OPINION

ERA/OPI/2017-3

OF THE EUROPEAN UNION AGENCY FOR RAILWAYS

for

European Commission

regarding

a potential deficiency of the ENE TSI

Disclaimer:

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1. General Context

1. In its letter referenced as Ares(2017)3625832 and dated on 18 July 2017 addressed to the European Union Agency for Railways, the European Commission requested the Agency to prepare a technical opinion on a possible deficiency of Commission Regulation (EU) No 1301/2014 of 18 November 2014 on the technical specifications for interoperability relating to the 'energy' subsystem of the Union's rail system ("ENE TSI")[1], identified by the Eisenbahn Bundesamt (EBA), Germany.

2. The requests from the Commission and EBA are presented in Annex 1 to this opinion.

3. EBA considers that the current method for the assessment of the pantograph sway and the contact wire position and the corresponding calculation method are deficient. They are unnecessarily complicated and lead to an increase in the investment costs for the concerned projects by approximately 10%.

2. Legal Background

1. Article 19 of *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 (Agency Regulation)*[2], states that "*The Agency shall: [...] (d) 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;*" and Article 8 states that "The Agency shall conduct an impact assessment of its recommendations and opinions"

2. According to Article 6 of 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[3], if it appears that a TSI has a deficiency, the Commission may require the Agency to issue opinions in this respect. At the request of the Commission, "*the Agency's opinion shall constitute acceptable means of compliance and may therefore be used for the assessment of projects, pending the adoption of a revised TSI.*" (Article 6(3) of Directive 2016/797)

3. Analysis

1. The request for technical opinion addresses two basic parameters:
   4.2.9.2 – Maximum lateral deviation
   4.2.10 – Pantograph gauge.

   Both basic parameters use, as a basis, the pantograph gauge calculation method, defined in the Appendix D. This method derives from the kinematic gauge methodology, thoroughly elaborated in the CEN standard EN 15273.

2. Though both parameters are based on the same formulas and assumptions, the outcomes of the calculation lead to different results:
   - in case of the pantograph gauge – definition of the envelope to allow free passage of the pantograph in relation to infrastructure;
   - in case of lateral deviation – definition of the limits of the position of contact point (between contact wire and pantograph) on the pantograph head.
3. The calculation method, set out in the Appendix D of TSI, has been criticised to be too detailed and strict and therefore created problems with its implementation. For this reason in 2015, ERA submitted to CENELEC the Requirement for a Standard (RfS 051 - see Annex 2) to revise quickly EN 50367, which is a reference standard on technical criteria for the interaction between pantograph and overhead line. The main aim of that RfS was to provide a simple methodology for the calculation (regarding the application

[1] *OJ L 356, 12.12.2014*
[2] *OJ L 138, 26.5.2016, p. 1–43*
[3] *OJ L 138, 26.5.2016, p. 44–101*

rules for pantograph gauge envelope and permissible contact wire position) to facilitate the assessment of the acceptance of pantograph heads in relation to overhead contact lines.

4. On the 12/07/2017, at the subcommittee SC9XC of CENELEC meeting, it has been reported that *WG09 – Fixed installations and Rolling Stock - Current collection systems – Technical criteria for the interaction between pantograph and overhead contact line* completed the drafting of prEN 50367 (64727). The subcommittee SC9XC endorsed the document and submitted it to CENELEC Enquiry by the decision 53/02 as follows:

   Decision 53/02
   Noting the proposal of WG09 Convenor, SC9XC endorses the draft of prEN 50367 (64727) – Railway Applications - Current collection systems - Technical criteria for the interaction between pantograph and overhead line (to achieve free access). SC9XC asks WG09 convenor and Sec to consider editorial comments from CENELEC consultant and then send this revised draft in CENELEC Enquiry.
5. The new method defined in clause 5.2.5 of the draft prEN 50367 has no negative impact on interoperability, and it will be discussed in the future revision of ENE TSI.
6. The request for technical opinion asks for a possibility to use the method defined in clause 5.2.5 of the draft of prEN 50367 in the current electrification projects.

