS's (based on the results from risk assessment for the operation, National Rules (where permitted)), the COR and company rules.

4.4.4 In relation to a specific requirement in the TSI OPE including a COR, a RU/IM can deviate from the requirements using the CSM on risk evaluation and assessment. They will need to analyse the hazards and quantify the risks and make a decision based on the results. If a result of the analysis determines that the

requirement cannot be applied because it could result in a serious safety risk to the operation, the RU/IM needs to demonstrate this analysis and the alternative approach using the CSM on risk evaluation and assessment. The NSA may also need to be contacted particularly if it is a substantial change to the safety certificate/authorisation. If the CSM on risk evaluation and assessment is applied, this decision to use a different rule should be verified (see CSM on risk evaluation and assessment Regulation (EU) 402/2013) and consideration given as to whether there is a need to review the TSI or add new/updated CORs. In such cases the Agency should be contacted for further information.

4.4.5 For all the rules developed, the Agency, in order to have the same basis to carry on the works, assumes that:

- All members of railway staff apply the rules correctly.
- All other technical equipment works correctly.
- The train radio is installed.
- Signalling rules are the ones related to the operational use of the national signalling system .

4.4.6 Any detailed instructions given by the signaller to the driver on how to deal specifically with the event will be complementary to the COR and part of the work instructions in the SMS.

4.5 National Rules

4.5.1 National Rules (NRs) under the RSD are permitted according to those listed in TSI OPE Appendix I. TSI OPE 2023 defines obligation for Member States to analyse their national rules, to identify national rules in contradiction or redundant with novelties introduced and to submit a time plan for their repealing or modification.

4.5.2 If a topic is not included as a National Rule it should be reviewed by the RU to see if it is still relevant and useful in their train operation, taking into account results from their risk assessment. If the topic is considered relevant, then a company process or rule should be established. Relevant information and key requirements from NRs should be used as a basis to check that the SMS sufficiently covers those aspects.

4.5.3 In relation to who can issue NRs – the following is taken from the National Rules Task Force Report in 2012:

"Only Member States have competence to establish NSR" and "Only binding safety rules established at Member State level are NSR"; "In all cases the Member States shall ensure that the NSA and third parties which issue certain NSR are given the task to issue such NSR by law (i.e. the task to issue NSR is officially given by law); otherwise their rules cannot be considered as NSR.

From the legal point of view, NSRs are 'binding' when two conditions are fulfilled:

- *The issuing body was delegated with necessary legislative powers to establish the particular rule.*

- *In case of indirect rules a Member State may: either authorize a third party (e.g. an IM or RU) to issue safety rules within the specified scope, or recognise established rules of third parties as NSR (e.g. standards, UIC leaflets or OSJD rules) by providing references to such rules in national legislation".*

4.5.4 The NSAs are responsible, through the certification process and subsequent supervision, to check that RUs SMS procedures cover all the necessary aspects particularly in providing further detail to the TSI OPE and the related company rules.

4.6 Acceptable means of compliance

AMOCs are defined in Directive (EU) 2016/797 as *non-binding opinions issued by the Agency to define ways of establishing compliance with the essential requirements*. They include non-binding examples of good practice for compliance with the safety requirements. In the case of the TSI OPE this covers the control of certain operational risks. Therefore the RU does not have to provide any justification for the use of the AMOC which confirms that the sector is responsible for managing and controlling the risk(s) and developing appropriate risk control measures which are relevant for its own area of operation.

The Agency developed European Acceptable Means Of Compliance (AMOCs) based on best practice from the railway sector to replace certain topics that have been national rules in the past. AMOC's are voluntary; this means that if RUs prove through their risk analysis documentation that the necessary measures to control the risks linked to their operational activities are implemented, they can choose not to apply the good practices defined in an AMOC (see also guidance AMOC's) or other available standards.

When developing and reviewing its operational processes, RUs and IMs should consider that operational requirements can have 3 main different sources:

1. EU legislation (e.g. TSI OPE) ;
2. National rules, only the ones admitted by TSI OPE;
3. Organizational needs as defined in the SMS (e.g. design of operations, mitigation measures identified in the risk assessment process, etc.).

AMOCs may define possible ways of establishing compliance with requirements coming from source 1 and source 2, therefore there could be also national AMOCs only limited to requirements coming from national rules admitted by point 4.4.2 of TSI OPE (national rules are only admitted in the areas identified in the Appendix I). National AMOCs on operational requirements defined in the EU legislation should not exist.

AMOC's were created in three specific operational areas:

- Safety of load (linked to 4.2.2.4.1 of the TSI OPE annex "safety of load");
- Safety of passengers (linked to 4.2.2.4.2 of the TSI OPE annex "safety of passengers");
- Checks and tests before departure, including brakes and checks during operation (linked to 4.2.3.3.1 of the TSI OPE annex "Checks and tests before departure").

[A supporting guidance for AMOC's management and the AMOCs themselves are available on ERA's website:](https://www.era.europa.eu/domains/technical-specifications-interoperability/operation-and-traffic-management-tsi_en)

https://www.era.europa.eu/domains/technical-specifications-interoperability/operation-and-traffic-management-tsi_en

Making the railway system
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Annex 1 – Operational guidance

Please note that the information given in Annex 1 on operational guidance is not an exhaustive list and is subject to the RUs and IMs operational context and risk assessment in their SMS.

It is given as an indication only.

To help with compliance, references are also included pointing out to the relevant paragraphs in the TSI OPE.

1.1 Specifications relating to staff

1.1.1 This guidance relates to the obligation that staff are selected and trained so that they are competent in their job and fit to carry out any safety critical tasks. They should also have all the necessary information to allow them to carry out their tasks in a safe way. The TSI OPE sets high level specifications in relation to staff performing safety critical tasks. However, it does not describe in detail the working conditions and professional requirements of all staff performing safety critical tasks. These should be taken into account by the IMs and RUs in their SMS, specifically the requirements for a competence management system. The Regulation (EU) 2018/762 Annex 1 criteria (5.1.4, 5.1.5 and 5.1.6) specifically requires to consider aspects that are part of the requirements in the TSI OPE and should therefore be considered as an input to the development and assessment of the SMS. The SMS of the RU and IM should also identify and manage the competence of those staff who perform safety related functions (i.e. where the TSI OPE does not specify high level requirements) and take into account how their roles can affect the safety of the operation.

1.1.2 In relation to medical fitness, there are some requirements mandated at EU level. This includes the TDD for train drivers and in the TSI OPE for staff accompanying a train or preparing trains. These staff perform safety critical tasks and should be classified as such even if this is only part of their overall responsibilities. For that part which is considered safety critical, they will need to meet the requirements in the appropriate EU legislation and this should be included in the organisations competence management system. For all other aspects of their tasks, the operational context and the outputs from the risk assessment should consider what medical requirements are necessary. This includes whether they also have additional safety related functions (e.g., train and timetable planners, train driver managers, safety managers) or not. This is not mandated at EU level.

1.1.3 There should be an operational process that covers how the SMS deals with the specifications relating to staff. This should be based on information from the risk assessment and set out how the competence, documentation and working conditions of identified staff executing safety critical tasks will ensure the safe

operation of the train and how other safety related functions can affect the safety of the operation. It should also link to the generic criteria in CSM on SMS, criteria 4.2 on competence.

	Regulation (EU) 2018/762 Annex 1	TSI OPE reference and associated guidance												
1.1.4	<p>CSM 4.2.1</p> <p><i>The organisation’s competence management system shall ensure that staff having a role that affects safety are competent in the safety-related tasks for which they are responsible (see 2.3. Organisational roles, responsibilities, accountabilities and authorities), including at least: (a) identification of the competencies (including knowledge, skills, non-technical behaviours and attitudes) required for safety-related tasks;</i></p> <p><i>(b) selection principles (basic educational level, psychological and physical fitness required);</i></p> <p><i>(c) initial training, experience and qualification;</i></p> <p><i>(d) ongoing training and periodic update of existing competencies;</i></p> <p><i>(e) periodic assessment of competence and checks of psychological and physical fitness to ensure that qualifications and skills are maintained over time;</i></p> <p><i>(f) specific training in relevant parts of the safety management system in order to deliver their safety related tasks.</i></p>	<p>TSI OPE 4.6 – Professional Competences and Appendices F and G</p> <p>TSI OPE 4.7 – Health and Safety conditions</p> <p><i>When assessing the risk, the organisation shall:</i></p> <p><i>(a) make sure that its staff have attained the appropriate professional competence to undertake all necessary safety-critical tasks [see: TSI OPE 4.6 and Appendices F and G]</i></p> <p><i>Note the interface with TSI OPE Professional competence point 4.6.1 and Safety in Railway Tunnels TSI (SRT TSI) point 4.6.1 Tunnel specific competence of the train crew and other staff requirements.</i></p> <p><i>(b) set up and document the process put in place to meet medical, psychological and health requirements [see: TSI OPE 4.7]</i></p> <p><i>In the table below you can find an overview of how the competences of staff should be managed and how the legislation should be taken into account when ensuring staff’s competences.</i></p> <table border="1" data-bbox="1032 874 1910 1406"> <thead> <tr> <th>Competences</th> <th>Safety-critical tasks</th> <th>Safety-related functions</th> </tr> </thead> <tbody> <tr> <td>Identification</td> <td>SMS</td> <td>SMS</td> </tr> <tr> <td>Elements relevant to professional qualification</td> <td>SMS + <ul style="list-style-type: none"> • TSI OPE, Appendix F • TSI OPE, Appendix G • TDD • National rules (dispatching and authorizing train movement) </td> <td>SMS</td> </tr> <tr> <td>Health and safety conditions</td> <td>SMS + <ul style="list-style-type: none"> • TSI OPE, Annex, point 4.7.2 • TSI OPE, Annex, point 4.7.3 • TDD] • National rules on limits </td> <td>SMS+ <ul style="list-style-type: none"> • National rules on limits </td> </tr> </tbody> </table>	Competences	Safety-critical tasks	Safety-related functions	Identification	SMS	SMS	Elements relevant to professional qualification	SMS + <ul style="list-style-type: none"> • TSI OPE, Appendix F • TSI OPE, Appendix G • TDD • National rules (dispatching and authorizing train movement) 	SMS	Health and safety conditions	SMS + <ul style="list-style-type: none"> • TSI OPE, Annex, point 4.7.2 • TSI OPE, Annex, point 4.7.3 • TDD] • National rules on limits 	SMS+ <ul style="list-style-type: none"> • National rules on limits
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	Regulation (EU) 2018/762 Annex 1	TSI OPE reference and associated guidance
1.1.5	<p>CSM 5.1.4</p> <p><i>To control the allocation of responsibilities where relevant for the safety of operational activities, the organisation shall identify responsibilities for coordinating and managing the safe running of trains and movements of vehicles and define how relevant tasks affecting the safe delivery of all services are allocated to competent staff within the organisation (see 2.3. Organisational roles, responsibilities and authorities) and to other external qualified parties when appropriate (see 5.3. Contractors, partners and suppliers).</i></p>	<p>TSI OPE 4.2.1.– Specifications relating to staff</p> <p>In relation to the use of two drivers in the cab, under Appendix I there will be no allowances for this type of rule at national level:</p> <ul style="list-style-type: none"> ○ If companies decide to require it that is their choice: <ul style="list-style-type: none"> ▪ But if an RU operating in a MS which regularly uses one driver using the risk assessment and controls in their SMS, they should not be required to have two drivers ○ An additional trainee driver (assistant or apprentice) can continue to be allowed but not as a NR – this should be part of the procedures in the SMS. <p>TSI OPE 4.7 – Health and safety conditions is linked specifically to the CSM requirement 4.2.1 on competence and medical fitness. The SMS should set out the requirements and it should cover:</p> <ul style="list-style-type: none"> ● Responsibility for the staff: <ul style="list-style-type: none"> ○ When assessing the risk, the organisation should take into account the need to determine, provide and sustain a safe working environment which conforms to applicable legislation in particular Council Directive 89/391/EC; ○ Medical and psychological requirements of all the staff employed by the RU and IM that have a role and responsibility that can affect the safety of the operation. The delivery of these requirements is also influenced by the legal obligations in individual Member States. The results of the medical and psychological procedures set out in the SMS should be accepted by all NSAs, RUs and IMs concerned for cross border operations, see also the UIMC railway medical guidelines [https://uic.org/IMG/pdf/uimc_railway_medical_guidelines.pdf]. ● Specifications relating to staff executing safety critical tasks (which includes EU Directive 2007/59/EC on drivers and Appendices F and G of TSI OPE) and safety related functions where the SMS should consider the roles and responsibilities of staff and how their competence is assured. ● Health and safety conditions - Hearing requirements: <ul style="list-style-type: none"> ○ The following values concerning the hearing requirements are given as guidelines in relation to the requirement in 4.7.3.3: <ul style="list-style-type: none"> ▪ The hearing deficiency should not be higher than 40 dB at 500 and 1000 Hz; <p>The hearing deficiency should not be higher than 45 dB at 2000 Hz for the ear with the worst air conduction of sound.</p>

	Regulation (EU) 2018/762 Annex 1	TSI OPE reference and associated guidance															
1.1.6	<p>CSM 5.1.5</p> <p><i>To control information and communication where relevant for the safety of operational activities (see 4.4. Information and communication), relevant staff (e.g. train crews) shall be advised of the details of any specified conditions of travel, including relevant changes which may result in a hazard, temporary or permanent operational restrictions (e.g. due to specific type of vehicles or to specific routes) and conditions for exceptional consignments, where applicable.</i></p>	<p>TSI OPE 4.2.1.2 – Information exchange between IMs and RUs, including information for staff executing safety critical tasks</p> <p>The specific elements to cover include:</p> <ul style="list-style-type: none"> • Documentation for IM and RU staff executing safety critical tasks (rule book and route book (4.2.1.2.1 and 4.2.1.2.2) • Informing the driver in real time during train operation (4.2.1.2.4) • Safety related communications (4.2.1.5) • Appendix C – safety related communications methodology <ul style="list-style-type: none"> ○ C2 Book of European and national instructions <p>As a general remark, IM and RU should establish structured communication flows and means:</p> <div data-bbox="1010 660 1928 1171" data-label="Diagram"> <table border="1"> <thead> <tr> <th></th> <th>"Normal" communication</th> <th>"As soon as it is available"</th> <th>"Real-time" communication</th> <th>"Emergency" communication</th> </tr> </thead> <tbody> <tr> <td>Communication flow</td> <td>From IM to RU</td> <td>From IM to RU</td> <td>Signaller <-> Driver</td> <td>Signaller <-> Driver</td> </tr> <tr> <td>Means</td> <td>RINF (Rule & Route Books)</td> <td>RINF (Rule & Route Books)</td> <td>Operational Instructions</td> <td>Any means</td> </tr> </tbody> </table> <p style="text-align: center;">In any case the message should reach the recipient, on time, and this might be in parallel if needed</p> <p style="text-align: center;">SMS integration</p> </div> <p>The following levels of communication should be established:</p> <ul style="list-style-type: none"> • "Normal communication": It refers to the communication between organisations - IM and RU, not between people. Example of such "normal communication" is the exchange of information about the line conditions: signals, stations, planned works, planned speed restrictions, etc. 		"Normal" communication	"As soon as it is available"	"Real-time" communication	"Emergency" communication	Communication flow	From IM to RU	From IM to RU	Signaller <-> Driver	Signaller <-> Driver	Means	RINF (Rule & Route Books)	RINF (Rule & Route Books)	Operational Instructions	Any means
	"Normal" communication	"As soon as it is available"	"Real-time" communication	"Emergency" communication													
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	Regulation (EU) 2018/762 Annex 1	TSI OPE reference and associated guidance
		<p>The main concept is that the RU has enough time to digest the information within its organization and, for example, providing training to the driver when needed.</p> <p>Communication means is the RINF.</p> <p>TSI OPE does not define the timing for having the information given via RINF and the relevant timing for digesting the same information. The IM and the RU should collaborate to define an operational procedure to manage such type of communication based on their organisation and risk assessment.</p> <ul style="list-style-type: none"> • “Real-time communication”: It refers to situations where the information needs to reach the recipient real-time. It also refers to situations or conditions that are identified by the SMS of the RU and the IM, but their occurrence cannot be planned. • “As soon as it is available”: In case real-time communication is needed, RINF is the parallel means, to provide with information as soon as it is available (e.g. Temporary Speed Restrictions). <p>Example: information about a speed limitation given from the IM to the RU a couple of days before the entering into force or extraordinary works on the track not scheduled.</p> <p>For such situations, TSI OPE foresees two means of communication that are used at the same time. The first flow is established between people, the driver and the signaller, they communicate via operational instructions (see TSI OPE 4.2.1.5 and Appendix C). The second communication flow is established between organisations. The RU and the IM, communicate via RINF as per the “normal communication”.</p> <p>In case a real-time communication is needed (e.g. in specific degraded situations), the main communication flow is established between the driver and the signaller via operational instructions.</p> <ul style="list-style-type: none"> • “Emergency situation”: It refers to situations that are urgent, unexpected, and usually dangerous, that pose an immediate risk to health, life, property, or environment and that require immediate action. The foreseeable emergency situations should be defined in the RU’s and IM’s SMSs. Emergency management (see TSI OPE 4.2.3.7) should start as quickly as possible. Therefore, the communication flow is established between people, the driver and the signaller, via any available means of communication, always respecting SMS provisions that are risk based.

	Regulation (EU) 2018/762 Annex 1	TSI OPE reference and associated guidance
		<p>One of the key members of staff who need specific information on train operation is the driver. Drivers need a set of different documents; each of them with its own purpose and scope.</p> <p>The rule book includes all necessary operational rules and procedures that the driver has to know and to apply in normal and degraded operation or in emergency situations</p> <p>To ensure that the driver can apply the rules correctly, the driver should also be informed about the route characteristics and about the parameters and characteristics of each vehicle. The route characteristics are set out in the Route book. The parameters and characteristics of each vehicle, running isolated or coupled to other vehicles, and the specific methods of use, relevant for safety of operation are reported for each vehicle in the relative operational procedures.</p> <p>When a RU operates on a different infrastructure where new or other rules apply, they will need to consider applying the CSM on risk evaluation and assessment (Regulation (EC) 402/2013) to the operational changes. This will include any changes required to the rule book and route book and the potential effect it will have on the driver undertaking the different operation. The results of the risk assessment will then need to be applied, including considering how the format and / or the content of the rule book and route book will need to be adapted and/or changed to ensure that the driver can operate safely on the new route.</p> <p>In addition to the documents mentioned above, the driver should be equipped with the book of European and national instructions including forms for all European instructions, national instructions and other documents needed to fill in during the train journey. How this information is provided depends on the methods and modes of communication used i.e. digital, verbal or written.</p> <p>The RU and IM should ensure that safety related information for drivers and other staff executing safety critical tasks is:</p> <ul style="list-style-type: none"> • relevant, complete and understandable for the intended users (including the language(s) used by the RU or IM, taking into account the operating languages defined by the IM for its network); • valid, accurate and consistent; • controlled (i.e. distribution, access, retrieval, use, storage, control of changes, retention, desposition, etc.);

	Regulation (EU) 2018/762 Annex 1	TSI OPE reference and associated guidance
		<ul style="list-style-type: none"> • communicated before it takes effect; • easily accessible to staff and where required copies are formally given to them; and • received and understood. <p>A method to format and generate controlled document is to provide appropriate fields at least for:</p> <ul style="list-style-type: none"> • unique identification number; • date; • responsible person for preparation; • responsible person for authorising the release (of the original document and of the following revisions); and • list of revisions. <p>The SMSs of the respective RUs and IMs should include provisions for cooperating as well as ensuring that the rule book and route book are updated whenever necessary.</p> <p>In emergency situations, the IM should provide relevant information on the co-ordination process for operations to the RU as set out in the communication protocol and agreed between each IM and RUs.</p>
1.1.7	<p>CSM 5.1.5</p> <p><i>To control information and communication where relevant for the safety of operational activities (see 4.4. Information and communication), relevant staff (e.g. train crews) shall be advised of the details of any specified conditions of travel, including relevant changes which may result in a hazard, temporary or permanent operational restrictions (e.g. due to specific type of vehicles or to specific routes) and conditions for exceptional transport/consignment, where these are required.</i></p>	<p>TSI OPE 4.2.1.2.1 – Rule book</p> <p><u>Requirements for the rule book</u></p> <p>The rule book needs to cover the following aspects:</p> <ol style="list-style-type: none"> a) Common EU safety and operating rules and procedures in accordance with Appendices A, B, C and D of the TSI. However, the content of the rule book is not limited to topics mentioned in the TSI. The RU should assess all operational procedures and processes needed to prepare and operate the train, including all instructions set out in the RUs SMS for staff executing safety critical tasks. b) Additional national operating rules that are permitted by Appendix I of the TSI. c) Specific information on the interface requirements and communication with IM staff in normal and degraded operation or emergency situations. d) It needs to take into account that a “standard” language for operations has not been developed, so the driver must have language competence in the operating language(s) used on all the lines the driver runs on. Ensuring the language competence should be part of the

	Regulation (EU) 2018/762 Annex 1	TSI OPE reference and associated guidance
		<p>RU's competence management system. It should take into account the RU's internal assessment about driver's language competency and the internal competence management system, i.e. training the driver in the foreign language instead of translating the operational rules or training the drivers in the driver's mother tongue and provide translation tables, explanations or bilingual documents. These are also elements related to Directive (EU) 2007/59.</p> <p>e) The IM and RU respectively cover at least the following for the Rule Book:</p> <div style="display: flex; justify-content: space-between;"> <div data-bbox="891 528 1491 986" style="border: 1px solid black; padding: 5px; width: 48%;"> <p><i>IM sets out operational rules for the operation on its infrastructure.</i></p> <p><i>Following aspects shall at least be covered:</i></p> <ul style="list-style-type: none"> - <i>Staff Safety and Security</i> - <i>Signalling and Control Command (class A and B systems)</i> - <i>Train Operation including degraded mode and related to the line characteristics</i> - <i>Degraded and emergency situations</i> - <i>The management of Incidents and accidents and the reporting requirements</i> </div> <div data-bbox="1503 528 2134 986" style="border: 1px solid black; padding: 5px; width: 48%;"> <p><i>RU sets out operational rules for the operation of its Rolling Stock.</i></p> <p><i>Following aspects shall at least be covered:</i></p> <ul style="list-style-type: none"> - <i>Staff Safety and Security</i> - <i>Train Operation including degraded mode and related to the line characteristics Traction and Rolling Stock including all information relevant to the operation of the rolling stock</i> - <i>Degraded and emergency situations</i> - <i>The management of Incidents and accidents and the reporting requirements</i> </div> </div> <div style="text-align: center; margin: 10px 0;">  </div> <div data-bbox="1055 1086 1962 1358" style="border: 1px solid black; padding: 5px; margin: 0 auto; width: 80%;"> <p>RU compiles the relevant rules for the driver in the rule book:</p> <ul style="list-style-type: none"> - With indication of the scope of the rules (relevant network); - <i>appendix 1 : Manual of communication procedures in accordance with Appendix C1 of TSI OPE;</i> - <i>appendix 2 : Book of European and national instructions in accordance with Appendix C2 of TSI OPE.</i> </div>

