

Authorization Concept in the 4th Railway Package

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Abstract – The procedure for placing in service (PinS) of railway subsystems is addressed in the European Interoperability Directive (EID). The aim of the new 4th Railway Package (4th RP) is to increase the efficiency and quality of rail transport by minimizing any administrative or legal obstacle in order to develop a single European railway area in the future. In the paper the concept of authorization is reviewed with the adoption of the 4th RP. A distinction of authorization before and following the 4th RP adoption is described. The main barriers or obstacles to address such harmonized process and procedure are identified. Another objective is to investigate how the Common Safety Methods for Risk Assessment (CSM-RA) are used and perceived within an authorization process.

Keywords – Railway subsystems, Placing in service, Placing on the market, Interoperability, Safety integration.

I. INTRODUCTION

The procedure for PinS of subsystems has been covered by the EID. The scope of authorization has been gradually extended by the high-speed trans-European network (TEN), culminating in the revised Interoperability Directives [2] and [4], which extends the scope of authorization processes throughout the railway system. At the same time, [2] introduced the main idea of “vehicle authorization” and the classification of national notified rules in order to facilitate the mutual recognition of vehicle authorization requirements under national rules. The recast EID [2] is complemented by the Recommendation 2011/217/EU [3] and is now updated with the recent adoption of Recommendation 2014/897/EU [1], supporting the description of a common understanding of the procedure for authorizing the PinS of vehicles and subsystems.

The term used for authorizing a placement into service of a railway structural subsystem changes across the different EU railway legislation starting from the adoption of the 1st Railway Package within the Directive 1996/48/EC.

“Placing in service” means all the operations by which a subsystem or a vehicle is put into its design operating state. [2] “Authorization for the placing in service of fixed installations” means all the operations by which a subsystem is put into its operational service; “Authorization for placing on the market of a mobile subsystem” means the first making available on the Union’s market of an interoperability constituent, subsystem or vehicle ready to function in its design operating state. [1]

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The concept of authorization is reviewed with the adoption of the 4th RP. In the following sections, a distinction of authorization before and following the 4th RP adoption is described.

II. AUTHORIZATION PROCESS AS INTENDED BEFORE THE 4TH RAILWAY PACKAGE

A. The placing in service concept

The authorization for placing in service (APIS) of a subsystem is “the recognition by the Member State (MS) that the applicant for this subsystem has demonstrated that it meets, in its design operating state, all the essential requirements of Directive 2008/57/EC when integrated into the rail system”. [1]

The design operating state means: “the normal operating mode and the foreseeable degraded conditions (including wear) within the range and conditions of use specified in the technical and maintenance files. It covers all conditions under which the subsystem is intended to operate and its technical boundaries”. This is provided in the form of an “EC” declaration of verification, according to Article 17 of [2]. Figure 1 summarizes the activities before and after APIS of a structural subsystem. This process is before the new terms introduced with the adoption of the 4th RP.

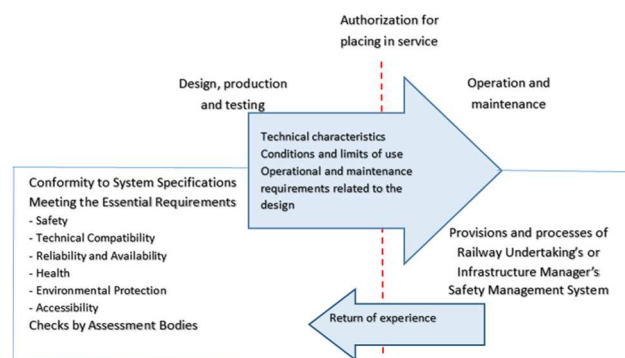


Fig. 1. Authorization of a structural subsystem - activities before and after APIS [1]

From the EU legal framework perspective, an authorization is granted on railway structural subsystems. However, the concept of authorization of vehicles is addressed considering a vehicle composed of the rolling stock subsystem (RST) and, where applicable, the on-board control-command and signaling subsystem (OB-CCS).

