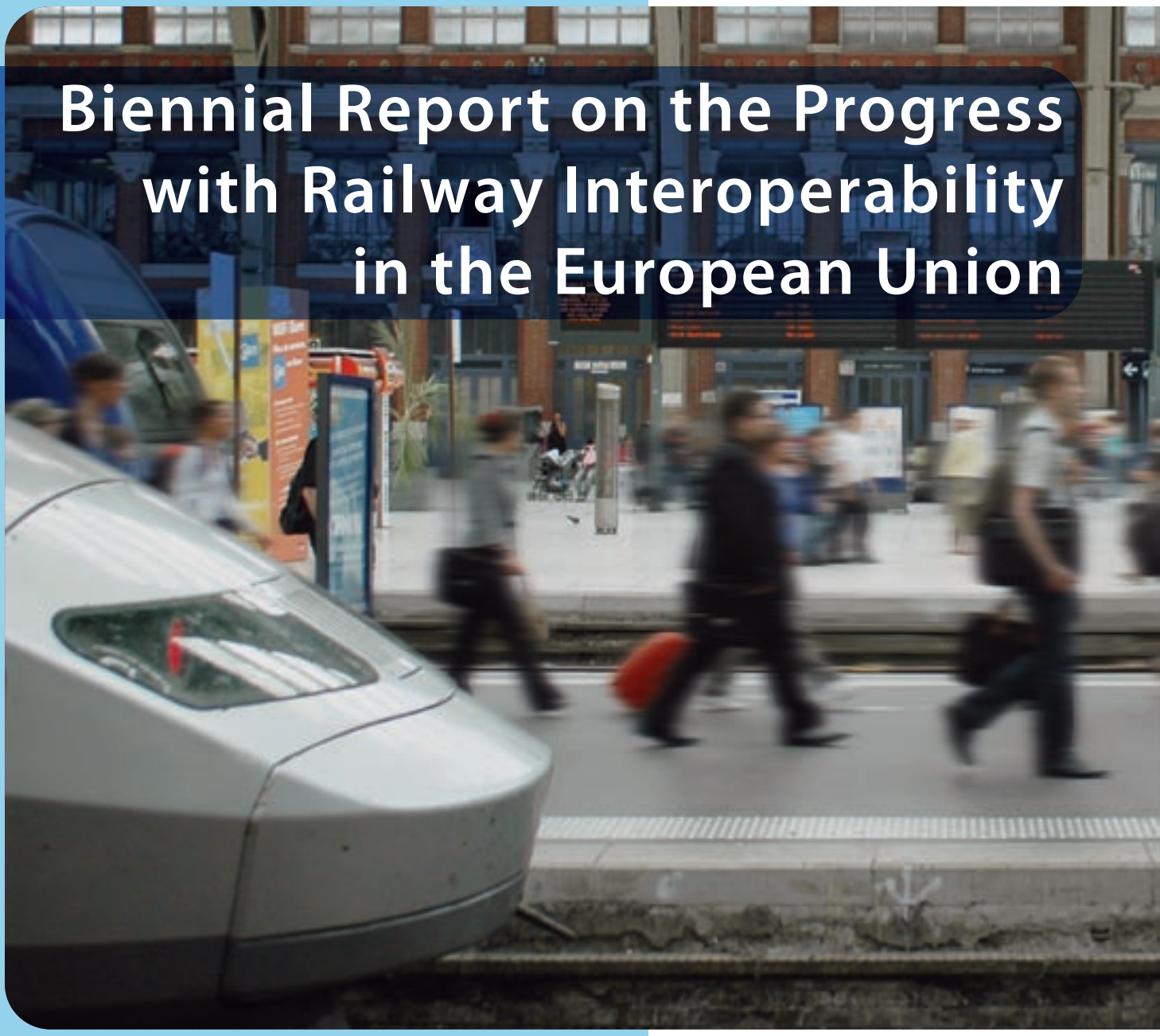
2009

Biennial Report on the Progress with Railway Interoperability in the European Union



European Railway Agency

Foreword

This is the first report on the progress with railway interoperability in the European Union which the European Railway Agency produces biennially according to its regulation. The next report is due in 2011.

Reporting every two years allows the Agency to analyse the trends of implementation of interoperability across the European Union. For the time being, the availability of interoperability related data in the Agency is rather limited because databases and registers are still being defined or populated. Therefore, the Agency collected data from other sources, the main being the questionnaires distributed to the national safety authorities and sector organisations.

The contributions of the respondents allowed the Agency to analyse a set of interoperability indicators and to outline the achievements and problems in the implementation of railway interoperability. These indicators are structured into three groups evaluating institutional developments, legal aspects and introduction of interoperable constituents and subsystems on the market.

Sector feedback provided insight into effects of the introduction of interoperability regime on the market. Though the data are not always complete or fully reliable, the report makes a comprehensive analysis of the interoperability progress. It also draws the attention to the costs and benefits to the market actors resulting from the introduction of interoperability regime.