	Regulation (EU) 2018/762 Annex 1	TSI OPE reference and associated guidance
1.1.8	<p>CSM 5.1.5</p> <p><i>To control information and communication where relevant for the safety of operational activities (see 4.4. Information and communication), relevant staff (e.g. train crews) shall be advised of the details of any specified conditions of travel, including relevant changes which may result in a hazard, temporary or permanent operational restrictions (e.g. due to specific type of vehicles or to specific routes) and conditions for exceptional transport/consignment, where these are required.</i></p>	<p>The requirement that the rules are presented in a clear format is mandated to ensure that staff executing safety critical tasks are presented with the different rules for the various networks in a consistent manner. This is particularly important, as the driver should be able to easily find the rules relating to the similar situations the driver may encounter on the different infrastructures on which the driver is running.</p>
1.1.9	<p>CSM 5.1.5</p> <p><i>To control information and communication where relevant for the safety of operational activities (see 4.4. Information and communication), relevant staff (e.g. train crews) shall be advised of the details of any specified conditions of travel, including relevant changes which may result in a hazard, temporary or permanent operational restrictions (e.g. due to specific type of vehicles or to specific routes) and conditions for exceptional transport/consignment, where these are required.</i></p>	<p>TSI OPE 4.2.1.2.2 - Route book</p> <p>The IM must provide the RU with the information for the route book as defined in Appendix D2 including permanent or temporary modifications.</p> <p>The RU is responsible for the complete and correct compilation of the route book, for example, arranging for any necessary translation and/or providing explanatory notes.</p> <p>It needs to take into account that a “standard” language for operations has not been mandated, so the driver should have the competency for all operating languages used on the lines that they run on. Ensuring the language competency should be part of the RU’s SMS and competence management system – see also the explanations on the rule book.</p> <p>It should cover the routes and the associated lineside equipment for the routes over which the driver will operate and relevant to the driving task. The route book should contain the relevant elements for the driver to identify its train location (position) at any moment to know the corresponding maximum speed to ensure that trains run safely.</p>

	Regulation (EU) 2018/762 Annex 1	TSI OPE reference and associated guidance
		<p>The format of the route book is to be prepared in the same manner for all the infrastructures operated on by the trains of an individual RU.</p> <p>The IM must inform the RU(s) of the changes to the infrastructure related information in the route book by means of an update on the parameters listed in Appendix D2 whenever such information becomes available.</p> <p>Based on the modified information, the RU must update the route book and communicate the modification in accordance with the procedures defined in their SMS, including instructing their drivers impacted by the change.</p> <p>A list of elements that the IM has to deliver to the RU for the compilation of the route book is listed in Appendix D2. However, the RU is not required to put ALL information provided by the IM as part of Appendix D2 into the route book; only that information that is RELEVANT for the driving task (TSI OPE 4.2.1.2.2) e.g. a RU operating with class B only equipped locomotives does not have to include information about ERTMS/ETCS in the route book.</p>
1.1.10	<p>CSM 5.1.5</p> <p><i>To control information and communication where relevant for the safety of operational activities (see 4.4. Information and communication), relevant staff (e.g. train crews) shall be advised of the details of any specified conditions of travel, including relevant changes which may result in a hazard, temporary or permanent operational restrictions (e.g. due to specific type of vehicles or to specific routes) and conditions for exceptional transport/consignment, where these are required.</i></p>	<p>TSI OPE 4.2.1.2.3 – Train running information for drivers</p> <ul style="list-style-type: none"> ○ The RU should set out in its SMS process how information for normal operation will be provided to the driver. The format and tool is for the RU to decide. This information shall be provided digitally by 15/12/2026 at the latest.
1.1.11	CSM 5.1.5	TSI OPE Appendix C – Book of European and national instructions

	Regulation (EU) 2018/762 Annex 1	TSI OPE reference and associated guidance
	<p><i>To control information and communication where relevant for the safety of operational activities (see 4.4. Information and communication), relevant staff (e.g. train crews) shall be advised of the details of any specified conditions of travel, including relevant changes which may result in a hazard, temporary or permanent operational restrictions (e.g. due to specific type of vehicles or to specific routes) and conditions for exceptional transport/consignment, where these are required.</i></p>	<p>The book of European and national instructions should include the national instructions permitted by Appendix I of the TSI as well as European instructions from Appendix C2 and any guidance. See Annex 3 for further information.</p> <p>The RU and the IM should decide the best form in which to store this information so that it is available, easily accessible and useable by the driver and the signaller.</p>
1.1.12	<p>CSM 5.1.5</p> <p><i>To control information and communication where relevant for the safety of operational activities (see 4.4. Information and communication), relevant staff (e.g. train crews) shall be advised of the details of any specified conditions of travel, including relevant changes which may result in a hazard, temporary or permanent operational restrictions (e.g. due to specific type of vehicles or to specific routes) and conditions for exceptional transport/consignment, where these are required.</i></p>	<p>TSI OPE 4.2.1.2.4 – Informing the driver in real time during train operation</p> <p>The TSI OPE annex on this point states:</p> <p><i>“The infrastructure manager shall inform and instruct drivers in real time about last minute changes to operations regarding the line or relevant lineside equipment, in accordance with the communication methodology established between IM and RU in line with Appendix C.</i></p> <p><i>Real time information shall be limited to situation and changes that have not been managed under 4.2.1.2.2 and 4.2.1.2.3 in accordance with IMs and RUs SMS procedures and are directly affecting the driver’s route.</i></p> <p><i>For emergency situations, appropriate alternative means of communication shall be established between the IM and RU in order to ensure that relevant information is made available.</i></p> <p><i>Infrastructure managers and railway undertakings must have a process in place to be able to confirm the suitability of the vehicles and the drivers in respect of route knowledge for real time route deviation.”</i></p> <p>The process in place to be able to confirm that the checks for the suitability of the vehicles and the drivers in respect of route knowledge in advance of a real time route deviation have been carried out,</p>

	Regulation (EU) 2018/762 Annex 1	TSI OPE reference and associated guidance
		is performed within the scope of the IMs and RUs own responsibilities and liabilities according to point 4.2.1.1. and 4.2.2.5.1.
1.1.13	<p>CSM 5.1.6. <i>To control competence where relevant for the safety of operational activities (see 4.2. Competence), the organisation shall ensure, in accordance with applicable legislation (see 1. Context of the organisation), for staff undertaking safety-related tasks:</i></p> <p><i>(a) compliance with their training and work instructions, and corrective actions are taken where required;</i></p> <p><i>(b) specific training in case of anticipated changes affecting the running of operations or their task assignment;</i></p> <p><i>(c) adoption of adequate measures following accidents and incidents.</i></p>	<p>TSI OPE 4.2.1.1 - General requirements and Appendices F and G on elements relevant to professional qualification for the tasks associated with accompanying trains on elements relevant to professional qualification of the task of preparing trains</p> <p>The SMS competence management system should cover the following aspects for the staff carrying out the tasks:</p> <ul style="list-style-type: none"> a) <u>Professional competences for drivers</u> (see Directive 2007/59/EC): <ul style="list-style-type: none"> ○ Language competence (see Directive 2007/59/EC which sets out language levels); ○ Rules knowledge; ○ Route / Infrastructure knowledge; ○ Rolling stock knowledge. b) <u>Appendix F – elements relevant to professional qualification for tasks associated with accompanying trains</u> <ul style="list-style-type: none"> ○ Knowledge on passenger safety (point 2.5 of Appendix F) In 2.5 (b) of Appendix F, the verb identify is used. In this context, it means the capability to describe the identification and memorisation of context, to perform tasks and to solve problems in a defined frame. ○ In 2.5 (c) of Appendix F, it is required that the training on passenger safety covers, both the technical competences and non-technical skills. Some elements that should be taken into account for the training of non-technical skills are described below. <ul style="list-style-type: none"> ▪ Situational awareness should take into account the following: <ul style="list-style-type: none"> ● Attention to details; ● Overall awareness; ● Maintain concentration; ● Retain information; ● Anticipation of risk. ▪ Conscientiousness should take into account the following: <ul style="list-style-type: none"> ● Systematic and thorough approach; ● Checking.

	Regulation (EU) 2018/762 Annex 1	TSI OPE reference and associated guidance
		<ul style="list-style-type: none"> ▪ Communication should take into account the following: <ul style="list-style-type: none"> • Techniques for active listening; • Clarity; • Assertiveness; • Sharing information. ▪ Decision-making and action should take into account the following: <ul style="list-style-type: none"> • Effective decisions; • Timely decisions • Diagnosing and solving problems • Being calm under pressure <p>In case there is no accompanying staff on-board the train performing safety critical tasks, the driver should be able to perform the tasks related to 2.5 of Appendix F in accordance with the driver’s certificate.</p> <p>c) <u>Appendix G – elements relevant to professional qualification for the task of preparing the train</u></p> <p>IMs and RUs should consider their own staff as well as subcontracted staff when drafting operational rules and applying their Safety Management System. Additional legislation like Council Directive 2005/47/EC on working conditions of mobile workers engaged in interoperable cross-border services in the railway sector of 18 July 2005 have to be taken into account.</p>
1.1.14	<p><i>To control competence where relevant for the safety of operational activities (see 4.2. Competence), the organisation shall ensure, in accordance with applicable legislation (see 1. Context of the organisation), for staff undertaking safety-related tasks:</i></p>	<p>The development of competence management procedures should be part of the SMS of the RU and IM. The procedures in the competence management system should also include identifying staff that are covered by the SMS.</p> <p>Safety critical tasks identified by TSI OPE are those covered by the Train Driver Directive and the TSI OPE Appendices F and G as well as tasks carried out by IM staff dispatching trains and authorizing train movements. There are other safety critical tasks that are not covered by TSI OPE and Train Driver Directive; these should be identified in the SMS of RU/IM (e.g. track workers, staff operating in a</p>

	Regulation (EU) 2018/762 Annex 1	TSI OPE reference and associated guidance
	<p><i>(a) compliance with their training and work instructions, and corrective actions are taken where required;</i></p> <p><i>(b) specific training in case of anticipated changes affecting the running of operations or their task assignment;</i></p> <p><i>(c) adoption of adequate measures following accidents and incidents.</i></p>	<p>marshalling yard, etc.). There are also staff that can have safety related functions; this includes, for example, train and timetable planners, train driver managers, safety managers.</p> <p>Both safety critical tasks and safety related functions are covered by the SMS. There cannot be any national rules on issues such as the identification of such staff, selection principles (except those for train drivers and staff covered by TSI OPE Appendices F and G which set out educational and medical fitness requirements), training methods and requirements or competence schemes. All these aspects should be described in the competence management system process.</p> <p>In relation to IM staff dispatching trains and authorizing train movements, national rules are permitted as there is an open point in Appendix I covering this element.</p>
1.1.15	<p>National Rules (NRs)</p> <p>NRs for this topic are allowed in the following areas and should be considered by the RU and/or IM:</p> <ul style="list-style-type: none"> ❖ IM staff dispatching trains and authorizing train movements ❖ Health and safety conditions: <ul style="list-style-type: none"> ➤ Alcohol and drug limits including the use of psychotropic medication ❖ Train running information for drivers – additional information ❖ Safety-related communications methodology – national instructions 	

1.2 Specifications relating to train operation – Fundamental Operational Principles (FOP)

The fundamental operational principles formulated in the Appendix B.1 of the TSI OPE address both IMs and RUs, from the perspective of that part of the operations for which they are responsible.

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
1.2.1	<p>CSM 5.1.2 (RUs)</p> <p><i>The organisation shall ensure that its operational arrangements conform to the safety-related requirements of applicable Technical Specifications for Interoperability and relevant national rules and any other relevant requirements (see 1.1. Organisation, context and scope of the safety management system).</i></p>	1	<p>TSI OPE - Appendix B</p> <p><i>“The method of authorising a train movement shall maintain a safe interval between trains”.</i></p> <p>By means of a ‘safe interval between trains’, the risk of a collision between trains should be mitigated.</p> <p>In accordance to the type of operation, such a ‘safe interval’ is in general achieved as follows:</p> <ul style="list-style-type: none"> • in normal operation: by means of the train control and signalling systems in place and/or operational procedures, reserving and protecting a (portion of) line or track for each train and preventing access for other vehicles; • in degraded operation: e.g. by means of running on sight, for an assisting train entering a section occupied by a failed train <p>Each authorisation for train movement is limited to an ending point of the authorisation, also known as an ‘End Of Authority’ as defined in Appendix J (e.g., an indication on the DMI, a signal showing a stop aspect/indication, a specific point on the line as instructed by the signaller), preventing the train from coming into collision with another train.</p> <p><u>SMS operational process</u></p> <p>There should be an operational process for the movement of trains that takes into account normal, degraded and emergency conditions. This should be based on information from the risk assessment and set out how the train control systems are operated in such a way to ensure the safe movement of the trains.</p>
	<p>CSM 5.1.3 (RUs)</p> <p><i>To control risks where relevant for the safety of operational activities (see 3.1.1. Risk assessment), at least the following shall be taken into account:</i></p> <p><i>(f) authorisations for movements of vehicles.</i></p>		

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
	<p>CSM 5.1.2 (IMs)</p> <p><i>The organisation shall ensure that its operational arrangements conform to the safety-related requirements of applicable Technical Specifications for Interoperability and relevant national rules and any other relevant requirements (see 1.1. Organisation, context and scope of the safety management system).</i></p> <hr/> <p>CSM 5.1.3 (IMs)</p> <p><i>To control risks where relevant for the safety of operational activities (see 3.1.1. Risk assessment), at least the following shall be taken into account:</i></p> <p><i>(a) identification of the safe boundaries of transport for traffic planning and control based on the design characteristics of the infrastructure;</i></p> <p><i>(b) traffic planning, including timetable and train path allocation;</i></p>		<p>The operational process to be included within the scope of this principle takes into account the following:</p> <ul style="list-style-type: none"> • Train control and signalling systems rules (both Class A and Class B systems) and how they are applied. <p><u>Company rules</u></p> <p>These are examples of the types of company rules that should be covered under FOP No 1:</p> <ul style="list-style-type: none"> • Movement authority requirements and documented information to staff, including the procedures for communicating the change in movement authority and arrangements where the system is defective or disconnected. TSI OPE Appendix B – COR 12 “Anomalies in lineside signalling” should be taken into account. • For Class A systems, this should include the use of Appendix A and any necessary procedures. • IM company rules should cover the design and installation of lineside signals and markers and take into account where they are placed. Marker boards harmonised under EN 16494:2015 may be placed as defined in CCS TSI. • The following TSI OPE Appendix B Common Operational Rules (COR) should have further detail incorporated into a company rule: <ul style="list-style-type: none"> ○ COR 9 – Running on sight ○ COR 16 – End of authority passed without permission. For Appendix B further detail may be needed to be incorporated into a Company rule. <p>TSI OPE – 4.2.2.8 Requirements for lineside signals and marker sighting</p> <p>This section applies to lineside signals, markers, signs and information boards that need to be observed by the driver. It does not need to take into account speeds operated under cab signalling conditions; this reflection is covered in the TSI by “whenever applicable”.</p>

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
			<p><i>TSI OPE Appendix B – COR 9 – Running on sight</i></p> <p>In the case of ETCS, this rule is not restricted to running in OS mode; it also applies when the driver has to run on sight for other reasons, e.g. running in SR mode, running in FS with <u>European Instruction 6</u> requiring running on sight, etc.</p>
1.2.2	<p><u>National rules (NRs)</u></p> <p>NRs for this topic are allowed in the following areas and should be considered by the RU and/or IM:</p> <ul style="list-style-type: none"> ❖ Signalling rules (rules related to the operational use of national signalling systems (not ERTMS)) ❖ Running at caution ❖ Maximum speed in degraded mode including running on sight ❖ Safety-related communications methodology - National operational instructions (see Appendix C2) <p><i>In those Member States that operate permissive driving, this is understood as a driver being allowed to override a stop aspect on his/her own decision and under specific circumstances and be able to run on sight on the network where this is permitted.</i></p>		

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
1.2.3	<p>CSM 5.1.2 (RUs)</p> <p><i>The organisation shall ensure that its operational arrangements conform to the safety-related requirements of applicable Technical Specifications for Interoperability and relevant national rules and any other relevant requirements (see 1.1. Organisation, context and scope of the safety management system).</i></p>	2	<p>TSI OPE - Appendix B</p> <p><i>“A train shall only operate over a portion of line if the train composition is compatible with the infrastructure”.</i></p> <p>This principle is concerned with confirming the compatibility of a train with the infrastructure of the route over which it is planned to operate, before it starts operating on this route. Compatibility between a train and infrastructure is affected primarily by the dimensions of a vehicle and any load placed on it; the clearances between the train and the infrastructure or trains on adjacent tracks (gauging); the minimum required braking capacity of the train; the weight and length of a train and the capacity and capability of the infrastructure.</p> <p><u>SMS operational process</u></p> <p>There should be an operational process for the preparation and compatibility of the train taking into account all operational requirements. This should be based on information from the risk assessment and set out how the safe operation of the train is maintained. The frequency and scope of the checks should be determined by the risk assessment and the operational requirements/characteristics (weight/length of the train and compatibility with the routes over which it will travel). It also needs to take into account specific requirements on dangerous goods and how these risks are managed particularly in relation to train composition. (see also: https://www.era.europa.eu/activities/transport-dangerous-goods/inland-tdg_en)</p>
	<p>CSM 5.1.3 (RU)s</p> <p><i>To control risks where relevant for the safety of operational activities (see 3.1.1. Risk assessment), at least the following shall be taken into account:</i></p> <p><i>(a) planning of existing or new train routes and new train services, including the introduction of new types of vehicles, the need to lease vehicles and/or to hire staff from external parties and the exchange of information on the maintenance for operational purposes with entities in charge of maintenance;</i></p>		

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
	<p><i>(c) preparation of trains or vehicles before movement, including pre-departure checks and train composition;</i></p> <p><i>(f) authorisations for movements of vehicles.</i></p> <hr/> <p>CSM 5.1.2 (IMs)</p> <p><i>The organisation shall ensure that its operational arrangements conform to the safety-related requirements of applicable Technical Specifications for Interoperability and relevant national rules and any other relevant requirements (see 1.1. Organisation, context and scope of the safety management system).</i></p> <hr/> <p>CSM 5.1.2 (IMs)</p> <p><i>To control risks where relevant for the safety of operational activities (see 3.1.1. Risk assessment), at least the following shall be taken into account:</i></p> <p><i>(a) identification of the safe boundaries of transport for traffic planning and control based on the</i></p>		<p>The operational process to be included within the scope of this principle takes into account the following:</p> <ul style="list-style-type: none"> • Route compatibility requirements – see TSI OPE 4.2.2.5, Appendix D1 and Annex 4 of this guide); • Train composition – must be planned well in advance to check that conformity is in line with the path ordered or to request another path suitable for the train (including procedures for exceptional loads) and procedures to ensure that the RU is fully aware of the train composition for the whole run and that there are no deviations unless agreed). The composition of the train should also take into account the transport of dangerous goods (see below); • Train preparation – including who is responsible, the documentation required and how the train is formed and ensuring that the train is complete, coupling and uncoupling of vehicles. The preparation of the train should also take into account the transport of dangerous goods (see below); • Description of the infrastructure – permanent information through the Register of Infrastructure, or other available means according to the timeline and indications set available in the regulation Appendix ; D1; • Train identification; • The responsibilities/duties of crew and the mechanism for providing information to drivers and other staff performing safety critical tasks in the operational domain; • Exceptional transport for when the load is outside the normal parameters for the train path. For these cases, it is necessary to distinguish between the one-off and the regular exceptional transport. The conditions defined for the exceptional transport can be fulfilled with a different validity period or requirements depending on the nature of the exceptional transport. The conditions can be valid once or e.g. for one year. However, the RU needs to ensure that for regular exceptional transport, they continue to meet the requirements of the train path; • Dangerous goods – including classification, acceptance, identification and labelling. Separation/distance requirements between the loads/containers and maximum content of them. (see also: https://www.era.europa.eu/activities/transport-dangerous-goods/inland-tdg_en)

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
	<p><i>design characteristics of the infrastructure;</i> <i>(b) traffic planning, including timetable and train path allocation;</i> <i>(d) setting of conditions for running exceptional transport or consignments.</i></p>		<p><u>Company rules</u></p> <p>These are examples of the types of company rules that should be covered under FOP No 2:</p> <ul style="list-style-type: none"> • Train composition; • Train preparation including coupling; • Exceptional loads; • Dangerous goods; • IM/RU's Rules on information necessary to the driver and others who may be involved in train preparation and/or composition (see also rule and route book); • UIC Leaflets 419, 421, 700, 471-3. <p><i>TSI OPE- 4.2.2.5.2 and 4.2.2.7 Train composition and preparation</i></p> <p>The RU is required to ensure that the train is in running order before and throughout the operation. The RU should ensure that all vehicles as well as the combination of vehicles in a train or a train composition fulfil all requirements regarding safety and the route on which the train is operated. This includes not only the vehicles themselves, including their equipment, but also any freight load and the securing of it on or in a vehicle.</p> <p>The train preparation process should set the conditions to prevent the train from being detached or being derailed (due to e.g. transversal and longitudinal stresses), having regard to the parameters and characteristics of the lines to be operated.</p> <p>Some of the activities are carried out by the RU itself, for others the RU can subcontract some of these activities to other players like keepers, Entities in Charge of Maintenance (maintenance of the freight vehicles) or even the IM (e.g. maintenance of vehicles, train departure procedures). However, even by subcontracting some of the activities to other players the RU has the responsibility according to Article 4 (3) of the Safety Directive to manage the risks of their operation. They should therefore cooperate</p>

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
			<p>with subcontractors or those undertaking tasks that could affect the safety of the train and ensure that everyone is aware of their individual responsibilities and discharge them effectively. This should be part of their procedures in their SMS.</p> <p>Train preparation also includes the coupling and uncoupling of the vehicle. This is not classed as shunting and therefore not permitted as a national rule.</p> <p>Shunting is the movement of all types of vehicles other than trains as defined in Appendix J to TSI OPE. Every train that operates on the network has a unique number. Shunting movements do not have a unique train number; it could be identified by other means (e.g. a shunting number) if necessary for operation.</p> <p>An example of shunting is a movement of a vehicle using shunting signals including optical and acoustical communication or shunting point of reference.</p> <p>The (de)connecting of a vehicle or a wagon due to a problem (i.e. brake issues) is not classed as shunting but a change in the train composition and part of the train preparation process. The moving of (de)connected vehicles or wagons could be part of shunting.</p> <p>Moving vehicles for track maintenance is to be managed via the SMS. Nevertheless, an OTM being transferred from one station to another (meaning the machine(s) are not working) on an allocated train path should normally be considered as a train.</p> <p>On the network under the scope of EU Directive 2016/798, shunting should take place under a RU safety certificate or an IM authorisation.</p> <p>Driver and other staff with this responsibility are trained to do this as part of the SMS of the RU/IM.</p> <p>In relation to TSI OPE 4.2.2.5.2 and 4.2.2.7 – Ensuring that the train is in running order - the following aspects need to be considered:</p> <p style="padding-left: 40px;">The train composition should be planned in advance in order to check the conformity with the path ordered or to request another path suitable for the train. Therefore, the RU should</p>

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
			<p>indicate general characteristics that influence the choice of routes as well as other constraints (like gauge, vehicle’s speed limits etc.).</p> <p>The actual train composition should always be so that the train may run on the routes planned. This includes aspects like train length, axle load, accepted braking systems, braking performance, CCS-equipment on board and others (see (a) to (g) below). If the characteristics differ from those indicated to the IM, the RU has to inform the IM about this. If necessary, a new path must be requested or amended according to the processes defined in the IM’s network statement (commercial aspects are not subject of TSI OPE and therefore not covered). This procedure should cover:</p> <ul style="list-style-type: none"> (a) the weight, axle load and axle distribution must be compatible with the load carrying capacity of the infrastructure; (b) the weight of the train must be within the maximum permissible for the section of route, the strength of the couplings, the traction power and other relevant characteristics of the train; (c) the maximum speed of the train: <ul style="list-style-type: none"> – the maximum speed at which the train can run must take into account any restrictions on the route(s) concerned, braking performance, axle load and vehicle type; (d) the clearance gauge; (e) reference profiles for which each vehicle was authorised in the train (inclusive of any load) must be within the maximum permissible for the section of route; (f) train detection system(s); (g) energy related elements: <ul style="list-style-type: none"> – maximum train current, – maximum current at standstill per pantograph,