4. The opinion

- The requirements set out in points 4.2.9.2 and 4.2.10 of the ENE TSI are based on the published versions of standards EN 15273 and EN 50367.
- Following the RfS 51, CENELEC has revised the EN 50367, and in particular its clause 5.2.5. However, the standard is still in the draft stage, before the CENELEC enquiry. Therefore, at this phase of development, it cannot be considered as a final document.
- According to the TSI development procedure, any change in the requirements (chapter 4) or assessment methods (chapter 6) - following the final adoption of the revised standard by CENELEC - has to be discussed and accepted by the ENE Working Party (WP), and is subject to public consultation, and finally submitted for opinion to RISC.
- Taking into account:
  a. the reported increase of the electrification projects costs to ensure compliance with the existing TSI ENE,
  b. the alignment of the method defined in clause 5.2.5 of the draft prEN 50367 with the Agency strategy on future ENE TSI revision, in order to create stable legal framework in providing the necessary freedom to designers of OCLs to ensure interoperability and manage the dewirement risk,
  c. the relatively lengthy process for the revision of TSIs,
  d. the national technical experience in using this method in Germany ,

  The Agency is of the opinion that the method defined in clause 5.2.5 of the draft prEN 50367 can be considered as an acceptable means of compliance until the appropriate amendment and final adoption of the future revised ENE TSI.

Valenciennes, 13.03.2017

Josef DOPPELBAUER
Executive Director

Annex 2

Requirement for a Standard

Requesting Body: ERA	**Document Identification Number:** N°: IU-RFS-051 Rev: 0.1 Date: 211015
Sub-system: Energy	**Title of TSI:** Energy
Other reference (interoperability constituent,...):	

Standards Body: CENELEC	**Mandate Number:**
WI Number:	**WG Number:**

Proposed Title: revision of EN 50367 (Railway applications - Current collection systems - Technical criteria for the interaction between pantograph and overhead line (to achieve free access)).

Scope of Standard:

Background and main objective.

The objective of this RfS is in one hand to **simplify** the methodology of the calculation of the free passage of the pantograph (***mechanical kinematic pantograph gauge***), and on the other to clearly **identify** and **allocate** the border and margins between the rolling stock and the infrastructure.

The current methodology (Appendix D ENE TSI) is complicated, and includes some random-related parameters.

Therefore, the revision should provide a **simple methodology** for the calculation to facilitate the assessment of the acceptance of pantograph heads in overhead contact lines.

This RfS covers the request for a fast revision of standard EN 50367 regarding the application rules for pantograph gauge envelope, and contact wire position calculations.

The revision should address following topic:
The TSI ENE and also the TSI LOC&PAS make links for the calculation of pantograph gauge envelopes and for the permissible position of contact wire to the formula set given by EN 15273. The calculated movements are implemented in the same manner for checking the envelopes to allow for the free passage of pantographs and for checking the pantograph position to allow proper operation (geometric interaction).
The calculation of lateral position between contact wire and pantograph requires for consideration of several different approaches regarding the mechanical dewirement of pantographs from contact wire (safety of operation) and of leaving the working range of the pantograph by the contact wire (quality of operation).
This requires application rules for calculations made according EN 15273. As a topic that is related to the interaction between the pantograph and the contact line this needs to be added to the scope covered by EN 50367.

TSI Details:

Reference Paragraph in TSI: ENE TSI §4.2.9.2 and §4.2.10. with Appendix D

Annexes (reference and title): No annex.

Other Reference Documents: No other documents.

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Requesting Body, approved	IU Head of Unit	Anna GIGANTINO		16/12/2015
Standards Body, approved				

EUROPEAN UNION AGENCY FOR RAILWAYS

Making the railway system work better for society.

