EUROPEAN UNION AGENCY FOR RAILWAYS

Moving Europe towards a sustainable and safe railway system without frontiers.

OPINION

OPI-2026-8

OF THE EUROPEAN UNION AGENCY FOR RAILWAYS

for

THE EUROPEAN COMMISSION

Updating existing Acceptable Means of Compliance (AMOCs) regarding Safety of load, safety of passengers and checks and tests before departure, including brakes and checks during operation

1. General Context

Railway Undertakings (RUs) and Infrastructure Managers (IMs) shall manage their operations and the traffic among others in accordance with the Technical Specifications for Interoperability for the Operation and Traffic Management, hereinafter "TSI OPE" (Annex to Commission Implementing Regulation (EU) 2019/773[1]).

According to Article 2(33) of the Directive on the interoperability of the rail system within the European Union (Directive (EU) 2016/797[2]), Acceptable Means of Compliance (AMOCs) are *"non-binding opinions issued by the Agency to define ways of establishing compliance with the essential requirements"*. Therefore, AMOCs define good practices also by referring to available standards, which the actors of the railway sector can use in their safety management system as evidence that their operational procedures comply with high-level requirements set out in EU legislation (in this case the TSI OPE and the Common Safety Method on requirements for safety management systems – CSM on SMS (Regulation (EU) 2018/762[3]).

AMOCs cover areas that are for the IM/RU's SMS to manage, no national rules on the topics covered by AMOCs are allowed.

2. Legal Background

According to the provisions of Article 10(2) of Regulation (EU) 2016/796[4], the Agency shall issue opinions at the request of the Commission on amendments to any act adopted on the basis of Directive (EU) 2016/797.

According to Article 19(1)(d) of Regulation (EU) 2016/796, the Agency shall issue opinions which constitute acceptable means of compliance concerning deficiencies in TSIs in accordance with Article 6(4) of Directive (EU) 2016/797 and provide those opinions to the Commission.

According to section 4.4.3 of the TSI OPE the Agency may by means of technical opinions define acceptable means of compliance, whichshall be presumed to ensure compliance with specific requirements and ensure safety in accordance with Directive (EU) 2016/798[5].

This opinion covers the update of the AMOCs covering the following topics:

1. Safety of load,
2. Safety of passengers,
3. Checks and tests before departure, including brakes and checks during operation.

The AMOC itself constitutes a non-legally binding opinion and its use is strictly voluntary. In order to update AMOCs the Agency returned to the Working Party (WP) that was set up for the revision of Regulation (EU) 2015/995[6].

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[1] Commission Implementing Regulation (EU) 2019/773 of 16 May 2019 on the technical specification for interoperability relating to the operation and traffic management subsystem of the rail system within the European Union and repealing Decision 2012/757/EU, OJ L 139, 27.5.2019, p. 5.

[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, OJ L 138, 26.5.2016, p. 44.

[3] Commission Delegated Regulation (EU) 2018/762 of 8 March 2018 establishing common safety methods on safety management system requirements pursuant to Directive (EU) 2016/798 of the European Parliament and of the Council and repealing Commission Regulations (EU) No 1158/2010 and (EU) No 1169/2010, OJ L 129, 25.5.2018, p. 26.

[4] Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016 on the European Union Agency for Railways and repealing Regulation (EC) No 881/2004, OJ L 138, 26.5.2016, p. 1.

[5] Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety, OJ L 138, 26.5.2016, p. 102.

[6] Commission Regulation (EU) 2015/995 of 8 June 2015 amending Decision 2012/757/EU concerning the technical specification for interoperability relating to the 'operation and traffic management' subsystem of the rail system in the European Union, OJ L 165, 30.6.2015, p. 1–69.

3. Analysis

3.1. Concept

As a general concept, RUs and/or IMs are responsible to manage their specific operational and traffic management requirements in their SMS.

Article 4(1) (d) of the Railway Safety Directive (Directive (EU) 2016/798) states as follows:

"With the aim of developing and improving railway safety, Member States, within the limits of their competences shall:

d) ensure that 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, obliging them to:

> *(i) implement necessary risk control measures as referred to in point (a) of Article 6(1), where appropriate in cooperation with each other;*
>
> *(ii) apply Union and national rules;*
>
> *(iii) establish safety management systems in accordance with this Directive".*

Article 4(3) (a) and (b) of the Railway Safety Directive states as follows:

"Railway undertakings and infrastructure managers shall:

> *a) implement the necessary risk control measures referred to in point (a) of Article 6(1), where appropriate in cooperation with each other and with other actors;*
>
> *b) take account in their safety management systems of the risks associated with the activities of other actors and third parties;"*

The same concept has been detailed in the CSM on SMS, ANNEX I Point 3.1.1.1 (for RUs) and ANNEX II point 3.1.1.1 (for IMs):

According to these provisions, the organisation shall:

> a) identify and analyse all operational, organisational and technical risks relevant to the type, extent and area 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 Annex I, Section 1. Context of the organisation);
>
> b) evaluate the risks referred to in point (a) by applying appropriate risk assessment methods;
>
> c) develop and put in place safety measures, with identification of associated responsibilities (see
> Annex I, Section 2.3. Organisational roles, responsibilities, accountabilities and authorities);
>
> d) develop a system to monitor the effectiveness of safety measures (see Annex I, Section 6.1. Monitoring);
>
> e) recognise the need to collaborate with other interested parties (such as railway undertakings, infrastructure managers, manufacturer, maintenance supplier, entity in charge of maintenance, railway vehicle keeper, service provider and procurement entity), where appropriate, on shared risks and the putting in place of adequate safety measures;
>
> f) communicate risks to staff and involved external parties (see Annex I, Section 4.4. Information and communication).

Therefore, it is the responsibility of RUs and/or IMs to identify, assess, eventually mitigate, monitor and review continually their own operational risks.

Based on that, the AMOC is a proposed way addressed to the RUs and/or IMs to demonstrate compliance with the TSI OPE as a mean to manage operational risks, taking into account that the provisions of the TSI OPE cover the entire operational and traffic management subsystem, whilst every single RU or IM manages only part(s) of the subsystem.

RUs and/or IMs should in compliance with the EU and national legal requirements define their operational context and consequently they should identify the risks occurring in their activities.

Then, on a voluntary basis, RUs and IMs, acting accordingly to the cooperation agreement they have, are free to assess and decide for themselves whether an AMOC is applicable to the part of the subsystem they are supposed to manage each their parts of the agreed risk mitigation measures. An AMOC could be entirely or partially applicable to the RU's and or IM's operational context, for example an RU could be involved in the freight transport, but without the transport of dangerous goods, whilst an AMOC could deal with both.

If an RU and/or IM evaluates an AMOC as applicable to the operational context and decides to use it, the RU and/or IM should assess the risks the AMOC could cover within the operational activities to be performed. For example, initially and according to the applicable legislation, risks relating to inadequate tests and checks should be identified and mitigated – then the relevant part of the good practice in the AMOCs should be crossed referenced with the risk in the RU's and/or IM's' risk assessment processes. This should regularly be kept up to date as part of the monitoring activities for their operations.

As AMOCs are non-binding opinions issued by the Agency to define ways of establishing compliance with the essential requirements, the RUs and/or IMs are free to decide whether to apply the AMOC/part of the AMOC, or not. Nevertheless, the RUs and IMs are responsible for managing their operational risks.

AMOCs should be accepted throughout the EU by Member States and National Safety Authorities as examples of good practice.

According to TSI OPE point 4.4.2 and Appendix I, national rules[7] on the defined AMOC topics are generally not permitted. Therefore, if a Member State (MS) and/or a NSA/ or any other entity requires an RU and/or IM to comply with additional national requirements, then that MS or NSA or the other entity will have to provide, in line with Article 8 of Railway Safety Directive, evidence as to why their national requirements provide a higher degree of risk control than that set out in the AMOC. However, AMOCs are not national rules and if a RU and/or IM decides not to apply the AMOC and develop their own processes, it may do this and does not have to prove that its processes are as good or better than the good practice set out in the AMOC but it should ensure that its processes are adequate in controlling/mitigating the risks that it has identified.

As a result, the substantiated use of this AMOC should be taken into consideration by the Agency or the NSAs when an RU and/or IM applies for a safety certificate or authorisation, when the certification body assesses compliance of the applicant with the requirements of the CSM on SMS and the TSI OPE.

The certification body will check the sufficiency of the RU's and/or IM's processes in controlling the risks and will check how the AMOC is used, if it is the case, by assessing the risk assessment process of the RU and/or IM to ensure that the AMOC good practice has been identified as a relevant control measure for the identified risk.

[7] With the meaning of Article 8 Directive (EU) 2016/798.

3.2. Overview of update in the requirements and evolution

3.2.1. Safety of load

TSI OPE paragraph 4.2.2.4.1 Safety of load states that the RU shall make sure that freight vehicles are safely and securely loaded and remain so throughout the journey.

Following the initial publication, the working group received feedback on the use of AMOC, and this ultimately led to version 3.1, which is the subject of this opinion.

Version 3.1 represents a major evolution and expansion of Version 1. While the core principles remain the same, the document has been significantly enhanced in technical detail, scope, and operational guidance, especially for intermodal transport and specific loading processes. The following are the main changes introduced by version 3.1:

3.2.1.1. Overall Evolution and Progressive Updates

Compared to Version 1, version 3.1:

- incorporates updates following change requests (CRs) and new TSI OPE developments;
- includes review of Part 1 and integration of experience from operational feedback;
- reflects contributions from bodies such as JNS and National Safety Authorities.

3.2.1.2. Introduction of a Detailed Annex on Semi-Trailers (Major Change)

This annex was not present in Version 1 and introduces:

- a complete operational process (5 phases: unloading, preparation, loading, securing, departure);
- detailed checks, actions, and responsibilities at each step;
- specific focus on:
    - kingpin–hitch interaction,
    - locking systems,
    - compatibility of wagons and semi-trailers,
    - coordination with terminals and other actors.

3.2.2. Safety of passengers

TSI OPE paragraph 4.2.2.4.2 Safety of passengers sets out that RUs shall ensure that passenger transport is undertaken safely at the departure and during the journey.

Following the initial publication, the working group received some feedback on the use of AMOC, and this ultimately led to version 2, which is the subject of this opinion.

Version 2 represents a significant update and enrichment of Version 1. While the overall structure and philosophy remain similar, Version 2 introduces new safety topics, expanded operational guidance, and a more comprehensive risk-based approach. The following are the main changes introduced by version 4.

3.2.2.1. Introduction of a New Operational Topic: Alighting Outside Platforms

This topic was not present in Version 1 and includes:

- conditions under which evacuation outside a platform may occur;
- detailed procedures for RU onboard staff and IM (signaller);
- coordination requirements to ensure safe evacuation and track protection;

- risk mitigation measures for passengers moving in railway environments.

More detailed step-by-step instructions are defined for communication with the signaller and coordination of evacuation routes.

3.2.2.2. New Risk Area: transport and charging of batteries on-board

Version 2 introduces explicit requirements to manage **risks** linked to passenger devices (e.g. batteries connected to onboard power).

3.2.3. Checks and tests before departure, including brakes and checks during operation

The TSI OPE paragraph 4.2.3.3.1 Checks and tests before departure, including brakes and checks during operation states that the RU shall define the checks and tests to ensure that any departure is undertaken safely (e.g. doors, load, brakes).

Following the initial publication, the working group received a multitude of feedback on the use of AMOC, and this ultimately led to version 4, which is the subject of this opinion.

Version 4 represents a major evolution compared to Version 1. While Version 1 was the initial release, Version 4 is a significantly enhanced, more detailed, and operationally mature document aligned with recent technical developments. The following are the main changes introduced by version 4.

3.2.3.1. Overall Revision of the Document

Compared to the first release, Version 4:

- reorganizes the structure (conceptual Part 1, operational Part 2, detailed Annex);
- clarifies the role of AMOCs as voluntary tools supporting compliance;
- strengthens alignment with EU legal and safety frameworks (TSI OPE, Safety Directive, CSM).

3.2.3.2. New Operational Content (Checks During the Journey)

A key addition in Version 4 is the introduction of section 2.10.2 “Checks during journey requiring alighting from the train”. This topic was not included in Version 1 and introduces:

- procedures when staff must leave the train during operation;
- mandatory coordination between Railway Undertakings (RU) and Infrastructure Managers (IM);
- safety requirements (communication with the signaller, track protection, ensuring train immobilization).

3.2.3.3. Evolution of Braking Rules (Annex I)

Another major difference concerns Annex I, updated based on the latest TrainDy studies:

- Version 4 includes amendments following the 4th TrainDy Study;
- introduces a more harmonized and detailed braking ruleset for freight trains;
- provides detailed requirements on:
    - G/P brake positions;
    - concepts such as LL (Long Locomotive) and XLL;
    - limits on train length, mass, and vehicle distribution;
    - control of longitudinal forces (LCF and LTF) to mitigate derailment risks.

Annex I to this Opinion contains the impact assessment.

4. The opinion

The Agency non-binding opinions defined acceptable means of compliance, which shall be presumed to ensure compliance with specific requirements and ensure safety in accordance with Directive (EU) 2016/798.