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
			<ul style="list-style-type: none"> – mean contact force, – arrangement of pantographs, – running through phase and system separation sections; and <p>(h) any other changes of parameters, which were considered for the train path allocation.</p> <p>For each train, the RU should ensure that they know the train composition during the whole train run. This is necessary to cope with all possible risks that may arise during the train run. The IM should be informed about specific details of the train, in accordance to the requirements for ‘Pre-departure data’ in point 4.2.2.7.2 of TSI OPE.</p> <p>The RU should also ensure that operational procedures/company rules are in place and used by staff to ensure that all safety related equipment is fully functional and that the train is safe to operate throughout its journey.</p> <p>Concerning the cryptographic keys, neither the signaller nor the driver can do anything if the proper cryptographic keys are not already installed in the on-board (except of course running without ETCS, which is a degraded situation). If the keys are not the correct ones, there will be an operational issue: a train that is not compatible with the route (i.e. cannot run in ETCS Level 2 although it is equipped with ETCS L2 on-board and has passed all other compatibility checks) could enter that route. The RU must check that the cryptographic keys are the correct ones via a procedure described in its SMS.</p> <p>ETCS National Values (NVs) are a similar concern. The driver has no way of confirming whether the applicable ETCS NVs are loaded into the on-board system. If they are not, then a safety issue can occur as the on-board system will rely on the set of values already stored which may be less restrictive than the applicable ones (the already stored values may be either those of another network or the default ones, specified in the CCS TSI). The SMS of both the RU and IM should detail solutions at the operational</p>

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
			<p>level to ensure a safe train run until the on-board system acquires the correct NVs (in selected locations depending on the trackside engineering).</p> <p>The RU may, for instance, require that a locomotive without a confirmed set of NVs always goes over a specific location in the station (e.g. a particular service line) where it can pick up the applicable NVs before starting a journey.</p> <p>The RU will be informed on the applicable national values in every network they operate in through Appendix D3 data provided via RINF or other available means awaiting the update of the RINF-tool.</p> <p>It is important to note that it is the RU’s responsibility to ascertain whether the correct NVs are loaded in the on-board system. It is not the driver’s responsibility. The RU should include in its SMS suitable provisions to prevent this situation from occurring in the first place.</p> <p>TSI OPE 4.2.3.4.3 sets out high-level requirements on dangerous goods. In addition, Directives 2012/34/EC on establishing a single European railway area and 2008/68/EC on the inland transport of dangerous goods are also relevant. However, it is key that adequate risk assessments are undertaken to ensure that hazards are identified and controlled. Reliance on a National Rule which is not risk based and does not take into account the operational requirements is not sufficient. (see also https://www.era.europa.eu/activities/transport-dangerous-goods/inland-tdg_en)</p> <p><i>TSI OPE - 4.2.3.2 Train identification</i></p> <p>The TSI OPE requires that each train should have a unique identification. The standard means for this is the train running number.</p> <p>Due to existing CCS-systems and other IT-systems, the total number of train running numbers is limited; the numbers should be re-used on the European network.</p>

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
			<p>To ensure that trains can be correctly identified, each train running number should be unique per network. In this case, it means not only rail network, but also the IT-networks of e.g. GSM-R and ETCS. If the IT-systems have another geographical extent than the rail network, the different extents should be compared. The largest extent should be considered when assigning the train numbers. If, for example, two IMs decide to establish one common GSM-R network, then the IMs would have to ensure that a train running number is not repeated on the network of the other IM because they operate on the same GSM-R network.</p> <p>The train running number is allocated by the IM allocating the train path. In doing so, the IM should cooperate with other IMs to ensure that the number is not re-used unnecessarily. Furthermore, the IM should ensure that all affected parties (RU and other IMs) are informed about the allocated train number and possible changes.</p> <p>Changes of the train running number should be avoided as much as possible. If a change is necessary, the IM should inform the RU and other IMs about the change. If modification of the train running number in on-board systems is not possible while running, then the manual change of a train running number should take place while the train is at standstill , in order to ensure clear identification by signallers and others during the train run.</p>
1.2.4	<p><u>National rules (NRs)</u></p> <p>NRs for this topic are allowed in the following areas and should be considered by the RU and/or IM:</p> <ul style="list-style-type: none"> ❖ Specific requirements to operate combined transport trains exceeding the loading gauge but not exceeding the codification of the line ❖ Exceptional transport (there is a definition in TSI OPE which explains what this means) ❖ Train running information for drivers – additional information 		

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
1.2.5	<p>CSM 5.1.2 (RUs)</p> <p><i>The organisation shall ensure that its operational arrangements conform to the safety-related requirements of applicable Technical Specifications for Interoperability and relevant national rules and any other relevant requirements (see 1.1. Organisation, context and scope of the safety management system).</i></p> <hr/> <p>CSM 5.1.3 (RUs)</p> <p><i>To control risks where relevant for the safety of operational activities (see 3.1.1. Risk assessment), at least the following shall be taken into account:</i></p> <p><i>(c) preparation of trains or vehicles before movement, including pre-departure checks and train composition;</i></p> <p><i>(d) running trains or movement of vehicles in the different operating conditions (normal, degraded and emergency).</i></p> <hr/> <p>CSM 5.1.2 (IMs)</p> <p><i>The organisation shall ensure that its operational arrangements conform to the safety-related</i></p>	3	<p>TSI OPE - Appendix B</p> <p><i>“Before a train begins or continues its journey, it shall be ensured that passengers, staff and goods are carried safely”.</i></p> <p>This principle concerns the train and its readiness for starting or continuing a movement. It includes, the evaluation of circumstances to ensure safety in various operational situations, such as adequate braking capacity of the train, adequate definition and respect of the speed that the train is permitted to travel, proper formation and coupling of the train, proper identification, proper loading and securing of freight, safe passengers boarding and alighting of passengers, adequate control of crowding on trains and platforms, provision of adequate information to train preparation and operational staff and the effective execution of their safety tasks. The aim is to prevent collisions, derailments and any other accident due to a number of risks.</p> <p><u>SMS operational process</u></p> <p>There should be an operational process that ensures that the train is ready for a safe movement. This should be based on information and the outcomes from the risk assessment which set out how the safety of the train is ensured before it commences its operation and secondly, that it will continue to be safe throughout the journey. It should include information for people involved in train or station operations and infrastructure work.</p> <p>The operational processes to be included within the scope of this principle takes into account the following:</p> <ul style="list-style-type: none"> • Before a train starts or continues a journey, the process should cover:

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
	<p><i>requirements of applicable Technical Specifications for Interoperability and relevant national rules and any other relevant requirements (see 1.1. Organisation, context and scope of the safety management system).</i></p> <hr/> <p>CSM 5.1.2 (IMs)</p> <p><i>To control risks where relevant for the safety of operational activities (see 3.1.1. Risk assessment), at least the following shall be taken into account:</i></p> <p><i>(c) real-time traffic management in normal mode and in degraded modes with the application of traffic restrictions of use and the management of traffic disruptions.</i></p>		<ul style="list-style-type: none"> ○ checks of safety conditions of a section in respect to what could constitute a hazard to train movements and the procedures necessary to control these (e.g. the section is not occupied, switches are in the correct positions, operation during works, etc.); ○ the requirements and procedures for reporting hazards to train movements; ○ the actions the people involved should take to stop trains approaching the affected location; ○ a means for indicating that the train is complete; ○ sufficient traction power for anticipated gradients; ○ any restrictions to be imposed on train movements (e.g., speed restrictions due to trackside works, etc.); ○ examination of the line to obtain more information about a reported hazard. <ul style="list-style-type: none"> ● Departure of a train; ● Exceptional weather conditions and the different types of weather planned for or exceptional rail-head conditions; ● Tests and checks before departure; ● Safety of the load – weight distribution/axle loading/load securing/kinematic envelop/load covering; ● Braking performance based on the requirements provided by RINF and the IM (see Annex 4 which also gives an example of a braking sheet); ● Train specifications – train visibility, front and rear end indication, train audibility; ● Risk management in the use of sanding (i.e. when and how, what specific measures are needed to control any risks) ● Relevant instructions to staff ensuring the safe movement of the train from start to finish of the journey. ● <p><u>Company rules</u></p> <p>These are examples of the types of company rules that should be covered under FOP No 3:</p>

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
			<ul style="list-style-type: none"> • IM/RU’s rules as these are specific to the rolling stock being prepared – tests and checks before departure; <ul style="list-style-type: none"> ○ loading and unloading of wagons including visual inspections (UIC Leaflet – safety of loading and European Standard EN 16860); ○ procedures for coupling and uncoupling of trains; ○ visual checks of trains, including wagons and containers/bogies/axels for defects/damage/signs of overheating and the procedures for reporting them; ○ braking rules – tests/ tables/sheets – see Annex 4; ○ check of the braking system (track brakes, hand brakes, emergency brakes) to ensure secured are working effectively and also for defects/damage; ○ check of buffers and couplers for damage and that they are secured; ○ tests of on-board safety devices and safety related equipment, including audible warning devices; ○ communication systems; ○ check of doors, lamps, horns etc.; ○ train documentation; ○ platform gap procedures; ○ maximum permissible speeds for the train and path – these should not exceed the limits set for safe operation taking into account the characteristics of the train and the constraints of the infrastructure; ○ Appendix B for the general rules in relation to safe departure and operation of the train with detailed instructions within IM/RU’s rules; ○ exceptional weather conditions, the different types and what to do in the event of a problem with the train; ○ safe boarding and leaving the train. <p>When determining the frequency and scope of the various checks to be carried out, the safety risks of train operation from start to finish of its journey should be taken into account. For example, some checks may be needed only before the start of the journey while other/ additional checks may be</p>

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
			<p>required during the journey if the operational risk context requires it. This should be decided by the RU based on the outcome of risk assessment.</p> <p>Train crew should receive relevant instruction on the operation of door controls at platforms not long enough to accommodate the complete train; operating rules should provide instructions to be applied when a train overruns a platform at which it is scheduled to stop.</p> <p>The RU can use the AMOC’s on:</p> <ul style="list-style-type: none"> - safety of load; - safety of passengers; - checks and tests before departure; <p>as a best practice from the railway sector to replace certain topics that have been national rules in the past. AMOC’s are voluntary; this means that if RUs prove through their risk analysis documentation that the necessary measures to control the risks linked to their operational activities are implemented. RUs can choose not to apply the good practices defined in an AMOC or other available standards (see also point 4.6 of this guidance).</p> <p>Trains that operate with partnered RUs across borders may wish to consider the UIC ATTI trusted handover procedure (see https://uic.org/atti for further information).</p> <p>This FOP should also cover requirements in relation TSI OPE 4.2.1.1 - Train visibility; TSI OPE 4.2.2.2 – Train audibility; TSI OPE 4.2.2.3 – Train departure; TSI OPE 4.2.2.4 – Safety of passengers and load; TSI OPE 4.2.2.6 – Train braking</p> <p><i>TSI OPE – 4.2.2.1.3.2 – Rear end signal – Freight trains in international traffic</i></p> <p>The question of whether reflective plates are accepted in international traffic remains an issue in some Member States. TSI OPE provides dates for acceptance of reflective plates in Member States.</p> <p>However, in the interim, it is important that Member States offer a transparent and non-discriminatory approach to ensure effective and efficient cross border operation. With this in mind, the IM should</p>

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
			<p>provide a prompt response to individual requests from RUs to access the network with clear information on the risk analysis. If the request is refused or an RU had problems with gaining access to a network or part of a network, the NSA concerned should be contacted for further assistance.</p> <p><i>TSI OPE - 4.2.2.4.1 Safety of load</i> <i>See AMOC on Safety of Load</i></p> <p><i>TSI OPE Appendix B – Common Operational Rule COR 1 - Sanding</i></p> <p>The application of sand is an effective way of improving the adhesion of wheels to the rail, to aid braking and start moving especially in conditions of low/poor rail adhesion.</p> <p>A build-up of sand on the railhead may cause a number of problems especially in relation to the activation of track circuits and the effective operation of points and crossings.</p> <p>This should be taken into account in the IM’s operational rules and the driver’s rule book. There is an interface with TSI CCS.</p> <p>The risk assessment on the relevant operational scenarios involving sanding should identify the situations requiring the driver to report the location where the sanding device has been used (e.g., to identify areas where sand might have accumulated in case it constitutes an insufficiently controlled risk).</p>

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
			<p><i>TSI OPE Appendix B – COR 2 - Departure of the train</i></p> <p>In the rule it is stated that:</p> <p>“At the initial station or after a scheduled stop the driver is allowed to depart when the following conditions are fulfilled:</p> <ul style="list-style-type: none"> • After the driver has received an authorisation for train movement; and • After train service conditions are fulfilled; and • When it is time to depart, except when allowed to start before the scheduled time.” <p>The authorisation for train movement can be given through different means such as signalling system, radio communication, instructions, rules, pre-established documentation, etc.</p> <p>In addition, it is recommended that a single ETCS operational train category is assigned to a train at the start of the journey, which should be maintained to its final destination.</p>
1.2.6	<p><u>National rules (NRs)</u></p> <p>NRs for this topic are allowed in the following areas and should be considered by the RU and/or IM:</p> <ul style="list-style-type: none"> ❖ Signalling rules - Rules related to the operational use of the national signalling system; ❖ Local operational rule - Rules of a strictly local nature relating to specific local conditions, when not mentioned in RINF in accordance with Article 14(11) of Directive (EU) 2016/797; ❖ Train visibility - Front end (see point 4.2.2.1.2) - Existing Non TSI conform vehicles; ❖ Exceptional transport; ❖ Specific requirements to operate combined transport trains exceeding the loading gauge but not exceeding the codification of the line. ❖ Sanding – automatic sanding device. 		

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
1.2.7	<p>CSM 5.1.2 (RUs)</p> <p><i>The organisation shall ensure that its operational arrangements conform to the safety-related requirements of applicable Technical Specifications for Interoperability and relevant national rules and any other relevant requirements (see 1.1. Organisation, context and scope of the safety management system).</i></p>	4	<p>TSI OPE - Appendix B</p> <p><i>“Before a train is allowed to start or continue its movement, it shall have an authority to move and all necessary information to define the conditions of that authority”.</i></p> <p>The safety benefits of a system for maintaining safe intervals between trains are compromised if a train proceeds without an authorisation for train movement. This principle concerns ensuring the train has an authority to move provided either by the signalling system or by other authorised methods. (e.g., an operational instruction from the signaller with an authorisation for train movement) and, for the portion of line or track to which the authorisation applies, all the necessary information to comply with.</p> <p>Granting authorisation to move in normal or degraded operation should be clearly defined and set out by the IM in its SMS by operational arrangements to ensure that trains are authorised to run in the predetermined direction with a clearly defined start and end point.</p> <p><u>SMS operational process</u></p> <p>There should be an operational process that ensures that the train is ready for the movement. This should be based on information from the risk assessment and set out the information needed to ensure that the train can operate safely and in accordance with the operating conditions and signalling and other authorised methods. It should also cover preparedness for ensuring there are operational procedures and company rules in place for degraded operation and failure of equipment.</p>
	<p>CSM 5.1.3 (RUs)</p> <p><i>To control risks where relevant for the safety of operational activities (see 3.1.1. Risk assessment), at least the following shall be taken into account:</i></p> <p><i>(d) running trains or movement of vehicles in the different operating conditions (normal, degraded and emergency);</i></p> <p><i>(f) authorisations for movements of vehicles.</i></p>		
	<p>CSM 5.1.2 (IMs)</p> <p><i>The organisation shall ensure that its operational arrangements conform to the safety-related requirements of applicable</i></p>		

<p><i>Technical Specifications for Interoperability and relevant national rules and any other relevant requirements (see 1.1. Organisation, context and scope of the safety management system).</i></p>	<p>In coherence with such SMS operational process, the related operational procedures should consider that the safety of operations could be impacted by the constraints arising from the following aspects among others:</p> <p>(a) the characteristics of the infrastructure, the characteristics of each train and their interaction: gradient, Overhead Contact Line supply limits, etc;</p> <p>(b) the status of the equipment which may be affected by an authorisation for train movement: switches, level crossings, track occupancy circuits, etc.;</p> <p>(c) the simultaneous operation of multiple trains on the infrastructure;</p> <p>(d) environmental circumstances likely to affect safety of operations or following an alert issued in a timely manner by the competent bodies (for IMs, e.g. hydrogeological hazards).</p> <p><u>Company rules</u></p> <p>Operating rules, supported by maintenance and train preparation instructions for each type or class of vehicle, should cover:</p> <ul style="list-style-type: none"> • the process for giving the authorisation for train movement that is in accordance with the route for which the RCC has been performed; • situations where a train can be misrouted; RUs and IMs should identify the appropriate safety measures; • the rules set out in Appendices A and B. In particular in relation to the requirements to be met, in respect of on-board equipment, before trains or vehicles are permitted to enter service. This should cover both normal and degraded operation in accordance to Appendices A and B. Further detail is given below: <ul style="list-style-type: none"> – define the circumstances in which trains or vehicles may be permitted to enter service with defects or isolations which could affect their safe movement, and the additional safeguards which should be applied to mitigate increased risks which arise as a consequence; – when a train or vehicle which has become defective has to be moved, instructions for its movement should specify: <ul style="list-style-type: none"> • the maximum speed for the movement;
<p>CSM 5.1.3 (IMs)</p> <p><i>To control risks where relevant for the safety of operational activities (see 3.1.1. Risk assessment), at least the following shall be taken into account:</i></p> <p><i>(c) real-time traffic management in normal mode and in degraded modes with the application of traffic restrictions of use and the management of traffic disruptions;</i></p>	

		<ul style="list-style-type: none"> • the point at which the train is to be taken out of service or other controls applied, such as disembarking passengers, remarshalling or turning the train; • any additional safeguards to be applied to the movement. <ul style="list-style-type: none"> – instructions to drivers about the movement of a defective train and the interaction with signallers; – instructions to drivers on what to do in the event of unforeseen or unscheduled stops; – permissible speeds – covered by IM/RU’s operational rules and instructions for coupling vehicles or multiple units, including the correct connection of brake and other control systems; – operating rules and instructions for special vehicles (e.g., OTM) should prescribe the safety checks to be carried out prior to movement as a “train”; – updating the information when the formation of a freight train is changed or the status of vehicles is changed (e.g., from loaded to empty); – equipment mounted on special vehicles (e.g., OTM) when removed and placed in the vicinity of the track, they should be placed in such a way that they do not occupy the gauge. In the event that such removed equipment is to be placed on another rail vehicle, FOP No.3 should be complied with.; – information should be provided to train crew about stopping points at station platforms; – operating rules for data recording both on the train and supervision of the data outside the train; – train ready message; – operating rules for train reporting including position and handover which ensures the efficient and effective operation; – operating rules should prescribe the requirements for train dispatch and arrival at stations. <ul style="list-style-type: none"> • The following Appendix B <i>Common Operational Rules (CORs) are relevant and further detail should be incorporated into company rules:</i> <ul style="list-style-type: none"> • COR 3 – No authorisation for train movement at the expected time; • COR 4 – Complete failure of front end lights; • COR 5 – Complete failure of rear end signal; • COR 6 – Failure of the audible warning device of a train;
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		<ul style="list-style-type: none"> • COR 7 – Failure of level crossing; • COR 8 – Failure of voice radio communication; • COR 10 – Assistance to a failed train; • COR 11 – Authorisation to pass an End of Authority; • COR 15 – Failure of on-board equipment; • COR 16 – End of authority passed without permission; • COR 17 – Failure of trackside equipment including catenary; and • COR 18 – Entering an occupied track section within a station. <p><i>This FOP should also cover TSI OPE 4.2.2.7 – Ensuring the train is in running order; TSI OPE 4.2.2.9 – Driver Vigilance; TSI OPE 4.2.3.2 – Identification of Trains; TSI OPE 4.2.3.3 – Train departure; TSI OPE 4.2.3.4 Traffic management (including train reporting); TSI OPE 4.2.3.6 – Degraded operation</i></p> <p><i>TSI OPE - 4.2.3.3.2 Informing the infrastructure manager of the train’s operational status</i></p> <p>TSI OPE requires that the RU informs the IM when a train is ready to access the network and to start its train run. This requirement includes the possibility that IM and RU agree beforehand that a train is ready at the moment of departure when the RU does not indicate the contrary. It should be understood that such agreement needs to be concluded between IM and RU to ensure efficient use of the infrastructure.</p> <p>Three different steps should be differentiated:</p> <p>a) Train path allocation: The operator of the train needs to obtain a train path. The request for a path as well as the allocation has to be done under the rules applying the “Directive on allocation of paths and the levying of charges” 2012/34/EC.</p> <p>b) Train operation: Train operation starts when the train path has been allocated and includes the preparation and operation. Once this has started, the operator becomes the RU. The operation of the train is in the scope of the TSI OPE. The TSI OPE defines the interfaces between IM and RU to ensure that both operate the train on a common understanding of their different responsibilities.</p>
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		<p>c) Train run: The train run starts with the train ready message (according to point 4.2.3.3.2) at the point of origin (first point of the path contract) and ends with the arrival at the termination point (last point in the path contract).</p> <p><i>TSI OPE - 4.2.3.4.2 Train reporting</i></p> <p>The train reporting includes several requirements on train position reporting and hand over time.</p> <p>These requirements set out the kind of information that is necessary for efficient and effective train operation in order to allow smooth train runs in the interest of all RUs' customers – passengers and freight customers.</p> <p>The amount of reporting points and the means of reporting should be adapted to the operational needs for efficient operation on each line and its traffic.</p> <p>A freight corridor at the limit of its capacity probably requires other reporting protocols than a line with three freight trains per day (although the freight RU's customer might still have very high requirements on the reporting – depending on the business case for those transports).</p> <p>One way of communication may be the Telematic applications that are necessary following the TSIs TAF and TAP; but the TSI OPE does not require Telematic applications. In the interest of smooth operation, it may be necessary to consider also other ways of communication like telephone or other means.</p> <p><i>TSI OPE - 4.2.3.5 Data recording</i></p> <p>The information recorded should at least be accessible to the NIBs. However, at national level, some other “authorised bodies” might be given the right to access these data.</p>
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		<p>The precise geographic location should precise a distance in km/ml from a recognisable location.</p> <p><i>TSI OPE 4.2.3.5.1 Data recording</i> <i>Recording of monitoring data outside the train</i></p> <p>The TSI OPE requires first of all that certain data is recorded. This should be seen in connection with the principle that TSI OPE requires what shall be done and not the technical method of how to do it. On existing lines, the recording may take place by hand-written documentation. The assessment of risks associated with the procedures and the possible need for technical equipment (for existing lines) is a task of the IM.</p> <p>The recording of safety related communications between driver and signaller should not be understood as a technical requirement to split between safety and non-safety related communication.</p> <p><i>TSI OPE - 4.2.3.5.2 Data recording</i> <i>Recording of monitoring data on-board the train</i></p> <p>Various types of data are to be recorded on-board the train which includes “<i>detection by on-board alarm systems related to the safe operation of the train, if fitted</i>”. An example of on-board alarm systems also covers hot axle box detectors. These on-board alarm systems exclude passenger alarms, which are not specific to the control of operational safety but could be related to passenger safety in the event of an incident.</p> <p>RUs should make use of the recorded data within their monitoring while respecting legislation on data protection.</p> <p>In relation to TSI OPE 4.2.3.4.4 – Operational quality; TSI OPE 4.2.3.5 Data recording – this also links to how the RU and IM monitor the safety performance of their operation. Therefore, these requirements also link to CSM criteria 6.1 on Monitoring</p>
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		<p><i>TSI OPE Appendix B - COR4 – Complete failure of the front end lights</i></p> <p>This guidance clarifies the aspect of maximum speed:</p> <p>In good visibility, the train can proceed at the 'maximum permitted speed' following the risk assessment of this failure in conditions of good visibility, more precisely :</p> <ul style="list-style-type: none">• without any additional speed restriction due to the failure, <p>or</p> <ul style="list-style-type: none">• the maximum speed defined by the RU for this failure, <p>unless</p> <p>a maximum speed for this failure has been defined as a national rule under App. I 'Maximum speed in degraded mode including running on sight'. In the latter case, the maximum speed defined under a national rule will apply.</p> <p>In poor visibility or darkness when the train has been fitted with at least one portable light, the train can proceed at the 'maximum allowable speed for that failure' following the risk assessment for this failure in conditions of poor visibility or darkness, more precisely at the maximum speed defined by the RU for this failure, unless a maximum speed for this failure has been defined as a national rule under App. I 'Maximum speed in degraded mode including running on sight'. In the latter case, the maximum speed defined under a national rule will apply.</p> <p>All the means to solve this failure at the origin point of the train should be considered as a condition to its depart, otherwise, the train should be considered not suitable for the operation.</p> <p><i>TSI Appendix B – COR15 – Failure of on-board equipment</i></p>
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		<p>a) the impact of the failure determined by its nature (e.g., if the failure limits the possibility of trains running);</p> <p>b) the action to take in relation to the failure;</p> <p>c) the relevant instruction to give to the driver.</p> <p>Instructions that help to determine the safe behaviour of the driver are not only the instructions of the signaller but also all the other rules developed by the RU and that the driver should follow unless these rules compromise safety.</p> <p>TSI OPE Appendix B - COR18 Entering an occupied track section within a station.</p> <p>Note: No confirmation is required for a parked wagon set, regardless whether or not it is coupled to a non-staffed traction unit.</p>
1.2.8	<p><u>National rules (NRs)</u></p> <p>NRs for this topic are allowed in the following areas and should be considered by the RU and/or IM:</p> <ul style="list-style-type: none"> ❖ Safe operation of test trains; ❖ Operation during works; ❖ Recording of monitoring data outside the train – additional information required. ❖ Signalling rules - Rules related to the operational use of the national signalling system; ❖ Local operational rule - Rules of a strictly local nature relating to specific local conditions, when not mentioned in RINF in accordance with Article 14(11) of Directive (EU) 2016/797; ❖ Safety-related communications methodology - National operational instructions (see Appendix C2); ❖ Operations in long tunnels (see 4.3.5) - Additional information; ❖ Maximum speeds in degraded mode including running on sight. 	