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1. Introduction

The legal basis for this report is provided by Art. 14(2) of the Agency Regulation 881/2004/EC[1] as amended by Regulation 1335/2008/EC:

> *'The [European Railway] Agency shall monitor progress with the interoperability of the railway systems. Every two years it shall present and publish a report on progress with interoperability. The first such report shall be published during the Agency's second year of activity.'*

The European Railway Agency, hereinafter referred to as the Agency, started its activities in the course of 2005 and was fully operational in 2006. The delay in presenting this report is due to the time necessary to establish coherent set of indicators to monitor interoperability progress and to collect the relevant data. This report is the first Agency report on the progress with railway interoperability. However, an earlier report on railway interoperability status in the period 2000 to 2005 was published by the European Commission in 2006.[2]

To help understand the evolution of railway interoperability, the report first defines the aims of interoperability.[3] Chapter 3 summarises the legal and institutional framework established to enhance technical and operational compatibility between rail networks. Chapter 4 explains the indicators used to evaluate the railway interoperability progress. It will also analyse the indicators for which data is available. Chapter 5 will look into effects of Technical Specifications for Interoperability (TSIs) on railway market.

The assessment made in this report shows that interoperability is making progress. The legal framework has been developed and implemented in the Member States with few exceptions. Five high speed (HS) Technical Specifications for Interoperability (TSIs), five conventional rail (CR) TSIs and two transversal TSIs applying to both HS and CR are in force. The institutions and competent authorities at European and national level are established and functioning. The railway interoperability, however, is not only advancing within the regulatory framework but also shows progress on the railway market. A number of interoperable train-sets, wagons and infrastructures have been placed in service. Railway interoperability, however, requires big investments. These costs together with the possibility to apply national approaches where the European Communities legal framework is not yet developed could act as a hindrance to achieving interoperability targets. Therefore, the future progress depends to a large extent on the political will at European and national level to support efficient and effective interoperability strategies.

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[1] Regulation (EC) No 881/2004 of the European Parliament and of the Council of 29 April 2004 establishing a European railway agency, OJ L 164 of 30/04/2004, pp 1-43.

[2] Commission of the European Communities, Report from the Commission to the Council and the European Parliament: Progress Report 2000 to 2005 on the implementation of the Interoperability Directives (96/48/EC for high speed rail and 2001/16/EC for conventional rail), COM(2006)660 final, 06.11.2006, Brussels.

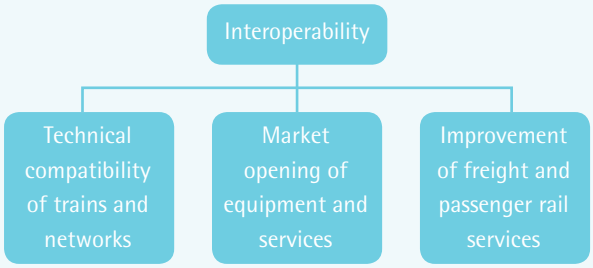
[3] In this report interoperability will be used to indicate railway interoperability.

2. Evaluating the progress with railway interoperability

The legislative approach towards interoperability is based on a strategy imposing interoperability requirements only for new, renewed and upgraded rail subsystems. From this perspective railway interoperability might be expected to make moderate progress in short to medium term.

What are the aims of railway interoperability?

Railway interoperability aims to contribute to the EC Treaty objective to develop trans-European transport networks (Art. 154 and 155 of the EEC Treaty). The Interoperability Directive 2008/57/EC (Art. 2(b)) defines interoperability as *'the ability of a rail system to allow the safe and uninterrupted movement of trains which accomplish the required levels of performance for these lines. This ability depends on all the regulatory, technical and operational conditions which must be met in order to satisfy the essential requirements.'*



However, interoperability involves more than achieving technical compatibility between different railway systems. *'The pursuit of this objective must lead to the definition of an optimal level of technical harmonisation and make it possible to ... facilitate, improve and develop international rail transport services within the European Union and with third countries.'* (ibid, Art. 1(2)(a)).

It also aims at the '*creation of the internal market in equipment and services for the construction, operation, renewal and upgrading of the trans-European ... rail system*.' (ibid, Art. 1(2)(b)). Therefore, it necessitates the removal of technical, administrative and procedural obstacles to seamless train movement as well as promoting competitive markets in the rail industries. This is to be achieved by taking into consideration political, social and organisational factors that impact the performance of the railway system.

The pursuit of interoperability of the trans-European railway network is closely related to the railway safety. Therefore, in its activities the Agency strives not only to improve interoperability across the European Union but also to at least maintain high safety levels. Among the essential requirements established by the directives those on safety are first on the list. By the introduction in the TSIs of specifications covering most of these requirements, the safety of the rail system is gradually improved when subsystems are built or renewed. The general development of railway safety will not be dealt with in this report as it is a subject of a separate biennial report done by the Agency. The first such Agency report on railway safety performance was published in 2008.[1]

Is railway interoperability making progress?

The aim of this report is to answer this question by assessing the progress with interoperability. In order to evaluate the current situation it may be useful firstly to look at the starting conditions. The rail assets have a lifespan of 30-40 years for rolling stock and up to a century for the infrastructure. Furthermore, the introduction of interoperable rail subsystems entails high costs for rail actors. For these reasons it is not feasible to migrate hastily to the interoperability targets defined in the EC legislation. Consequently, the legislative approach towards interoperability is based on a strategy imposing interoperability requirements only for new, renewed and upgraded rail subsystems. An exception is the European Rail Traffic Management System (ERTMS) which has been introduced by more aggressive strategy due to its importance for interoperability. From this perspective railway interoperability might be expected to make moderate progress in short to medium term.