The annexes provide the final AMOC's on following topics:

- Annex II: Safety of load – v3.1,
- Annex III: Safety of passengers – v2,
- Annex IV: Checks and tests before departure, including brakes and checks during operation – v4.

The opinion is addressed to the European Commission.

Qualified electronic signature by: OANA RODICA GHERGHINESCU

Date 2026-06-02 13:30:46 UTC

Oana GHERGHINESCU
Executive Director

Annex 1

Impact Note

Regarding update AMOC - TSI OPE - RSD

Issued as per Art. 8(1) of Regulation (EU) 2016/796 and the Impact Assessment procedure adopted by the ERA Management Board (Decision n.290, 16/03/2022)

1. Context and assessment of impacts

1.1. Context

In accordance with the TSI OPE the Agency published in December 2021 three AMOCs (Acceptable Means of Compliance) put forward as a technical opinion covering:

- Safety of load,
- Safety of passengers,
- Checks and tests before departure, including brakes and checks during operation

A Light Impact Assessment report accompanied the Agency's technical opinion concluding that the preferred option would be to adopt the three AMOCs compared to the do-nothing option.

At this point updates of the three AMOCs are proposed in the Technical Opinion of the Agency. This Impact Note examines the merits of the proposed updates of the AMOCs.

1.2. Analysis performed

The analysis performed regarding the updated AMOCs is based on a review of:

- OPI-2026-8 (AMOCs)
- Annexes to OPI-2026-8 notably the new versions of the AMOCs
- Light Impact Assessment (LIA) for the three AMOCs from 2021

1.3. Assessment of impacts

Agency's impact assessments can either be: 1) Full Impact Assessment (FIA); 2) Light Impact Assessment (LIA); 3) Impact note (IN). The choice of the type of impact assessment to use is described in the Agency's Impact Assessment procedure (adopted by the Management Board) and is based on the significance of the impacts generated, the complexity of the proposal and previous impact assessment. For this Opinion the chosen IA type is an Impact Note considering that the impacts have previously been adequately assessed in 2021 with a LIA.

Considering that the AMOCs are based on voluntary application by the concerned railway stakeholders, it is likely that the advantages associated with the updated version outweigh any disadvantages building on the conclusion from the 2021 LIA. In particular, the LIA concluded that '*According to the results of the assessment the do-something was preferred and it was recommended to adopt the AMOCs as they have high value considering that they were developed together with the rail sector. The AMOCs can increase interoperability and therefore competitiveness of rail transport and their adoption does not require an amendment of TSI OPE. In addition they can be applied as a control measure to the RUs risk assessment. Considering the voluntary character of the AMOCs. The benefits largely outperform the costs of implementing the AMOCs which are mostly related to an adaptation of the skills of NSA/ the Agency's staff to this new scheme*.

Moreover, it was also noted in the LIA that '*AMOCs are a voluntary scheme and therefore for now future evaluations are not foreseen*'.

1.4. Stakeholders affected

Railway undertakings (RU)	☒	Member States (MS)	☒
Infrastructure managers (IM)	☒	Third Countries	☐
Manufacturers	☐	National safety authorities (NSA)	☒
Keepers	☐	European Commission (EC)	☒
Entity Managing the Change (EMC)	☐	European Union Agency for Railways (ERA)	☒
Notified Bodies (NoBo)	☐	Shippers	☒

Associations	☐	Passengers	☒
		Staff	☒

The stakeholders' ecosystem includes industry and institutional stakeholders directly affected by the initiative as well as other stakeholders such as shippers and passengers that are indirectly affected. The geographical coverage includes potentially the entire Single European Railway Area subject to the TSI however, being AMOCs a voluntary scheme and not an EU legal requirement, it is not possible to define upfront a clear geographical coverage of the initiative.

2. Preferred option

2.1. Recommendation

Overall, it is considered that the update of the three AMOCs remain well covered by the findings from the Light Impact Assessment (LIA) undertaken for the original versions (published in December 2021). Considering the voluntary basis of the AMOCs this Impact Note concludes that the preferred option is represented by the proposed updates compared to the situation without the updates.

EUROPEAN UNION AGENCY FOR RAILWAYS

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Annex II to TO 2026-8
Operations and traffic management system TSI
Acceptable means of compliance on safety of load

	Drafted by	*Verified by*	*Approved by*
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Position	Project Officers	Head of Unit	Head of Department
Date	06/05/2026	06/05/2026	06/05/2026
Signature			

The present document is a non-legally binding opinion of the European Union Agency for Railways. The purpose of this document is to define ways of establishing compliance with the essential requirements of the relevant EU legislation. It is without prejudice to the decision-making processes foreseen by the applicable EU legislation. Furthermore, a binding interpretation of EU law is the sole competence of the Court of Justice of the European Union.

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Document History

Version	*Date*	*Comments*
1	17/12/2021	First publication
2	18/12/2023	Revision following AMOC CR 1/2023 and CR 4/2023: point 2.2
3	02/12/2024	• Review of the AMOC after publication of TSI OPE 2023 version; • Integration of Annex I "Loading and securing of semi-trailers on pocket-wagons" (v3.0) in the AMOC as a result of CR 2023-5.
3.1	06/05/2026	• Review of part 1 • Annex I: Input from JNS Crosswind on unintended lifting • Annex I: Input from NSA DK on marking • Annex I: return of experience on possible obstructions on the hitch plate

Contents

Part 1

1.1. Introduction

RUs and IMs shall manage their operations and the traffic among others in accordance with the TSI OPE.

According to Article 2(33) of the Directive on the interoperability of the rail system within the European Union (Directive (EU) 2016/797, as amended), Acceptable Means of Compliance (AMOCs) are "non-binding opinions issued by the Agency to define ways of establishing compliance with the essential requirements".

AMOCs define good practices also by referring to available standards, which the actors of the railway sector can use in their safety management system as evidence that their operational procedures comply with high-level requirements set out in EU legislation (in this case the TSI OPE and the Common Safety Method on requirements for safety management systems – CSM on SMS (Commission delegated Regulation (EU) 2018/762).

1.2. Legal basis

The basis for the development of AMOCs is the TSI OPE[1], and more precisely section 4.4.3 which gives the Agency the possibility to define AMOCs by means of opinions .

This AMOC covers the topic "safety of load".

The AMOC itself constitutes a non-legally binding opinion and its use is voluntary.

1.3. Concept

As a general concept, the RUs and/or IMs are responsible to manage their specific operational and traffic management requirements in their SMS.

Article 4(1) (d) of the Railway Safety Directive (Directive (EU) 2016/798) states as follows:

"With the aim of developing and improving railway safety, Member States, within the limits of their competences shall:

d) ensure that 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, obliging them to:

> *(i) implement necessary risk control measures as referred to in point (a) of Article 6(1), where appropriate in cooperation with each other;*
>
> *(ii) apply Union and national rules;*
>
> *(iii) establish safety management systems in accordance with this Directive".*

Article 4(3) (a) and (b) of the Railway Safety Directive states as follows:

"Railway undertakings and infrastructure managers shall:

[1] Annex to Commission Implementing Regulation (EU) 2019/773

a) implement the necessary risk control measures referred to in point (a) of Article 6(1), where appropriate in cooperation with each other and with other actors;

b) take account in their safety management systems of the risks associated with the activities of other actors and third parties;"

The same concept has been detailed in the CSM on SMS, ANNEX I Point 3.1.1.1 (for RUs) and ANNEX II point 3.1.1.1 (for IMs):

According to these provisions, the organisation shall:

a) identify and analyse all operational, organisational and technical risks relevant to the type, extent and area 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 Annex I, Section 1. Context of the organisation);

b) evaluate the risks referred to in point (a) by applying appropriate risk assessment methods;

c) develop and put in place safety measures, with identification of associated responsibilities (see Annex I, Section 2.3. Organisational roles, responsibilities, accountabilities and authorities);

d) develop a system to monitor the effectiveness of safety measures (see Annex I, Section 6.1. Monitoring);

e) recognise the need to collaborate with other interested parties (such as railway undertakings, infrastructure managers, manufacturer, maintenance supplier, entity in charge of maintenance, railway vehicle keeper, service provider and procurement entity), where appropriate, on shared risks and the putting in place of adequate safety measures;

f) communicate risks to staff and involved external parties (see Annex I, Section 4.4. Information and communication).

Therefore, it is the responsibility of RUs and/or IMs to identify, assess, eventually mitigate, monitor and review continually their own operational risks.

Based on that, the AMOC is a proposed way addressed to the RUs and/or IMs to demonstrate compliance with the TSI OPE as a mean to manage operational risks, taking into account that the provisions of the TSI OPE cover the entire operational and traffic management subsystem, whilst every single RU or IM manages only part(s) of the subsystem.

RUs and/or IMs should in compliance with the EU and national legal requirements define their operational context and consequently they should identify the risks occurring in their activities.

Then, on a voluntary basis, RUs and IMs, acting accordingly to the cooperation agreement they have, are free to assess and decide for themselves whether an AMOC is applicable to the part of the subsystem they are supposed to manage each their parts of the agreed risk mitigation measures. An AMOC could be entirely or partially applicable to the RU's and or IM's operational context, for example an RU could be involved in the freight transport, but without the transport of dangerous goods, whilst an AMOC could deal with both.

If an RU and/or IM evaluates an AMOC as applicable to the operational context and decides to use it, the RU and/or IM should assess the risks the AMOC could cover within the operational activities to be performed. For example, initially and according to the applicable legislation, risks relating to inadequate tests and checks should be identified and mitigated – then the relevant part of the good practice in the AMOCs should be crossed referenced with the risk in the RU's and/or IM's' risk assessment processes. This should regularly be kept up to date as part of the monitoring activities for their operations.

As AMOCs are non-binding opinions issued by the Agency to define ways of establishing compliance with the essential requirements, the RUs and/or IMs are free to decide whether to apply the AMOC/part of the AMOC, or not. Nevertheless, the RUs and IMs are responsible for managing their operational risks.

AMOCs should be accepted throughout the EU by Member States and National Safety Authorities as examples of good practice.

According to TSI OPE point 4.4.2 and Appendix I, national rules[2] on the defined AMOC topics are generally not permitted. Therefore, if a Member State (MS) and/or a NSA/ or any other entity requires an RU and/or IM to comply with additional national requirements, then that MS or NSA or the other entity will have to provide, in line with Article 8 of Railway Safety Directive, evidence as to why their national requirements provide a higher degree of risk control than that set out in the AMOC. However, AMOCs are not national rules and if a RU and/or IM decides not to apply the AMOC and develop their own processes, it may do this and does not have to prove that its processes are as good or better than the good practice set out in the AMOC but it should ensure that its processes are adequate in controlling/mitigating the risks that it has identified.

As a result, the substantiated use of this AMOC should be taken into consideration by the Agency or the NSAs when an RU and/or IM applies for a safety certificate or authorisation, when the certification body assesses compliance of the applicant with the requirements of the CSM on SMS and the TSI OPE.

The certification body will check the sufficiency of the RU's and/or IM's processes in controlling the risks and will check how the AMOC is used, if it is the case, by assessing the risk assessment process of the RU and/or IM to ensure that the AMOC good practice has been identified as a relevant control measure for the identified risk

1.4. Responsibility

Each RU and/or IM remains responsible for how this AMOC is used in their SMSs. They should ensure that they can identify the risks for which the AMOC provides control. The AMOC should not just be included in the SMS without the RU and/or IM justifying its use through their risk management procedures and their document management system.

Each RU and/or IM should analyse which part of the AMOC is applicable to its operational context and determine, based on the outcome of a risk assessment, how the AMOC or part of it should be integrated into its own SMS.

The Agency is not responsible for how the AMOC is used. It is particularly important that when the RU and/or IM use this AMOC, return of experience and/or information resulting from accidents and incidents investigations is considered to ensure that the content of the AMOC remains relevant and up to date.

The Agency should be informed of any return of experience which should be used to update the AMOC.

This AMOC is specifically applicable for RUs and how they ensure that the train, including all its vehicles and their load, is technically fit for the journey to be undertaken and remains so throughout the journey.

There are other areas of responsibility in relation to the design of the vehicles, the maintenance of the vehicles and exchange of information (Entities in Charge of maintenance – ECMs) and the planning of the route (communication between the RU and IM) which are not included but need to be managed by those with the relevant responsibilities.

1.5. List of acronyms used in this text

- AMOC: Acceptable Means of Compliance
- CSM: Common safety method
- ECM: Entity in Charge of Maintenance

[2] With the meaning of Article 8 of Directive (EU) 2016/798.

- ERA: European Union Agency for Railways or the Agency
- EU: European Union
- FOP: Fundamental Operational Principles
- IM: Infrastructure Manager
- NSA: National Safety Authority
- RU: Railway Undertaking
- SMS: safety Management System
- TSI: Technical Specification for Interoperability
- TSI OPE: Technical Specification for interoperability relating to the operation and traffic management subsystem (Commission Implementing Regulation (EU) 2019/773)
- UIC: Union Internationale des Chemins de fer

For all other acronyms used in this text, see https://www.era.europa.eu/content/era-railway-terminology-collection or on the ERA website / LIBRARY / ERA Railway Terminology Collection.

Part 2

2.1. Introduction to the relevant part of the TSI OPE

The TSI OPE point 4.2.2.4.1. *Safety of load* states that the RU shall make sure that freight vehicles are safely and securely loaded and remain so throughout the journey.