ANNEX 3

Light Impact Assessment

TSI ENE – Technical Opinion 2017-3

	Elaborated by	*Validated by*	*Approved by*
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Document History

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First draft	25/08/2017	
Second draft	28/08/2017	Comments S. Lis, I. Ballester
v03	30/08/2017	Review O.Gherghinescu

Contents

1. Context and problem definition

1.1. Problem and problem drivers	The request of the NSA Germany states that *"the current method referenced within the TSI ENE for the assessment of the pantograph sway and the contact wire position and the corresponding calculation method lead to* ***an increase of investment costs for the concerned projects by approximately 10%.****"* In order to comply with the assessment method from TSI ENE and therefore also EN 15273, the useable contact wire lateral position (based on displacement of the panto in terms of track axis) will be reduced up to 16% as compared to when the national calculation method is applied. In other words the result is a reduced value - up to 8 m- for spanlengths in comparison with DB standard contact line types.
1.2. Main assumptions	N.a.
1.3. Stakeholders affected	*Category of stakeholder*: IM *Importance of the problem*: 4 – mainly for DB, as reported to the Agency
1.4. Evidence and magnitude of the problem	Main sources of information as regards the magnitude of the problem: 1. ERA/2013/INTEROP/OP/01; Final Report, Tobback, Hauben, 12th Dec. 2013; p. 21 The 2 most representative overhead contact line (OCL) designs for the study are the conventional network OCLs Re100 and Re160, as most conventional lines are equipped with these OCLs and cover 75% of the [DE]-network. Since these OCLs were designed for the 1950mm pantograph, both wind blow-off and gauge are suspected to be correct. Above mentioned standard contact lines have been operated successfully on the basis of the national calculation method. The calculation method of TSI ENE (2014) and the parameters used need to be questioned in order to avoid the excessive reduction in span lengths and an increase of public or private investments for railway IM. 2. Calculation based on figures of impact on DB OCL-design (Germany): Estimated additional cost impact of reduced spanlength: › 10% reduction of spanlength (8m for 80 m spanlength) leads to 1.388 additional poles per single trackkm; › Average cost of 1 additional pole is estimated at 10 kEUR/pole

	⇨ Additional catenary investment cost of 13.8 kEUR/single trackkm This figure does not yet take into account the one-off cost to re-design the standard OCL-designs for the German network. The first electrification project in Germany which could be negatively impacted is the electrification of the line Emmerich-Oberhausen.
1.5. Baseline scenario	If no action is taken, the application of the current method referenced within the TSI ENE for the assessment of the pantograph sway and the contact wire position and the corresponding calculation method are likely to generate **additional catenary investment costs for the IMs**. However, it is worth mentioning that the problem has been already acknowledged and is already taken into consideration within the scope of the planned revision of the TSI ENE (period 2017-2019). Request for Standard (RfS 051) covers the request for a necessary revision of standard EN 50367, Railway applications - Current collection systems".
1.6. Subsidiarity and proportionality	The problem is linked to requirements within the TSI ENE.

2. Objectives

2.1. Strategic and specific objectives	☐ Europe becoming the world leader in railway safety ☐ Promoting rail transport to enhance its market share ☒ Improving the efficiency and coherence of the railway legal framework ☐ Optimising the Agency's capabilities ☐ Transparency, monitoring and evaluation ☒ Improve economic efficiency and societal benefits in railways ☐ Fostering the Agency's reputation in the world **Specific objectives**: 1. Ensure **an effective and feasible method of assessment** of the dewirement risk 2. Avoid **additional cost burden for the IMs** (This includes allowing the use of the existing standard OCL-designs in Germany, which demonstrated the appropriate handling of the dewirement risk)
2.2. Link with Railway Indicators	N.a.