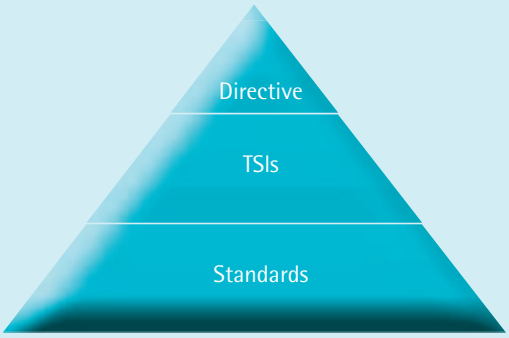
[1] Railway Safety Performance in the European Union 2008, A biennial report from European Railway Agency, http://www.era.europa.eu/core/Safety/Documents/our%20products/ERA%20biennial%20reports/Web-ERA_Rapport_final_2008-09-01.pdf

3. Regulatory framework

3.1. Legal framework

The legislative process in the field of interoperability has started in the mid-1990s and is an essential part of railway market liberalisation. As already noted, it aims at improving the competitive position of the railways vis-à-vis other transport modes. Up until 2008, the two main interoperability acts were Directive 96/48/EC which deals with Trans-European high speed rail system and 2001/16/EC which deals with conventional rail system. These two interoperability directives were amended by Directives 2004/50/EC and 2007/32/EC. The former amendment aligns Directive 96/48/EC with Directive 2001/16/EC. The latter amendment relates to clarification and improvement of EC verification procedure of the subsystems. In 2008 a recast of the interoperability directives was made by Directive 2008/57/EC which merges their provisions together into a single instrument to help provide simplification. It also envisages extension of geographical scope of the TSIs and cross-acceptance of vehicles.

The exhaustive list of the EC railway interoperability legislation is given in Annex 1.



The interoperability directives are based on the so-called 'new approach' principles which are applied to products intended to be placed (or put into service) on the Community market and specified in EC directives since mid-1980s. They define the essential requirements for a product which must be fulfilled so that it has access to the market of other Member States. Due to the complexity of the rail system, it was divided in structural and functional subsystems[1]. They are covered by Technical Specifications for Interoperability (TSIs) which appear as an intermediate level between directives and standards. The TSIs specify the basic parameters necessary to meet essential requirements and to achieve interoperability. For those basic parameters which are specified functionally, the manufacturers may decide how to implement them. Usually this is done by applying harmonised European standards as they give a presumption of conformity with the essential requirements, and therefore provide legal certainty about the outcome of the verification processes. Conformity with European standards is however not mandatory, in the spirit of European law.

Transposition, implementation and enforcement of the EC interoperability legislation

This report will not evaluate the transposition, implementation and enforcement of the interoperability directives since these activities are within the competence of the European Commission. The information published on DG TREN website shows delay in transposition of interoperability directives in some countries. This has a direct negative impact on progress with interoperability. Though the implementation of EC interoperability legislation is not subject in this report, the analysis in section 4.1 will partly address it. This will help better understand whether the institutions dealing with interoperability at national level have the administrative capacity and the financial means to perform efficiently.

Feedback and improvement

Once in force and applied, the legislation may reveal areas for improvement or show errors. Therefore interoperability legislation is constantly being examined and revised. The last recast of interoperability directives aimed to simplify the existing processes. With regard to the TSIs, two main processes may be outlined:

(1) the revision of the TSIs which takes account of technological progress and corrects critical and non-critical errors; and

(2) simplified procedure for the minor errors established in the Directive 2008/57/EC where the Agency issues technical opinions and thus shortens significantly the time for correcting the error (Art. 7(2)).

3.2. Institutional framework

A well established institutional framework underpins the efficient implementation of interoperability legislation. Therefore we will make a brief overview of the existing institutions, bodies and organisations dealing with interoperability on national and European level. Other bodies carrying out safety related tasks are not dealt with here since this report is dedicated to interoperability.

[1] Structural subsystems are infrastructure; energy; control, command and signaling; and rolling stock. Functional subsystems are traffic operation and management, maintenance and telematic applications for passengers and freight.

3.2.1. European Union level

The **European Commission** has the ultimate responsibility for drafting interoperability legislation and monitoring its implementation after its adoption.

The European Commission was assisted by the **European Association for Railway Interoperability (AEIF)** for the drafting of the TSIs for the HS rail system as well as the first set of CR TSIs. AEIF acted as a joint representative body of the railway stakeholders. Such an approach for TSI drafting was pushed forward due to the complexity of the subject and technical expertise required to ensure interoperability improvement while maintaining high safety levels. The AEIF performed this activity from late 1990s till 2006 when it officially transferred its activities and documentation to the European Railway Agency.

The activities of the **European Railway Agency** are regulated by Regulation 881/2004/EC recently amended by Regulation 1335/2008/EC. The Agency activities are strictly defined in these two legal acts and in the mandates given by the Commission.