2.2. Information on the scope of the AMOC

This AMOC provides guidance for RUs on preventing the risks of unsafe load of a freight wagon (for train speeds up to and including 120 km/h) before and during the train journey.

Competence and responsibility for undertaking the tasks are not covered in this AMOC, they should be covered as part of the RU's SMS. These topics should also take into account any risks and control measures that are part of the RU's strategy on Human and organisational factors.

The technical inspections carried out prior to the train entering in service is a key part of the safety of load for freight however, this is covered by the AMOC on Checks and tests. Information from this AMOC may be used as an input into the Checks and tests process.

The exceptional transport requirements are not part of this AMOC and should be agreed on with the infrastructure manager.

The RU should consider in the process the following aspects:

Planning

Planning of the transportation of the load, includes the type of load and securing, the design and use of the correct wagon, route compatibility checks and if relevant, any contractual arrangements with other RUs who also transport the load.

EN[3] line category

The RU shall ensure that the payload does not exceed the limit in the load table[4] marked on the wagon corresponding to the EN line category(ies) of the intended route. In the case where more than one value is to be taken into account, the lowest limit should be respected unless the concerned IM(s) have authorized the movement.

Loading of wagons and weight distribution

The RU should guarantee the appropriate distribution of load over all the axles and the wheels of the wagon when running in operation, as well as satisfying the obligation that the permissible payload, marked on a load table affixed to the wagon, is not exceeded[5].

The payload limits of the load limit table are only valid if the permissible payload is evenly distributed over the length of the wagon and centrally loaded transversely.

Vehicles should be loaded to ensure the even distribution of the weight of the load over all the axles and the wheels (front-back and left-right equilibrium).

[3] EN 15528 Railway applications - Line categories for managing the interface between load limits of vehicles and infrastructure.
[4] If a wagon is not marked with a load table showing the permissible maximum payload for each Line Category, the payload limit or the limit table can be calculated according to EN 15528 section 6.
[5] The RUs shall ensure that vehicles are not loaded beyond the load limit value of the load table imposed by the lowest line category of the concerned sections of line.

Where, due to the size or shape of a particular load this is not possible, the RU should apply special conditions of travel to the load for the entire journey[6], considering the relevant interface with the concerned IM(s).

In the case of displaced or unevenly distributed loading, the payload (determined from the load-table) should be reduced, so that the value of the permissible axle load is not exceeded by any axle. The reduced payload should comply with the requirements in the UIC Loading Guidelines Volume 1 Principles for distribution of the load for longitudinally and laterally displaced loading and the maximum offset for the centre of gravity of the load across the wagon.

Load securing

The RUs should ensure by their own SMS, that freight vehicles are safely and securely loaded and remain so during the journey. Therefore, they should implement the appropriate risk control measures, and when necessary, cooperate to this end with other involved actors. Without prejudice to the responsibilities defined for the Entity in Charge of Maintenance, this should include the monitoring of risks arising from the use of load securing equipment and sharing the relevant information with other involved actors to ensure that the load securing equipment is and remains in a safe state and is functioning properly.

Profile of the vehicle gauge

The vehicle-loading gauge permitted by the infrastructure manager should be within the maximum permissible gauge for routes during the whole train journey.

Load covering

RUs should ensure that any materials used to provide a cover for a load on a vehicle are safely attached either to the vehicle or to the load. These coverings should be made of materials that are suitable to cover the load in question taking into account the forces that are liable to be experienced during the journey.

In case of a load already equipped with a covering, such as a semi-trailer, the RU should identify the hazards and the responsibilities in relation to the covering. This information should be shared with the contractors, partners and suppliers when they have a role in the loading process.

Dangerous goods

In case of the transport of dangerous goods the appropriate legislation (the RID, Directive 2008/68/EC and the relevant national law) applies. When transporting dangerous goods, the applicable legal framework applies.

2.3. Links to existing legislation on risk assessment

Fundamental operational principle

The fundamental operational principle most relevant to the activity of safety of loading is FOP 3:
"*Before a train begins or continues its journey, it shall be ensured that passengers, staff and goods are carried safely.*"

This principle concerns the train and its readiness for movement. It includes, as examples: the braking capacity of the train, the speed that the train is permitted to travel, the formation and coupling of the train, identification, loading and securing of freight, the provision of adequate information to train preparation and operational staff. The aim is to prevent collisions, derailments due to a number of risks.

[6] Further information can be found in the Guide for the application of TSI OPE, EN 15528 and the UIC Loading Guidelines

Risk assessment

The Safety management system operational process shall cover how the safety of the load will be ensured.

Requirement 5.1.3 of Annex I to Regulation 2018/762 states:

"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:
*(c) **preparation of trains or vehicles before movement**, including pre-departure checks and train composition;*
(d) running trains or movement of vehicles in the different operating conditions (normal, degraded and emergency);"

Information from the output of the risk assessment should set out how, when preparing the train, the safety of the load is ensured before it commences its operation and secondly, that it will continue to be safe throughout the journey. It should include information for staff involved in train preparation or other staff including the driver. This information should form the basis of SMS processes, procedures and instructions for staff.

2.4. Safety requirements

- The RU should make sure that vehicles are safely and securely loaded and remain so throughout the journey considering foreseeable operational scenarios (this includes meteorological conditions, etc.). RUs should consider all relevant operational data to identify their own operational scenarios, including data resulting from acquired experience;
- All vehicles that are part of a train including their load — should be compatible with all the requirements applicable on the routes over which the train is planned to operate. This includes respecting the following:
  - the mass limit permitted by the IM for the respective lines as part of the route where the train is intended to run;
  - the mass limit permitted by each vehicle of the train;
  - the vehicle-loading gauge permitted by the IM for the respective lines as part of the route where the train is intended to run;
- All vehicles that are part of a train including their load should be technically operational taking into account the characteristics of the wagon, the load and the infrastructure and remain so throughout the journey;
- The RU should perform the necessary actions, also by the means of contractual arrangements with third parties, in order to ensure that each vehicle and its load (when present), is free from visual damages, that any non-conformity of vehicles is timely reported to the ECM. In particular, for pocket wagons and their semi-trailers, this includes the proper working of the locking system in all the following operational phases:
  - At train arrival, before removal of the semi-trailer from the pocket wagon;
  - At train arrival, after removing the semi-trailer from the pocket wagon;
  - Before placing the semi-trailer onto the pocket wagon;
  - During and directly after the placement of the semi-trailer onto the pocket wagon;
  - Before train departure, when the pocket wagon is loaded with semi-trailers and secured.

2.5. EN Standard 16860

EN 16860 "Railway applications - Requirements and general principles for securing payload in rail freight transport" describes the principles of cargo securing.

2.6. UIC Loading Guidelines – Code of Practice for Loading and Securing of goods on railway wagons – Volume 1 – Principles and Volume 2 – Goods

The UIC Guidelines on the safety of load provides information that can help RUs in managing and controlling the risks by using the guidance.

Whilst this AMOC provides a presumption of conformity, RUs are always required under the applicable legislation to provide evidence in their own SMSs of the hazards that they have identified and how the risks are controlled.

2.7. Good practice on "Loading and securing of semi-trailers on pocket wagons"

Article 4 (4) of the Railway Safety Directive states as follows:
"*Without prejudice to the responsibilities of railway undertakings and infrastructure managers referred to in paragraph 3, entities in charge of maintenance and all other actors having a potential impact on the safe operation of the Union rail system, including manufacturers, maintenance suppliers, keepers, service providers, contracting entities, carriers, consignors, consignees, loaders, unloaders, fillers and unfillers, shall:*
a) implement the necessary risk control measures, where appropriate in cooperation with other actors;
b) ensure that subsystems, accessories, equipment and services supplied by them comply with specified requirements and conditions for use so that they can be safely operated by the railway undertaking and/or the infrastructure manager concerned."

Therefore, the good practice specified in Annex I provides information that will help the RU in making the necessary arrangements with all parties involved in the transport process. This should include arrangements ensuring:

- the compatibility between kingpin and hitch;
- the locking system is maintained and working properly in order to perform its function;
- there is enough vertical locking force taking into account foreseeable operational scenarios relevant for the RUs operation (e.g. wind gusts, cross wind, etc.).

In the case of transport of semi-trailers on pocket wagons, often many actors are involved, while the responsibility for safe loading and securing of semi-trailers remains with railway undertakings involved.
This Annex I on the safe loading and securing of semi-trailers on pocket wagons recommends a loading and securing process to RUs. In case further actors are involved, it helps RUs to conclude contractual agreements for the outsourced steps of the process and the respective monitoring activities.
Therefore, in the Annex, the term "the RU shall ensure" means either …

- "the RU shall themselves carry out"
- "the RU shall ensure by contractual arrangements followed by monitoring as specified in the Common Safety Methods for Monitoring that another actor carries out"

… the respective actions and checks.

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Annex I
Loading and securing of semi-trailers on pocket wagons

1 DEFINITION OF SCOPE

1.1 Preamble

The present Annex I has been drafted with the input of the experts of the subgroup 1 "AMOC" of the JNS Normal Procedure "Crosswind".

The present Annex I, on the loading and securing of semi-trailers on pocket wagons describes the loading and securing process for semi-trailers that are codified in accordance with IRS 50596-5 and secured by hitches.

In other scenarios where codified semi-trailers are loaded and secured on freight wagons, the involved railway undertaking shall ensure and demonstrate through the application of their risk management process(es) that the loading and securing process achieves at least the same level of safety.

In other scenarios where semi-trailers, that are **not** codified in accordance with IRS 50596-5, are loaded and secured on freight wagons, the involved railway undertaking shall ensure and demonstrate through the application of their risk management process(es) that the loading and securing process achieves at least the same level of safety.

1.2 Reference documents

The following table only applies to this document:

Acronym	Name	Reference
RSD	Railway Safety Directive	Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety
OPE TSI	Technical specification for interoperability relating to operation and traffic management	Commission Implementing Regulation (EU) 2019/773 of 16 May 2019 on the technical specification for interoperability relating to the operation and traffic management subsystem of the rail system within the European Union and repealing Decision 2012/757/EU
AMOC Safety of Load	Acceptable means of compliance on safety of load	Version 2 of 18/12/2023 : Revision following AMOC CR 1/2023 and CR 4/2023: point 2.2
CSM REA	Common Safety Methods for Risk Evaluation and Assessment	Commission Implementing Regulation (EU) No 402/2013 of 30 April 2013 on the common safety method for risk evaluation and assessment, amended by Regulation 2015/1136
CSM MON	Common Safety Methods for Monitoring	Commission Regulation (EU) No 1078/2012
WAG TSI	Technical specification for interoperability relating to freight wagons	Commission Regulation (EU) No 321/2013 of 13 March 2013 concerning the technical specification for interoperability relating to the subsystem rolling stock — freight wagons of the rail system in the European Union and repealing Decision 2006/861/EC
IRS 50596-5	International Railway Solution	Transport of road vehicles on wagons – Technical Organisation – Conveyance of semi-trailers with P coding or N coding on recess wagons, 3rd edition, 2020-04

1.3 Definitions

The following definitions are to be considered when reading this annex:
Combined Transport: intermodal freight transport of intermodal loading units (e.g. swap bodies, semi-trailers, containers, roller units) that includes rail.

Combined Transport Train: as defined in the TSI OPE, Appendix J, a combined transport train is a freight train composed completely or partly of freight wagons loaded with intermodal loading unit(s) (e.g. swap bodies, semi-trailers, containers, roller units).

Pocket wagon: Freight wagon designed to transport semi-trailers or containers.

Semi-trailer: Road vehicle which can be transported by rail, usually on fixed-recess wagons (pocket wagons). In this document, the semi-trailer is meant to be suitable for handling by crane. It is handled by gantry cranes or mobile transhipment equipment by the grappler pockets using grabs and lifted and loaded on the pocket wagons (vertical transhipment). In this document, the semi-trailers considered are codified and suitable for wagons with a compatibility code P.

Hitch: device to hold the semitrailer in a safe position by withstanding the defined forces in all directions in accordance with the designed operating state.

Hitch manual: document describing how to operate the hitch.

Kingpin locking indicator: technical (e.g. mechanical or electronic) means that reliably indicates if the kingpin of the semi-trailer is locked against upwards directed vertical forces.

Kingpin in hitch funnel indicator: technical (e.g. mechanical or electronic) means that reliably indicates if the kingpin of the semi-trailer is correctly positioned in the hitch funnel.

For all other terms and acronyms used in this text, see https://www.era.europa.eu/content/era-railway-terminology-collection or on the ERA website / LIBRARY / ERA Railway Terminology Collection.

2 LOADING AND SECURING PROCESS

The loading and securing process is divided in five consecutive phases, starting at the arrival of a pocket wagon in a terminal until the loaded train departs. For each phase, the different steps (actions and checks) are listed and identifiable by the combination of phase number and running letter, but the order of these steps may be changed.

2.1 Phase 1: Unloading

(at the arrival, before removal of the semi-trailer from the pocket wagon)

The RUs shall ensure that the following visual checks are carried out:

1a) Check if the wagon is free of labels to be taken out of service.
1b) Check if the semi-trailer is in the right position, including that the kingpin is in the hitch funnel, in accordance with the hitch manual;
1c) Check if the kingpin locking indication/indicator, if applicable, is indicating “locked” (mechanical or electronic indicator), in accordance with the hitch manual.