	CSM on SMS reference and legal text	FOP	TSI OPE reference and associated guidance
1.2.9	<p>CSM 5.1.2 (RUs)</p> <p><i>The organisation shall ensure that its operational arrangements conform to the safety-related requirements of applicable Technical Specifications for Interoperability and relevant national rules and any other relevant requirements (see 1.1. Organisation, context and scope of the safety management system).</i></p>	5	<p>TSI OPE - Appendix B</p> <p><i>“A train shall be prevented from proceeding onto a portion of line if it is known or suspected that it would not be safe for the train to proceed until measures have been taken to allow the train to continue safely”.</i></p> <p>This principle addresses the risks of collision and derailment when the line is obstructed or becomes unsafe. This includes failure of level crossings, obstructions on the line or problems with the infrastructure. This does not include unsafe passing of a level crossing by road users. The starting point of this principle is that a portion of line is known or suspected to be unsafe for trains to pass over it. Therefore, controls to ensure the safety of the infrastructure for train movements will need to have been introduced to overcome or prevent a risk. The aim is to prevent the threat to train movements presented by an obstruction or unsafe condition occurring. The detection of deviating conditions in relevant points along the line that could affect the safety of operations, taking into account railway infrastructure characteristics (e.g. hydrogeological risky areas), could be performed by trackside technological devices (e.g. rockfall detecting devices / sensors, landslide detecting devices/sensors), or following a warning issued in a timely manner by the competent bodies, or according to organisational procedures.</p> <p><u>SMS Operational processes</u></p> <p>There should be an operational process that ensures that the train is prevented from operation if it is unsafe to do so. This should be based on information from the risk assessment and set out the information needed to prevent the movement of the train or set out requirements that will ensure that the train can operate safely and in accordance with the operating conditions and signalling and other authorised methods.</p>
	<p>CSM 5.1.3 (RUs)</p> <p><i>To control risks where relevant for the safety of operational activities (see 3.1.1. Risk assessment), at least the following shall be taken into account:</i></p> <p><i>d) running trains or movement of vehicles in the different operating conditions (normal, degraded and emergency);</i></p>		
	<p>CSM 5.1.2 (IMs)</p> <p><i>The organisation shall ensure that its operational arrangements conform to the safety-related requirements of applicable Technical Specifications for Interoperability and relevant</i></p>		

<p><i>national rules and any other relevant requirements (see 1.1. Organisation, context and scope of the safety management system).</i></p>	<p><u>Company rules</u></p> <p>The operational procedures to be included within the scope of FOP No 5 are:</p> <ul style="list-style-type: none"> • Operating rules should include descriptions of the operation on the different types of level crossing; • Operating rules are required, to mitigate the risks for the operation of the train in case of obstructions of the line or e.g. animals/people on the track during normal operation, level crossings, etc.; • Operating rules for managing infrastructure work (including speeds in degraded mode and particular operating conditions), infrastructure failures (including catenary and no traction current), weather conditions; • Operating rules for dealing with fires and other incidents, including specific rules for dangerous goods incidents (see also https://www.era.europa.eu/activities/transport-dangerous-goods/inland-tdg_en); • TSI OPE Appendices A and B Common Operational Rules (CORs) regarding failures with further detail incorporated into a company rule: <ul style="list-style-type: none"> • COR 4 – Complete failure of front end lights; • COR 5 – Complete failure of rear end signal; • COR 7 – Failure of level crossing; • COR 12 – Anomalies in line side signalling; • COR 13 – Emergency call; • COR 14 – Immediate actions to prevent danger to a train; and • COR 17 – Failure of trackside equipment including catenary. • Speeds in degraded mode – when and how they should be applied on both Class A (Appendix A) and Class B (Appendix B) lines. Including: <ul style="list-style-type: none"> – an authorisation to pass a signal showing / a stop aspect / indication ; – Running on sight; – Infrastructure failures; – Exceptional weather conditions; – Running without route knowledge; – Failure of braking system or other vehicle defect (not covered by Appendix B).
<p>CSM 5.1.3 (IMs)</p> <p><i>To control risks where relevant for the safety of operational activities (see 3.1.1. Risk assessment), at least the following shall be taken into account:</i></p> <p><i>(c) real-time traffic management in normal mode and in degraded modes with the application of traffic restrictions of use and the management of traffic disruptions;</i></p>	

		<p><i>TSI OPE Appendix B – COR 13 - Emergency call</i></p> <p>The operational rule referring to the emergency call is based on the following:</p> <ul style="list-style-type: none"> • the operational situations in which a person shall trigger the emergency call are covered by company's risk assessment and rules , • the COR starts from the moment an emergency call is received, • the first action of all the drivers after taking note of an emergency call is to do everything in order to reduce potential consequences, • in such a situation all concerned drivers are listening to the communications; for non GSMR emergency calls, the drivers avoid speaking unless they have to give new relevant elements, • the signaller communicates with drivers to provide additional instructions or information, • after receiving an emergency call the actions performed by the signaller shall be part of the company rules of the IM, • only the signaller is allowed to revoke an emergency call, • only the signaller can decide when to resume normal operation, • no special rule is needed for non-stopping areas and safe areas. <p>The “Emergency Call” can be a dedicated emergency call functionality (GSM-R or other) or a vocal (radio) message “Mayday, mayday, mayday”.</p> <p><i>TSI OPE Appendix B – COR 14 - Immediate actions to prevent danger to trains</i></p> <p>IMs and RUs should cooperate to identify, analyse and evaluate foreseeable situations that constitute a (potential) danger in order to manage interfaces and provide their staff with adequate operational procedures as well as the necessary training to deal with such situations (e.g. unexpected obstacles on the track).</p> <p>For example, in case of unexpected automatic activation of the braking system, there should be operational procedures for the driver to come quickly to a safe stop, taking into account local stopping constraints where applicable (i.e. tunnels, viaducts).</p>
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		<p>Another example, in case the IM has an alert system to report obstacles on the track, operational procedures should be in place to ensure that trains moving towards the affected area can be stopped in a timely and safe manner.</p> <p>The signaller is also to be understood under the collective term “staff” in COR 14.</p> <p><i>TSI OPE Appendix B – COR 17 – Failure of trackside equipment including catenary</i></p> <p>IMs should identify, analyse and evaluate failures of trackside equipment including catenary, cooperating with RUs when necessary, in order to manage interfaces. IMs and RUs should provide their staff with adequate operational procedures as well as the necessary training to deal with such situations.</p> <p>For example, in case of failure of the catenary (e.g., overhead line torn off by obstacles) procedures should be in place to switch off the overhead line voltage and take action(s) to eliminate any residual voltage and to protect the area.</p>
1.2.10	<p><u>National rules (NRs)</u></p> <p>NRs for this topic are allowed in the following areas and should be considered by the RU and/or IM:</p> <ul style="list-style-type: none"> ❖ Common operational principles and rules failure of crossing – additional information; ❖ Signalling rules - Rules related to the operational use of the national signalling system; ❖ Maximum speeds in degraded mode including running on sight; ❖ Running at caution; ❖ Local operational rule - Rules of a strictly local nature relating to specific local conditions, when not mentioned in RINF in accordance with Article 14(11) of Directive (EU) 2016/797; ❖ Operation during works; ❖ Managing an emergency situation and emergency responses (see point 4.2.3.7) -Role of local/national authorities and emergency services, and their contact details - Methods and procedures in emergency situation not covered by the requirement of this Regulation, including notification of accidents and incidents: national instructions on modalities for notifications to authorities; ❖ Safety-related communications methodology - National operational instructions (see Appendix C2); ❖ Operations in long tunnels (see 4.3.5) - Additional information. 	

	CSM reference and legal text	FOP	TSI OPE reference and associated guidance
1.2.11	<p>CSM 5.1.2 (RUs)</p> <p><i>The organisation shall ensure that its operational arrangements conform to the safety-related requirements of applicable Technical Specifications for Interoperability and relevant national rules and any other relevant requirements (see 1.1. Organisation, context and scope of the safety management system).</i></p>	6	<p>TSI OPE - Appendix B</p> <p><i>“A train shall not continue to operate after it has been found to be unsafe in any respect, until measures have been taken to allow the train to continue safely”.</i></p> <p>This principle addresses the risks, which might occur on a train and prevent it from continuing safely, e.g. a defect arising in an on-train system or component which affects the safe operation of the train or could, if remedial action is not taken, affect the safety of other trains; a fire on the train; an uncontrolled release of a hazardous substance from a freight vehicle and a displaced or insecure load on a freight vehicle.</p> <p>The detection of deviating conditions on board that could affect safety of operations, taking into account train composition characteristics, could be performed by on board technological devices (e.g axle bearing/boxes temperature detection devices, etc.) or following a warning issued in a timely manner by the competent bodies, or according to organisational procedures.</p> <p><u>SMS Operational processes</u></p> <p>There should be an operational process that ensures that the train is prevented from operation if it is unsafe to do so. This should be based on information from the risk assessment and set out the information needed to prevent the movement of the train or set out requirements that will ensure that the train can operate safely and in accordance with the operating conditions and signalling and other authorised methods.</p>
	<p>CSM 5.1.3 (RU)s</p> <p><i>To control risks where relevant for the safety of operational activities (see 3.1.1. Risk assessment), at least the following shall be taken into account:</i></p> <p><i>(d) running trains or movement of vehicles in the different operating conditions (normal, degraded and emergency);</i></p>		
	<p>CSM 5.1.2 (IMs)</p> <p><i>The organisation shall ensure that its operational arrangements conform to the safety-related requirements of applicable Technical Specifications for Interoperability and relevant national rules and any other</i></p>		

<p><i>relevant requirements (see 1.1. Organisation, context and scope of the safety management system).</i></p>	<p><u>Company rules</u></p> <p>These are examples of the types of company rules that should be covered under FOP No 6:</p> <ul style="list-style-type: none"> • Operating rules should define the procedures for prompt reporting of: <ul style="list-style-type: none"> – defects in on-train systems or any safety critical component which affect the safe operation of the train or could affect the safety of other trains; – fires on trains; – dangerous goods incidents; – displaced loads. • TSI OPE Appendix B Common Operational Rules regarding failures with further detail incorporated into a company rule: <ul style="list-style-type: none"> – COR 4 – Complete failure of front end lights; – COR 5 – Complete failure of rear end signal; – COR 6 – Failure of audible warning device; – COR 8 – Failure of voice radio communication; – COR 13 – Emergency call; – COR 14 – Immediate action to prevent danger to trains; – COR 15 – Failure of on board equipment; and – COR 17 – Failure of trackside equipment including catenary • Operating rules covering evacuation where the RU/IM has control of the evacuation procedure. • Operating rules governing the response of train crew to fires on trains (in addition to the requirements to report the event immediately and to prevent other trains from approaching) should cover: <ul style="list-style-type: none"> – preferred types of location to stop a train which is on fire; – fires on trains carrying dangerous goods; – fires on trains carrying passengers; – actions to prevent the spread of fire; – assessment and reporting of the condition of the train after the fire is extinguished, in advance of decisions about its onward movement. • Operating rules covering locations to consider in case of an emergency stop of the train: it should be avoided to stop on viaducts, in tunnels and any other location. These areas could be
<p>CSM 5.1.3 (IMs)</p> <p><i>To control risks where relevant for the safety of operational activities (see 3.1.1. Risk assessment), at least the following shall be taken into account:</i></p> <p><i>(c) real-time traffic management in normal mode and in degraded modes with the application of traffic restrictions of use and the management of traffic disruptions;</i></p>	

		<p>mentioned in the routebook. They could be indicated via track side board markers, or displayed in the DMI, as unsafe to stop.</p> <ul style="list-style-type: none"> • Actions to be taken in response to a report of a dangerous goods incident should be prescribed by operating rules, supported by instructions specific to the goods involved, provided by the consignor or the RU. • Compliance with international and European requirements on dangerous goods. (see also https://www.era.europa.eu/activities/transport-dangerous-goods/inland-tdg_en). • . <p>RUs should always ensure that, when they take specific actions, these do not contradict with those taken by the IM. This is why it is important to establish good cooperation procedures in their respective SMSs that deal with such events.</p> <p><i>This FOP should also cover TSI OPE 4.2.3.7 – Managing an emergency situation and TSI OPE 4.2.3.8 – Aid to train crew in the event of an incident or of a major rolling stock malfunction. In addition, this has links to the requirements in CSM Criteria 5.5 on Emergency Management.</i></p> <p>RUs and IMs should ensure that their emergency management plan in their SMS takes into account how to operate in an emergency situation, including the use of appropriate communication methods between the relevant IMs and other RUs and to take into account the procedures to be used in such situations by the signaller, the driver and other involved staff. Therefore, there should always be a link between the output of the risk management process and the definition of specific procedures on how to deal with emergency situations.</p> <p>There are cases where several (more than one) IMs can be concerned. Indeed both, TSI OPE point 4.2.3.7 and CSM on SMS point 5.5, only refer to IM and not IMs. The risk here is that an RU operating on networks managed by different IMs is forced to define different procedures to deal with the same type of emergency which, even from an HOF point of view, represents a serious risk.</p> <p>Even if this is not explicitly quoted in the TSI OPE, the same can be derived from CSM on SMS requirements Annex II (SMS requirements for IMs):</p> <ul style="list-style-type: none"> • <i>1.1 c): the organization shall identify interested parties (e.g. regulatory bodies, authorities, RUs, IMs, contractors, suppliers, partners), including those parties external to the railway system, that are relevant to the safety management system;</i>
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		<ul style="list-style-type: none"> • <i>2.4.1: Staff, their representatives and external interested parties, as appropriate and where relevant, shall be consulted in developing, maintaining and improving the safety management system in the relevant parts they are responsible for, including the safety aspects of operational procedures.</i> • <i>3.1.1.1 a): the organisation shall identify and analyse all operational, organisational and technical risks relevant to the character and extent of operations carried out by the organisation. Such risks shall include those arising from human and organisational factors such as workload, job design, fatigue or suitability of procedures, and the activities of other interested parties (see 1. Context of the organisation);</i> • <i>5.5.6: The emergency arrangements are regularly tested in cooperation with other interested parties and updated when appropriate.</i> <p>There is a need for IMs to cooperate in order to manage all emergency situations in the same way as much as possible.</p>
1.2.12	<p><u>National rules (NRs)</u></p> <p>NRs for this topic are allowed in the following areas and should be considered by the RU and/or IM:</p> <ul style="list-style-type: none"> ❖ Maximum speeds in degraded mode including running on sight; ❖ Running at caution ❖ Local operational rule - Rules of a strictly local nature relating to specific local conditions, when not mentioned in RINF in accordance with Article 14(11) of Directive (EU) 2016/797; ❖ Managing an emergency situation and emergency responses (see point 4.2.3.7) -Role of local/national authorities and emergency services, and their contact details - Methods and procedures in emergency situation not covered by the requirement of this Regulation, including notification of accidents and incidents: national instructions on modalities for notifications to authorities; ❖ Safety-related communications methodology - National operational instructions (see Appendix C2); ❖ Recording of monitoring data on-board the train (see 4.2.3.5.2) - Additional information; ❖ Operations in long tunnels (see 4.3.5) - Additional information. 	

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Annex 2 – ERTMS operational principles and rules (Appendix A)

2.1 General

This Annex clarifies the operational context for the application of the principles and rules contained in Appendix A to the TSI OPE. All references below refer to Appendix A contents unless otherwise specified.

The driver is expected to be trained in the ERTMS principles and in using the on-board system. In particular, through training the driver is expected to acquire proper awareness about risks that can occur using ERTMS on board functions in degraded situation (e.i. use of override function when ERTMS operativity is limited by system failures). The RU will be informed through OPE App. D3 on ERTMS trackside engineering features that affect operations; the driver is assumed to have been informed on these features accordingly.

The driver is also expected to know the rule book and have sufficient knowledge of the means and provisions put in place by the IM to address degraded situations.

Concerning the scoping definition “GSM-R voice radio operational rules are applicable on lines equipped with GSM-R independently of the control command system in use” under §3.2, it is clarified that any rule involving a voice communication over GSM-R between signaller and driver can be considered to also refer to public GSM, if the option to use public GSM as an alternative to GSM-R is applicable in the network concerned.

Operational text messages are covered by the rules to the extent that they provide to the driver essential information relevant to the rule. For instance, the text message providing the reason for a trip is not presented in the relevant rule (§6.41) as it does not directly dictate to the driver the actions required after the trip. The rule itself covers all available options for the driver after a trip; it is then up to the driver to select the applicable option depending on the situation, the tripping cause etc.

National rules continue to be allowed where non-harmonised rules are listed under Annex C, as they can be considered as “signalling rules” and/or “local operational rules” under OPE App. I. These rules do not depend on the technical functions of ERTMS, which are harmonised; instead they are linked to the national systems (operational rules, interlocking...), implementation choices and company procedures (e.g. shunting...) which are not harmonised and therefore out of scope of the harmonised operational rules for ERTMS. This list should help:

- to check the existence of the relevant non harmonised rules in the rule book,
- to take care about the interface between the harmonised rules and the non-harmonised rules.

Common understanding of braking mode abbreviations

In the § 4.2. TERMS & ABBREVIATIONS – Table 2 – Abbreviations, the abbreviations “G - Goods train braking mode” and “P - Passenger train braking mode”, refer to the braking “mode”, pointing to a technical way of braking (and not to the type of train that is braked). G stands for the brake position of the slow-acting brake (commonly used in the past for freight trains, where G can be understood as Goods). P stands for the brake position of the rapid-acting brake (commonly used in the past for passenger trains, where P can be understood as Passengers).

2.2 ETCS

As mentioned in §3.2, the rules on ETCS are applicable to On-board units (OBUs) complying with the single set of specifications according to Baseline 4, as defined in CCS TSI with an operated system version X.Y up to and including 2.2 (e.g. the Supervised Manoeuvre mode or the Balise Transmission Module alarm inhibition are not covered). It is also applicable to OBUs complying with either of the two Baseline 3 (B3) sets of specifications under CCS TSI (Commission Regulation 2016/919). OBUs fitted with the first B3 version (SRS 3.3.0) are generally also covered, to the extent where technical functionalities featured in the rules are available. The rules are applicable to both operated system versions (X=1 and X=2), however some cases will never occur in operated system version X=1 (e.g. rule 6.15 on running in LS or rule 6.44 on managing a defective¹ level crossing).

The rules are also largely applicable to OBUs following the older Baseline 2 specification (known as 2.3.0d), provided that the DMI used fulfils the specification ERA_ERTMS_015560, to the extent relevant to 2.3.0d functionalities. Still, due to the lack of DMI harmonization among 2.3.0d On-board Units, whether any particular rule in Appendix A is applicable to a 2.3.0d OBU is implementation specific and has to be checked on a case-by-case basis. If, following this verification, some of the indications displayed on the DMI are not compliant with the indications contained in the harmonised operational rules; the driver's rule book has to be adapted accordingly by the concerned RU.

It is also clarified that some OBU features which were only applicable in 2.3.0d or even older versions of the specifications (but not in any B3 implementation) are no longer covered in Appendix A. In such cases, older versions of Appendix A may have to be consulted.

It is assumed that the ETCS On-board Unit is loaded with the appropriate National Values and cryptographic keys. The procedure to ensure this will be managed under the RU's SMS and may possibly rely on information to be provided by the IM (e.g. on the trackside locations where the National Values may be picked up by the On-board subsystem; and that the proper cryptographic keys are loaded in the train and in all RBCs in the route).

In the definition of "tandem" in Table 2 of section 4.2 it was added "...but not electrically...". This was meant to distinguish tandem operation in NL mode from multiple operation, where the slave locomotives are electrically coupled to and remote-controlled from the master (leading) one, with their ETCS OBUs in SL mode. This differentiation is not to be confused with any other electrical connection that may exist along a train (e.g. through the UIC bus) to ensure inter-communication between drivers.

ETCS acronyms are not translated in TSI OPE (e.g., the acronym "FS" is reproduced in all language versions, meaning "Full Supervision mode"), but the full terms are translated and the original English terms are added (to justify the acronyms). RUs should manage via their SMS the possible use of a language (e.g., for the rule book) other than the one(s) prevailing on the network. RUs are – considering the results of the risk analysis – free to choose the language used in the DMI.