In these last years, the concept of authorization of a network project has been introduced [1]. With the term network project

is intended a project to place in service new, renewed or upgraded fixed equipment composed of more than one structural subsystem. In this case, an authorization covers more than one structural subsystem and it is more similar to a vehicle authorization. However, the term *network project* is especially reserved to track-side structural subsystem. With the adoption of the 4th RP such concept is no more addressed.

Since the adoption of the Technical Specification for Interoperability (TSI) for CCS subsystem 2012/88/EU and as confirmed in the new TSI CCS (EU)2016/919, another concept of authorization seems to be addressed specifically for Class A systems. In fact, pursuant to Article 18(5) of [2], *the notified body (NoBo) may issue certificates of verification for certain parts of a subsystem, if allowed to do so under the relevant TSI CCS (as it is)*. Therefore, in principle, the issue of an authorization for those parts of the CCS subsystem in which such part is included might be possible. However, such parts belong to Class A system. However, such a concept is not further exploited in the current and incoming EU legislation of railway interoperability.

B. Definition of the involved actors

Table I presents the involved actors in an authorization process [1].

TABLE I
INVOLVED ACTORS IN AN AUTHORIZATION PROCESS

Actor's name		Description (according to EU Rec. 2014/897[1])
Applicant		It means the signatory of the "EC" declaration of verification in accordance with Article 18 of [4] and asking for an APIS of a subsystem. Where the CSM-RA is required under Article 15 of [4], the role of the <i>proposer</i> according to [5] should be taken by the <i>applicant</i> for authorization
Applicant for vehicle/network project authorization		It means the entity asking for an authorization for PinS of a vehicle or network project respectively. Where the CSM-RA is required under Article 15 of [4], the role of the <i>proposer</i> according to [5] should be taken by the <i>applicant</i> for authorization
Assessment Body	Notified Body (NoBo)	Means a body as defined by Article 2(j) of [2]: <i>means the bodies which are responsible for assessing the conformity or suitability for use of the interoperability constituents or for appraising the "EC" procedure for verification of the subsystems</i>
	Designated Body (DeBo)	Means a body designated by a MS in accordance with Article 17(3) of [2] for verification of compliance of a subsystem with the national rules
	(Risk) Assessment Body (AsBo)	Means a body as defined by Article 3(14) of [5]: <i>means the independent and competent external or internal individual, organization or entity which undertakes investigation to provide a judgement, based on evidence, of the suitability of a system to fulfil its safety requirements</i>
Proposer		Within the [1], this actor is associated with the <i>applicant</i> where the CSM-RA is required under Article 15 of [4]. Its definition is to be found out in the [5] Article 3 point 11

The term *Proposer* in [5] and recalled within [1] is associated to the following entities:

- Railway Undertaking (RU)
- Infrastructure Manager (IM)
- Entity in Charge of Maintenance (ECM)
- A contracting entity or a manufacturer which invites a NoBo to apply the "EC" verification procedure in accordance with Article 18(1) of [2] or a designated body (DeBo) according to Article 17(3) of [2];
- An applicant for an authorization for the PinS of structural subsystems

The term *Applicant* for authorization introduced in [1] and [5] within the definition of *Proposer* is not fully explained across the different EU railway legislation. The use of multiple and different terms may introduce confusion during an authorization process because an actor is not uniquely defined. There are cases where the *Applicant* and the *Applicant for authorization* still exist. Other comments from the practices:

- The *Applicant for APIS* is not necessarily the one who arranges for the "EC" verification procedure and the national verification procedure.
- The *Proposer* is part of an authorization process only when the CSM-RA Regulation applies also to structural subsystems and required in [2]: 1) in case the relevant TSI requires risk assessment and specifies the parts of [5] to be applied; 2) in case of a significant change, as indicated in [5], the risk management process shall be applied in the PinS framework for structural subsystems to ensure their safe integration into an existing system, in accordance with Article 15(1) [2].
- In the case of application of the aforementioned letter (b) the *Proposer* may act as the *Applicant* and may be the same actor/entity.

C. Authorization process

A railway structural subsystem or a vehicle receives an APIS when the following requirements are fulfilled [2]:

- 1) The technical compatibility of the subsystems with the system in which they are integrated;
- 2) The safe integration of the subsystems according to the Safety Directive (2004/49/EC);
- 3) Each MS shall verify that the subsystems comply with the relevant provisions of the Operation and Maintenance TSI before they are put into service.