If checks 1a) to 1c) return all a positive result, the RU can proceed to action 1d)[7]:

1d) Unlock the kingpin.

If action 1d) has been performed, the RU shall ensure that the following visual checks are carried out:

1e) Check if the locking system remains unlocked, in accordance with the hitch manual;
1f) Check if the locking indication/indicator, if applicable, (mechanical or electronic), indicates “unlocked”.

If the checks 1e) and 1f) return a positive result, the RU can perform the following action and proceed to Phase 2:

1g) Remove the semi-trailer from the pocket wagon.

The RU shall ensure, if any of the checks 1a) to 1c) or checks 1e), 1f) returns a negative result and/or if an irregularity is detected during the unloading of the wagon, such as unintentional lifting of the wagon where the wheel is temporarily not in contact with the rail head (i.e. derailment), that …

- … the hitch concerned is not used for the reloading with semi-trailers;
- … the wagon is labelled accordingly;
- … the negative results are documented and communicated to relevant parties (e.g. terminal, RU, ECM and keeper);
- … the ECM decides on the further steps.

2.2 Phase 2: After unloading

(at arrival, after removing the semi-trailer from the pocket wagon)

The RUs shall ensure that the following visual checks are carried out for each hitch:

[7] Note that when only check 1b) returns a negative result, this can be considered as a case of ‘wrong loading’. In this case, the RU can choose to ensure that only the negative results are documented and communicated to the relevant parties (the RU that executed the transport to the terminal, ECM, and keeper) and proceed afterwards to action 1d).

2a) Until the 04/05/2027: check if the maintenance interval of the hitch is not expired based on the marking on the pocket wagon (see figure 1 below), or by contacting the RU or ECM;
As of 04/05/2027 check if:
   i. the marking is present on the pocket wagon (see figure 1 below);
   ii. the maintenance interval of the hitch is not expired;
   iii. the green dot referring to the locking force is present (ref. to TSI WAG as amended by Commission implementing regulation (EU) 2025/2064).

2b) Check if the hitch is free of damages, in accordance with the hitch manual;

2c) Check if the locking system is functioning correctly, in accordance with the hitch manual, and check if the kingpin locking indication/indicator, if applicable, is in working order (mechanical or electronic indicator), and activated (electronic indicator);

If checks 2a) to 2c) are all positive, the RU can proceed to Phase 3.

The RU shall ensure, if any of the checks 2a) to 2c) returns a negative result, that …

- … the hitch concerned is not used for the reloading with semi-trailers;
- … the wagon is labelled accordingly;
- … the negative results are documented and communicated to relevant parties (e.g. terminal, RU, ECM and keeper);
- … the ECM decides on the further steps.

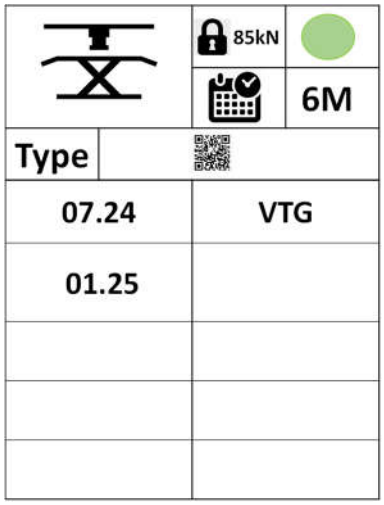

Figure 1: Marking on the wagon as required by point 4.2.2.4.4 of the TSI WAG

2.3 Phase 3: Preparation for loading

(before placing the semi-trailer onto the pocket wagon)

The RU shall ensure that the following actions are performed:

Pocket wagon:

3a) Fold and secure all intermediate supports and spigots (at both lateral sides);

3b) Position, if necessary, the hitch at the right height (as indicated on the codification plate of the semi-trailer) and secure the tools in their holders;

3c) Position, if applicable, the wheel wedges (as indicated on the codification plate of the semi-trailer).

Semi-trailer:

3d) Fold up and secure the lateral and back underrun protection (if required by the marking on the semi-trailer);
3e) Unbrake the trailer;
3f) Release the air of the air suspension, if present (presence air suspension indicated by pictograph).

The RU shall ensure that the following checks are carried out:

3g) Check if the wagon is not labelled to be taken out of service.
3h) Check if the maintenance interval of the hitch is not expired (based on the marking on the pocket wagon, respectively by contacting the RU or ECM);
3i) Check if the hitch is free of damages, in accordance with the hitch manual;
3j) Check if the tools for the height- and longitudinal adjustment are in their correct position, intact and not missing (based on the hitch manual).
3k) Check if the locking system is functioning correctly, in accordance with the hitch manual, and checks if the kingpin locking indication/indicator, if applicable, is in working order (mechanical or electronic indicator), and activated (electronic indicator);
3l) Check if the hitch height is compatible with the semi-trailer (based on the physical markings on the pocket wagon and the codification plate on the semi-trailer);
3m) Check that there are no damages preventing the semi-trailer to be transported (e.g. if the tarpaulin, if present, is entirely tightened by the fixing mechanism).

If checks 3g) to 3m) are all positive, the RU can proceed to Phase 4.

The RU shall ensure, if any of the actions 3a) to 3c) is not possible and/or any of the checks 3g) to 3m) returns a negative result, that …

- … the hitch concerned is not used for the reloading with semi-trailers;
- … the wagon is labelled accordingly;
- … the negative results are documented and communicated to relevant parties (e.g. terminal, RU, ECM and keeper);
- … the ECM decides on the further steps.

The RU shall ensure, if any of the operations 3d) to 3f) is not possible and/or if the check 3m) returns a negative result, that …

- … the semi-trailer is not loaded on the pocket wagon;
- … the negative results are documented and communicated to relevant parties (e.g. terminal and RU);
- … the terminal decides on the further steps.

2.4 Phase 4: Loading and securing of semi-trailer on pocket wagon

(During and directly after the placement of the semi-trailer onto the pocket wagon)

The RU shall ensure, that the following action is performed:

4a) Lift the semi-trailer and crank up the support legs.

If action 4a) can be performed, the RU can proceed to action 4b). The RU shall ensure, if action 4a) is not

possible, that …

- … the semi-trailer is not loaded on the pocket wagon;
- … the negative results are communicated to relevant parties (e.g. terminal and RU);
- … the terminal decides on the further steps.

The RU shall ensure that the following action is performed:

4b) Correctly place the semi-trailer onto the pocket wagon, including correctly inserting the kingpin in the hitch funnel and its locking.

Note: In case of the transfer by crane or reach stacker, the RU shall ensure that the action 4a) is performed by one machine operator with the support of either a dedicated ground staff member, standing next to the pocket wagon or with the support of a technical system(s) (e.g. cameras, sensors) that can clearly be recognized by the machine operator and that delivers at least the same level of safety.

The RU shall ensure that the ground staff member or the machine operator supported by a technical system(s) carries out the following checks:

4c) Check if the hitch-plate is free from possible obstructions (e.g. snow and ice, stones, leaves);
4d) Check if the kingpin is correctly placed into the hitch funnel;
4e) Check if the hitch and the wheels are the only connecting points between the pocket wagon and the semi-trailers;
4f) Check if the semi-trailer is not tilted in transversal direction and if the loading tolerances are respected;
4g) Check if the wheel wedges (if present) are correctly positioned;
4h) Check if the semi-trailer is unbraked while placing the semi-trailer onto the pocket wagon ;
4i) Check if the air of the air suspension has been released (for semi-trailers equipped with air suspension)
4j) Check if the lever of the brake system is in the right position in accordance with its rules (visible markings on the unit);
4k) Checks if the kingpin locking indication/indicator is indicating “locked” (mechanical or electronic indicator), in accordance with the hitch manual;
4l) Check if the hitch longitudinal position is compatible with the semi-trailer (based on the physical position of the kingpin).

If checks 4c) to 4j) are all positive, the RU can proceed to Phase 5.

The RU shall ensure, if any of the checks 4c) and 4j) returns a negative result, that …

- …the semi-trailer is moved back to the ground;
- … the negative results are documented and communicated to relevant parties (e.g. terminal and RU);
- … the terminal decides on the further steps.

2.5 Phase 5: Train departure

(Before train departure when the pocket wagon is loaded with semi-trailers and secured)

The RU shall ensure, that the following checks are carried out:

5a) Control if the checks performed during the previous phase of the loading procedure (phase 4) returned no negative results;

5b) Check if the loaded semi-trailer is compatible with the pocket wagon it is loaded on (based on the physical markings on both the pocket wagon and the semi-trailer);
5c) Check if the hitch is at the right height (as indicated on the codification plate of the semi-trailer);
5d) Check if the hitch is in the right longitudinal position (as indicated on the codification plate of the semi-trailer);
5e) Check if the hitch and the wheels are the only connecting points between the pocket wagon and the semi-trailers;
5f) Check if the kingpin is correctly placed in the hitch funnel, in accordance with the hitch manual;
5g) Checks if the kingpin locking indication/indicator, if applicable, is indicating “locked” (mechanical or electronic indicator), in accordance with the hitch manual;
5h) Check if the moving parts (e.g. spigots) are properly secured;
5i) Check if the wheel wedges (if present) are correctly placed at the wheels of the semi-trailer (as indicated on the codification plate of the semi-trailer);
5j) Check that there are no damages preventing the semi-trailer to be transported (e.g. if the tarpaulin, if present, is entirely tightened by the fixing mechanism);
5k) Check if the crash element (if present) is not isolated (i.e. by checking the lever or cock position);
5l) Check if the trailer is braked or unbraked, in accordance with its rules.

If checks 5a) to 5l) are all positive, the RU can release the train for departure as far as the loading and securing of semi-trailers on pocket wagons is concerned.

The RU shall ensure, if any of the checks 5a) to 5l) returns a negative result, that …

- … the semi-trailer is not transported on the pocket wagon concerned and is unloaded;
- … the negative results are documented and communicated to relevant parties (e.g. terminals, ECMs and keepers);
- … the RU decides on the next steps.

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Annex III to TO 2026-8

Operations and traffic management system TSI

Acceptable means of compliance on safety of passengers

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Date	06/05/2026	06/05/2026	06/05/2026
Signature			

The present document is a non-legally binding opinion of the European Union Agency for Railways. The purpose of this document is to define ways of establishing compliance with the essential requirements of the relevant EU legislation. It is without prejudice to the decision-making processes foreseen by the applicable EU legislation. Furthermore, a binding interpretation of EU law is the sole competence of the Court of Justice of the European Union.

Document History

Version	*Date*	*Comments*
1	16/12/2021	First publication
2	06/05/2026	• Review of part 1 • Including safe alighting and evacuation of passengers outside of a platform • Including the control of risks ~~linked~~ associated to a fire or explosion on board

Contents

Part 1

1.1. Introduction

RUs and IMs shall manage their operations and the traffic among others in accordance with the TSI OPE.

According to Article 2(33) of the Directive on the interoperability of the rail system within the European Union (Directive (EU) 2016/797, as amended), Acceptable Means of Compliance (AMOCs) are "non-binding opinions issued by the Agency to define ways of establishing compliance with the essential requirements". Therefore, AMOCs define good practices also by referring to available standards, which the actors of the railway sector can use in their safety management system as evidence that their operational procedures comply with high-level requirements set out in EU legislation (in this case the TSI OPE and the Common Safety Method on requirements for safety management systems – CSM on SMS (Commission delegated Regulation (EU) 2018/762).

1.2. Legal basis

The basis for the development of AMOCs is the TSI OPE, and more precisely section 4.4.3 which gives the Agency the possibility to define AMOCs by means of technical opinions[1].

This AMOC covers the topic "safety of passengers".

The AMOC itself constitutes a non-legally binding opinion and its use is strictly voluntary.

1.3. Concept

As a general concept, the RUs and/or IMs are responsible to manage their specific operational and traffic management requirements in their SMS.

Article 4(1) (d) Railway Safety Directive (Directive (EU) 2016/798) states as follows:

"With the aim of developing and improving railway safety, Member States, within the limits of their competences shall:

d) ensure that 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, obliging them to:

> *(i) implement necessary risk control measures as referred to in point (a) of Article 6(1), where appropriate in cooperation with each other;*
>
> *(ii) apply Union and national rules;*
>
> *(iii) establish safety management systems in accordance with this Directive".*

Article 4(3) (a) and (b) of the Railway Safety Directive states as follows:

"Railway undertakings and infrastructure managers shall:

> *a) implement the necessary risk control measures referred to in point (a) of Article 6(1), where appropriate in cooperation with each other and with other actors;*
>
> *b) take account in their safety management systems of the risks associated with the activities of other actors and third parties;"*

[1] In accordance with Article 10 of Regulation (EU) 2016/796.