In addition to the European institutions there are two platforms to ensure the representation of the national interest in the legislative process: the Railway Interoperability and Safety Committee (RISC) and the Network of National Safety Authorities (NSA Network).

RISC is a committee composed of the representatives of the Member States which represent their national interest on railway interoperability and safety matters. RISC discusses and votes on all TSIs and other legislative acts related to interoperability. Till 2008 this committee acted under the name 'Article 21 Committee'.

NSA Network is composed of the representatives of the National Safety Authorities (NSAs). It is a platform for discussion of all Agency on-going activities where NSAs may express their views. NSA Network also proved to be a useful instrument to collect valuable national data used by the Agency for delivering high quality proposals and recommendations.

3.2.2. National level

The establishment of **National Safety Authorities (NSAs)** is provided in Art. 16 of the Railway Safety Directive 2004/49/EC. Among other things, they are responsible for the authorisation for placing the structural subsystems in service and for supervising that the interoperability constituents are in compliance with the essential requirements. The NSAs actively participate in the Agency working parties on drafting and revision of the TSIs. They also take part in the NSA Network described above. All Member States have established their NSA, except Luxembourg (to be established in 2009), Cyprus and Malta (no railway network). It may be noted that some Member States were still in the process of building the capacity of their NSA during the conception of this report. Though it is not an EU Member State, Norway also established a NSA. As a country of the European Economic Area, Norway concluded agreement with the European Community, has adopted EC railway interoperability and safety legislation and is applying it. Therefore, Norway takes part in the Agency activities and is included in the analysis made in this report.

The establishment of **Notified Bodies (NoBos)** is provided in Art. 20 of the first Interoperability Directive 96/48/EC. The Notified Bodies are responsible for carrying out conformity assessment and verification procedures. These bodies are notified by the Member States to the European Commission with explicit mention for which subsystem and under which interoperability directive – HS or CR[2] - they will have competences. An analysis of the Notified Bodies in the different Member States is provided in section 4.1.2.

3.2.3. Stakeholders representation at EU level

The railway stakeholders are also actively involved in the process of TSI drafting and revision. They are represented by the Representative Bodies (RBs) as provided by Art. 6(7) of Directive 96/48/EC. The list of officially recognised **Representative Bodies** was voted by Article 21 Committee (which in 2008 was renamed to RISC). For the time being 9 sector organisations are on the list: ALE, CER, EIM, ERFA, ETF, UNIFE, UIP, UITP and UIRR[3].

The Agency coordinates its work with **European Standardisation Bodies** to ensure consistency between the TSIs drafting process and the standards development. When necessary, the Agency makes requests for development of new or amendment of existing standards according to the general mandate to the standardisation bodies given by the Commission. In May 2007, the Agency signed

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[2] Member States have made two notifications to the European Commission: one for HS interoperability directive and one for CR interoperability directive for the Notified Bodies having competences for both interoperability directives.

[3] Autonomous Train Drivers' Unions of Europe (ALE), Community of European Railway and Infrastructure Companies (CER), European Rail Infrastructure Managers (EIM), European Rail Freight Association (ERFA), European Transport workers' Federation (ETF), Association of European Railway Industries (UNIFE), International Union of Private Wagons (UIP), International Association of Public Transport (UITP), International Union of combined Road-Rail transport companies (UIRR).

a Memorandum of Understanding with CEN, CENELEC and ETSI to streamline the technical coordination with European Standardisation Bodies and to ensure consistency between the TSIs drafting process and the standards development.

NB Rail was established according Art. 20(5) of Directive 96/48/EC as amended by Directive 2004/50/EC. It acts as a coordination group of the Notified Bodies and discusses any matter related to conformity assessment and verification procedures as well as TSIs application. NB Rail participates in Conformity Survey Group of the Agency where it gives expertise on conformity assessment and verification procedures of the TSIs which are being drafted or revised. The Agency participates in NB-Rail strategic and plenary meetings as well as in all the NB Rail subsystems sub-groups. The aim of this participation is to provide information on ongoing activities in the Agency and to receive feedback regarding TSIs application.

4. Railway interoperability progress

To measure the progress with interoperability the Agency established three main groups of indicators: institutional, legal and subsystem related indicators.

Institutional indicators aim to assess the progress of establishment of the institutions dealing with interoperability. In particular they focus on their competences and structure, the administrative capacity as well as their procedures.

Legal indicators analyse the progress of development of the interoperability legislative framework and related documents and exceptions. This includes adopted TSIs and standards as well as derogations, open points and specific cases. The monitoring of transposition of the interoperability directives into national law and of implementation plans of the TSIs are within the competence of the European Commission and therefore not dealt with in this report.

Subsystem related indicators evaluate the progress of introduction of interoperable subsystems – railway vehicles and infrastructure – on the railway market.

For the time being, the availability of interoperability related data is rather limited because databases and registers (most of which are required by the EC railway legislation) are still being defined or populated with data.

Therefore, the Agency collected data from Representatives Bodies and National Safety Authorities by questionnaires and in certain cases conducted bilateral meetings. These data provided the basis for identifying the current state of interoperability across the European Union and Norway. Malta and Cyprus are not included in the analysis below since they do not have railway network. The Agency cannot guarantee the completeness of the collected data since some respondents did not reply[1] and some of those who replied might not have provided complete data. Nevertheless, it is a good starting point for evaluating the current situation.

