

HyLAW

HyDrail – Rail Applications Assessment

Main Author(s): [Dainis Bošs, Latvian Hydrogen association]
Contributor(s):

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Table of Contents

Introduction and summary	4
HyLAW Summary and Methodology	4
HyDrail application.	4
Overview and assessment of current legal framework	4
Registration of a rolling stock.	6
Necessary Documentation.	7
Renewal (modernization of the rolling stock).	9
Policy Recommendations	9
References	10

Introduction and summary

HyLAW Summary and Methodology

HyLaw stands for Hydrogen Law and removal of legal barriers to the deployment of fuel cells and hydrogen applications. It is a flagship project aimed at boosting the market uptake of hydrogen and fuel cell technologies providing market developers with a clear view of the applicable regulations whilst calling the attention of policy makers on legal barriers to be removed.

The project brings together 23 partners from Austria, Belgium, Bulgaria, Denmark, Finland, France, Germany, Hungary, Italy, Latvia, Norway, Poland, Romania, Spain, Sweden, Portugal, the Netherlands and United Kingdom and is coordinated by Hydrogen Europe.

Through extensive research, interviews and legal analysis, the HyLaw partners have identified the legislation and regulations relevant to fuel cell and hydrogen applications and legal barriers to their commercialization.

This National Policy Paper provides public authorities with country specific benchmarks and recommendations on how to remove these barriers.

HyDrail application.

Fuel-cell system powertrain installation on board (freight and shunting and other rolling stock) to secure that the train is using the energy only from the fuel-cell and battery system, as well as replacing the existing diesel-electric (etc) powertrain on board with fuel-cell electric technology. The modernization can renew the lifecycle of existing rolling stock and is viewed as an alternative for new purchases of rolling stock whereas a completely new rolling stock would be a new type of locomotive in the railway sector. The modernization includes the renovation of the train by replacing the existing i.e. diesel-generator with fuel cell module and battery pack.

Overview and assessment of current legal framework.

The overall ruling determines that the owner of the rolling stock or the user of the rolling stock must ensure that the equipment and the rolling stock itself is in line with the legislative acts and locomotive OEM firesafety rulings from whom the owner of the rolling stock or the user determines the specific rolling stock firesafety equipment maintenance and usage schedule, including the actions to be taken in case of fire. The instruction must be approved by the national railway operator.

Taking into account the intension of HyDrail application a number of safety issues will be directly appointed to the designers, manufacturers and rolling stock users/owners in order to reach the EU and National obligations for real life deployment.

The maintenance of the rolling stock is a number of actions that must be performed in order to secure the operational usage and safety issues and to perform damage prevention. The actions also include the maintenance works that are scheduled by manufacturer of the locomotive and the designer technical rulling. The owner of the rolling stock or the user must ensure that the scheduled maintenance works are performed regarding the suggestions of the rolling stock manufacturer.

Taking that into account it is necessary that the designers and the manufacturers are well known with the railway rolling stock and fuel cell and hydrogen technology in order to develop a correct set of suggestions, because if the performed actions does not align with the manufacturer determinated suggestions, it is necessary to perform a risk assessment that evaluates the safety level of the rolling stock. The risk assessment is performed by accredited national accreditation body regarding the legislative acts about European railway system integratty and is approved to perform such evaluation.

It is forbidden to use a rolling stock that has no renovation and maintenance system and the maintenance works have not performed regarding the renovation system. In order for the shunting locomotive to use the public railway infrastructure routes, the railway operator establishes a commission that once a year evaluates the technical level of the rolling stock.

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In order to acquire the access right to the public-use railway infrastructure and to guarantee the provision of safe services in the relevant infrastructure line sections, the railway undertaking, before commencing carriage must obtain a safety certificate.

I.e. in Latvia the public entity The State Railway Administration performs the registration of rolling stock. The State Railway Administration in supplementing and publishing the records of the

railway infrastructure and the rolling stock register shall indicate the conformity of each sub-system or the parts thereof included to the specified requirements for the applicability of technical specifications for interoperability. The State Railway Administration controls new or renovated railway infrastructure objects or rolling stock commissioning and checks the suitability to railway technical exploitation ruling and work safety ruling.

Registration of a rolling stock.