The same concept has been detailed in the CSM on SMS, ANNEX I Point 3.1.1.1 (for RUs) and ANNEX II point 3.1.1.1 (for IMs):

According to these provisions, the organisation shall:

a) identify and analyse all operational, organisational and technical risks relevant to the type, extent and area 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 Annex I, Section 1. Context of the organisation);

b) evaluate the risks referred to in point (a) by applying appropriate risk assessment methods;

c) develop and put in place safety measures, with identification of associated responsibilities (see Annex I, Section 2.3. Organisational roles, responsibilities, accountabilities and authorities);

d) develop a system to monitor the effectiveness of safety measures (see Annex I, Section 6.1. Monitoring);

e) recognise the need to collaborate with other interested parties (such as railway undertakings, infrastructure managers, manufacturer, maintenance supplier, entity in charge of maintenance, railway vehicle keeper, service provider and procurement entity), where appropriate, on shared risks and the putting in place of adequate safety measures;

f) communicate risks to staff and involved external parties (see Annex I, Section 4.4. Information and communication).

Therefore, it is the responsibility of RUs and/or IMs to identify, assess, eventually mitigate, monitor and review continually their own operational risks.

Based on that, the AMOC is a proposed way addressed to the RUs and/or IMs to demonstrate compliance with the TSI OPE as a mean to manage operational risks, taking into account that the provisions of the TSI OPE cover the entire operational and traffic management subsystem, whilst every single RU or IM manages only part(s) of the subsystem.

RUs and/or IMs should in compliance with the EU and national legal requirements define their operational context and consequently they should identify the risks occurring in their activities.

Then, on a voluntary basis, RUs and IMs, acting accordingly to the cooperation agreement they have, are free to assess and decide for themselves whether an AMOC is applicable to the part of the subsystem they are supposed to manage each their parts of the agreed risk mitigation measures. An AMOC could be entirely or partially applicable to the RU's and or IM's operational context, for example an RU could be involved in the freight transport, but without the transport of dangerous goods, whilst an AMOC could deal with both.

If an RU and/or IM evaluates an AMOC as applicable to the operational context and decides to use it, the RU and/or IM should assess the risks the AMOC could cover within the operational activities to be performed. For example, initially and according to the applicable legislation, risks relating to inadequate tests and checks should be identified and mitigated – then the relevant part of the good practice in the AMOCs should be crossed referenced with the risk in the RU's and/or IM's' risk assessment processes. This should regularly be kept up to date as part of the monitoring activities for their operations.

As AMOCs are non-binding opinions issued by the Agency to define ways of establishing compliance with the essential requirements, the RUs and/or IMs are free to decide whether to apply the AMOC/part of the AMOC, or not. Nevertheless, the RUs and IMs are responsible for managing their operational risks.

AMOCs should be accepted throughout the EU by Member States and National Safety Authorities as examples of good practice.

According to TSI OPE point 4.4.2 and Appendix I, national rules[2] on the defined AMOC topics are generally not permitted. Therefore, if a Member State (MS) and/or a NSA/ or any other entity requires an RU and/or IM to comply with additional national requirements, then that MS or NSA or the other entity will have to provide, in line with Article 8 of Railway Safety Directive, evidence as to why their national requirements provide a higher degree of risk control than that set out in the AMOC. However, AMOCs are not national rules and if a RU and/or IM decides not to apply the AMOC and develop their own processes, it may do this and does not have to prove that its processes are as good or better than the good practice set out in the AMOC but it should ensure that its processes are adequate in controlling/mitigating the risks that it has identified.

As a result, the substantiated use of this AMOC should be taken into consideration by the Agency or the NSAs when an RU and/or IM applies for a safety certificate or authorisation, when the certification body assesses compliance of the applicant with the requirements of the CSM on SMS and the TSI OPE.

The certification body will check the sufficiency of the RU's and/or IM's processes in controlling the risks and will check how the AMOC is used, if it is the case, by assessing the risk assessment process of the RU and/or IM to ensure that the AMOC good practice has been identified as a relevant control measure for the identified risk.

1.4. Responsibility

Each RU and/or IM remains responsible for how this AMOC is used in their SMSs. They should ensure that they can identify the risks for which the AMOC provides control. The AMOC should not just be included in the SMS without the RU and/or IM justifying its use through their risk management procedures and their document management system.

Each RU and/or IM should analyse which part of the AMOC is applicable to its operational context and determine, based on the outcome of a risk assessment, how the AMOC or part of it should be integrated into its own SMS.

The Agency is not responsible for how the AMOC is used. It is particularly important that when the RU and/or IM use this AMOC, return of experience and/or information resulting from accidents and incidents investigations is considered to ensure that the content of the AMOC remains relevant and up to date.

The Agency should be informed of any return of experience which should be used to update the AMOC.

The majority of this AMOC is specifically applicable for RUs and how they ensure the safety of passengers. Additionally, some details of this AMOC may cover part of the interface with the IM.

There are other areas of responsibility in relation to the design of the vehicles, the maintenance of the vehicles and exchange of information (Entities in Charge of maintenance – ECMs) and the planning of the route (communication between the RU and IM) which are not included but need to be managed by those with the relevant responsibilities.

1.5. List of acronyms used in this text

- AMOC: Acceptable Means of Compliance
- ATTI: Agreement on freight Train Transfer Inspection
- CSM: Common safety method
- ECM: Entity in Charge of Maintenance
- ERA: European Union Agency for Railways or the Agency
- EU: European Union
- FOP: Fundamental Operational Principles

[2] With the meaning of Article 8 of Directive (EU) 2016/798.

- GCU: General Contract of Use for Wagons
- IM: Infrastructure Manager
- NSA: National Safety Authority
- RU: Railway Undertaking
- SMS: safety Management System
- TSI: Technical Specification for Interoperability
- TSI OPE: Technical Specification for interoperability relating to the operation and traffic management subsystem (Commission Implementing Regulation (EU) 2019/773)
- UIC: Union Internationale des Chemins de fer
- VDV: Verband Deutscher Verkehrsunternehmen

Part 2

1.1. Introduction to the relevant part of the TSI OPE

Section 4.2.2.4.2. of the Annex of the TSI OPE on *Safety of passengers* states that the RU "*shall ensure that passenger transport is undertaken safely at the departure and during the journey*".

1.2. Information on the scope of the AMOC

This AMOC provides guidance for RUs and other involved actors, such as IMs, on preventing the risk to passengers that may arise during the boarding or leaving a train or during other operations (train departure, train journey, people standing on the platform etc.). The issue of the correct platform length for the length of the train is an interface to be managed between the RU and IM.

Competence and responsibility for undertaking the tasks are not covered in this AMOC, they should be covered as part of the RU's SMS. These topics should also include any risks and control measures that are part of the RU's strategy on human and organisational factors.

This AMOC does not cover items such as health & safety of passengers on stations, , slips and trips at the station and platform, and cross over with other TSI's (INF, PRM, Loc&Pas).

Technical issues in relation to vehicles are also not covered. The difference between TSI Compliant vehicles or existing non-TSI compliant vehicles which are permitted on the network are not discussed in this AMOC. For example, external door opening or closing should rely on the technical solution specified in the relevant TSIs. However, for non-TSI compliant vehicles operational solutions that adequately manage the risk is also acceptable. It is for the RU to decide how these risks are managed.

In individual Member States, the responsibility for the information provided on stations to the passengers that may either be for the RU or IM. This is not covered in this AMOC but should be considered by the appropriate party in their SMS including the sharing of information on risks.

In relation to dealing with any emergency situation, this should be taken forward by both the IM and RU in accordance with the requirements in Regulations 2018/762 and 2019/773.

This AMOC covers the following stages:

- Boarding and leaving the train;
- Train departure;
- Train Journey;
- Arrival of train (including not at a platform and end of service);
- End of service;
- Coupling or decoupling of vehicles
- Safe alighting and evacuation of passengers outside of a platform

1.3. Links to existing legislation on risk assessment

Fundamental operational principle (FOP)

The fundamental operational principle most relevant to the activity of safety of passengers is FOP 3:

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

This principle concerns the train and its readiness for starting or continuing a movement and therefore ensuring that the safety of passengers is considered.

Risk assessment

The safety management system operational process shall cover how the safety of passengers will be ensured.

Requirement 5.1.3 of Annex I to Regulation 2018/762 states:

"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:

(c) preparation of trains or vehicles before movement, including pre-departure checks and train composition;

(d) running trains or movement of vehicles in the different operating conditions (normal, degraded and emergency);"

Requirement 5.1.3 – ANNEX II to Regulation 2018/762 states:

"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:

(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;

(d) setting of conditions for running exceptional consignments;"

Information from the output of the risk assessment should set out how the safety of passengers is ensured before it commences its operation and, secondly, that the safety of the passengers will continue to be safe throughout the journey. It should include information for staff involved in train despatch if they are part of the RU's or IM's staff or other staff including the driver and on-board staff. This information should form the basis of the SMS processes, procedures and instructions for staff.

The RU and/or IM is responsible for integrating this AMOC into its own SMS by the mean of its risk management procedures.

1.4. Examples of good practice

The following Annex sets examples of elements of good practices that can be taken into account by the RU, and IM if the case, as evidence of compliance with the TSI OPE. It is not an exhaustive list; therefore the good practice should be integrated with additional requirements resulting from risk analysis performed by all involved actors for the parts of system under their responsibility.

ANNEX

1. Boarding and leaving a train

Safety requirements:

- Avoid conditions which may lead to falling into the gap between the train and the platform in the boarding area of the train;
- Prevention from hazards caused by closing external doors;
- Prevention of hazards caused by moving steps;
- Prevention of hazards caused by ramps or lifts;
- Train should not be moved when external doors are open;
- Prevention of hazards to passengers leaving the train on the wrong side;
- External doors should be opened on the correct side(s).

1. Boarding and leaving the train at scheduled stops, should both take place at standstill.
2. The horizontal and vertical gap between the platform and the steps may vary depending on the configuration of the platform and the type of train. Where there is a risk of a potential fall between the train and the platform, the RU, in accordance with the arrangements set out in an operational risk assessment, should inform passengers of such particularities.
3. In order to guard against the risk of falling out of the train, when it is at standstill, the RU should ensure the closure and, if the train permits, the locking of the external doors. The external doors should be closed before train departs according to the provision defined in the relevant TSIs.
4. When designing and adapting a service, the determination of train composition by the RU should incorporate the length of the platforms of the stations served.
5. The length of each train should, as far as possible, be compatible with the usable length of the platforms served, so that passengers can safely board or leave. If the train is longer than the platform, the following measures should, for example, be implemented:
    - deletion of a regular stop; and/or
    - A possible closure to part of the train. Staff on the platform, train crew, passengers should be informed that parts of the train are not usable; and/or
    - on board and audio announcement in order to explain the passengers which external doors are to be used for boarding or leaving the train; and/or
    - Ensure that those doors with no access to the platform, cannot be opened by the passengers during normal operation.
6. Where, exceptionally, the operating conditions do not permit the above requirements to be met, the measures described in the section on ***Coming to a standstill outside a platform*** should be such as to ensure passenger safety (see also points 4 and 7, paragraph 2).
7. In order to prevent hazards of a passenger falling from a train, and where technical equipment is fitted, the RU should ensure the following:
    - close the external doors before departure and keep those closed when a train with passengers is moving or stopped in a place where passengers services are not foreseen;
    - if the external doors are fitted with a door locking device as defined in the relevant TSIs, those doors should be locked before departure and keep locked when a train with passengers is moving or stopped in a place where passengers services are not foreseen;
    - all doors that are not to be used by the passengers are to be closed and maintained closed for the whole journey;

- make sure that the train boarding aids are blocked and in their secured position;

8. When the IM in charge of traffic management exceptionally needs to change the scheduled platform to a shorter one that cannot take the entire train, the IM should inform the RU in order to allow them to take the appropriate action.
9. Operational procedure for on-board staff should include conditions for taking care of persons with reduced mobility for boarding and leaving the train.

2. Train departure

Safety requirements:

- Prevention from hazards caused by closing external doors.
- Prevention of hazards caused by moving steps.
- Avoid conditions which may lead to falling into the gap between the train and the platform in the boarding area of the train.
- External doors control and command system, as defined by the relevant TSIs, when present, should be active and effective.
- The train is in the good running order and all the necessary checks and tests have been carried out.

1. The external doors should be closed before departure and those should be kept closed when a train with passengers is moving.
2. If the external doors are fitted with a door locking device as defined in the relevant TSIs, those doors should be locked before departure and kept locked when a train with passengers is moving.
3. Before the train departs, the attention of passengers should be drawn to the impending closing of the external doors and their departure by:
   - an audible announcement inside and outside the train, according to the relevant TSIs; and/or
   - an acoustic and/or light device installed on the platform or on board when defined by the relevant TSIs; and/or
   - a member of staff authorising the departure who draws the attention of passengers and train staff by for example a whistle.
4. The RU's SMS operational procedures should specify the specific measures to be taken in the event of degraded situations, non-compliant composition, etc.
5. If passenger information signs are used in the coaches, these should be visible to the passengers. If passenger announcements and/or audible messages are used, these should be able to be clearly heard.
6. For trains with accompanying staff, before giving the authorisation for departure, the side external doors should be closed. However, in respect of certain types of trains, the door of the accompanying staff may remain open as long as it is necessary for operational reasons.
7. For a driver only operation, the RU should define appropriate operational procedure to be used before starting the train, including the use of technical devices as defined by the relevant TSIs. If technical devices are not available, the RU should consider as part of their risk assessment the appropriate procedure to be taken, such as a visual check, etc.
8. For all passenger trains, the operating conditions to be fulfilled before departure are as follows:
   - closing the external doors (and where possible locked);
   - authorisation to move is issued or transmitted to the driver;

- it is the scheduled time to depart, except when allowed to start before the scheduled time.