4.1. Administrative and institutional indicators

These indicators show how the interoperability legislation related to institutional set up has been implemented, what has been achieved, where problems have been encountered and what costs have been incurred.

4.1.1. National Safety Authorities (NSAs)

The Member States opted for different institutional solutions for their NSA. Since this was already analysed in previous studies[2] we will outline the main models used:

- Model 1: The NSA is the Ministry of Transport or part of it; used for example in Austria, Belgium and Denmark.

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[1] The NSAs which replied to European Railway Agency questionnaire are: BE, BG, CZ, DK, DE, EL, ES, FR, IT, LV, LT, HU, NL, NO, AT, PL, PT, SI,SK, FI, SE and UK. The NSAs which did not reply to European Railway Agency questionnaire are EE, IE, LU, and RO and therefore these countries are not included in some parts of the analysis in this report.

[2] KEMA and DHV (2007), *'Rail Interoperability and Safety, Transposition of legislation and progress on the field'*, a study carried out for the European Commission, Brussels, 17/10/2007, pp 112-113.

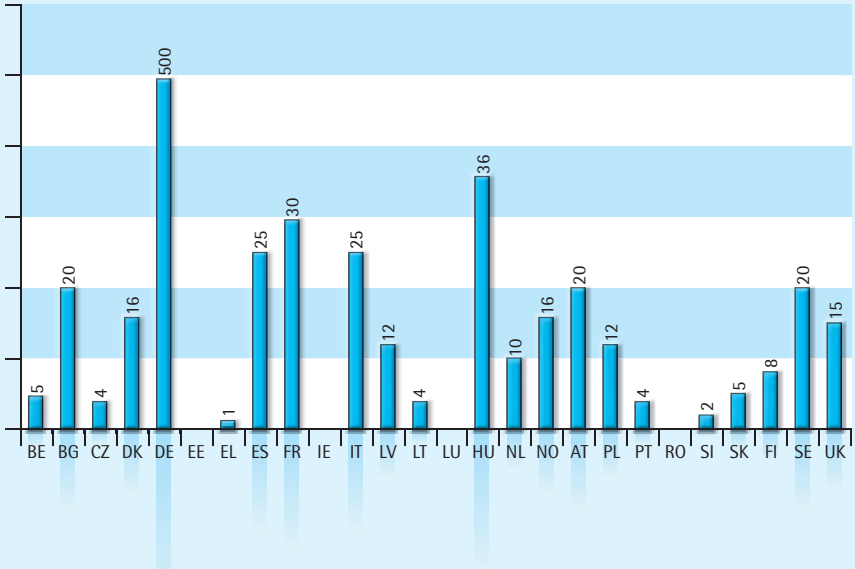
- Model 2: The NSA is not within the Ministry of Transport but is subordinated to it; used, amongst others, in Bulgaria, France and Lithuania.

- Model 3: The NSA is independent of Ministry of Transport and other ministries; used in Germany and the UK.

4.1.1.1. Number of staff involved in interoperability

In general the number of the NSA staff directly involved with interoperability issues varies between 10 and 20 people (see Chart 1)[3]. Hungary (36 employees), France (30 employees), Spain (25 employees) and Italy (25 employees) have allocated more administrative staff on interoperability issues than other Member States. However, some of these employees' job may include work with other issues and not be completely dedicated to interoperability issues. Germany takes a lead with a significantly greater number of staff dedicated to interoperability both directly and indirectly: 500 employees. At the other end of the spectrum are Belgium, Czech Republic, Greece, Lithuania, Portugal, Slovenia and Slovakia where the staff engaged with interoperability issues is 5 people or less. Indeed, the different sizes of the NSAs are entirely appropriate given the different needs and size of the railways. For example, the German NSA may require more staff to process authorisations in view of the specific regional government of Lander. However, NSA requires certain number of staff to function efficiently. Taking account of the increasing amount of activities related to interoperability legislation the countries with less than 5 people in charge with interoperability issues might face problems with their implementation.

Chart 1. Number of the NSA staff directly involved with interoperability issues by Member States*



* The figures for BE and UK have been approximated since they have part time employees.

Source: European Railway Agency questionnaire to NSAs

[3] The information related to the number of people in charge with interoperability issues in the NSAs is relevant for the period between mid-November 2008 and mid-February 2009. The NSAs provided information relevant for different dates within this period.

4.1.1.2. Staff recruitment

Most NSAs have problems with staff recruitment. Only three – Norway, the Netherlands and the UK – of the twenty-two NSAs who responded do not experience difficulties in recruiting staff. The common problem is finding well qualified and experienced staff for which, in most cases, there is a strong competition from rail industry. NSAs, railway companies and railway manufacturers compete for experts and quite often railway industry provides more attractive salaries. Furthermore rail specialists are difficult to get on the labour market. Thus NSAs demand for high skilled specialists with thorough knowledge and experience in railways is difficult to be met. Some NSAs recognised that the problem originates at educational level since there is insufficient number of schools to prepare railway specialists.