Within an authorization process the demonstration of the aforementioned points is mandatory.

The term *technical compatibility* means the ability of two or more structural subsystems with common interface to interact with each other and maintain their design performance and expected level of operation. Technical compatibility at the interface between network and vehicles is crucial for safety. Table II shows the association between technical compatibility of vehicles and network projects.

The term *safe integration* means the action to ensure that the inclusion of an element (component, part, subsystem, network

project, a new vehicle type, software, procedure, organization) into a larger system does not introduce unacceptable risk to the overall system.

TABLE II
DESCRIPTION OF THE TECHNICAL COMPATIBILITY FOR VEHICLES AND NETWORK PROJECTS AS STATED IN [1]

Item	Description of the technical compatibility of CCS subsystem
Vehicle	Technical compatibility within the OB-CCS subsystem between Class A and Class B (if relevant)
	Technical compatibility between the vehicle and OB-CCS subsystem
	Technical compatibility between the vehicle and the network (at interface level)
Network projects (Track-side CCS (TS-CCS))	Technical compatibility within the TS-CCS subsystem
	Technical compatibility between the TS-CCS subsystem and the track-side signaling
	Technical compatibility between the TS-CCS subsystem with the vehicle and with the OB-CCS subsystem

In general, the term *safe integration* could be used to explain: a) safe integration between the components in a subsystem; b) safe integration between subsystems in a vehicle or a network project. Table III shows the association between safe integration of vehicles and network projects. And Table IV shows the relation between safe integration and the APIS.

TABLE III
SAFE INTEGRATION FOR VEHICLES AND NETWORK PROJECTS

Item	Point	Description of the <i>safe integration</i>
Vehicles and Fixed subsystems / Network projects	1	Safe integration between the components in a subsystem
	2	Safe integration between subsystems in a vehicle or a network project
Vehicles	3	Safe integration of a vehicle with the characteristics of the network
	4	Safe integration of vehicles into the Safety Management System (SMS) of RUs This includes interfaces with the subsystem operating staff and ECM maintenance activities, as well interfaces between vehicles.
	5	Safe integration of the train with the specific routes on which it operates
Fixed subsystems / Network projects	6	Safe integration of network characteristics with the vehicle characteristics specified in the TSIs and/or the national rules
	7	Safe integration with adjacent parts of the line sections (the network)
	8	Safe integration of network project into the SMS of the IM. This includes interfaces with the network operating staff and the IM maintenance activities, as well as its contractors
	9	Safe integration of the network with the specific trains that will operate over it.

Regarding the use of the CSM-RA to verify safe integration before APIS: Point (1) is entirely in the scope of the TSIs addressing a subsystem; if no explicit technical rules exist covering this point, the TSI may require the CSM-RA to be applied and adopt a risk based approach to specify the acceptable risk level; Where there are no mandatory rules

(TSIs, national rules) covering this interface fully, point (2) should be checked by using the CSM-RA;

Point (3) should be fully covered by TSIs and, where envisaged by Article 17(3) of [2], national rules and this rule-based verification should be carried out by a NoBo or DeBo as part of its responsibility for “verification of the interfaces of the subsystem in question with the system into which it is incorporated”, otherwise the requirements for transparency, non-discrimination and interoperability would be compromised; The use of the CSM-RA is therefore not mandatory for point (3) or the cases where TSIs or national rules exist. In the cases where national rules do not specify this interface fully these national rules is possible to require the application of CSM-RA for addressing the risks not covered. Points (4), (5), (8) and (9) are not subject to APIS.

TABLE IV
RELATION BETWEEN SAFE INTEGRATION AND THE APIS

Safe Integration points (from Table III)	Authorization for placing vehicles in service	Authorization for placing fixed subsystems and network projects in service
1, 2 and 3	X (to be carried out before the authorization)	
1, 2, 6 and 7		X (to be carried out before the authorization)

III. AUTHORIZATION IN THE 4TH RAILWAY PACKAGE

The proposal for a 4th RP, presented by the Commission in January 2013, was approved in May 2016. The new package includes six legislative documents (Directives, Regulations, Reports, Impact assessments, Staff Working Documents).