9. In case there are malfunctioning external doors, those doors should be protected and should remain protected for the whole journey, passengers and staff should be informed (for example by announcement and/or by a visual indicator). The train should have sufficient functioning doors to ensure the safety of the passenger service.
10. On some platforms, good visibility of passengers boarding and leaving is not possible. This includes curved platform, obstacles hampering visibility, multiple access to platforms, etc. In these situations, the RU should carry out a risk assessment of the situation and formalise specific operational procedures to be implemented.
11. Operational procedures for on-board staff should include conditions for taking care of persons with reduced mobility for boarding and leaving the train.

3. Train journey

Safety requirements:

- External doors should be kept closed and or locked while running;
- Prevention of hazards caused by moving steps;
- Prevention of hazards to passengers falling out of the train;
- Prevention of hazard to passengers leaving by external doors opening outside of a platform (e.g. for shorter usable length of platform);
- Controlling of risks ~~linked~~ associated to a fire or explosion on board, e.g. due to the transport and charging of batteries by passengers.

1. The external doors should be closed before departure and those should be kept closed during the entire journey.
2. If the external doors are fitted with a door locking device as defined in the relevant TSIs, those doors should be locked before departure and kept locked during the entire journey.
3. In the event of danger, passengers should be able to alert staff who are in charge on the train. These staff should be able, if necessary, to bring the train to a stop, and provide and/or arrange passenger assistance and undertake necessary evacuation measures if this is needed.
4. The RU should define the operational procedure to be applied by on-board staff to ensure the safety of passengers when exceptional circumstances do not permit normal operation.
5. Each RU should manage within their operational procedures the following issues:
   - accommodating passengers with reduced mobility;
   - opening of the external doors in an emergency to allow passengers to evacuate;
   - external doors should only be opened to allow passengers to leave/board when the train is within a platform;
   - informing passenger when only part of the train is in service;
   - risks associated to fire and/or explosion and/or release of toxic substances on board due to the transport and/or the connection of devices to the on-board electrical network by passengers. A distinction should be made between small and big devices in terms of electrical power needed.

4. Arrival of train (including not at a platform)

Safety requirements:

- Prevention of hazards to passengers leaving the train on the wrong side;
- Each RU should ensure that the train length or the external doors to be opened are compatible with the technical parameters of the infrastructure (TSI OPE Appendix D1).

- Prevention of hazard to passengers leaving by external doors opening outside of a platforms (e.g. for shorter usable length of platform);
- Prevention of hazards to passengers caused by moving steps;
- Prevention of hazards to passengers falling out of the train;
- Avoid conditions which may lead to falling into the gap between the train and the platform in the boarding area of the train;
- Prevention of hazards to passengers being injured during coupling and uncoupling;
- Check of the train at the end of service to ensure that there are no passengers still on the train.
- Within the framework of their responsibilities both the RU and the IM should ensure that, passengers only board and leave the train at designated locations and measures are taken in case of a stopping problem (i.e. the train external doors are not all aligned with the platform).

1. The RU should have specific operational procedures to deal with any changes to the usable length of the platform, as communicated to the RU, which can affect the safety of passengers. Relevant information should then be provided to the passengers.
2. Where it is necessary to move passengers through the coaches, the RU should as part of its operational risk assessment have operational procedures for the relevant staff. This should include an acoustic announcement or a passenger information system installed in the coaches.
3. The RU should ensure that passenger trains stop at the designated marker point of a platform, or even at the end of the platform if necessary, thereby ensuring that all carriages are at the platform when the usable platform length is sufficient.

5. End of service

Safety requirements:

- to avoid passenger being left in a parked and locked train, opening the external door with the emergency handle and for example stepping out on a track with traffic.

1. In order to ensure that no passengers are present in the train, the following should be carried out:
    - closing external doors;
    - inspecting the train, for example by walking through the train or by having a confirmation by the on board cameras;
    - issuing of announcements in the train (repeat if possible);
    - provision of information on the display or other means of indicating that the train does not take passengers.
    - extinguishing internal train lighting, if possible.

6. Coupling or decoupling of vehicles

Safety requirements:

- To control the hazard to passengers of having sharp movements during coupling and uncoupling operations.

The RU risks assessment should consider the measures necessary to ensure the safety of passengers when coupling/decoupling vehicles.

Examples of measures to be considered are:

1. Information in the form of voice announcements could be made to passengers.
2. Closing external doors on either side of the train.

7. Safe alighting and evacuation of passengers outside of a platform

With regards to point 4, the good practices in this point apply for a train that comes to a stop outside a platform, this includes stops outside the usual points of service, if evacuation is needed.

Safety requirements:

- Prevention of unauthorised and unsecured alighting of passengers outside of a platform;
- Prevention of hazards to passengers falling out of the train when alighting outside of a platform;
- Prevention of hazards to passengers due to the moving of the train while alighting outside of a platform;
- Prevention of hazards to passengers in or near the tracks during the evacuation of passengers from the location of alighting outside of a platform to the designated safe location of this evacuation (e.g. a nearby platform, a level crossing, an emergency exit in a tunnel);
- Prevention of hazards to passengers while walking, or being moved in case of persons with reduced mobility, on railway domain not designed for passenger movement (e.g. hazards linked to the railway infrastructure like slippery sleepers, power supply equipment, cable slits);

Any alighting and evacuation of passengers outside of a platform should be avoided if possible, e.g. by means of:

- moving passengers through the coaches in order to leave the train by an external door at the platform;
- moving or repositioning the train in a coordinated way with the signaller in order to allow passenger movement by means of a platform.
- by transferring passengers directly to another train on an adjacent track;
- by transferring passengers to a part of the train set which can continue the journey, followed by a decoupling from the failed part of the train set which will remain stationary and secured;
- by downhill coasting, in accordance with the train's movement authorisation, to reach a nearby platform when the gradient is favourable.

When the alighting and evacuation of passengers outside of a platform cannot be avoided, RUs should provide instructions to their on-board staff (i.e. the driver), taking into account the procedure in place on a network to ensure a safe alighting and evacuation of passengers, in particular the provisions in place for coordinating such operations with IM staff (i.e. the signaller), in particular:

RU on-board staff (e.g. the driver) should:

- keep the external doors closed and, if possible, locked until it is safe to start the alighting and evacuation of passengers;
- instruct passengers not to attempt to alight from the train;
- take immediate action in case of any unauthorised alighting, e.g. by means of an emergency call to alert drivers and the signaller;
- inform the signaller on the necessity to alight outside of a platform, specifying the location where

passengers will need to alight;

- in collaboration with the signaller, define the evacuation route from the location of alighting to the designated safe location (e.g. a nearby platform, a level crossing, an emergency exit in a tunnel), in order to interrupt railway operations in this area, taking into account the terrain as well as conditions like the weather and remaining daylight;
- ensure passenger comfort awaiting the alighting, in order to prevent any unauthorised alighting;
- request for assistance by additional RU staff and/or emergency services if necessary, e.g. for the evacuation of persons with reduced mobility or for dedicated technical means to alight safely;
- inform passengers on the timing of alighting and how to alight safely when authorised to do so;
- not start any alighting and evacuation until passenger safety has been ensured in accordance with the procedure in place on a network (e.g. confirmation from the signaller that railway operations have been interrupted and no train will pass in the area from the location of alighting to the designated safe location)
- follow the instructions given by the signaller when applicable;
- ensure that the train remains at standstill during the alighting and evacuation, until having received authorization from the signaller to restart once the evacuation has ended;
- assist passengers during the alighting and evacuation;
- inform the signaller when the evacuation has ended and railway operations may resume.

IM staff (i.e. the signaller) should apply the relevant SMS procedure (s).

EUROPEAN UNION AGENCY FOR RAILWAYS

Moving Europe towards a sustainable and safe railway system without frontiers.

Annex IV to TO 2026-8

Operations and traffic management system TSI

Acceptable means of compliance on checks and tests before departure, including brakes and checks during operation

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Position	Project Officers	Head of Unit	Head of Department
Date	06/05/2026	06/05/2026	06/05/2026
Signature			

The present document is a non-legally binding opinion of the European Union Agency for Railways. The purpose of this document is to define ways of establishing compliance with the essential requirements of the relevant EU legislation. It is without prejudice to the decision-making processes foreseen by the applicable EU legislation. Furthermore, a binding interpretation of EU law is the sole competence of the Court of Justice of the European Union.

Document History

Version	*Date*	*Comments*
1	17/12/2021	First publication
2	12/07/2022	Amendments after 2nd TrainDy study
3	18/12/2023	Suspension of braking rules: Annex I point 3
4	06/05/2026	• Revision of the entire document • Adding of point 2.10.2 “Checks during journey requiring alighting from the train” • Amendments to the Annex I after 4th TrainDy Study

Contents

Part 1

1.1. Introduction

RUs and IMs shall manage their operations and the traffic among others in accordance with the TSI OPE.

According to Article 2(33) of the Directive on the interoperability of the rail system within the European Union (Directive (EU) 2016/797, as amended), Acceptable Means of Compliance (AMOCs) are *"non-binding opinions issued by the Agency to define ways of establishing compliance with the essential requirements".* Therefore, AMOCs define good practices also by referring to available standards, which the actors of the railway sector can use in their safety management system as evidence that their operational procedures comply with high-level requirements set out in EU legislation (in this case the TSI OPE and the Common Safety Method on requirements for safety management systems – CSM on SMS (Commission delegated Regulation (EU) 2018/762).

1.2. Legal basis

The basis for the development of AMOCs is the TSI OPE, and more precisely section 4.4.3 which gives the Agency the possibility to define AMOCs by means of technical opinions[1].

This AMOC covers the topic "checks and tests before train departure, including brakes and checks during operation".

The AMOC itself constitutes a non-legally binding opinion and its use is strictly voluntary.

1.3. Concept

As a general concept, the RUs and/or IMs are responsible to manage their specific operational and traffic management requirements in their SMS.

Article 4(1) (d) of the Railway Safety Directive (Directive (EU) 2016/798) states as follows:

"With the aim of developing and improving railway safety, Member States, within the limits of their competences shall:

d) ensure that 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, obliging them to:

> *(i) implement necessary risk control measures as referred to in point (a) of Article 6(1), where appropriate in cooperation with each other;*
>
> *(ii) apply Union and national rules;*
>
> *(iii) establish safety management systems in accordance with this Directive".*

Article 4(3) (a) and (b) of the Railway Safety Directive states as follows:

"Railway undertakings and infrastructure managers shall:

[1] In accordance with Article 10 of Regulation (EU) 2016/796.

a) implement the necessary risk control measures referred to in point (a) of Article 6(1), where appropriate in cooperation with each other and with other actors;

b) take account in their safety management systems of the risks associated with the activities of other actors and third parties;"

The same concept has been detailed in the CSM on SMS, ANNEX I Point 3.1.1.1 (for RUs) and ANNEX II point 3.1.1.1 (for IMs):

According to these provisions, the organisation shall:

a) identify and analyse all operational, organisational and technical risks relevant to the type, extent and area 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 Annex I, Section 1. Context of the organisation);

b) evaluate the risks referred to in point (a) by applying appropriate risk assessment methods;

c) develop and put in place safety measures, with identification of associated responsibilities (see Annex I, Section 2.3. Organisational roles, responsibilities, accountabilities and authorities);

d) develop a system to monitor the effectiveness of safety measures (see Annex I, Section 6.1. Monitoring);

e) recognise the need to collaborate with other interested parties (such as railway undertakings, infrastructure managers, manufacturer, maintenance supplier, entity in charge of maintenance, railway vehicle keeper, service provider and procurement entity), where appropriate, on shared risks and the putting in place of adequate safety measures;

f) communicate risks to staff and involved external parties (see Annex I, Section 4.4. Information and communication).

Therefore, it is the responsibility of RUs and/or IMs to identify, assess, eventually mitigate, monitor and review continually their own operational risks.

Based on that, the AMOC is a proposed way addressed to the RUs and/or IMs to demonstrate compliance with the TSI OPE as a mean to manage operational risks, taking into account that the provisions of the TSI OPE cover the entire operational and traffic management subsystem, whilst every single RU or IM manages only part(s) of the subsystem.

RUs and/or IMs should in compliance with the EU and national legal requirements define their operational context and consequently they should identify the risks occurring in their activities.

Then, on a voluntary basis, RUs and IMs, acting accordingly to the cooperation agreement they have, are free to assess and decide for themselves whether an AMOC is applicable to the part of the subsystem they are supposed to manage each their parts of the agreed risk mitigation measures. An AMOC could be entirely or partially applicable to the RU's and or IM's operational context, for example an RU could be involved in the freight transport, but without the transport of dangerous goods, whilst an AMOC could deal with both.

If an RU and/or IM evaluates an AMOC as applicable to the operational context and decides to use it, the RU and/or IM should assess the risks the AMOC could cover within the operational activities to be performed. For example, initially and according to the applicable legislation, risks relating to inadequate tests and checks should be identified and mitigated – then the relevant part of the good practice in the AMOCs should be crossed referenced with the risk in the RU's and/or IM's' risk assessment processes. This should regularly be kept up to date as part of the monitoring activities for their operations.