4.1.1.3. Administrative costs

The total budget in the NSAs for interoperability activities is 10.8 million EUR for 12 NSAs which provided information[4]. The data also highlight the difference in budget spending in the new Member States - EU12 - on one hand and EU15+Norway on the other hand. EU 12 have substantially lower budgets.

4.1.1.4. Competences of the NSAs

Most bodies acting as NSAs[5] have other responsibilities than the defined in the interoperability and safety directives but these are, however, outside their competence of a NSA. For example, a number of bodies act as an NSA and as a rail regulatory body and/or deal with dangerous goods (RID). Some of them regulate the metro, light rail, trams and/or supervise infrastructure projects. The scope of activities varies from one body to another and is very much dependent on national institutional and legal set-up.

4.1.2. Notified Bodies

4.1.2.1. Number of Notified Bodies

The bodies to carry out conformity assessment and verification procedures are notified by the Member States to the Commission with indication of the directive and subsystems of their competence.

The total number of the Notified Bodies as of 1st January 2009 is 47 which is an increase of 17.5% compared with the situation on 1st January 2008 (see Chart 2). Of the total 47 Notified Bodies, 35 operate both under HS and CR Directives, 3 only under HS one, and 9 only under CR one. Eight new Notified Bodies started operation and one other suspended its services. Three Notified Bodies extended their competence from HS subsystems only to HS and CR subsystems.

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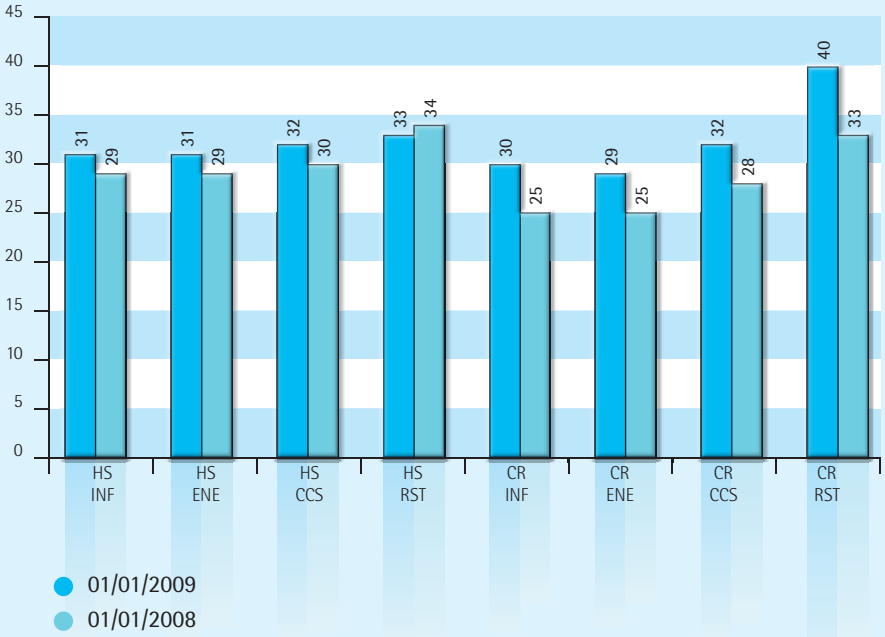
[4] BE, CZ, DK, ES, FR, LT, NL, PL, PT, SK, FI and SE.

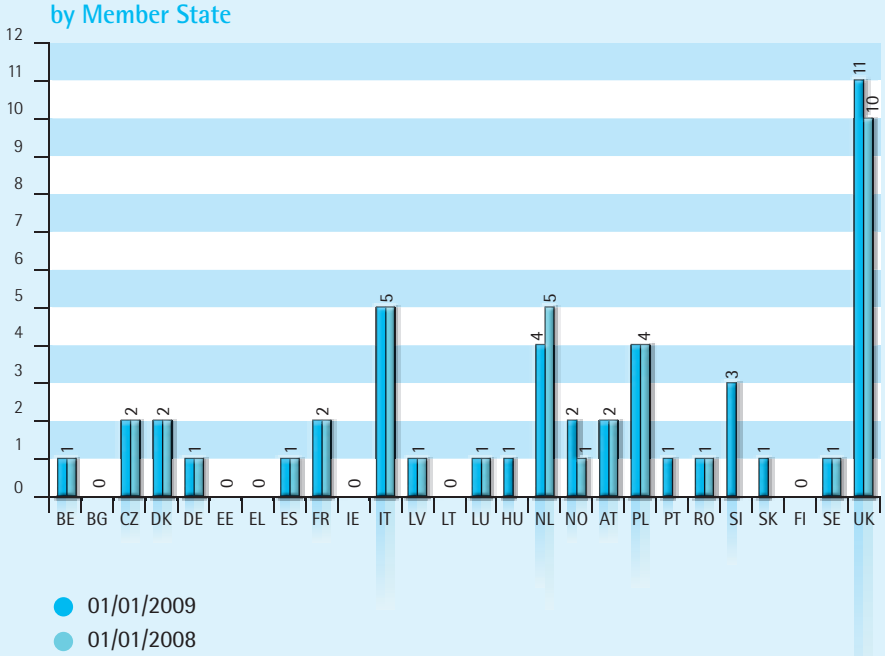
[5] From the 22 respondents only NL, AT and SI replied that the NSA is in charge only with interoperability and safety issues.