Specific principles and rules

- Principle 5.1.1. The wording implies that DMI indications have higher priority over lineside indications, in line with the principle of cab signalling. A properly engineered trackside system will require the driver to observe lineside indications only in very rare occasions, e.g. when running without an MA. If specific trackside engineering choices contravene this principle (e.g. track conditions not implemented, level crossings not connected to ETCS etc.), the RU shall consider these

¹ = Technically equipped but not functioning; Concerning the difference between "not protected" and "defective": A defective LX is always a not protected one but a not protected LX is not necessarily a defective one; it is allowed for an IM to assimilate a passive LX (i.e., one that is not protected by a technical system) to a "not protected" one and apply the dedicated ETCS procedure for such LX, in which case App. A rule 6.44 will apply as well.

constraints in their SMS, reflect them in the drivers' Rule book and train their drivers accordingly. OPE TSI App. D3 lists information useful to the RU in this regard.

- Principle 5.1.2. In case of coexisting ETCS levels, the wording 'any instruction' should be regarded as 'any operational instruction'. Furthermore, the requirement to ascertain the ETCS level in which the train is operating is only necessary if the operational instruction varies according to the ETCS Level. So if the operational instruction is identical for the coexisting levels, this requirement does not apply.
- Principle 5.1.9. This principle does not apply in case of restarting in the opposite direction after a trip has occurred, in which case European Instruction 3 and 7 apply (as stated in point 6.41).
- Principle 5.1.10 on the use of the ETCS Stop Marker (SM) respectively: it is clarified that on the approach to a Stop Marker, the driver needs a specific authorisation to pass (otherwise, s/he has to stop):
 - when running with an MA while this Stop Marker can unambiguously be identified as matching the projected EOA of the current MA on the DMI, or
 - when running without an MA.

Such authorisation shall be given by means of European Instruction 1 or 7 (depending on the operational situation) and can be transmitted over any medium as long as it meets the modalities listed in Appendix C.

- Principle 5.1.11 on the use of the ETCS Location Marker (LM): it is clarified that on the approach to a Location Marker:
 - when running with an MA while this Location Marker can unambiguously be identified as matching the projected EOA of the current MA on the DMI, the driver needs a specific authorisation to pass (otherwise, s/he has to stop). Such authorisation shall be given by means of European Instruction 1 or 7 (depending on the operational situation) and can be transmitted over any medium as long as it meets the modalities listed in Appendix C;
 - when running without an MA, the driver needs a specific order to stop (otherwise s/he can pass). By "specific" is meant a dedicated order which is issued for a particular train in a particular instance. Such order may have any form and may be transmitted over any medium as long as it meets the modalities listed in Appendix C.
- In the context of Appendix A, the ETCS Stop Marker and the ETCS Location Marker are assimilated to lineside signals. An End of Authority (EoA) can be physically identified through a SM, a LM, a lineside signal with a stop aspect or any other marker board, harmonised or not, with the same operational effect (e.g. buffer stop, end of catenary for an electric loco etc.). The definition of EoA is no longer limited to the end of a supervised ETCS Movement Authority; it is generalised to indicate any location beyond which the train shall not proceed without authorisation, regardless of any underlying technical protection or operational procedure. For this purpose, the acronym "EoA" is moved from Table 3 of Appendix A section 4.2 to the generic Glossary under Appendix J of OPE TSI.
- Under the combination of App. A principles 5.1.1 and 5.1.10/5.1.11, a driver running with an MA without release speed shall stop at the earliest between the EoA indicated on the DMI and the EoA marked by a SM/LM on the trackside. If the driver observes only the EoA indicated on the DMI, the train may be tripped when passing the physical EoA marked by the SM/LM in case the odometer undermeasures. Even then, there is no risk involved since the supervised location (danger point, overlap) will still be protected. In combination with App. A rule 6.18, a driver running with an MA with release speed is allowed to proceed up to the SM/LM indicating the physical EoA if the EoA indicated on the DMI is encountered first, which will occur if the odometer overmeasures. In doing so, the driver shall respect the release speed as max speed. Regardless of whether release speed is

provided or not, if the SM/LM is encountered first (i.e. before the EoA indicated on the DMI is reached), the driver shall stop at this SM/LM.

- Rule 6.2.4. In case an ETCS stop marker board is fitted with an additional light indication authorising the (permissive) passing of the marker board, the rules for 'ETCS with trackside signals' without the issuing of European Instruction 7 for the acknowledgement of SR can apply given the assimilation of this light indication to a 'trackside signal at proceed aspect'. The IM shall clarify which light indication can serve this purpose.
- Rule 6.18: The second case ("...to proceed without exceeding the release speed when the trackside signal shows a proceed aspect") also applies when using a (non-harmonised) fixed lineside board defined to mean "always proceed". This case concerns Level 1 implementations under permissive driving, where a OS Movement Authority will be issued at the end of a block section if a FS MA cannot be provided, due to lack of track vacancy ahead. If the trackside is engineered to always issue such a OS MA, then the train will never be tripped when passing this EoA so a simple (reflective) marker board indicating the equivalent of a proceed aspect can meet this need, i.e. without having to provide any live information. If the route ahead is clear, then the train will get a FS MA; the marker board allowing the train to proceed will have given a valid information in that case as well.
- Rule 6.29. If the driver has been informed by the signaller in an indirect way, i.e. when drivers have been informed by their RU following information on poor adhesion conditions provided by the IM to RU's, the driver is not required to inform the signaller before selecting 'Slippery Rail'.
- Rule 6.43: it deals with the case where a train enters a section fitted with an ETCS trackside system version that is incompatible with the train's on-board system version. This situation should normally never occur if the Route Compatibility Check has been properly carried out.
- Rule 6.44: it applies when the ERTMS trackside supports the 'not protected' level crossing in accordance to the technical procedure for passing a non-protected level crossing in ETCS SUBSET 026 point 5.16, which can be implemented for level crossings equipped with 'active indications' to prohibit or to authorise the crossing by road users (traffic lights and even barriers) that are monitored by the trackside, as well as for level crossing equipped with 'passive indications' only warning road users to cross safely in absence of an approaching train. In case of a level crossing with 'active indications' for road users, a detection of a possible malfunctioning of the level crossing equipment will trigger a 'not protected status' followed by the ERTMS trackside support for movements passing the level crossing, for which COR 7 of Appendix B for a 'defective' level crossing applies.

2.3 GSM-R

It is clarified that the network name appearing in rule 7.3.2 is indicative and in actual implementations it will be replaced by the specific GSM-R network name.

Following the introduction of rules 7.13 and 7.14 on public roaming and considering that the support of public GSM frequencies remains an option for GSM-R cab radios, the following clarifications are provided:

A. BASIC SCENARIO FOR PRIMARY COMMUNICATIONS:

- 1 CCS TSI compliant situation: GSM-R as primary communication system. This means:
 - 1.1 CCS TSI compliant (GSM-R) network coverage on all lines
 - 1.2 All trains fitted with CCS TSI compliant (GSM-R) cab radios
 - 1.3 The IM has to offer GSM-R roaming services to any foreign GSM-R SIM card fitted in rolling stock intended to operate in that MS network to allow the use of that GSM-R network
- 2 Non CCS TSI compliant situation: Public GSM networks used as primary communication. This means:

2.1 Need for a formal derogation when support of this solution is an access criterion in the concerned parts of the rail network

2.2 A notified national rule to ensure that cab radios which are fitted in rolling stock intended to operate in that part of the network, are able to roam to public networks (support of the public frequency bands as indicated in EIRENE)

2.3 The IM has to ensure that public roaming services are offered to any (domestic and foreign) GSM-R SIM cards fitted in rolling stock intended to operate in that part of the network

2.4 In all cases, the train/route compatibility has to be verified on a case per case basis, considering the above conditions.

- Are roaming services available for the concerned SIM card
- Is the cab radio supporting the public frequency band

B. FALLBACK SCENARIO, IN CASE OF UNAVAILABILITY OF PRIMARY SOLUTION:

1 Fallback is not defined in the CCS TSI. This means:

1.1 When support of fallback is not an access criterion, no derogation and no national rule needed

1.2 When support of a fallback solution is an access criterion, there is a need for at least a notified national rule.

2 Fallback options may be:

2.1 Using public networks

- Using the cab radio in public roaming mode
- Using handheld devices (either GSM-R handheld in roaming mode or public mobile devices)

2.2 Using other communication means

- Specific radio systems (e.g. TETRA)
- Lineside communication systems

3 In all cases, relevant provisions need to be in place in the SMS of IMs and RUs to ensure the conditions of use as well as all necessary operational interfaces (calling numbers, public GSM coverage considerations e.g. in tunnels, etc.), including e.g. a notified national rule to ensure that the signaller is informed about the fallback communication means a driver is using.

Concerning Group Call ID 555, this was only made mandatory in EIRENE SRS 15.4.0. This means that cab radios applying earlier versions of the specifications normally have not implemented this feature. In case an IM considers that GID 555 has to be used in an area and this is not supported by some of the vehicles running in that area (due the configuration of the SIM), this has to be previously solved by the IM (by making sure that properly configured SIM cards are retrofitted in all cab radios, which were commissioned before EIRENE SRS 15.4.0 entered into force) and/or an alternative operational solution has to be provided to the driver.

2.4 Harmonised ERTMS Marker Boards

The exact dimensions and other physical properties of the harmonised ERTMS marker boards (MBs) are specified in EN 16494, which is now included in the CCS TSI mandatory specifications (under index 38 of App. A thereof)

It is understood that not all harmonised ERTMS MBs have to be used, if not required by the network's operational concept. If however an IM has a specific operational need that can be addressed by a harmonised MB, then this MB shall be used instead of a national one.

Harmonised ERTMS MBs shall be installed as specified in document 21E089 "Engineering rules for harmonised marker boards" under index 101 of CCS TSI App. A. Detailed migration provisions are also specified in that document, which is to be perceived as a guide towards the target system, where ETCS would be the only ATP available on the lines concerned (i.e. no Class B).

It will be acceptable that for an (undefined) migration period, both harmonised and non-harmonised MBs can co-exist in a network (no migration plan is mandated). The IM shall determine the migration modalities taking human and organisational factors into account so as to prevent "patchwork" implementations (national and harmonised MBs coexisting in the same section).

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Annex 3 – Safety related communications methodology (TSI OPE Appendix C)

Communications between the train crew and the signaller should be strictly limited to the service in progress. Other kind of communications not strictly related to the execution of the service in progress should be immediately interrupted (e.g. the misuse of mobile devices and/or smartphones).

3.1 Communication

Appendix C refers to oral and verbal communication. Oral refers to communication that is spoken and heard, such as when someone speaks out loud. Verbal refers to communication that is written or expressed in words, such as when someone writes something down or types it out.

The respective SMSs of the IMs and RUs should include arrangements that ensure safety communication (exchange of safety-related information). These arrangements should be based on the results of risk assessment and include (non-exhaustive list) the communication methodology(s), procedure(s) and means (see requirement 4.4 of CSM on SMS).

Differences between repeat and read back

In point 2.3 of Appendix C on the communication content, some standard terminology is specified. There are some differences between the repetition of a message and reading back a message.

Read back

Signaller	Driver	Comment
'message text' over		
	received: 'message text' over	= "read back"
correct		

Driver does not read back the message correctly, signaller repeats it

Signaller	Driver	Comment
'message text' over →		
	← received: "wrong message text" over	= "read back"
error, I say again 'message text' over →		= "repeat"
	← received: 'message text' over	= "read back"
correct →		

Driver did not understand the message and asked the signaller to repeat the message

Signaller	Driver	Comment
'message text' over →		
	← Say again (speak slowly) over	= "I have not understood your message, please say again"
error (I say again) 'message text' over →		= "repeat"
	← received: 'message text' over	= "read back"
correct →		

When the term "say again" is used to have the message repeated in the event of poor reception or misunderstanding, it is considered good practice to add "speak slowly" or "speak louder" depending on the situation.

Use of International Phonetic Alphabet and pronunciation of numbers

In point 3 of Appendix C on communication rules, the pronunciation of the numbers and the use of the phonetic alphabet is required. The following is an example of the use of the International Phonetic Alphabet, decimal points and numbers:

Signal Number KX 835 = Signal Kilo X-Ray eight three five

Points A B = points alpha bravo

The lack of additional characters, present in national alphabets, in appendix C, point 3 of the TSI OPE is identified as a deficiency. Pending the finalisation of the deficiency process as defined by Article 8 of Directive (EU) 2016/797, the following provision may be applied:

The IM may:

- add further letters, along with a phonetic pronunciation for each letter added, if required by the alphabet of the IM's operating language(s);
- define the pronunciation of symbols (e.g. the symbol '/' or ';') if required for safety-related communications.'

The expression should be given in local time, in plain language. It would be also acceptable, whenever necessary, for the time to be spelled out digit by digit.

With the finalisation of the process in Article 8 of Directive (EU) 2016/797, the provision above will no longer be applicable and shall be deleted.

Use of 112

In some Member States, the driver must use the number 112 in case of emergency.

3.2 Operational instructions

Operational instructions are defined in TSI OPE (Appendix C2). They are either European Instructions or National instructions where permitted.

Appendix C enables the IM to draw up the messages and book of European and national instructions. These elements should be addressed to the RU at the same time as the rules and regulations are made available. These are then used by the IM and the RU to draw up the documents for their staff, instructions for signallers and Appendix 1 to the rule book

The extent to which forms are used and their structure may vary. For some scenario's, the use of operational instructions will be appropriate, whilst for others it will not be appropriate. Furthermore, the use of operational instructions with defined coding for the fields could have several advantages, among others :

- translated or multilingual forms can be prepared for the driver, especially in operating languages that are not the native language of the driver;
- visualization and traceability of the instructions received, by having the instructions on a template after the communication procedure;
- predefined and uniform instructions instead of 'free text'.

In principle when it is necessary for an operational instruction to be written down by the driver, the train must be at standstill. However, the RU and IM may jointly undertake a risk assessment, which could, as a result, define the conditions under which it is safe to deviate from this principle. The results of this risk assessment should set out the controls necessary (i.e. procedures) in the SMS of the IM and RU, which will ensure safe operation.

An operational instruction should be issued as close as practicable to the affected area, meaning the most appropriate location depending on the circumstances (e.g. the foreseeable impact on capacity, the type of traffic, the type of operational instruction). This should prevent situations e.g.:

- in case of high-speed lines, any operational instruction with an obligation to run with restrictions (e.g. a speed restriction or running on sight) should preferably be issued during the last scheduled stop before accessing the affected area, in order to avoid the stopping of high-speed trains at the last marker board giving access to the affected area, which would reduce capacity on high-speed lines significantly;
- in case of an obligation to run with lowered pantographs, the European Instruction No 9 needs to be issued at a location which will allow the train to make speed in order to pass the area with lowered pantographs, which would become impossible if this instruction were to be issued 'as close as possible' to the affected area.

The area description for an authorisation or obligation on a European Instruction can be expressed in different ways:

Start	End
Location, by means of: <ul style="list-style-type: none"> • an operational point, or • the wording '<i>Current</i>', under the conditions defined in point 3.4.1.9. 	Location, by means of: <ul style="list-style-type: none"> • an operational point, or • the wording '<i>Next speed indication</i>' in case of a speed restriction under the conditions defined in point 3.4.1.9.
Track/signal/level crossing	Track/signal/level crossing
Km	Km

Examples of additional terms which may be required to support the Communication requirements in Appendix C

Messages sent between the signaller and the driver

If an emergency message is not introduced by an emergency call functionality, it should be introduced by Mayday Mayday Mayday.

Need to stop all trains by signaller and/or driver:

The need to stop all trains must be transmitted by means of an acoustic signal; if this is not available the following phrase must be used:

Emergency, stop all trains

Need to stop a particular train from the signaller to the driver:

Emergency stop train (on line/track)
(name)

Information on location or area is, if necessary, specified in the message.

In addition, this message is to be quickly complemented, if possible, by the reason, and the train's identification.

Obstruction on or near the track
Or Fire on the train or near the track
Or (other reason)
on lineat (name) (km)
Driver of train (number)

3.3 Guideline structure for messages

These messages may be structured along the following lines:

Stage in the communication flow	Message element
Reason for passing the information	for information for action
Observation	There is I saw I had I hit
Position — along the line — in respect to my train	at(station name)(characteristic point) at mile post/kilometre point(number) power car(number) trailer car(number)
Nature — object — person (see glossary)
State — static — moving	standing on lying on fallen on walking running towards
Location with respect to the tracks	

3.4 European instructions (EI)

3.4.1 GENERAL

3.4.1.1 When an European instruction must be issued, it is recommended that the mandatory fields at the start of the procedures (A, B and D) are first filled-in. Next the procedure itself should be filled in by using the tick boxes and associated input fields. At the end of the procedure the mandatory field Z of the lower part should be filled in. Non-mandatory fields (C, V, W, Y) will be filled-in where applicable. The SMS of the IM can define a different sequence for the filling-in.

The EI should only be transmitted once filled-in by the signaller, except for the unique identification in field Z, which can be obtained at the end of the transmission.

Digital transmission of EI's will be harmonised in the near future.

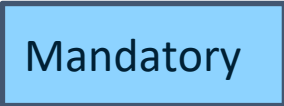
3.4.1.2 Compared to the 2019 version, all EIs can now be used for shunting movements as well. If an IM does not wish to use them for shunting movements, they can simply remove the "Shunting composition No" option from input field A, according to the provisions of App. C2 - section 6: *"If a specific tick box, field or option for input in a field is not to be used in a Member State or on the network of an infrastructure manager, there is no obligation to display this tick box, field or option for input in a field in the European instruction."*

3.4.1.3 On the forms of the generic European Instructions in App. C2 - Section 6, generic fields in the header and footer (coded with an alphabetical identifier) are marked by means of a specific colour code. These colours serve an operational purpose, namely to differentiate:

Mandatory fields are indicated in blue and shall be filled-in for the EI to become valid, in accordance to the 'minimal content' of an operational instruction in point 2 of App. C2.

Fields that may optionally be filled-in when necessary or relevant are indicated in yellow; they may be omitted altogether from the forms used by the signaller when not used by an IM.

Tick-boxes identifying the exact sub-instructions to be activated under each EI (orange - multiple selection possible).



Mandatory



Optional

The colour coding does not have to be preserved in the actual forms used by the operational staff. If preserved on the forms for the signallers, they only serve as a support tool to help them not forget the minimum required fields to be filled-in.

3.4.1.4 The goal of identifiers starting with "x" is to facilitate IMs in creating a single form for multiple EIs where tick box and fields have the same content in different European Instructions (e.g. one form for the issuing of a EI 1, 2 or 7 as an authorisation for movements). Whenever "x" is used in the identifier of a tick box or field, it is meant to be replaced by the number of the applicable European instruction only when transmitting this instruction digitally. The reason is that in case of the standard verbal radio transmission, a driver may only have the template of the European Instruction (as in the App. C.2) at his/her disposal featuring "x" identifiers. Even if the driver has the national "variants" of the European Instructions, these may still be combined in fewer forms, thereby still featuring "x" fields.

3.4.1.5 Depending on the instruction given by the signaller, the driver will fill-in the European instruction. If the predefined information of the European instructions is not sufficient and additional information is needed, the field additional instruction x.95 shall be ticked and additional instruction in the field x96 should be provided by the signaller as free text. The signaller shall not use the “Additional instructions” fields x.95 and x.96 for an information that is already covered by another dedicated tick box and/or field of the EI. IMs are not allowed to add new tick boxes / fields / options for input in a field or modify the title or content (e.g. add / remove parts) of any tick box / field / option for input in a field to meet national needs. IMs are only entitled to remove entire tick boxes / fields / options for input in a field from their EI forms when these are not used on their network, as indicated in App. C2 – section 6 *“If a specific tick box, field or option for input in a field is not to be used in a Member State or on the network of an infrastructure manager, there is no obligation to display this tick box, field or option for input in a field in the European instruction. No tick box, field or option for input in a field shall be added.”*

3.4.1.6 Compared to the numbered identifiers of fields with multiple options for input in the 2019 version, a ‘third identifier’ has been introduced. This third identifier has been introduced at the end of the numbered identifier for each option for input (e.g. x.42.1 for ‘Km/h’ and x.42.2 for ‘Mph’) to allow full digital transmission of the EI. When transmitting an EI verbally, the selected option for input in a field can be communicated by calling out the entire numbered identifier (i.e. x.42.1), the name of the option (i.e. Km/h) or both (i.e. x.42.1 Km/h). The IM should preferably adopt a consistent “code of practice” on how to do this, so that all signallers apply the same when quoting this field during an EI read-out.

3.4.1.7 As stated under App.C2 - section 6, “The scope of each individual field cannot extend beyond the scope of application of the European instruction to which it belongs”. Some examples:

- for EI 1 and EI 7 the speed restriction by means of x.41 cannot extend beyond the EoA following the furthest one, up to which the driver is normally authorised to proceed under any of these EIs (or the next one in case of EI 2 or EI 1 / EI 7 when only one EoA is included). If a speed restriction for a section beyond that EoA is required, a separate EI 5 should be issued instead of using x.41 of EI 1 / EI 2 / EI 7, unless the movement beyond that EoA is also going to be authorised through another EI 1, in which case the speed restriction will be included therein. In case of permissive driving, where no EI 1 is required to pass an EoA at a permissive signal, EI 5 should be used to instruct a speed restriction, e.g. one that is not included in the OS MA when passing the permissive signal. If a speed restriction, especially a temporary not (yet) included in an MA, needs to apply beyond a location at which the train will enter a supervised mode (having picked up an MA in the meantime), then EI 5 should be used instead of EI 1, at least for the section beyond the start of supervised operation (known speed restrictions due to points and other fixed installations are assumed to be already factored-in in the received MA).
- for EI 5 and EI 6 as “scope of application” can be understood the affected sections or portion of line over which the respective restrictions apply.

3.4.1.8 Although the order in which the fields are indicated on the actual forms used by IMs and RUs is not strictly regulated (*“While the content and the identifiers must be used and the alphabetical and numerical order of the identifiers must be respected, the format itself shall be indicative”* under App. C2 – section 6), it is recommended for both parties (IM-RU) to follow in their EI forms the order of the EI templates shown in App. C2. This will reduce the possibility of errors in the transmission of EIs even when some fields are not used by some IMs.

3.4.1.9 Under the condition that the location of the receiving train or shunting composition is already described in field C of the EI being issued, the fields 1.11.1 ‘Km’ and 1.11.2 ‘Signal’ of EI 1 and x.43 ‘Location’ and x.47.1 ‘Km’ or x.47.2 ‘Signal’ for the generic area description of EI 1, 2, 5, 6, 7, 8, 9 can be filled-in with *“current”* as a reference to the current location in field C, indicating that the respective instruction applies already as of that location.

For a speed restriction by means of EI 1, 2 or 7, except a temporary one that is not included in an MA and for which EI 5 should be used, the field x.44 'Location' or x.48 (x.48.1 'Km' or x.48.2 'Signal') of the generic area description used as the ending location of the speed restriction can be filled-in with "next speed indication" as a reference to a speed indication on the DMI (when receiving an MA) or a lineside speed indication (while running without an MA). The use of this ending location in x.44 of EI 1, 2 or 7 could enhance the ergonomics for the driver through an improved visibility of such a speed indication in comparison to locating a lineside Km (in x.48.1) or signal identification (in x.48.2), as well as simulate normal operations from one speed indication to the next.

In case the starting and/or ending point of an obligation requiring clarification of the track or line to which a 'Km' or 'Signal' in x.47 or in x.48 refers to, the fields x.45 and/or x.46 should also be filled in accordingly.

When defining the starting and ending point of a speed restriction under x.41, both fields of the same pair (e.g. x.43 and x.44 / x.47 and x.48) should be filled in.