As AMOCs are non-binding opinions issued by the Agency to define ways of establishing compliance with the essential requirements, the RUs and/or IMs are free to decide whether to apply the AMOC/part of the AMOC, or not. Nevertheless, the RUs and IMs are responsible for managing their operational risks.

AMOCs should be accepted throughout the EU by Member States and National Safety Authorities as examples of good practice.

According to TSI OPE point 4.4.2 and Appendix I, national rules[2] on the defined AMOC topics are generally not permitted. Therefore, if a Member State (MS) and/or a NSA/ or any other entity requires an RU and/or IM to comply with additional national requirements, then that MS or NSA or the other entity will have to provide, in line with Article 8 of Railway Safety Directive, evidence as to why their national requirements provide a higher degree of risk control than that set out in the AMOC. However, AMOCs are not national rules and if a RU and/or IM decides not to apply the AMOC and develop their own processes, it may do this and does not have to prove that its processes are as good or better than the good practice set out in the AMOC but it should ensure that its processes are adequate in controlling/mitigating the risks that it has identified.

As a result, the substantiated use of this AMOC should be taken into consideration by the Agency or the NSAs when an RU and/or IM applies for a safety certificate or authorisation, when the certification body assesses compliance of the applicant with the requirements of the CSM on SMS and the TSI OPE.

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The Agency should be informed of any return of experience which should be used to update the AMOC.

The majority of this AMOC is specifically applicable for RUs and how they ensure that the train, including all its vehicles and their load, is technically fit for the journey to be undertaken and remains so throughout the journey, including braking. Additionally, some details of this AMOC may cover part of the interface with the IM.

There are other areas of responsibility in relation to the design of the vehicles, the maintenance of the vehicles and exchange of information (Entities in Charge of maintenance – ECMs) and the planning of the route (communication between the RU and IM) which are not included but need to be managed by those with the relevant responsibilities.

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Part 2

2.1. Introduction to the relevant part of the TSI OPE

The relevant TSI OPE requirement to this AMOC is:

- 4.2.3.3.1. *Checks and tests before departure*

This AMOC also relates with other topics as defined in the scope (ref. to paragraph 2.2) therefore there are interfaces with other TSI OPE requirements, mainly:

- 4.2.2.5.2. Train composition
- 4.2.2.6.1. Minimum requirements of the braking system
- 4.2.2.6.2. Braking performance and maximum speed allowed
- 4.2.2.7.1. General requirement on ensuring that the train is in running order
- 4.2.3.4.3. Dangerous goods
- 4.2.1.2. Documentation for drivers
- 4.2.1.3. Documentation for railway undertaking staff other than drivers

2.2. Information on the scope of the AMOC

Vehicles are exposed to influences during railway operations, freight wagons are also exposed to influences during loading and unloading; those can lead to wear and tear and damage that cannot be detected exclusively by the maintenance measures carried out by the ECM within the scope of its obligations.

Within its own role and responsibilities, the RU should identify which inspections, checks and tests are necessary in order to run their trains safely.

To the end of this AMOC, the following definitions apply:

- An inspection is a critical examination to formally determine if a device or system is fit for purpose (or fit to perform in accordance with its intended function). An example is “verify for handbrake release”.
- A check is a visual observation to ensure the device or system is in place and is not obviously damaged or obstructed. An example is “visual verification of a manometer”.
- A test is a deliberate action or experiment to find out how well something works in accordance with its intended operation or function. An example is “test of the fire detection system”.

The RU, within its role and responsibilities, defines inspections, checks and tests of freely visible parts of vehicles including its load. These should ensure that damages are detected and the operations are carried out safely. The RU defines the content and the frequency and/or places of these inspections, checks and test.

This includes the risk of a train starts moving while transported goods or the vehicles themselves may pose an intolerable risk to personnel, passengers, third parties or environment. Although not all scenarios are covered, as this depends strongly on the specific context where the RU intends to operate. The RU needs to consider all the risks of their operational context, if necessary together with all relevant stakeholders. The RU should draw up rules for the application cases occurring in the company and the types of vehicles; in case of freight wagons, including loads and loading units used.
It is essential that RUs consider the train brake performance before the train departure. In case of a change in the train composition during the journey (technical problem, etc.) the RU should be able to make the recalculation of train brake performance done before continuation of its journey.

The safety of load is a key part of the checking process however, this is covered by the AMOC on Safety of Load. The particular aspects in relation to checking safe boarding and leaving of passengers are covered by the AMOC on safety of passengers. It is for the RU/IM to decide whether they wish to apply any of the AMOCs or part of them.

This AMOC provides guidance for RUs on:

1) the check of all the freely visible parts of freight wagons (also loaded with dangerous goods), including their freely visible loads and loading units during railway operations, in order to detect damage, assess it and decide whether and under what conditions safe transport can be carried out.
2) the inspection of the integrity of the train in order to assure that all the vehicles are properly coupled and connected to the brake pipe.
3) the definition of train braking sheet & wagon list and brake position rules for freight trains.
4) performing air brake tests.
5) the use of composite brake blocks.
6) safe alighting of staff performing checks on the tracks or outside platforms.

This AMOC does not cover items such as

1) competences and who is responsible for undertaking the tasks, they should be covered as part of the RU's SMS.
2) health & safety of passengers and personnel, cross over with other TSI's (INF, PRM, Loc&Pas).
3) how the train brake performance calculation is done.
4) the route compatibility check process.
5) inspections, checks and tests of the active locomotives/traction units, non-active locomotives are to be considered as wagons.
6) shunting.
7) degraded and emergency operations.

This AMOC refers to the following good practices:

1. Freight Trains
    a. ATTI refers to GCU
    i. Inspections, tests and checks before train movement;
    ii. Quality assurance procedure;
    iii. Managing defects and irregularities.
    b. VDV 758 refers to GCU
    i. Test before shunting (not relevant for this AMOC)
    ii. Test after stabling/parking;
    iii. Test before train movement; iv. Inspection before train movement with specific freight wagons or loads.

2. Freight trains with dangerous goods
    a. RID refers to UIC IRS 40471-3
    i. Inspections and checks before train movement.
3. Train “braking sheet & wagon list” and brake position rules for Freight trains
    a. Braking sheet and wagons list
    b. Brake settings for different freight train types
4. Air brakes test
    a. UIC IRS 40453
5. Use of composite brake blocks
6. Tests during the train journey:
    a. Brake test while driving

2.3. Links to existing legislation on risk assessment

Fundamental operational principle (FOP)

The fundamental operational principle most relevant to the activity of safety of passengers is FOP 3:

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

This principle concerns the train and its readiness for movement. It includes, as examples: the braking capacity of the train, the speed that the train is permitted to travel, the formation and coupling of the train, identification, loading and securing of freight, safe passengers boarding and alighting of passengers, adequate control of crowding on trains and platforms, the 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.

Risk assessment

The Safety management system operational process shall cover how, when and where inspections, tests and checks before train departure including braking and checks during normal operations will be ensured.

Requirement 5.1.3 – ANNEX I of Regulation 2018/762 states:

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:

(c) preparation of trains or vehicles before movement, including pre-departure checks and train composition;

(d) running trains or movement of vehicles in the different operating conditions (normal, degraded and emergency);

Requirement 5.1.3 – ANNEX II of Regulation 2018/762 states:

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:

(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;
(d) setting of conditions for running exceptional consignments;

Information from the output of the risk assessment should set out how the risk that a running train can create intolerable consequences on people, infrastructure and environment is managed. It should include information for staff performing inspections, checks and tests, for staff performing train preparation activities and other staff including the driver. This information should form the basis of SMS processes, procedures and instructions for staff.

The RU and/or IM is responsible for integrating this AMOC into its own SMS by the means of its risk management procedures.

2.4. Safety Requirements

1. The departure of a train needs confirmation that the checks and/or tests and/or inspections of the train has demonstrated the existence of conditions ensuring safe movement.
2. The checks and/or tests and/or inspections of a train should cover the safety devices of the vehicles, as well as the loads, the markings on the vehicles and compliance with the allowed mass and gauge.
3. The checks and/or tests and/or inspections should also include checking the train's composition and braking characteristics, the train's head and tail signals and that the brake test has been performed.
4. Each train may only run after the presence and proper functioning of the devices and parts associated with traffic safety have been checked.
5. The train should run within the constraints imposed by its composition and, in particular:
    a. the number of traction units and their distribution in the train,
    b. the characteristics of the vehicles in the train and of their load,
    c. the mass and length of the train,
    d. the way loaded and empty vehicles are distributed in the train,
    e. the characteristics of the coupling and buffering devices on the vehicles in the train,

    taking into account the parameters and characteristics of the lines to be travelled, in order to prevent the train from dividing, derailing or otherwise being subjected to transverse and longitudinal forces on the train that would compromise its safe operation.
6. All vehicles in a train should be connected to the continuous automatic braking system as defined in the LOC&PAS and WAG TSIs.
7. The railway undertaking should ensure that during operations each train achieves at least the necessary braking performance.
8. By means of the braking system, the train, running at its maximum permitted speed, should be able to stop within the residual space of the section granted in exclusive use.
9. The train must be able to stop also in specific conditions. Therefore, the RU can also do inspections, checks and tests during the journey (E.g. bad weather conditions – heavy snow, icing; exceptional infrastructures – steep slopes, etc.)
10. The first and last vehicles (including any traction units) in any train should have the automatic brake operative.
11. In the case of a train becoming accidentally divided into two parts, both sets of detached vehicles should come automatically to a standstill as a result of a maximum application of the brake. The RU should define and put into practice all necessary actions in order to prevent uncontrolled movements of vehicles.

2.5. Freight trains

2.5.1. ATTI

The Agreement on freight Train Transfer Inspection (ATTI) sets the rules governing the transfer of wagons between RUs based on the GCU (General Contract of Use for Wagons). The objective of the ATTI is to enhance cooperation between RUs, harmonising and developing the relevant rules accordingly. It aims to allow better forward planning as well as to increase the quality and safety of trains subject to the agreement.

The GCU is a multilateral contract based on the Uniform Rules concerning Contracts of Use of Vehicles in international rail traffic (CUV - Appendix D to COTIF 1999[3]). The GCU specifies the mutual rights and obligations of Wagon Keepers and Railway Undertakings with regard to the use of rail freight wagons as a means of transport throughout Europe and beyond.

This contract, including its appendices, sets out the conditions for the provision of wagons for use as a means of transport by RUs in national and international traffic.

It sets out provisions governing the technical condition of wagons exchanged between two or more RUs, as established during a transfer inspection. It describes also a quality assurance procedure to be applied by RUs and the way to manage defects and irregularities.

[https://uic.org/special-groups/atti]

2.5.2. VDV 758

VDV Recommendation 758 describes a cross-company standard for the tests of freight wagons in railway operations. It requires the application of the GCU.

The VDV Recommendation 758 is addressed to the Railway Undertaking. It provides framework conditions and uniform methods but does not make any organisational arrangements for the implementation of this VDV Recommendation. The Railway Undertakings should define operational procedures according to their own safety management system.

VDV Recommendation 758 is a basis for the creation of internal company rules for the testing of freight wagons in railway operations. It describes the minimum requirements for these tests and thus reinforces the responsibilities of the Railway Undertakings.

VDV Recommendation 758 does not deal with the obligation to provide information on safety-relevant vehicle damage and defects in accordance with the Commission Delegated Regulation (EU) 2018/762. These should be identified and implemented by the Railway Undertaking.

VDV Recommendation 758 describes four stages of tests of freight wagons in railway operations:

— Level 1 - Test before shunting; (not relevant for this AMOC)

— Level 2 - Test after stabling/parking;

— Level 3 - Test before train movement;

— Level 4 - Inspection before train movement with specific freight wagons or loads.

It is important to note that the VDV recommendations are developed and produced by the German rail sector for their use. However, many of the principles may be of use to RUs who operate throughout Europe. If the

[3] See http://otif.org/en/?page_id=172

RU decides to apply them, it has to be done by using the RU's operational risk assessment (ref back to paragraph 2.3) and SMS procedures. The recommendations are voluntary and it is up to the RU to decide if they are relevant to them. If they are used, it is important to note that any reference to German law is not applicable unless the RU operates in Germany.

2.6. Freight trains with dangerous goods

2.6.1. IRS 40471-3

UIC IRS 40471-3 (Inspections of dangerous goods consignments) published by UIC is applied as a means of conformity to the Regulation concerning the International carriage of Dangerous goods by rail (RID – Appendix C to COTIF 1999)[4] requirements for Safety obligations of the carrier.

The purpose of RID point 1.4.2.2 is to ensure that the carrier (the RU in the scope of this AMOC) who takes over the dangerous goods at the point of departure should perform inspections, tests and checks before train departure that mainly relates with:

- Goods' authorization for carriage,
- Provision of relevant information and instructions,
- Absence of defects, leakages or cracks, missing equipment, etc.,
- Respect of deadlines for inspections of tank-wagons, battery-wagons, wagons with demountable tanks, portable tanks, tank-containers and MEGCs,
- Respect of loading limits,
- Presence of relevant placarding & marking.