Chart 2. Number of Notified Bodies under Directives 96/48/EC and 2001/16/EC by subsystem, 01/01/2009



Source: Nando database

Chart 3. Number of Notified Bodies under Directives 96/48/EC and 2001/16/EC by Member State



Source: Nando database

Though interoperability directive for conventional rail and CR TSIs were adopted later than the HS ones, there is no substantial difference in the number of the Notified Bodies for HS

and those for CR subsystems (see Chart 2). The leading subsystems in terms of Notified Bodies having competence to certify under them are RST and CCS both for high speed and conventional rail. The information is relevant for 1st January 2009.

In general the number of the Notified Bodies competent for HS subsystems stayed stable between 1st January 2008 and 1st January 2009. The CR subsystems have shown greater increase of the Notified Bodies: between 4 and 7 by subsystem since beginning of 2008.

4.1.2.2. Level of competition between Notified Bodies

Not all Member States established Notified Bodies. As of 1st January 2009, nineteen Member States and Norway have established at least one Notified Body. The Member States which have not done yet so are Bulgaria, Estonia, Greece, Ireland and Lithuania. The Notified Body in Finland suspended its activities in 2007 due to the negative operating results of its services.

With 11 Notified Bodies, the UK takes the lead in the EU in terms of established Notified Bodies. Italy ranks second with five Notified Bodies and the Netherlands and Poland rank third with four Notified Bodies each. In Poland, all the four bodies are notified to carry out conformity assessment and verification for RST subsystem, whereas for the other subsystems there is only one or two competent Notified Bodies.

In general, the NSAs trust the certificates of verification for subsystems issued by a Notified Body located in another Member State as foreseen by the interoperability directive. However, some of them have certain concerns. These are related to specific features of the national rail systems where national rules apply, i.e. TSIs open points. This concern is, however, not justified because it is not within the interoperability directive requirements for the Notified Bodies to assess against specific national requirements covered by national rules.

The Notified Bodies assess the conformity of the subsystem only for the requirements specified in the TSI(s). Where national rules apply, for example open points or specific cases, the assessment against these rules is made by the competent national bodies, the so called designated bodies. In some Member States (see 4.2.4.1) a company which is a Notified Body may also act as a designated body for assessing notified national technical rules. However, it is within the competence of the Member States which bodies they will designate for carrying out the verification procedure against notified national technical rules.

Another concern for some NSAs is that different Member States apply different procedures for assessment of the bodies to be notified for conformity assessment and verification procedures. By notification, a Member State informs the Commission and the other Member States that a body, which fulfils the relevant requirements, has been designated to carry out conformity assessment according to a directive. The EU legislation does not require common accreditation scheme to be applied to Notified Bodies. Notification of Notified Bodies and their withdrawal are the responsibility of the notifying Member State. It is up to the Member States to decide how the assessment of the competence, impartiality and integrity of the bodies to be notified will be done. An important instrument, which is not mandatory, is the accreditation according to the EN 45000 series. Some Member States make use of it while others do not and hence the concerns of some NSAs that different criteria apply. The accreditation makes requirements and processes more transparent and the result is that the successful candidates are more likely to meet the criteria for the Notified Bodies defined in an Annex to the Interoperability Directive.

Though the competition between the Notified Bodies is supposed to be on European scale, at present the Notified Bodies compete either nationally or in some cases on regional level. This is partly because the Notified Bodies work in the language of the country where they are established and possibly in one or two more languages. The applicants from countries using other languages are less likely to spend extra costs for translating technical and application documents as well as for interpretive services during audits and other meetings with the Notified Body.

Another limitation to the Notified Bodies competition is that some companies act not only as Notified Bodies but also as bodies designated to assess the notified national technical rules during the authorisation procedure. This provides an opportunity for them to offer a more competitive price for a service including subsystem verification plus assessment of notified national technical rules (nNTR). As a result, in many cases, it is cheaper to choose the same company for subsystem verification (in its competence of a notified body) and for nNTR assessment (in its competence of a designated body) than two different companies for the two procedures. This gives competitive advantage to companies who act both as a Notified Body and as a designated body to evaluate nNTR.

It may be concluded that on EU level there is no much competition between the Notified Bodies except in the UK, Italy and the Netherlands. Therefore, the pressure to offer competitive pricing to clients is not strong. Some stakeholders noted that although the UK has a number of Notified Bodies the general hourly rates are very similar and thus there is little opportunity for significant levels of price based competition.

At this stage it is difficult to compare the situation of the level of competition for subsystems and for interoperability constituents but the latter seems to be higher, especially for CCS constituents.

4.2. Legal indicators

4.2.1. TSIs development and revision

For the time being five high speed (HS) TSIs, five conventional rail (CR) TSIs and two transversal TSI applying both to HS and CR are in force.

The first set of HS TSIs entered in force in 2003 (see Chart 4). They covered six subsystems: control-command and signalling (CCS), infrastructure (INF), energy (ENE), operation (OPE), rolling stock (RST) and maintenance (MAI). Consequently, they were revised and the revised versions entered in force respectively in 2006 for HS TSI CCS, and in 2008 for HS TSIs INF, ENE, OPE and RST. HS TSI Maintenance, though not formally repealed, has not been applied since the entry into force in 2008 of the revised set of HS TSIs. Each of the revised HS TSIs contains a section related to maintenance requirements which supersedes the requirements of HS TSI Maintenance. It may be concluded that the legislative framework for the HS rail system is completed and the future activities will be related mainly to revision of HS TSIs.