3.4.1.10 In App. C2 – section 6 it is stated "Whenever the signaller needs to issue an operational instruction for which a European instruction exists, the signaller shall use this European instruction. If an operational instruction related to a class B system requires more information than the European instructions, a national instruction may be used instead. In such a case, the infrastructure manager may set out these requirements in its national instructions." This provision means that EIs should replace pre-existing national operational instructions with the same operational purpose. The enhanced EIs introduced in this OPE TSI revision were carefully elaborated with the help of the sector to accommodate all national requirements so that there would be no more need to use the national equivalent of an operational instruction. If however, despite this effort, a national operational instruction contains more information than its EI counterpart, the IMs are encouraged for the sake of operational interoperability to use the "additional information" field of the EI as much as possible, rather than reverting to the national operational instruction. The use of the latter instead of the EI with the similar content should therefore only be limited to very few exceptional cases, duly justified. Assumptions for the application of EIs in ERTMS operation are meant to also apply when EIs are used for Class B. For instance, when receiving EI 1 to pass an EoA, the driver is expected to proceed with on-sight driving (unless tick box x.25 is selected), as this is inherent to SR mode of ETCS; the same expectation applies also when EI 1 is used to authorise passing of an EoA in Class B operation, even though not explicitly stated. In case an IM uses European Instructions in Class B operations, the meaning of any ERTMS worded instruction in Class B operations should at least be defined in national rules, in accordance to App. I for 'signalling rules'. Alternatively, an IM may decide for safety purposes to include this instruction in Class B operations using 'Additional instructions' in fields x.95 and x.96.

3.4.1.11 The provision under OPE App. A rules 6.2.4, 6.14 and 6.39 "It is possible to provide more than one European Instructions for an equal number of consecutive ETCS Stop Markers to be passed" allows any combination of EIs authorising the passing of EoAs to be issued simultaneously. For instance, an EI 7 to start a movement in SR or SH and pass the first SM followed by one or more EIs 1 to pass subsequent EoAs.

3.4.1.12 Where "Signal" is indicated (e.g. field 1.11.2, x.47.2, 7.21 etc.) marker boards or other equivalent indications are also to be understood.

3.4.1.13 For nominal situations EIs should be directly applied. For any other possible operational scenario where European instructions could be used, IMs should apply the risk management process² to determine if the EIs are applicable and how, even if they are not described in the sections below.

² CSM on SMS states in annex II "5.1.1. When planning, developing, implementing and reviewing its operational processes, the organisation shall ensure that during operation (a) risk acceptance criteria and safety measures are applied (see 3.1.1. Risk assessment) [...]".

3.4.2 EI-specific notes:

3.4.2.1 EI 1: The scope of an EI 1 extends from the first to the last EoA (included) for which authorisation is provided. The driver is allowed to proceed past the last EoA in this list or area and up to the next EoA, or until the OBU gets a MA, whatever comes first. The validity of an EI 1 is considered to be automatically terminated as soon as the OBU gets a MA. Permissive driving is assimilated to a special authorisation from the signaller, considered to be provided by default for all permissive signals without requiring a new EI 1 for each of them. This authorisation is assumed to exist already when issuing the EI 1 for passing the current (non-permissive) signal/SM, thereby giving the right to the signaller to include in the same EI 1 any speed restriction applying anywhere up to the next non-permissive signal/SM (since all permissive signals in-between are implicitly covered by the same EI 1). In that way, compliance with App. A and App. C rules is ensured. In case an obligation given by means of EI 1 would continue to apply after having received an MA, the signaller should issue a separate EI for that purpose. For instance, if a defective Level Crossing (normally covered in supervised operation under ETCS) exists in the section for which an EI 1 is issued, this should be notified to the driver by means of a separate EI 8. If the signaller needs to notify a speed restriction that will apply even after the On-board receives a MA, s/he should issue a separate EI 5. No separate EI 5 is necessary if the signaller is certain that the train will not pick up any new MA before the next EOA or if the MA will have integrated the applicable speed restriction.

To pass a EOA caused by a faulty signal aspect (e.g. signal unlit/irregular/unclear or wrongly indicating "Stop"), an EI 1 should be issued.

3.4.2.2 EI 2: if an ETCS train is tripped when leaving an ETCS area (e.g. due to a failed level transition), it is not required to use EI 2 to restart in Class B if the signaller needs to provide additional instructions than what is included in EI 2. However, if all information to be included in the instruction can be provided through EI 2, the signaller shall use EI 2 in such case as well. The validity of an EI 2 is considered to be automatically terminated as soon as the OBU gets a MA.

3.4.2.3 In EI 3, the driver is free to choose how to delete his/her MA if instructed to do so through tick box 3.20. For instance, using Override may not be considered a safe way under the RU's SMS as it allows the train to inadvertently start and overpass any EOA (technical protection overridden). Carrying out a full EoM, on the other hand, will require the driver to re-enter / revalidate the train data before starting again (SoM). The signaller should issue a European Instruction 3 to overrule a signal indication showing a proceed aspect.

3.4.2.4 An EI 5 should be issued in case of a temporary speed restriction that is not supported by the ETCS trackside and therefore not included in an MA, rather than including it under the x.41-x.48 fields of EI 1, EI 2, EI 7, since the scope of the latter will end as soon as a supervised mode is entered, so the driver will no longer have to respect these restrictions. EI 5 should also be used for a temporary speed restriction under permissive driving, as a permissive signal can clear any time and thus terminate the validity of an EI 1, EI 2 or EI 7. EI 5 should not only be used for a temporary speed restriction < [max speed for SH/SR] but for any temporary speed restriction, since an MA in FS (e.g. from a cleared permissive signal) will authorise full line speed. An EI 5 remains applicable regardless of the reception of an MA, unless otherwise indicated by means of an 'Additional Instruction' in field x.96.

3.4.2.5 An EI 6 should be used to instruct the driver to proceed on-sight (not to be confused with OS mode), possibly also combined with speed restrictions over the same section. This EI 6 prevails over any supervised mode and is generally used when the train has an MA but the driver needs to observe the line due to some external risk (e.g. an obstacle) or damage etc.

3.4.2.6 EI 7 is to be used when starting a mission, in particular when the OBU does not have a known position. It serves to authorise the train to start moving, get a position, report it to the RBC (Level 2) and get a MA. If some (up to two) EoAs need to be passed during this process, EI 7 also gives the possibility to prohibit the use of "Override" so as to benefit from the safeguard offered by the "List of expected balises" (if implemented trackside) to ensure that the intended train is starting on the intended track in the intended direction. The

authorisation provided through EI 7 is not to be confused with the one provided through EI 1, which is issued only to authorise the passing of an EoA, always using “Override”, when ETCS cannot provide a MA. The validity of an EI 7 is considered to be automatically terminated as soon as the OBU gets a MA. In case an obligation given by means of EI 7 would continue to apply after having received an MA, the signaller should issue a separate EI for that purpose. For instance, if a defective Level Crossing (normally covered in supervised operation under ETCS) exists in the section for which an EI 7 is issued, this should be notified to the driver by means of a separate European Instruction 8. If the signaller needs to notify a speed restriction that will apply even after the On-board receives a MA, s/he should issue a separate EI 5. No separate EI 5 is necessary if the signaller is certain that the train will not pick up any new MA before the next EOA or if the MA will have integrated the applicable speed restriction.

3.4.2.7 In EI 8 “and” is applicable if both 8.40 and x.41 fields are ticked; “or” is applicable if only one of these is ticked (normally 8.40, EI 8 should not be used to instruct a speed restriction only). In either case, the area description will be filled-in (fields x.43 – x.48) if applicable for either or both of 8.40 and x.41, depending on what has been ticked. When running under ETCS, an EI 8 should be issued to inform the driver about a defective Level Crossing if there is no MA available (see also points 3.4.2.1 and 3.4.2.6) or if the Level Crossing is not interfaced with the ETCS trackside, and it will apply also after receiving the MA. No EI 8 is necessary if the Level Crossing is interfaced with the ETCS trackside.

3.4.3 EXAMPLES

In order to illustrate the available guidance for the European Instructions, a filled-in example of each form has been added.

These filled-in forms are therefore only examples within the framework of Appendix C2 and the available guidance, without any obligation to use the European Instructions as illustrated by means of these examples.

Example No 1: EI 1 – Authorisation to pass EOA

Foreword on example detailing some features:

- authorisation to pass a single EOA located at an ETCS Stop marker (i.e. ‘M.P8’) by means of field 1.11.2 to the next lineside signal (i.e. ‘PZ12’) in a transition area from ETCS to NTC;
- exemption from running on sight by means of tick box x.25;
- speed restriction within the validity of EI 1 by means of tick box x.41, with a starting point by means of ‘M.P8’ in field x.47.2 ‘Signal’ and an ending point by means of ‘Next speed indication’ in field x.48.2 ‘Signal’ for a lineside speed indication between M.P8 and PZ12, following the guidance in point 3.4.1.9;
- multiple additional instructions by means of tick box x.95, i.e. to manually select Level NTC and to stop at the next signal (i.e. ‘PZ12’).

6733		06/12/2023	
A Train No Shunting composition No		B Date	
At ETCS Stop Marker M.P8		Traffic Centre Valenciennes	
C Location of train Location of shunting composition		D Location of issuer	
<input checked="" type="checkbox"/> European Instruction 1 – Authorisation to pass EOA			
1			
<input checked="" type="checkbox"/> Is allowed to pass EOA at <u>M.P8</u> and at and at 1.10 1.11.1 Km 1.11.2 Signal 1.12.1 Km 1.12.2 Signal 1.13.1 Km 1.13.2 Signal from to 1.14.1 Location 1.14.2 Km 1.14.3 Signal 1.15.1 Location 1.15.2 Km 1.15.3 Signal			
<input type="checkbox"/> Proceed in SH 1.20			
<input checked="" type="checkbox"/> Is exempted from running on sight x.25			
<input type="checkbox"/> Set SR speed to x.30 x.31.1 Km/h x.31.2 Mph			
<input type="checkbox"/> Set SR distance to x.35 x.36 Meter			
<input checked="" type="checkbox"/> Do not exceed the speed of <u>20</u> between in and x.41 x.42.1 Km/h x.42.2 Mph x.43 Location x.44 Location on and x.45.1 Track x.45.2 Line x.46.1 Track x.46.2 Line from <u>M.P8</u> to <u>Next speed indication</u> x.47.1 Km x.47.2 Signal x.48.1 Km x.48.2 Signal			
<input type="checkbox"/> Examine the line for the following reason and report findings to x.90 x.91 [free text] x.92 [free text]			
<input checked="" type="checkbox"/> Additional instructions x.95 <u>Select level NTC before passing of ETCS Stop Marker M.P8</u> <u>Stop at signal P12 and contact Traffic Centre Valenciennes</u> x.96 [free text]			
V ID of driver		W ID of issuer	
14:05		VAL114	
Y Time		Z Unique identification	
User instructions: Mark with a cross the tick boxes that become valid, as follows: <input checked="" type="checkbox"/> In case of multiple options for the information, delete the non-valid options, as follows: x.47.1 Km x.47.2 Signal In the valid fields, fill in the information on the dotted lines.			

Example No 4: EI 4 – Revocation of an instruction

Foreword on example detailing some features:

- the unique identification 'VAL137' in field 4.11 refers to the example No 6, more precisely an EI 6 for running on sight due to trespassers near the track, which is being revoked by EI 4.

<input type="text" value="443"/>		<input type="text" value="06/12/2023"/>	
A Train No Shunting composition No	B Date		
<input type="text" value="On track 5 in Valenciennes"/>		<input type="text" value="Traffic Centre Valenciennes"/>	
C Location of train Location of shunting composition	D Location of issuer		
<input checked="" type="checkbox"/> European Instruction 4 – Revocation of an instruction 4			
<input checked="" type="checkbox"/> Operational instruction 4.10	<input type="text" value="VAL137"/> 4.11 Unique identification	is revoked	
<input type="checkbox"/> Additional instructions x.95	<input type="text" value=""/> x.96 [free text]		
<input type="text"/>		<input type="text"/>	
V ID of driver	W ID of issuer		
<input type="text" value="15:27"/>	<input type="text" value="VAL138"/>		
Y Time	Z Unique identification		
User instructions: Mark with a cross the tick boxes that become valid, as follows: <input checked="" type="checkbox"/> In case of multiple options for the information, delete the non-valid options, as follows: <input type="text" value="x.47.1 Km x.47.2 Signal"/> In the valid fields, fill in the information on the dotted lines.			

Example No 5: EI 5 – Obligation to run with speed restriction

Foreword on example detailing some features:

- issuing of a speed restriction higher than the speed limit in mode OS or SR by means of field x.42.1 in supervised operation (mode FS);
- use of fields x.45.2 ‘Line’ and x.46.2 ‘Line’ in order to detail the different lines to which the starting and ending point by means of fields x.47.1 and x.48.1 ‘Km’ belong to, given the area of obligation covering a line junction, following the guidance in point 3.4.1.9;
- description of ‘Km’ in fields x.47.1 and x.48.1 by means of full numbers instead of decimals;
- clarification of the presence of lineside boards by means of tick box 5.67;
- instruction to examine the line for a possible snowbank at the line junction by means of tick box x.90, following an IM’s preference to include such an instruction in EI 5.

7832		06/12/2023	
A Train No Shunting composition No		B Date	
At signal PZ12		Traffic Centre Valenciennes	
C Location of train Location of shunting composition		D Location of issuer	
<input checked="" type="checkbox"/> European Instruction 5 – Obligation to run with speed restriction 5			
<input checked="" type="checkbox"/> Do not exceed the speed of 60 between in and x.41 x.42.1 Km/h x.42.2 Mph x.43 Location x.44 Location on 44 and 62 x.45.1 Track x.45.2 Line x.46.1 Track x.46.2 Line from 35.900 to 0.500 x.47.1 Km x.47.2 Signal x.48.1 Km x.48.2 Signal			
Speed restriction indicated by lineside boards <input checked="" type="checkbox"/> Yes 5.67 [or] <input type="checkbox"/> No 5.68			
<input checked="" type="checkbox"/> Examine the line for the following reason Snowbank at line junction and report findings to Traffic Centre Valenciennes x.90 x.91 [free text] x.92 [free text]			
<input type="checkbox"/> Additional instructions x.95 x.96 [free text]			
V ID of driver		W ID of issuer	
16:13		VAL142	
Y Time		Z Unique identification	
User instructions: Mark with a cross the tick boxes that become valid, as follows: <input checked="" type="checkbox"/> In case of multiple options for the information, delete the non-valid options, as follows: x.47.1 Km x.47.2 Signal In the valid fields, fill in the information on the dotted lines.			

Example No 6: EI 6 – Obligation to run on sight

Foreword on example detailing some features:

- combination of running on sight by means of tick box 6.40 with a speed restriction lower than the permitted maximum speed for running on sight (fixed by national rules under App. I point 1) by means of tick box x.41;
- description of the location of the train in field C, allowing a speed restriction with the use of 'Current' in field x.47.1 'Km' following the guidance in point 3.4.1.9.

443		06/12/2023	
A Train No Shunting composition No		B Date	
On track 5 in Valenciennes		Traffic Centre Valenciennes	
C Location of train Location of shunting composition		D Location of issuer	
<input checked="" type="checkbox"/> European Instruction 6 – Obligation to run on sight 6			
<input checked="" type="checkbox"/> Run on sight 6.40 [and]			
<input checked="" type="checkbox"/> Do not exceed the speed of 20 x.41 x.42.1 Km/h x.42.2 Mph			
between in _____ and _____ x.43 Location x.44 Location			
on _____ and _____ x.45.1 Track x.45.2 Line x.46.1 Track x.46.2 Line			
from Current _____ to 32.6 _____ x.47.1 Km x.47.2 Signal x.48.1 Km x.48.2 Signal			
<input checked="" type="checkbox"/> Examine the line for the following reason _____ and report findings to _____ x.90 x.91 [free text] x.92 [free text]			
<input type="checkbox"/> Additional instructions _____ x.95 x.96 [free text]			
V ID of driver		W ID of issuer	
15:24		VAL137	
Y Time		Z Unique identification	
User instructions: Mark with a cross the tick boxes that become valid, as follows: <input checked="" type="checkbox"/> In case of multiple options for the information, delete the non-valid options, as follows: _____ In the valid fields, fill in the information on the dotted lines.			

Example No 7: EI 7 – Authorisation to start after preparing a movement

Foreword on example detailing some features:

- optional use of field 7.12.1 to clarify the direction in which the starting is allowed, following the IM’s preference to include this field in EI 7 under the provisions in App. C2 point 6;
- optional use of tick box 7.20 to pass the first EOA (i.e. at ‘G.P8’) after having started, following provisions in App. A point 6.2.4 for ETCS without trackside signals and the IM’s preference to use tick box 7.20 when a train is not located at an ETCS Stop Marker;
- optional use of tick box x.30 for an SR speed lower than the national value;
- optional use of an additional instruction regarding the position of the next lineside signal after having passed the ETCS Stop Marker in field 7.21 (i.e. ‘G.P8’) by means of tick box x.96, following an IM’s preference to clarify this position.

932		06/12/2023	
A Train No Shunting composition No		B Date	
At Km 24.6 of line 44		Traffic Centre Valenciennes	
C Location of train Location of shunting composition		D Location of issuer	
<input checked="" type="checkbox"/> European Instruction 7 – Authorisation to start after preparing a movement 7			
<input checked="" type="checkbox"/> Is allowed to start in SR 7.10 [or] <input type="checkbox"/> Is allowed to start in SH 7.11 in the direction towards Valenciennes 7.12.1 Location 7.12.2 Signal			
<input checked="" type="checkbox"/> Is allowed to pass EOA at G.P8 7.20 [and] <input type="checkbox"/> Is prohibited to use override 7.23 7.21 Signal and at 7.22 Signal			
<input type="checkbox"/> Is exempted from running on sight x.25			
<input checked="" type="checkbox"/> Set SR speed to 20 x.30 x.31.1 Km/h x.31.2 Mph			
<input type="checkbox"/> Set SR distance to x.35 x.36 Meter			
<input type="checkbox"/> Do not exceed the speed of x.41 between in and x.42.1 Km/h x.42.2 Mph on x.45.1 Track x.45.2 Line and x.46.1 Track x.46.2 Line from x.47.1 Km x.47.2 Signal to x.48.1 Km x.48.2 Signal			
<input type="checkbox"/> Examine the line for the following reason x.90 and report findings to x.91 [free text] x.92 [free text]			
<input checked="" type="checkbox"/> Additional instructions x.95 Observe lineside indications to the leftside of the track after passing of G.P8 x.96 [free text]			
V ID of driver		W ID of issuer	
16:54		VAL146	
Y Time		Z Unique identification	
User instructions: Mark with a cross the tick boxes that become valid, as follows: <input checked="" type="checkbox"/> In case of multiple options for the information, delete the non-valid options, as follows: x.47.1 Km x.47.2 Signal In the valid fields, fill in the information on the dotted lines.			

Example No 8: EI 8 – Authorisation to pass defective level crossing(s)

Foreword on example detailing some features:

- no use of field C describing the location of the train, following the provisions in App. C2 point 2 and the IM’s preference not to use field C;
- use of tick 8.50 instead of an area description by means of tick box 8.40 and fields x.43 to x.48, following the IM’s preference to identify or locate each defective level crossing;
- optional use of fields V and W following the provisions in App. C2 point 2 and the IM’s preference to include the ID of the driver and issuer by means of their first and last name, e.g. in case of a delivery on paper to the driver.

<input type="text" value="2245"/> A Train No Shunting composition No	<input type="text" value="06/12/2023"/> B Date
<input type="text" value="Traffic Centre Valenciennes"/> C Location of train Location of shunting composition	<input type="text" value="Traffic Centre Valenciennes"/> D Location of issuer
<input checked="" type="checkbox"/> European Instruction 8 – Authorisation to pass defective level crossing(s) 8	
<input type="checkbox"/> Be advised of defective level crossing(s) 8.40 [and / or] <input type="checkbox"/> Do not exceed the speed of <input type="text"/> x.41 x.42.1 Km/h x.42.2 Mph between in <input type="text"/> and <input type="text"/> x.43 Location x.44 Location on <input type="text"/> and <input type="text"/> x.45.1 Track x.45.2 Line x.46.1 Track x.46.2 Line from <input type="text"/> to <input type="text"/> x.47.1 Km x.47.2 Signal x.48.1 Km x.48.2 Signal	
<input checked="" type="checkbox"/> Defective level crossing(s) (at) <input type="text" value="35.825"/> and <input type="text" value="36.430"/> and <input type="text"/> and <input type="text"/> 8.50 8.51.1 Km 8.51.2 ID 8.52.1 Km 8.52.2 ID 8.53.1 Km 8.53.2 ID 8.54.1 Km 8.54.2 ID and <input type="text"/> and <input type="text"/> and <input type="text"/> and <input type="text"/> and <input type="text"/> 8.55.1 Km 8.55.2 ID 8.56.1 Km 8.56.2 ID 8.57.1 Km 8.57.2 ID 8.58.1 Km 8.58.2 ID 8.59.1 Km 8.59.2 ID	
<input checked="" type="checkbox"/> When approaching level crossing(s), do not exceed the speed of <input type="text" value="10"/> 8.60 8.61.1 Km/h 8.61.2 Mph	
<input checked="" type="checkbox"/> Stop before level crossing(s) 8.65	
<input type="checkbox"/> Examine level crossing(s) 8.70	
<input type="checkbox"/> Activate level crossing(s) manually 8.75	
<input checked="" type="checkbox"/> Activate audible warning device 8.80	
<input checked="" type="checkbox"/> Is allowed to pass level crossing(s) 8.85	
<input type="checkbox"/> Additional instructions <input type="text"/> x.95 x.96 [free text]	
<input type="text" value="Driver Jean-Marc DUBOIS"/> V ID of driver	<input type="text" value="Signaller Didier MOREAU"/> W ID of issuer
<input type="text" value="19:12"/> Y Time	<input type="text" value="VAL151"/> Z Unique identification
User instructions: Mark with a cross the tick boxes that become valid, as follows: <input checked="" type="checkbox"/> In case of multiple options for the information, delete the non-valid options, as follows: <input type="text" value="x.47.1 Km x.47.2 Signal"/> In the valid fields, fill in the information on the dotted lines.	

Example No 9: EI 9 – Obligation to run with power supply restriction

Foreword on example detailing some features:

- use of field x.45.2 ‘Line’ in order to clarify the line to which the starting point by means of field x.47.1 ‘Km’ and ending point by means of field x.48.2 ‘Signal’ belong to, following the guidance in point 3.4.1.9;
- clarification of the absence of lineside boards by means of tick box 9.68;
- instruction to examine the catenary line for branches of a tree resting upon it, by means of tick box x.90, following an IM’s preference to include such an instruction in EI 9, in combination with an instruction to report findings to an IM entity in charge of the power supply;
- no use of field Y for the time of issuing, following the provisions in App. C2 point 2 and the IM’s preference not to use field Y.