The main objective is to create a single European railway area and to increase the quality and efficiency of the rail services by minimizing any technical, institutional and legal obstacles and enhance the competitiveness of the railway sector. There are two "pillars" specifying the concept of the 4th RP: 1) The *technical pillar* encompasses railway interoperability and safety and is controlled by the strengthened European Union Agency for Railways (EUAR); 2) The *political pillar* aims at opening up national passenger markets by giving access to all operators, as well as introducing mandatory tender procedures.

For the purpose of this paper, the *technical pillar* is that of interest while the others will not be further considered.

A. Authorization concept in the 4th railway package

The Directive 2016/797 [4] divides subsystems into the following categories:

- 1) *Mobile subsystems* that means the RST subsystem and the OB-CCS subsystem;

- 2) *Fixed subsystems or installations* that means the Energy (ENE), Infrastructure (INF) and TS-CCS structural subsystems.

For the aforementioned subsystems, [4] associates the following concepts:

The concept of “*placing on the market*” from an authorization point of view leads to: a) an authorization of placing on the market of mobile subsystems; b) a vehicle authorization for placing on the market (a vehicle is composed of a RST subsystem and of an OB-CCS subsystem); c) type authorization of vehicle.

The concept of “*placing in service*” from an authorization point of view leads to an Authorization for the placing in service that refers to fixed subsystems.

B. Testing during placing on the market procedure

Where tests are required to obtain documentary evidence of technical compatibility, the participating NSA may issue temporary authorizations to the applicant to use the vehicle for practical rail network checks. The IM, after consultation with the applicant, have to make effort to ensure that all tests are carried out within three months of receipt of the applicant's request. The NSA should ensure that the tests are carried out.

The Directive 2017/797/EU does not foresee a testing phase during the safe integration of the OB-CCS subsystem within the vehicle. However, during a procedure for placing on the market an OB-CCS such aspect may not be excluded in advance. In fact, applicant(s) might execute tests defined by them, according to the CSM-RA requirements. The *authorization* is issued according to Table V.

When a TS-CCS includes Class A equipment EUAR shall verify that the technical solutions envisaged are completely compatible with the TSIs in force and are fully interoperable.

TABLE V
AUTHORIZATIONS IN THE 4TH RAILWAY PACKAGE

Authorization	Application conditions	Entity who grants the authorization
Authorization for the PinS of fixed installations	Only for ENE, INF and TS-CCS subsystems involving European Railway Traffic Management System (ERTMS) products need an EUAR preauthorization	NSA of the MS concerned EUAR issues the preauthorization (only when ERTMS projects are involved)
Placing on the market of mobile subsystems	Depending on the area of use of the subsystem	NSA or the EUAR (upon request of an Applicant)
Vehicle authorization for placing on the market	Depending on the area of use of the vehicle	NSA or the EUAR (upon request of an Applicant)
Type authorization for vehicle	Depending on the area of use of the vehicle	NSA or the EUAR (upon request of an Applicant)

IV. CONCLUSION

In this paper the concept of APIS of railway structural subsystems was reviewed and a distinction of authorization before and following the 4th RP adoption was described.

Based on the detailed analysis of the procedures before and after the 4th RP stated in [2] and [4], the following difference addresses: 1) Regarding the roles both Directives still addresses the *applicant* but the entity assessing if an APIS is required is the MS in [2] and the NSA in [4] The latter case may involve EUAR in case of ERTMS projects; 2) No distinction between renewal or upgrading of vehicles or fixed subsystems in the Directive 2008/57/EC [2] while such difference is in the Directive (EU)2016/797 [4]; 3) The necessity of a file describing the project is valid for vehicles and fixed subsystems in Directive 2008/57/EC while in Directive (EU)2016/797 is only for fixed subsystem; 4) When a renewal or upgrading requires an APIS the related criteria used are specified better in Directive (EU)2016/797 instead of Directive 2008/57/EC; 5) The point related to the decision to what extent the TSIs need to be applied to the project remains only in Directive 2008/57/EC; 6) A time schedule to decide if the project requires a new APIS is more detailed in Directive (EU)2016/797; 7) The role of EUAR is in Directive (EU)2016/797 only.

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