The procedure differs regarding the assemblance of the rolling stock. The main factor is the the technical specifications for interoperability or so-called “TSI”. TSI are specifications drafted by the European Railway Agency and adopted in a Decision by the European Commission, to ensure the interoperability of the trans-European rail system.

Before starting the operation, the rolling stock shall be authorised for placing in service.

Prior to commencement of the rolling stock construction or upgrading (modification works providing for modifications in the basic parameters of the rolling stock (including thus not exclusive modifying a basic parameter or its function), the manufacturer of the rolling stock, the entity carrying out the upgrade, or the contracting entity ordering the rolling stock construction or upgrading, or their authorised representative shall submit to the State Railway Technical Inspectorate the technical assignment documentation for the respective project and shall receive from the latter a decision on the conditions of applicability of the technical specifications for interoperability in accordance with the procedures laid down in the laws and regulations on interoperability of trans-European rail systems, as well as on the conditions for placing in service of a type, series or make of the rolling stock. Rolling stock upgrading means actions modifying the basic parameters characteristic to a type of rolling stock including thus not exclusive - Energy supply system of the train; Length of the rolling stock unit ; Maximum design speed (structural speed); Maximum power of the train; Maximum motive force (for steam locomotive); Maximum stationary electric power on current collector et.c.

Rolling stock constructed or upgraded in accordance with one certificate of conformity for a type of rolling stock issued by a conformity assessment body shall be considered conforming to one type of rolling stock.

Conformity assessment of the rolling stock, which is not in conformity with all relevant technical specifications for interoperability, including the rolling stock, to which exemptions apply and which is not subject, in part or in full, to the technical specifications for interoperability (hereinafter - non-TSI-conform rolling stock), shall be carried out by a notified body accredited in

accordance with the laws and regulations regarding the interoperability of the trans-European rail systems (hereinafter - notified body), the scope of accreditation of which includes conformity assessment of fulfilment of the essential requirements provided for in the technical specifications for interoperability in respect of open access cases and national requirements applicable in special cases and applicable in accordance with the laws and regulations regarding the interoperability of the trans-European rail systems.

The notified body shall assess the conformity of all basic parameters of rolling stock, as set out in the technical specifications to the requirements laid down in the binding laws and regulations, standards and normative and technical documentation referred to in the technical specifications for interoperability and in laws and regulations regarding the interoperability of the trans-European rail systems.

The notified body shall carry out conformity assessment of the rolling stock in accordance with the modules for the conformity assessment procedures laid down in the technical specifications for interoperability. Where the respective type of rolling stock is not subject to any valid technical specifications for interoperability, the examination of the type of rolling stock shall be carried out for the conformity assessment, accompanied by verification of the rolling stock unit.

There are a number of entities that have received certificates to be “notified body”, thus the scope of allowed works are limited regarding the specialization. List of notified bodies can be found [here](#).

Note, that there is not enough information about TSI compliance with the fuel cell system on the rolling stock.

The owner, user, manufacturer of the rolling stock, the entity carrying out the upgrade, the contracting entity or their authorised representative (hereinafter - the applicant) shall request the manager of the railway infrastructure to examine compatibility with the infrastructure in which it is incorporated.

Necessary Documentation.

For the type of rolling stock to be authorised for placing in service, the applicant shall submit an application to the State Railway Technical Inspectorate, appending the following thereto:

- a declaration in accordance with Commission Regulation (EU) No 201/2011 of 1 March 2011 on the model of declaration of conformity to an authorised type of railway vehicle (hereinafter - Commission Regulation (EU) No 201/2011) with annexes, which have been

stipulated for the relevant case of placing in service in Paragraph 48, 54, 57, 58, 62 or 62 of this Regulation;

- the technical documentation (operating manual for the rolling stock that sets out operating, renewal and maintenance conditions of the rolling stock; Operating manual for the rolling stock);
- the test results of the railway infrastructure manager.