719		06/12/2023	
A Train No Shunting composition No		B Date	
At ETCS Stop Marker L12		Traffic Centre Valenciennes	
C Location of train Location of shunting composition		D Location of issuer	
<input checked="" type="checkbox"/> European Instruction 9 – Obligation to run with power supply restriction			
9			
<input checked="" type="checkbox"/> Power supply restriction between in <input type="text"/> and <input type="text"/> <small>9.40 x.43 Location x.44 Location</small> on <input type="text"/> and <input type="text"/> <small>x.45.1 Track x.45.2 Line x.46.1 Track x.46.2 Line</small> from <input type="text"/> to <input type="text"/> <small>x.47.1 Km x.47.2 Signal x.48.1 Km x.48.2 Signal</small>			
Power supply restriction indicated by lineside boards <input type="checkbox"/> Yes <small>9.67</small> [or] <input checked="" type="checkbox"/> No <small>9.68</small>			
<input checked="" type="checkbox"/> Run with lowered pantograph(s) <small>9.70</small>			
<input type="checkbox"/> Run with ‘main switch off’ <small>9.75</small>			
<input type="checkbox"/> Limit power consumption to <input type="text"/> <small>9.80 9.81.1 % 9.81.2 Amp. 9.81.3 kVA</small>			
<input checked="" type="checkbox"/> Examine the line for the following reason <input type="text"/> and report findings to <input type="text"/> <small>x.90 Branches of a tree resting on catenary line x.91 [free text] Power Manager of Lille x.92 [free text]</small>			
<input type="checkbox"/> Additional instructions <input type="text"/> <small>x.95 x.96 [free text]</small>			
V ID of driver		W ID of issuer	
<input type="text"/>		VAL158	
Y Time		Z Unique identification	
<input type="text"/>		<input type="text"/>	
User instructions: Mark with a cross the tick boxes that become valid, as follows: <input checked="" type="checkbox"/> In case of multiple options for the information, delete the non-valid options, as follows: <input type="text"/> x.47.1 Km x.47.2 Signal In the valid fields, fill in the information on the dotted lines.			

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Annex 4 – Route compatibility and Route Book (Appendix D)

Appendix D is composed of three parts, the first part relates to the vehicle and train compatibility checks with the route(s) intended for operation. The second lists the elements the IM has to provide to the RUs for the compilation of the route book. The third lists ERTMS trackside engineering information that the IM has to make available to the RUs for their drivers' training and route knowledge.

All Appendix D information has been coded under RINF and will be accessible through the dedicated RINF tool to be developed by ERA. Until RINF is populated and the tool is developed, IMs can choose how to communicate the App. D information to the RUs and other concerned parties (e.g. wagon keepers).

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4.1 Appendix D1 – Vehicle and train Route compatibility checks

⚠ Please note that parts of the following section of the AG (annex 4.1) is under revision and contains obsoleted information (in line with the TSI OPE 2019 version only).

4.1.1 Vehicle Route Compatibility Check and Vehicle Authorisation

4.2.2.5.1 Route compatibility

A) The railway undertaking is responsible for ensuring that all vehicles composing its train are compatible with the intended route(s).

(...)

The route compatibility process shall not duplicate processes performed as part of the vehicle authorisation under Commission Implementing Regulation (EU) 2018/545 to ensure technical compatibility between the vehicle and the network(s). Parameters of Appendix D1 already verified and checked during vehicle authorisation or other similar processes shall not be reassessed in the framework of route compatibility check.

For vehicle authorised under Directive (EU) 2016/797, the relevant vehicle data related to the parameters listed in Appendix D1, already checked during the authorisation process, being part of:

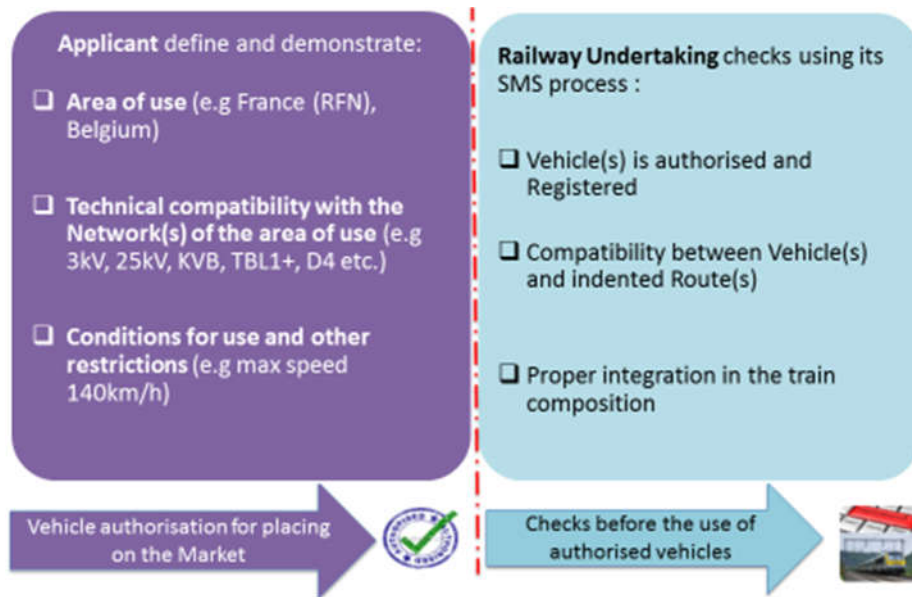
- the file referred to in Article 21 (3) of Directive (EU) 2016/797 and
- the vehicle authorisation as referred to in Article 21 (10) of Directive (EU) 2016/797,

shall be provided by the applicant referred to in Article 2 (22) of Directive (EU) 2016/797 or the keeper to the railway undertaking upon request, when such information is not available in ERATV or other registers for rail vehicles.

For vehicles authorised before Directive (EU) 2016/797, the relevant vehicle data related to the parameters listed in Appendix D1 shall be provided to the railway undertaking by the holder of the vehicle authorisation documentation or the keeper upon request, when such information is not available in ERATV or other registers for rail vehicles.

(...)

The route compatibility check is not part of vehicle authorisation for placing on the market of vehicle or vehicle type. There should be no duplication of the checks/demonstrations already carried out by the applicant for vehicle authorization, as part of the technical compatibility between the vehicle and network(s).



Note. There is no need to perform route compatibility checks for vehicle/trains already operating in specific routes if the route(s) or the vehicle/trains are not changed.

4.1.2 Route compatibility check and Safety Management System

4.2.2.5.1 Route compatibility

A) The railway undertaking is responsible for ensuring that all vehicles composing its train are compatible with the intended route(s).

The railway undertaking shall have a process in its SMS to ensure that all vehicles it uses are authorised, registered and compatible with the intended route(s) including the requirements to be followed by its staff.

(...)

Route compatibility checks should be performed by the RU before the use of vehicle(s) using its process covered by its SMS. This is covered under requirement 5.1 Operational planning and control. See Guidance on Safety certification and supervision for further information. https://www.era.europa.eu/sites/default/files/activities/docs/guide_sms_requirements_en.pdf

CSM on SMS requirements has specific criteria on operational control and planning which requires RUs to consider the need to control the risks from all their particular operational requirements. In particular, Annex 1, 5.1.3 requires RUs to control the risks and have procedures in place to cover the introduction of new types of vehicles and their compatibility with the route.

This means that RUs must have evidence in their SMS that they have a procedure and records that show that the vehicle is compatible with the route it is intended to operate. This will include information provided by the IM and RINF. If the RU identifies problems in obtaining this information there should be a joint resolution available between the RU and IM to resolve this.

The RU, as part of compliance with EU Regulation 1078/2012, will need to monitor and review the effectiveness of the route compatibility process set out in their SMS procedures; including checking the performance measures and revising/amending the process to ensure all risks are effectively managed.

A RU may decide to delegate the task of route compatibility check to the IM or another contractor. When this is done, the RU should set out the contractual arrangements with the contracting part and this must be covered by its safety management system. It is important to note that RU cannot delegate the responsibility particularly in relation to the control of risks.

When available, the IM must provide the list of vehicles types / list of vehicles already identified as compatible with Traffic load and load carrying capacity of infrastructure and train detection system. (RINF 1.1.1.5 Vehicles for which Route compatibility is verified) If concerned, there is no need for RUs to check this information again.

4.1.3 Route compatibility check process

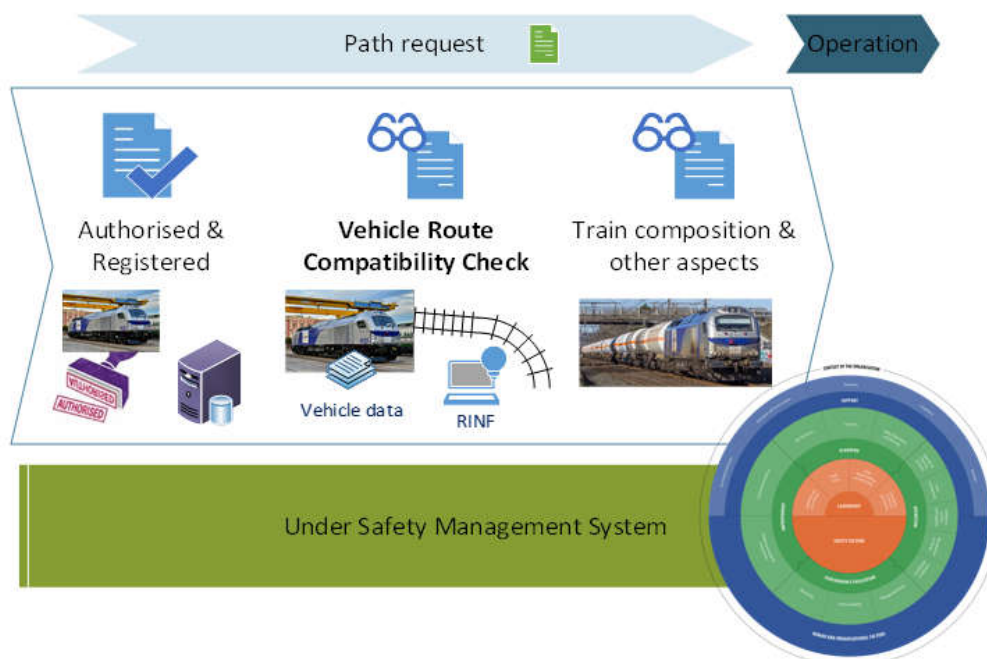
4.2.2.5.1 Route compatibility

A) The railway undertaking is responsible for ensuring that all vehicles composing its train are compatible with the intended route(s). (...)

The processes for route compatibility in the SMS of the railway undertaking shall include the following checks, which may be performed in parallel at any appropriate time or in any appropriate sequence:

- each vehicle is authorised and registered;
- each vehicle in the train is compatible with the route;
- the composition of the train is compatible with the route and the path;
- the preparation of the train ensuring that the train is correctly formed and complete.

The picture below provides the overview of checks before the use of vehicles performed by the RU:



4.1.4 Vehicle authorised and Registered

The RU verifies that the vehicle is authorised and registered

4.1.4.1 Vehicle and Train route compatibility checks

The RU performs the route compatibility checks by comparing the characteristics of vehicle/train with the intended route(s), using the procedures defined in the appendix D1.

The items to be checked by the RU for the purpose of route compatibility check are described in the appendix D1 of TSI OPE; this includes a limited and clearly identified set of parameters and procedures, which are relevant for ensuring the compatibility of vehicles/train with specific route(s).

Route compatibility is checked by evaluating vehicle data against the information from the RINF (or until RINF provides all necessary information in respect of the relevant parameters, the IM shall provide this information through other means free of charge, see Interoperability Directive [2] art. 23 (1) (b)).

Notes

- If a route compatibility check item is harmonised in a network (e.g. track gauge), there is no need of checking route compatibility, as it is already fully covered at vehicle authorization stage.
- Most of the items to be checked consist of a simple cross check.
- Some of the items to be checked need dedicated competences (e.g. compatibility with bridges).
- Some particularities of a network may require tests, but this should be seen as an exception.
- It is not a new authorization process.

4.1.4.2 Train composition

The RU is responsible for ensuring that the composed train with vehicle(s) compatible with the intended route. The check is performed for each time the composition of a train is new. The RU checks additional elements for the compatibility between a composed train and the route(s) such as length, load carrying capacity, braking etc.

4.1.4.3 Other aspects to be checked

4.2.2.5.1 Route compatibility

(...)

C) Additional elements for route compatibility shall be checked when relevant:

- transport of dangerous good as referred into point 4.2.3.4.3,
- quieter route as referred in Noise TSI,
- exceptional transport as referred in Appendix I
- access conditions to underground stations for diesel and other thermal traction systems as referred in clause 4.2.8.3 of LOC&PAS TSI.

The RU checks also other aspects such as transport of dangerous goods and exceptional load. (see also https://www.era.europa.eu/activities/transport-dangerous-goods/inland-tdg_en).

Fundamental Operational Principle No2 on page 39, (**"A train shall only operate over a portion of line if the train composition is compatible with the infrastructure"**) sets out more guidance on the aspects that need to be covered in relation to ensuring that the train composition is compatible with the intended route.

4.1.4.4 Railway Undertaking and Infrastructure Manager Interfaces

4.2.2.5.1 Route compatibility

B) The infrastructure manager shall provide the information for route compatibility as defined in Appendix D1 through RINF.

Appendix D1 sets out all the parameters that shall be used in the process of the railway undertaking before the first use of a vehicle or train configuration in order to ensure all vehicles composing a train are compatible with the route(s) the train is planned to operate on including, where appropriate, deviation routes and routes to workshops. Modifications of the route and changes of infrastructure characteristics have to be taken into account. When a parameter of Appendix D1 is harmonised at network(s) level of an area of use, conformity with that parameter may be presumed for any vehicle authorised for that area of use. National rules or additional national requirements for network access in respect of route compatibility are in principle considered incompatible with Appendix D1. The infrastructure manager shall not require additional technical checks for the purpose of route compatibility beyond the list laid down in Appendix D1.

At the latest by 15 December 2026, until RINF allows for hosting the following new parameters:

a) Specific check for Combined Transport

- (i) 1.1.1.1.3.4. Standard combined transport profile number for swap bodies*
- (ii) 1.1.1.1.3.9. Standard combined transport profile number for roller units*
- (iii) 1.1.1.1.3.8. Standard combined transport profile number for container*
- (iv) 1.1.1.1.3.5. Standard combined transport profile number for semi-trailers*
- (v) (CT Line code)*

b) Train detection systems: influencing unit

- (i) 1.1.1.3.4. Train detection systems defined based on frequency bands*
- (ii) 1.1.1.3.4.2. Frequency bands for detection*
- (iii) 1.1.1.3.4.2.1. Maximum interference current*
- (iv) 1.1.1.3.4.2.2. Minimum Input impedance*
- (v) 1.1.1.3.4.2.3. Maximum magnetic field*

c) 1.1.1.3.2.11. Safe consist length information from on-board necessary for access to the line and SIL

The infrastructure manager shall provide these information through other means free of charge as soon as possible and in electronic format to railway undertakings, authorised applicants for path requests and, where applicable, for the applicant referred to in Article 2(22) of Directive (EU) 2016/797.

The infrastructure manager shall inform the railway undertaking of the changes on characteristics of the route through RINF whenever such information becomes available and affects trains operation.

The RU and IM should cooperate on the route compatibility check on:

- Information and provision of route data.
- In case tests are needed, the IM should support the RU and make every effort to ensure that any tests take place within three months of receipt of the applicant's request.
- Discussion on specific parameters (e.g. bridge compatibility) and in case of operation restrictions.

- Take into account the results of the check, for example, possible operational conditions following checks are discussed with RU (e.g speed limitation).
- In case of structural changes of the Network (upgrading, renewal, new line or new station etc.), usually planned on long term, the route compatibility check may need to be performed again depending on the changes and their consequences. The IM using its safety management system must inform the RU of the changes on characteristics of the allocated path change, as soon as these changes occur.

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4.2 Appendix D2 – Elements the IM has to provide to the RU for the compilation of the route book

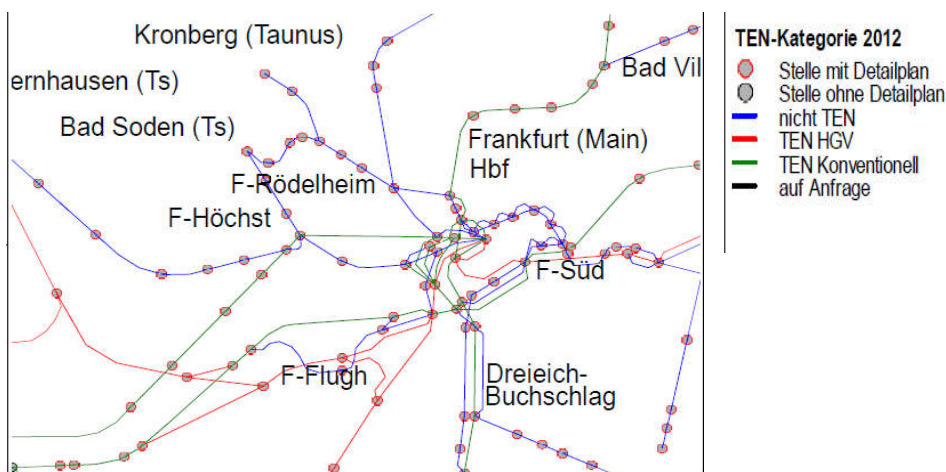
This part lists the elements necessary for the compilation of the route book and should be read in relation with point 4.2.1.2.2.1 Preparation of the Route book of TSI OPE. The Route book is an operational document developed by the RU based on information from the IM and delivered by the RU to the driver. As much information to be delivered by the IM to the RU for the compilation of the route book are identical to the information to be delivered by the IM to the RU to ensure that the train is compatible with the route intended for operation, Appendix D is used as unique document where this information is listed.

The IM makes information available via the RINF for all managed lines, so that the RU can compile the Route book.

However, the process for the compilation of the Route book and the one for ensuring the compatibility of the train with the route are two different processes, which are not linked to each other. When the route book is delivered to the driver, the train compatibility with the route intended for operation must have already been performed. However, there might be some changes to the infrastructure that might affect the operational running conditions and that must be communicated by the IM to the RU or directly to the driver in real time.

For the route book, maps and line diagrams should be given by the IM to the RU. Some examples of maps and diagrams are given in this application guide:

Example in Germany



Example in Italy

Scheda Treno

Fascicolo Linee 92 114	Treno 2313	Scheda n° 1/3 Da: FIRENZE S.M.N. A: P.M. Olmo	Sigla di Composizione V160B 120%
Validità Dal: 14.06.09 Al: 12.12.09	Termine Scheda ROMA TERMINI		
Classificazione REG	Prestazione 270t	Lunghezza	Int. alla Sigla E464 (in spinta) RSC4

Grado di securità	Binario L/R		Prog. Km	Località	Orario	Binario ILLUD Vel. Max.	m	Sembologia	m
	Vel. Max.	Vel. Mac.							
II	30	30	314.07	FIRENZE SMN	15.13	30			
	75	75	312.79	Cavalcavia Statuto		75	2		
I _a	100	100	311.00	Cippo		100			
			310.11	FIRENZE C.MARTE ...	15.19				
			253.38	P.M. ROVEZZANO	15.23				
I _{a2}			252.47	Ponte Fiu					
	160	160	250.00	Cippo		160			
II	100	100	234.29 2.26	1° BIVIO VALDARNO NORD		100	1		
	100	100	0.00 275.56	2° BIVIO VALDARNO NORD		100			
	145	145	274.38	FIGLINE	15.36	145			
			268.84	S. Giovanni	15.42	15.43			
I _b			264.00	Cippo					
I _{a3}	100	100	262.44	Monteverchi	15.48	15.49	100		
	100					100	2		
	85				15.54	85			
	90	90	253.13	Sb. Gal. Ambra		90			
II			248.88	Laterina	16.02				
			243.52	Ponticino	16.08				
	95	95		Dev. U.		95			
			233.97	Indicatore	16.09				
	115	115		Dev. U.		115			
	90	90		Dev. I.		90			
			227.37	AREZZO	16.13	16.14			
	105	105	226.00	Cippo		105			
	145	145	222.00	Cippo		145			
			221.13	P.M. OLMO					

Excerpt of an Italian Route Book (scheda treno)

NOTES:

- This image shows the relation between train's location (position) [km] and the corresponding train maximum speed [km/h] allowed in order for the driver to be able to consequently adapt the running speed
- The line maximum speed is provided through the IM's Route Book (Fasciolo linea)

Località di stampa Fe di Manlio - TRAIN SIMULATOR - STAMPA Schede Treno
 Data di stampa 14/12/2009 20:13 Valida per i treni di Train Simulator

vers. 99

4.3 Appendix D3 – ERTMS trackside engineering information relevant to operation that the infrastructure manager shall provide to the railway undertaking

Since TSI OPE 2019,, a number of additional pieces of information were found to be useful / necessary for RUs when training their drivers to operate on a network. These are meant:

- to better address RU needs that are currently only hinted at without being made explicit (e.g. under the generic App. D2 item 3.1.5 “Any other information the driver shall be aware of”);
- to address RU needs that are not covered at all by the current App. D2.

These additional items are included under the new Appendix D3, thereby ensuring that IMs will provide them and RUs will receive them . The majority of these items are not visible to the driver or can only be indirectly perceived under certain operational conditions, usually by observing the system behaviour in certain situations. The need to make these known to the driver stems from the flexibility offered by the ETCS toolbox, when engineering a trackside system; there can be numerous variations of TSI-compliant trackside implementations, each offering different user experience when running over it. The need for the driver to react differently according to the trackside engineering is covered in App. A principle 5.1.1.

It is assumed that the train/route compatibility of specific RU trains with specific IM routes has already been checked and confirmed based on App. D1 data; App. D3 then lists the information to be taken into account by the RU when defining the operational conditions that need to be considered while running.

List of items – justification for their need

4.3.1 Whether the ETCS trackside is engineered to transmit Track Conditions and if yes, which ones.

The transmission of Track Conditions (TCs) is not mandatory under ETCS specifications. If the trackside does not provide TCs, the driver will need to be informed about them via alternative ways (text messages, marker boards, Route Book, route knowledge, other...) and may need to react manually even when the rolling stock is configured to perform some operations automatically e.g. lower/raise pantograph. When an RU knows which TCs are transmitted by the trackside, it can adjust its rule - and route - books to match its rolling stock features: e.g. if the rolling stock can perform an automatic pantograph lower/raise when instructed by the ETCS OBU, then the respective rule for its drivers would be “observe the DMI and when seeing the (normally grey) icons for panto lowering/raising, ensure that the relevant action has taken place, by observing the relevant indications <XY> on the desk”. Different rules would apply accordingly if the rolling stock is not configured to carry out such trackside commands automatically, in which case the DMI will display the relevant commands in yellow first. This knowledge will also allow for a more focused customization of the applicable ETCS Driver’s Handbook.

Appendix A Rules 6.20-6.22, 6.28 and 6.35 have been complemented by “*or if this functionality is not supported by the trackside*” to indicate that when the respective track conditions are engineered on the trackside the driver will normally not have to watch out for the marker boards in supervised operation. The drivers can now know whether to expect this icon on the DMI (when running with a MA) or not.

Appendices D1 & D2 already provide for most of this information to be made available to the RU, e.g. on the permission to use special brakes or on the safe/non-stopping areas; there was however until now no provision to inform the RU whether this information will also be made available through the DMI, by means of ETCS Track Conditions. This is an important knowledge for the driver to have, also from the Human Factors point of view.

4.3.2 Whether the ETCS trackside implements the Level Crossing (LX) procedure or an equivalent solution

This proposed information is only about the ETCS tools that have been used in the trackside engineering, not about the state of any particular LX. If the trackside does not implement any solution to cover defective LXs (which are otherwise normally protected), then drivers will be required to adapt their driving according to

information from other sources (text messages, lineside signals, European Instructions from the signaller etc.) when encountering such LXs, as the onboard system will not supervise the train run over them.

A dedicated harmonised Marker Board has already been proposed to facilitate operational work-arounds when dealing with such occurrences.