3. Options

3.1. List of options	Option 0 (Baseline): no change to TSI ENE Option 1: Temporary solution in order to use the new standard until next TSI ENE revision Option 2: Permanent solution within TSI ENE with simplified and effective assessment of the dewirement risk
3.2. Description of options	**Option 0 (Baseline): no change to TSI ENE** The baseline is likely to induce additional investment costs for IMs (see 1.5) **Option 1: Temporary solution in order to use the new standard until next TSI ENE revision** Option 1 is proposed as mitigation measure in order to allow the continued use of existing OCL-designs, which demonstrated the appropriate handling of the dewirement risk, and in order to allow to deviate from the existing calculation method prescribed in the current TSI ENE. **Options 2: Permanent solution within TSI ENE with simplified and effective assessment of the dewirement risk** ERA initiated in 2015 the Requirement for a Standard (RfS) 051. RfS 051 covers the request for a necessary revision of standard EN 50367, Railway applications - Current collection systems". The revision is mainly driven by the adjustment of technical criteria for the interaction between pantograph and overhead line to fulfill interoperability requirements with the aim to simplify the assessment (and as such reduce the assessment costs). The working party of CENELEC SC9XC developed an effective method for the pantograph sway to define the permissible contact wire position. The application of the new calculation method aims at reaching a positive effect for the railway sector. The costs of investment for realising the overhead contact line should be reduced by optimisation of the calculation method of the pole distances for the overhead contact line. Option 2 requires the waiting time until TSI ENE will be revised to possibly capture the new proposed method.
3.3. Uncertainties/risks	In **Option 0**, technical experts within the Agency pointed out that the calculation method within the current TSI ENE does not include a strict definition of the working range (e.g. by not limiting the value of the working range to the contact strip in the calculation of dewirement risk) and as such might lead to a different result in OCL-design. It is not clear how far the use of a different/broader interpretation of the working range to handle the dewirement risk would not lead to a change of existing DB OCL designs with the use of the calculation method in the

	current TSI ENE. Nevertheless, the statement in section 1.4 that "*Above mentioned standard contact lines have been operated successfully on the basis of the national calculation method.*" is accepted by the technical experts within the Agency and therefore, the Working Party TSI ENE should re-assess the specific objective of mandating the harmonization of the calculation method within the TSI ENE as this case demonstrates the potential overregulation. As the new standard has not been evaluated and not handled within the Working Party TSI ENE, **option 2** is not feasible to develop or assess this as permanent change within the timeline provided for this technical opinion. Considering the risks and uncertainties associated to **Option 0 (Baseline)** as well as the time constraint for assessing the feasibility of **Option 2**, the recommendation is to proceed with Option 1, which responds to both specific objectives: 1. Ensure **an effective and feasible method of assessment** of the dewirement risk 2. Avoid **additional cost burden for the IMs**

4. Impacts of the options

4.1. Impacts of the options (qualitative analysis)

Category of stakeholder		*Option 1*
IM	Positive impacts	Keep existing OCL designs for German IM with long spanlengths (80 m).
	Negative impacts	N.a.
RU	Positive impacts	Interoperability is ensured
	Negative impacts	N.a.
NoBo	Positive impacts	N.a.
	Negative impacts	New methodology to learn for assessment of OCL designs
Railway sector	Positive impacts	German projects can act as evaluation case to assess the new methodology defined in the revised standard
	Negative impacts	N.a.
Overall assessment *(input for section 5.1)*	Positive impacts	Keep existing OCL designs for German IM with long spanlengths (80 m).
	Negative impacts	N.a.

4.2.	Impacts of the options (quantitative analysis)	N.a.

5. Comparison of options and preferred option

No comparison of options was necessary.

The only feasible option, which meets the specific objectives addressed by this technical opinion is **Option 1 Temporary solution in order to use the new standard until next TSI ENE revision.**

Option 0 is likely to generate additional costs and bears several costs and uncertainties.

Option 2 does not allow for a feasibility assessment within the timeline provided for this technical opinion.

6. Monitoring and evaluation

6.1.	Monitoring indicators	/
6.2.	Future evaluations	The next TSI ENE revision and its impact assessment should focus on in-depth evaluation of **Option 2** to optimize the assessments required for interoperability. This should reduce further the assessment costs for IMs and provide a more stable legal framework in providing the necessary freedom to designers of OCLs to ensure interoperability and manage the dewirement risk.