For the purpose of authorisation of non-TSI-conform type of rolling stock for placing in service, it is necessary to provide:

- declarations of conformity and technical documentation in accordance with the laws and regulations on interoperability of the trans-European rail systems, where technical specifications for interoperability have been applied in respect of any technical parameters of the rolling stock;
- declarations of conformity and evidence issued by the notified body on conformity of technical and operational characteristics with the applicable provisions of laws and regulations;
- declarations of conformity and evidence on technical and operational characteristics that shows that the rolling stock is compatible with the infrastructures and fixed installations, including climate conditions, energy supply system, control-command and signalling system, track gauge and infrastructure gauges, maximum permitted axle load and other constraints of the railway infrastructure;
- where the rolling stock built for 1520-mm-gauge railway infrastructure is also intended to be used for carriage to and from third countries, evidence on fulfilment of the requirements of the third countries concerned.

In respect of other technical parameters and the rolling stock as a whole, the State Railway Technical Inspectorate shall examine the technical conformity of the rolling stock with the provisions of the applicable laws and regulations; technical compatibility between the rolling stock and the respective infrastructure; safe integration of the rolling stock into the user's safety management system in accordance with provisions of Regulation No 402/2013; the procedures for operation, repairs and maintenance of the rolling stock.

Renewal (modernization of the rolling stock).

For the purpose of maintaining the operational capacity of the rolling stock and the level of its safety, renewal of the rolling stock shall be carried out providing for inspection, repair or replacement, adjustment and examinations of the assemblies and sets of the rolling stock. The renewal of the rolling stock shall cover renewal of basic parameters of the rolling stock in accordance with the values and requirements laid down to in the technical documentation

Where renewal is supposed to include works, which are neither part of the technical documentation, nor of a repairs and maintenance programme provided for in the safety management system of the user of the rolling stock and such works can modify the basic parameters peculiar to a type as Energy supply system of the train; Length of the rolling stock unit ; Maximum design speed (structural speed); Maximum power of the train; Maximum motive force (for steam locomotive); Maximum stationary electric power on current collector et.c. the entity carrying out the renewal shall ensure that a design assignment is drawn up and submitted to the State Railway Technical Inspectorate for a decision. Such renewal shall be considered as upgrading of the rolling stock.

Taking into account that this includes conditions of applicability of the technical specifications for interoperability in accordance with the procedures laid down in the laws and regulations on **interoperability of trans-European rail systems, and there is not enough information about fuel-cell TSI's**, currently all the actions that include the fuel cell system mounting on an existing rolling stock, by replacing the existing power train will be classified as a “Placing into service a New rolling stock”.

A further in-depth analysis must be performed in order to identify the TSI's about the possible HyDrail applications.

Policy Recommendations

- Develop fuel cell system related technical specifications for interoperability in order to ease the certification/registration process of the HyDrail applications.
- The technical specifications for interoperability could open the possibility of renewal (modernization) of a rolling stock, where the existing power-train is substituted with a completely new Fuel-cell system. In relation with the scheduled renewal works, it would extend the life-time of a locomotive for additional 30 years. This would allow for existing rolling stock units to be upgraded to fuel-cell locomotives in a simplified way.

References

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2. Republic of Latvia cabinet Regulation No. 724 on 3rd of August 2010 “Railway exploitation rulling”
3. DIRECTIVE 2004/49/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 April 2004 on safety on the Community's railways and amending Council Directive 95/18/EC on the licensing of railway undertakings and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification (Railway Safety Directive)
4. Council Directive 2005/47/EC of 18 July 2005 on the Agreement between the Community of European Railways (CER) and the European Transport Workers' Federation (ETF) on certain aspects of the working conditions of mobile workers engaged in interoperable cross-border services in the railway sector.
5. Directive 2007/58/EC of the European Parliament and of the Council of 23 October 2007 amending Council Directive 91/440/EEC on the development of the Community's railways and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure
6. DIRECTIVE 2007/59/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2007 on the certification of train drivers operating locomotives and trains on the railway system in the Community
7. Directive 2008/57/EC of the European Parliament and of the Council of 17 June 2008 on the interoperability of the rail system within the Community (Recast) (Text with EEA relevance)
8. Directive 2008/110/EC of the European Parliament and of the Council of 16 December 2008 amending Directive 2004/49/EC on safety on the Community's railways (Railway Safety Directive)
9. Directive 2012/34/EU of the European Parliament and of the Council of 21 November 2012 establishing a single European railway area Text with EEA relevance
10. Directive 2008/110/EC of the European Parliament and of the Council of 16 December 2008 amending Directive 2004/49/EC on safety on the Community's railways (Railway Safety Directive)