The purpose of IRS40471-3 is to:

- Set out the safety obligations required of carriers in accordance with RID 1.4.2.2.1,
- Control the risks arising from violations of the carrier obligations according to RID 1.4.2.2.1, -

  Maintain consistently high-quality inspections.

2.7. Train "braking sheet & wagon list" and brake position rules for Freight trains

Annex I sets out example of good practice that can be applied by the RU.

Annex I defines specific practices for freight train brake settings as well as the content and format of the brake sheet and wagon list for use in freight traffic.

[4] Implemented by Annex II to Directive 2008/68/EC of the European Parliament and of the Council of 24 September 2008 on the inland transport of dangerous goods.

2.8. Air brakes test

2.8.1. UIC IRS 40453

UIC IRS 40453 defines procedures for air brake tests effected with a powered unit.

The text specifies the type of tests to be carried out in the event of various changes being made to the train composition.

It indicates four different types of air brake tests:

- Type A test: Complete test,
- Type B test: Partial test,
- Type C test: Attachment test,
- Type D test: continuity test.

The text also describes cases when a brake test must be carried out and type of brake test to be effected. It describes as well the way to carry out them and the cases where there is no need to effect a brake test.

2.9. Use of composite brake blocks

The use of composite brake blocks (LL) has been deeply analysed during the JNS urgent procedure “Extreme effects of thermal overload in special cases of freight operation” and during the JNS normal procedure “Consequences of unintended brake applications with LL blocks”.

The final report of the normal procedure also includes conclusions from the urgent procedure, and it is available on the ERA website:

https://www.era.europa.eu/domains/accident-incident/joint-network-secretariat-jns_en

In chapter 1 of Part II of the final report above mentioned, risk control measures relevant for the RU are defined.

The Swedish Transport Agency carried out extensive tests during winters of 2018-2019, 2019-2020 and 2020-2021 in order to examine the braking performance of the composite brake blocks **during severe winter conditions** in the north of Sweden, following reported cases of loss of braking performance under such conditions. The link below provides:

- Safety Analysis from Swedish Transport Agency
- Results of the tests carried out
- Recommendations in operation and maintenance from one Swedish freight RU
- Reports.

[LINK to the Swedish NSA website]

2.10. Tests during train journey

The RU should define its own operational context and should identify, assess and eventually mitigate all risks relating with the defined context. By assessing those risks, the RU should define which type of inspections, checks and tests are needed and when they have to be performed in order to ensure that trains run safely.

The scope of the inspections, tests and checks, together with "when" these are to be performed, should be determined by the risk assessment and the operational 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.

2.10.1. Brake tests while driving

Brake tests while driving does not replace inspections, tests and checks that are to be performed before train departure.

The RU should define procedures to be applied whenever train composition operations are carried out or operating conditions arise that may compromise the proper functioning of the braking system:

- for checking the effectiveness of the brake system;
  - This may be performed:
    - after train departure,
    - at the first favourable opportunity,
    - before reaching maximum speed,
    - before engaging in downhill sections,
    - before approaching a buffer stop, by undertaking a test of the normal braking of the train;
- for reacting when the driver detects insufficient braking;
- for checking whether that the braking system is not providing any unwanted resistance to the free running of the train;
  - This may be performed by cutting the traction and observing the running behaviour of the train;
- for reacting when the driver detects unwanted resistance.

2.10.2. Checks during journey requiring alighting from the train

When on-board staff (i.e. the driver) has to alight from the train to perform a check during the journey, at a location where it is not safe to do so (e.g. operations on the adjacent track, tunnel, bridges), RUs should provide instructions to their on-board staff, taking into account the procedure in place on a network to ensure staff safety.

In this operational scenario, RUs and IMs should collaborate and agree on the adoption of adequate safety measures and the IM has the responsibility to coordinate the process.

RU on-board staff (i.e. the driver) should:

- inform the signaller on:
  - the stop at or outside of a platform while a rolling stock check is necessary, specifying the train's location,
  - if necessary for the rolling stock check, the track(s) adjacent to the train where an interruption of railway operations is required for the safe alighting and/or rolling stock check, e.g. specified by means of the track(s) identification, or by means of 'track to the left of the train', 'track to the right of the train', or 'on track to the left and right of the train' together with the direction of travel to determine the left and right side of the train,
  - the expected duration, if available, of the checks to be performed,

- the available communication means (e.g. the number of the driver's mobile phone) to reach the driver after having alighted.

- not start any alighting until staff safety has been ensured in accordance with the procedure in place on a network (e.g. confirmation from the signaller that railway operations have been interrupted and no train will pass on the adjacent track(s))
- follow the instructions given by the signaller when applicable;
- ensure that the train remains at standstill during the alighting and the rolling stock check, including the prevention of any train movement by other RU staff members;
- inform the signaller when the checks have ended and staff is on-board.

IM staff (e.g. the signaller) should apply the relevant SMS procedure (s).

ANNEX I

Train brake settings, content and format of the brake sheet and wagon list for use in freight traffic

1. Introduction

The present Annex I has been drafted with the input of the experts of the "UBS – Unified Braking Schema" project, it is based on existing UIC solutions, current operational best practices as well as on dedicated research done by the TrainDY[5] SW special group by considering varying infrastructure conditions in different countries, wherever relevant.

This annex defines good practices for freight train brake settings as well as the content and format of the brake sheet and wagon list for use in freight traffic, that for reading purposes are named in this text rules or ruleset. For freight train brake settings, a harmonized ruleset defines which rail vehicle brake positions are to be applied dependent on train parameters. In addition, the allowance of deviating brake settings is described.

2. Scope and objective

The objective is to implement an approach to how brake settings of different freight train types are applied to be compliant with the TSI OPE requirements. This AMOC defines a common ruleset for vehicle brake positions and related requirements depending on train weight, vehicle sequence in train consist and train brake setting.

In addition, specific changes to the approach commonly used have been proposed to develop rules that meet the practical requirements of railway operations in Europe. In some cases, research was required because the current practice in Europe varies greatly and thus does not enable adoption of a single ruleset without studying their comparable safety. Therefore, the TrainDY study group has performed scientific analysis to provide evidence that the new rules are not introducing any additional risks for vehicle derailment in operations.

This document also defines a common brake sheet and wagon list format and content description. The format has been developed to facilitate international freight train traffic without the need to use individual formats for each country or region. Therefore, it is possible to run a train through several countries by only using one document.

3. Train brake settings

The rules defined are intended to mitigate derailment but also specific train integrity loss risks that are related to the brake positions used in G- and P-braked trains. The evaluation criteria are the longitudinal compressive forces (LCF) occurring in a train consist during braking. Under unfavorable conditions, too high forces can cause a vehicle to derail. For train integrity loss also the risks of excessive longitudinal tensile forces (LTF) have been considered for scenarios where a train accelerates immediately after brake release. This may result in coupling breakage.

As a general principle already explained in the part 1 of this AMOC, RUs can deviate from the requirements set out in this Annex by the means of their SMS.

[5] 1. P/CIM CAB2/2020-1536 v3 (2021) CEF-PSA UBS Action
4. 24-74349-TVE31-BE-V1-Zukunftsprojekt-XLL (2025) Analysis of Brake Regime XLL with respect to Potential Derailment Probability

3.1. General rules for all freight trains

The following rules have been defined based on currently common operational practices on European railways (according to IRS 40421, TrainDy studies or selected best practices assuring the highest level of safety)

- Trains shall not exceed a vehicle rake length of 700 meters (excluding the active locomotives).
- Active locomotives shall be located at the front of the train.
- The first and last vehicle of the vehicle rake shall have an operational automatic brake (in case of wagon with more than one distributor valve, there shall not be any isolated brake). This ensures that, in the event of an unintended train separation, both resulting parts contain vehicles with fully operational automatic brakes, preventing uncontrolled movements. Moreover, this implies that there will not be any need for changing train composition when the train may have to change direction.
- The brake sheet should reflect the actual brake settings of the train. In ERTMS the actual brake settings of the train are to be entered in the on-board system.
- No more than 3 consecutive unbraked vehicles (vehicles with isolated brakes) shall be permitted in the vehicle rake. This requirement is ultimately about service brake acceleration, which makes it necessary to maintain a maximum distance between two operating control valves of no more than 3 vehicles in the brake pipe. 3 is not the maximum number of vehicles that can be isolated in the vehicles rake but it is the maximum number of consecutive vehicles that can be isolated.

3.2. G-braked trains

The following rules have been defined based on currently common operational practices on European railways (according to IRS 40421, TrainDy studies or selected best practices assuring the highest level of safety).

- G-braked trains shall not exceed the maximum tonnage of 4000 t
- G-braked trains shall have all vehicles in the vehicle rake in brake position G but may have up to 12 axles in brake position P.
- If a vehicle that is to be placed in G according to the rules described above cannot be set into G, the brake shall be switched off (isolated).

Trains may also run in position P even if the path used was foreseen for a G-train (e.g. to avoid change of brake position on the border) – no additional risks are introduced by allowing a train with a shorter braking distance to use a path of a train that may have a longer braking distance. In this case P-train shall be compliant with the following point 3.3.

3.3. P-braked trains

The following rules have been defined based on currently common operational practices on European railways (according to IRS 40421, a TrainDY studies or selected best practices assuring the highest level of safety).

- P-braked trains with a vehicle rake (weight in the range of 0…800 t (any leading active locomotives of the train shall not be considered for the purpose of the weight range calculation) shall have all vehicles in brake position P. This is to ensure highest possible brake performance.
- P-braked trains with a vehicle rake weight in the range of 801…1200 t shall have the leading active locomotives in brake position G and all other vehicles in brake position P. This is to alleviate longitudinal compressive forces in such trains.
- P-braked trains with a vehicle rake weight in the range of 1201…1600 t shall have the leading active locomotives and the first five vehicles thereafter in brake position G and all other vehicles in brake position P (the “Long Locomotive” concept (LL)). This is to alleviate longitudinal compressive forces in such trains.

- P-braked trains with a vehicle rake weight in the range of 1601…1900 t shall have the leading active locomotives and the first seven vehicles thereafter in brake position G and all other vehicles in brake position P (the "Extended Long Locomotive" concept (XLL)) . This is to alleviate longitudinal compressive forces in such trains.

Furthermore, the following rules shall be applied:

- If a vehicle that is to be placed in G according to the rules described above cannot be set into G, the brake must be isolated. Even if one of the first five vehicles of the vehicle rake in the LL concept or one of the first seven vehicles in the vehicle rake in the XLL concept has got an isolated brake it should nevertheless be counted as part of the vehicles after the leading active locomotive(s) to be set into brake position G according to the rules described above.
- If a vehicle that is to be placed in P according to the rules described above cannot be set into P, the brake shall be isolated. The usage of G-brakes for these vehicles is not allowed due to the longer release time of the brakes, which could cause excessive longitudinal tensile forces in a train in scenarios where a train is accelerating shortly after releasing the brakes.
- If multiple wagon (permanently coupled wagons) or articulated wagons with bogies or more than 3 individual wheel sets, which cannot be separated in service, are part of LL or XLL, the parts of the wagon unit or articulated wagon are counted individually as wagons. Moreover, all wagons of any single multiple wagon (or all elements of any articulated wagon) shall be set into the same brake position (P or G according to the rules described above).
- P-braked trains using the XLL concept shall be normally operated in single traction (**single traction refers to the use of one active locomotive at the front of the train**).

3.4. Summary table

In summary, the full ruleset for P- and G-trains is shown in the following tables.

	P-braked trains				
Vehicles rake weight (excl. active locos)	**Brake position of leading active locomotives**	**Brake position of the first vehicles thereafter and their count**	**Brake position of all following vehicles**	**What if required brake position not possible?**	**Allowance of unbraked vehicles (vehicles with isolated brakes)**
0…800 t	P	P	P	Turn brake off (to isolate brakes)	Any train may have up to 3 consecutive unbraked vehicles (isolated brakes), but the first and the last vehicle of the vehicle rake shall have active brakes
801…1200 t	G	P	P		
1201…1600 t (LL)	G	5 x G	P		
1601…1900 t (XLL)	G	7 x G	P		
1901…4000 t	No harmonization*				

* IRS 40421, TrainDY studies and selected best practices do not cover such a weight range therefore, harmonization is not possible. Individual RUs may still apply their own rules to allow such trains within their safety management systems.

	G-braked trains		
Vehicles rake weight (excl. active locos)	**Brake position of all vehicles**	**Maximum allowance of brake position P**	**Allowance of unbraked vehicles (vehicles with isolated brakes)**
0…4000 t	G	12 axles, for the rest brakes are to be turned off if brake position G is not possible (to isolate brake)	Any train may have up to 3 consecutive unbraked vehicles (isolated brakes), but the first and the last vehicle of the vehicle rake shall have active brakes

4. AMOC content – international brake sheet and wagon list

The international brake sheet and wagon list defines a standard format and content for the document that is to be provided to a locomotive driver before train departure. It can be used for international as well as domestic freight trains. The language of the document can vary but the format and fields (numbers and description) must remain the same. The specification can be found in the Appendix A.

5. Area of application

The defined rules can be applied when composing and preparing international (and possibly domestic) freight trains for departure at its origin and intermediate stations.

ANNEX I – *Appendix A*

International brake sheet and wagon list

International brake sheet and wagon list is published on the ERA website.