4.3.3 Whether the GSM-R network is configured to allow forced de-registration of a functional number by another driver.

This information is linked to Appendix A rule 7.11 on how to manage a functional number that is wrongly occupied by another GSM-R cab radio. Whether de-registering another cab radio is allowed among drivers is network-specific and up to the IM to define; if this condition is not fulfilled, the signaller will need to step in and perform the de-registration himself/herself. It is understood that the system configuration will be aligned with IM operational rules, i.e. the IM will not be prohibiting an operation that is technically possible (and obviously vice-versa).

Knowledge of this system feature will allow the RU to define which part of rule 7.11 applies, thereby avoiding any reference to non-harmonised rules.

4.3.4 Whether the GSM-R network has specific constraints concerning OBUs only able to operate in circuit-switch (CS)

There are two technical options for an OBU to connect to a GSM-R network for ETCS data exchange: Circuit-switch (CS), where every OBU takes up a dedicated communication channel when establishing a session with the base station, and Packet-switch (PS), where a session is established over a virtual channel, not taking up any exclusive physical bandwidth, as the information is exchanged in packets routed in a dynamic way over any channel available at the time of the transmission. PS offers therefore a much more efficient spectrum usage for the same amount of data, by only occupying a physical channel when necessary.

CS was the first solution to be defined and the only one available until GPRS (*offering Packet-switch capability*) was introduced under GSM-R Baseline 1 (CCS TSI Reg. 2016/919). Even afterwards, for backward compatibility reasons CS remained the standard way of connecting while PS became an option. Consequently, all GSM-R networks and OBUs support CS while only some newer ones also support PS. The constraint in question concerns older OBUs:

- only equipped to connect in CS, while the GSM-R trackside supports PS and CS, or
- connected in CS because the GSM-R trackside only supports CS.

Due to the limited capacity available in CS, an IM can enforce constraints to such OBUs, requesting that the driver only performs the SoM when the train is ready to depart, so as not to “occupy” a communication channel before it is absolutely necessary.

This information may be given during the dialogue between the control centre and the driver after the registration of the functional number of the cab radio (if this is part of the operational procedure), but the driver may have already started the input of train data in the ETCS OBU and launched the connection to the RBC in parallel. It is therefore essential for the RU to know in advance about any such constraints. In any case, a driver is also expected to know whether his/her OBU is CS or PS, so that s/he adapts his/her operating routine accordingly if required by such a network constraint. It is clarified that this constraint only applies to the data link OBU<->RBC over the GSM-R network and is not concerned with voice communication through the cab radio, which does not engage any full-time communication channel but relies instead on call set-up whenever necessary.

4.3.5 Reasons for which an ETCS Radio Block Centre can reject a train.

This concerns Level 2 operation and is linked to rule 6.40.2 of Appendix A. It is related to an optional ETCS trackside feature, allowing the RBC to reject a train without a valid position at SoM or for other, non-harmonised reasons.

4.3.6 The cant deficiency used to determine the basic Static Speed Profile (SSP) of the line and all other train categories with lower cant deficiency for which the ETCS trackside is configured to provide SSPs

This can be a safety critical information. The SSP is defined as a set of concatenated speed ceilings relative to the km position along a line, determining the speed limits at which the line can be travelled. The problem arises from the way the SSPs are defined in any specific ETCS trackside: usually, the basic SSP is calculated upon an average/common train running on the line, not upon the worst possible case in terms of maximum tolerated uncompensated lateral acceleration, which is measured in mm of tolerated cant deficiency (higher uncompensated lateral acceleration => higher cant deficiency). This alone is not a problem as long as the trackside also provides alternative SSPs for trains with a lower (worse) tolerated cant deficiency ("cant deficiency SSPs"); such SSPs can also be provided for different train categories defined in Annex B of Appendix A (the cant deficiency is one of the three parameters defining each operational train category in this table). Cant deficiency-related speed restrictions are necessary to compensate the line characteristics, essentially the minimum radius and associated cant applied. If the trackside does not provide a SSP matching the cant deficiency of a specific train, then the SRS stipulates that the ETCS OBU will apply the SSP with the closest cant deficiency among those available and if none is available, then it will apply the basic SSP. Whether this will result to higher speeds than those tolerated by a specific train depends on the cant deficiency of that train compared to the nominal cant deficiencies used to define the basic and the other SSPs. If all of these cant deficiencies are higher, the train with a lower one may be wrongly allowed by the OBU to run at speeds higher than those tolerated by its cant deficiency, leading to potentially dangerous situations e.g. a derailment in a curve. There is no problem for a train having a cant deficiency higher than the highest one supported by the trackside.

RINF clauses 1.1.1.1.4.2 and 1.1.1.1.2.5 and Appendix D1 item "running characteristics" already foresee that the actual cant deficiency applied in the infrastructure for the nominal line speed shall be made known to the RUs for them to assess the compatibility of their rolling stock with the route, by carrying out a "comparison of the combination of maximum speed, maximum cant deficiency and rail inclination(s), to which the vehicle is assessed, with the cant deficiency, speed and rail inclination(s) declared in RINF or information provided by the IM". The same App. D1 item also provides for a way to deal with a potential incompatibility between the route characteristics and those of the rolling stock: "In case vehicle characteristics don't match infrastructure characteristics and the compatibility between the vehicle and the route might be compromised, the IM shall provide the exact combination of speed and cant deficiency for the specific points in which the compatibility might be compromised. [...] The output of the check should be taken into account by the RU for the route book preparation. Operational conditions might be imposed as a result of this check (e.g. speed restrictions for a section of line)". Furthermore, Appendix D2 (clause 3.1.4) provides for "differential speeds relating to certain types of train" to also be communicated to the RU. These constraints however are not necessarily reflected in ETCS operation; when they don't, they fall upon the driver to manually comply with them, if the RU still wishes to route a train whose running characteristics don't match those of the line.

The information about which cant deficiencies have been used in the ETCS trackside engineering for the basic SSP and any other SSPs, is missing from the above RINF and App. D1 & D2 clauses. It may be assumed that the actual cant deficiency applied in the infrastructure, calculated for the nominal line speed, has been used to define the basic SSP; this will ensure that trains with a cant deficiency at least equal to that of the infrastructure, can be safely supervised by ETCS. This engineering principle is however not explicitly stated in the ETCS specifications. As a result, the cant deficiencies used for the SSPs are not transparent to the driver, so s/he cannot know whether his/her train will use an SSP that matches its cant deficiency or not; s/he needs therefore to be informed otherwise whether s/he can trust the ETCS supervision or not. If the actual cant deficiency of the train is worse than the lowest available cant deficiency SSP; the driver will need to manually reduce his/her speed using some RU-specific procedure, based on IM information to be provided in the context of the afore-mentioned App. D1 & D2 clauses.

4.3.7 The following National Values:

4.3.7.1 D_NVROLL: Parameter used by the ETCS onboard to supervise the distance allowed to be travelled under the roll-away protection and the reverse movement protection. This has been acknowledged to be of use when reversing for operational reasons like when splitting trainsets or when starting on an uphill ramp, where the leading engine will inevitably recede as the train will contract as soon as the brakes are released. For operational reasons, some IMs are reportedly enforcing in their rules a stricter rollaway allowance than the value they have defined for this parameter.

4.3.7.2 Q_NVEMRRLS: Qualifier defining whether the command for application of the emergency brake when the permitted speed has been exceeded (in ceiling speed or target speed monitoring) will be revoked as soon as the permitted speed is no longer exceeded or after the train has come to a complete standstill. It is clarified that this parameter is not related to the tripping function, where the emergency brake is always maintained until standstill and beyond, until acknowledged by the driver.

4.3.7.3 V_NALLOWOVTRP: Maximum speed allowed when pressing “Override EoA”. When this condition for selecting override is not fulfilled, the respective button will not be available on the DMI. This parameter is set to 0 when the IM does not allow a driver to override unless at standstill.

4.3.7.4 V_NVSUPOVTRP: Permitted speed limit to be respected when “Override EoA” is active. The driver does not know the value of this parameter as it not indicated on the DMI.

4.3.7.5 D_NVOVTRP: Maximum Distance for overriding the train trip. The driver does not know the value of this parameter as it not indicated on the DMI. It is helpful for the driver when deciding where to activate the override function, so that there is sufficient distance to pass the EoA, Stop Marker or any other boundary that requires overriding.

4.3.7.6 T_NVOVTRP: Maximum time for overriding the train trip. The driver does not know the value of this parameter as it not indicated on the DMI. It is helpful for the driver when deciding when to activate the override function, so that there is sufficient time to pass the EoA, Stop Marker or any other boundary that requires overriding.

4.3.7.7 D_NVPOTRP: Maximum distance allowed for reversing in Post Trip Mode. Not to be confused with D_NVROLL, which is not applicable in PT mode.

4.3.7.8 T_NVCONTACT: Maximum time without a safe message from RBC (safe link) before train reacts. It is noted that this timer will also count down when there is a loss of the radio connection as no messages can be received from the RBC in that situation. The loss of radio connection will also trigger the display of relevant icon ST04 on the DMI if the connection is not restored within 45 sec after it is lost; App. A rule 6.48 will then apply.

4.3.7.9 M_NVCONTACT: On-Board reaction when T_NVCONTACT expires (can be: trip, service brake or no reaction).

4.3.7.10 M_NVDERUN: Qualifier determining whether ETCS onboard allows a driver ID to be changed while running or only at standstill. If this information is not known to the driver, s/he will need to explore whether this option is available in the relevant DMI submenu.

4.3.7.11 Q_NVDRIVER_ADHES: Qualifier determining whether the driver is allowed to modify the adhesion factor used by the ETCS Onboard to calculate the braking curves. If this information is not known to the driver, s/he will need to explore whether this option is available in the relevant DMI submenu, under “Settings”.

4.3.7.12 Q_NVSBTSMPerm: parameter affecting the permitted speed calculated by the OBU by allowing the Service Brake Intervention curve (but not the Emergency Brake Intervention one) to be overpassed without the brakes applying when braking to a target.

4.3.7.13 the Baseline 3-specific National Values affecting the braking model. These are factors that allow the OBU to “tweak” the algorithms it uses to calculate the braking curves, to accommodate several IM

constraints; e.g. one of these NVs defines the required confidence level on the emergency brake safe deceleration, when the emergency brake is commanded on dry rails. As braking of rail vehicles is governed by several parameters combined into an algorithmic model with a certain statistical accuracy and associated safety margins, requiring this model to produce deterministic results (i.e. to match the calculated stopping position to the actual one, under emergency braking) is quasi-impossible. For this reason, these NVs have been defined to allow higher reliability (as per each IM's perception) in the achievement of the nominal braking performance figures. This information is addressed to the RUs, not to the drivers. When in possession of these values, the RU can assess the braking performance of its trains with respect to the intended route and possibly upgrade it when necessary.

The National Values may be not unique over the entire network of an IM. For instance, there may be different NVs defined for the high-speed network than for the conventional lines. In such cases, the IM shall provide all sets of NVs in force, indicating the scope of application of each set.

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Annex 5 – Braking performance and maximum speed allowed

5.1 Principles

Braking performance is a subject that concerns both the IM and RU. Point 4.2.2.6 of the TSI OPE clarifies the interface between IM and RU:

- Allocation of responsibilities,
- Communication related to braking performance.

In any case, the IM and RU have to work together and exchange information to ensure a safe operation of trains. IM and RU must ensure that the risks occurring at the interface between IM and RU are analysed and covered by operational rules and procedures in accordance with Article 9 of the Safety Directive [3].

5.2 Responsibilities of the IM and RU

The IM should ensure that the correct and complete information concerning the line characteristics is given to the RU in a clear and usable format (e.g. RINF, Data file). The IM has to indicate to the RU the conditions of use of brake systems affecting the infrastructure (route related information). The IM should also provide route characteristics that the RU must take into account for establishing the necessary braking performance and corresponding maximum speed. This should cover e.g. steep gradients and signalling distances. The IM should also make available the measure potentially applicable for constraints that the RU has to respect if a train does not reach the necessary braking performance (either general measures or line related, as appropriate).

The RU establishes procedures for the train composition and for determining the braking capability of the trains and corresponding maximum speed to ensure that the trains run safely on the intended route. The procedures should allow the driver to know the corresponding maximum speed of the train in its location (position) on the route, sufficiently in advance in order for the driver to consequently adapt the speed. The location can be determined in respect to relevant points on the route (e.g. trackside Marker Board/Stop Marker, kilometric/hectometric markers, switch number/id, tunnel-bridge-LX number/id, route training, GPS or other positioning systems) allowing the driver to correctly apply the received running constraints/operational instructions and to efficiently communicate with the signaller.

This should include normal and degraded mode operation. The procedures must take into account constraints like the availability and reliability of the brakes. The procedures must also take into account train running characteristics like longitudinal forces (and associated risks of coupler breakage), the CCS system characteristics (e.g. specific Class B system constraints) and the driver's fit for duty (e.g. reaction time). These general procedures established by a RU may be the same for all networks the RU is running on as the train characteristics and behaviour does not change by passing a border (exception: considerable changes in climatic conditions for instance). However, the necessary braking performance may vary from route to route (e.g. due to different gradients, or to different signalling distances).

With information provided under point 4.2.2.6.2 (1) of TSI OPE, the RU may perform stopping distance calculations or may determine the necessary braking performance of the train by applying the code of

practice such as the requirements for the necessary braking performance already in use on the intended route. The mentioned calculation or code of practice also takes into account the maximum speed allowed during operation.

In order to facilitate the procedure, next to the line characteristics defined in point 4.2.2.6.2 (1), the IM may provide the expected rolling stock minimum braking performance taken into account for the line at design stage and ensuring the compatibility of the rolling stock with the line at its maximum operating speed. This minimum braking performance requirement is expressed in deceleration profile and equivalent response time on level track or brake weight percentage depending on the maximum speed and composition of train as referred to in point 4.2.2.6.2 (2). By using this information, the RUs may calculate the required braking performance for larger parts of the network and calculations of the required stopping distance for each individual line may be avoided. When the IM provides the expected RST minimum braking performance, the RU has to express the braking performance using the same unit, and each party is responsible for this interface parameter expressed in that unit.

For the train braking performance based on brake weight percentage, the most common formula for conventional rail is intended to provide a simple way to evaluate the braking performance of a train composed of various vehicles and is the following:

$$\frac{(\text{Sum of brake weight including locos} \times 100)}{(\text{Sum of total weight of the train including locos})} = \text{Brake weight percentage}$$

Notes:

(1) The sum of brake weight is performed over the brake weight of active brakes only. The brake weight of each vehicle is determined when the vehicle is placed in service.

The sum of total weight is the actual or estimated (higher) weight

(2) This formula is considered as a code of practice; most of the existing braking tables are based on brake weight percentage, and can therefore also be considered as codes of practice.

However, any change in these braking tables should be assessed by the IM and by the RU (in case of change due to rolling stock characteristics) using the CSM on risk assessment to maintain the safety level in case of evolution of braking tables.

The procedures the RU should set up and implement are related to e.g.:

- the composition of trains and;
- the determination of the actual braking performance.

These procedures shall be managed by the RU within its safety management system using the AMOC on [Checks and tests before departure \(including brakes and checks during operation\)](#) and, where relevant, the CSM on risk assessment.

5.3 Establishing operational rules

5.3.1 Safety Management System

It is vital to ensure that the SMS has sufficient arrangements in place to deliver effective operational planning and control of all risks. This means that all operational procedures and company rules are managed through the IM's and RU's Safety Management System. Whether a braking rule is appropriate or continues to be appropriate is a key requirement of the risk assessment process as set out in the RU/IM SMS. The results of the risk assessment will determine what control measures are needed in order to ensure that the risk is managed. The RU/IM will need to regularly ensure that the braking rules remain effective in controlling the risk and updating them as and when required. For any operational changes, the CSM on risk assessment should be considered. Further information on this is set out in the CSM Guidelines.

5.3.2 Application of existing rules

Experience shows that railways have operated in a safe manner for a long time with the existing braking performance rules.

If an RU operates in or across one or more Member States, the RU may decide to take over existing rules from another entity (example: in different MSs, the IMs have managed these rules before).

If the RU applies existing rules, they need to consider the application of the CSM on risk assessment in relation to an operational change.

The braking sheet will be a key part of the procedure. There is now a harmonised format developed by the Unified Braking Scheme (UBS) of the Xrail group of RUs under the auspices of EC and UIC .

Link to braking sheet: <https://www.era.europa.eu/system/files/2022-11/TSI%20OPE%20AMOC%20tests%20checks%20braking%20-%20Annex%20I%20-%20Appendix%20A%20-%20brake%20sheet.pdf>.

5.3.4 Elements specific to ETCS

There are substantial differences in brake performance requirements between ETCS and non-ETCS trains.

First of all, it must be understood that driving in cab signalling with ETCS (or with any other CCS system without lateral signalling) implies that the braking performance of the train does not determine the maximum allowed speed resulting from a fixed braking distance. On the contrary, it determines the location where the driver is invited by ETCS to start braking according to the current train speed. For a speed equal to the maximum speed the train can operate on the line, this location is called the perturbation location.

Unlike lateral signalling, the braking performance of the train and the maximum distance over which the driver will be invited by ETCS to brake (i.e. the perturbation distance) should only be checked before it can be operated on a given line to determine whether:

- there would be a negative impact on the headway and by consequence on the ability of the train to meet the allocated timetable slots or
- for a ETCS level 1 application without semi-continuous infill transmission (by radio or by loop), the driver would be invited to brake before the train reaches the spot (balise) transmission location where the ETCS trackside can renew (extend) the Movement Authority of the train.

As of Baseline 3 and operated System Version 1.1, the braking curves are calculated in a harmonised way. For the train to perform accordingly, its available brake % must be calculated by applying the methodology described in UIC leaflet 544-1 6th edition, with the exception of §9.1.2, §9.2.2 and §9.3.3.

The OBU will calculate the braking curves if fed with appropriate data. These include the available braked weight percentage (or simply brake %) and the brake setting (P/G). The first is introduced as a numerical value while the second is introduced through the ETCS operational train category, where the train's cant deficiency is also stated. Both are captured during the train data entry procedure at SoM, under App. A rule 6.4.

If it is necessary to predetermine the perturbation distance calculated by the ETCS on-board equipment of the train, the RU shall use, in addition to the information referred to in the clause 4.2.2.6.2 alinea (1), also the ETCS braking curves trackside related parameters (the so called National Values for braking curves or "Correction Factors"). These will be notified to the RUs by means of App. D3 and will allow them to establish the resulting perturbation distance depending on the characteristics of the train.

IMs shall define the Correction Factors in such way that no additional requirement or constraint is exported to the RUs. For instance, the IM should not require the driver to introduce a different train category than the one the train actually belongs to. The IM should also not require the driver to perform manual adjustments to the brake % to be introduced to the OBU to account for train length instead of using the correction factors dedicated to this end.

The IM can still require the driver to recalculate and re-enter a different brake% when crossing a border if different inhibition principles apply with regard to special brake types (eddy-current, magnetic shoe, regenerative), where applicable. The reason is that although these brake types can be managed (enabled/inhibited) through the respective track conditions, their effect to the applicable brake % is not known a priori and can therefore not be considered automatically by the OBU when calculating the braking curves.

5.4 Procedures

5.4.1 Preparation

- The IM details the information necessary for the calculation of the necessary braking performance for all routes. The IM makes this information for necessary braking performance available to the RUs. The IM also indicates information like the conditions of use for brake systems that can impact the infrastructure like eddy-current, magnetic or regenerative brake. This results from point TSI OPE 4.2.2.6.2 (1).
- The IM may also deliver the existing requirements on expected rolling stock minimum braking performance, if they are available, to the RUs. If the IM decides to do so, this information should be made available to all RUs who intend to operate trains on the specified route of its network. This results from point TSI OPE 4.2.2.6.2 (2).
- The RU establishes procedures for determining the braking capability of the train at corresponding maximum speed and for train composition taking into account the line characteristics provided by the IM (included the maximum line speed related to the infrastructure). This results from point (3) of 4.2.2.6.2.

Note: The actual braking performance resulting from the checking of the actual train (train composition, brake availability, train length, train weight, brake settings...) will be used as an input value for any operation rule to be subsequently applied to the train. This means that the result of the calculation should be used as such (e.g., brake weight % to be used as calculated; ranges in a table may be derived as written without further deduction). The decision about the brake setting to use (e.g. P or G or combination of brake systems) for a train is then up to the RU, taking into account the relevant train characteristics such as length, type of couplers, etc and the AMOC on [Checks and tests before departure](#). However, the necessary braking performance must at least be achieved.

5.4.2 Train prepared to run

The RU calculates the actual braking performance for the individual train prepared to run and verifies that this actual braking performance matches or exceeds the necessary braking performance determined by the IM for the associated train path.

The RU must not take into account any brake system that is not allowed to be used on the given route.

5.4.3 Braking performance insufficient during operation

If during operation the actual braking performance does not meet the necessary braking performance determined at planning stage, the train may have to run at a lower speed than authorised for the train route. In this situation, the RU should inform the IM immediately and take appropriate measures (like reduction of speed) and the IM may take appropriate measures to reduce the overall impact on the traffic on its network.

The rules may be designed as one set of rules valid for the whole network or as route-specific rules.

In some cases, train operation will not be possible (according to the rules for reduced braking performance), either because of safety reasons (e.g. impossibility to halt a train on steep gradients) or for traffic management reasons (traffic disruption due to the resulting speed limit). In these cases, a possibility is a request for an ad hoc path in accordance with the actual braking performance achieved by the individual train.

5.4.4 Establish new / amend existing rules

If the RU decides to establish new rules or amend the existing ones, then they should consider the application of the CSM on risk assessment in relation to an operational change [7]. The technical parameters listed in EN 14198: 2016+A1:2018+A2:2021 and EN 14531: 2015+A1 :2018 as well as UIC-leaflet 544-1 should be taken into account for the risk assessment.

Technical development should not be hindered. If technical devices improve the braking performance on train level, the RU should be allowed to take this improvement into account. In addition, such a decision should be covered by a risk assessment (see art. 15 of RSD).

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Annex 6 – European Vehicle Number (Appendix H)

Each vehicle should have a European Vehicle Number. The details on the EVN are set out in Commission Decision 2007/756/EC.

How the EVN and related markings (TEN or Authorisation plate) are inscribed on the vehicle, is set out in Appendix H of the TSI OPE.

Inscription of the number and linked alphabetical marking on the bodywork

This part states the basic requirements concerning the marking on vehicles. It must be seen in connection with the requirements of the relevant TSIs for Rolling Stock concerning markings on the vehicles.

Alphabetical marking of the interoperability capability

Vehicles that have an authorization valid for an area of use covering all Member States should be marked with a “TEN”. This means, that the relevant TSIs for Rolling Stock (including for example TSIs as Noise, People with reduced mobility (PRM)) have been fulfilled and the vehicle is cross-authorized.

If a wagon to be authorised is to be marked as a TEN wagon and the applicant so requests, the assessments of the Agency acting as authorising entity will cover the additional conditions that a TEN wagon shall meet (WAG TSI §7.1.2). The marking GE is an additional marking to the TEN marking in case the Annex C (which is voluntary) of the TSI WAG is applied by the Applicant.

Vehicles that have an authorisation valid for an area of use which does not cover all Member States may not carry the marking “TEN”. They should carry an authorisation plate with the letter marking of the Member States where the vehicles are placed on the market. The Member States’ abbreviations shall be used according to part 4.

The marking PPV or PPW is not given by Member States of the European Union.