The legislative framework for CR TSIs, however, is not yet completed. For the time being, five CR TSIs are in force (see Chart 5). In 2006 three CR TSIs entered in force which covered control-command and signalling (CCS), rolling stock-noise (NOI) and telematic applications

for freight (TAF). In 2007 CR TSIs relating to rolling stock - freight wagons (WAG) and to Traffic Operation and Management (OPE) subsystems entered in force. Amendment to CR TSI WAG and CR TSI OPE is expected to be adopted and enter in force in 2009. Four other CR TSIs are under development and are envisaged to be adopted by the end of 2009 or in the beginning of 2010. They cover infrastructure (INF), energy (ENE) and locomotives and passenger RST (LOC&PAS) and telematic applications for passengers (TAP) subsystems. Since the existing CR TSIs entered in force 1-2 years ago and the complete set is not yet available, the analysis in the next sections will make a distinction between HS and CR subsystems.

Chart 4. Entry in force of HS TSIs, by year

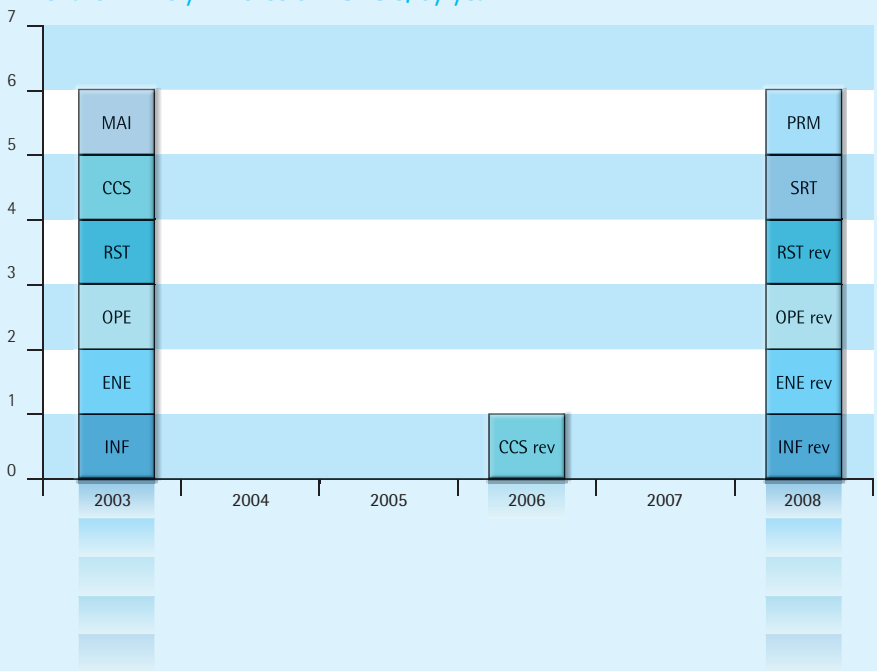
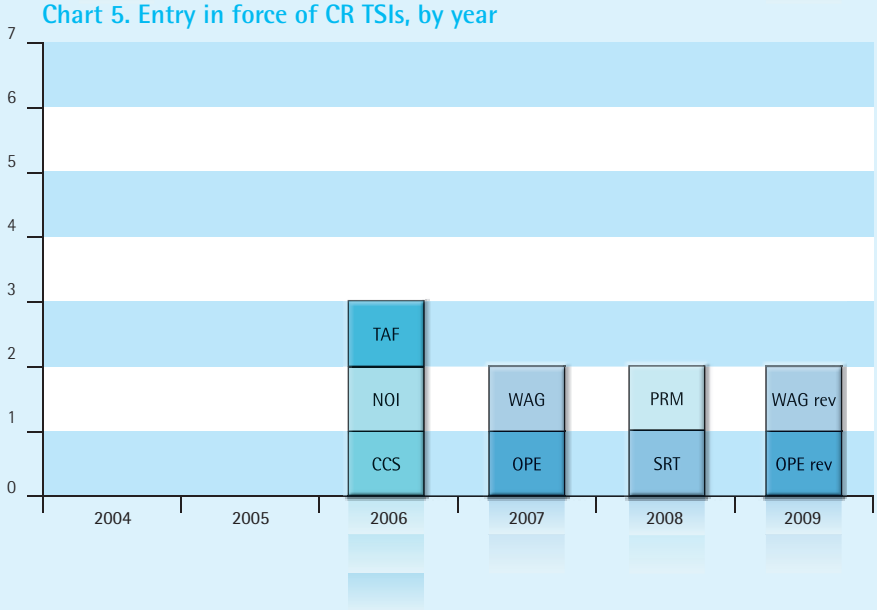


Chart 5. Entry in force of CR TSIs, by year



In addition to the two groups of CR and HS TSIs, there are two TSIs which apply to both HS and CR. They cover persons with reduced mobility (PRM) and safety in railway tunnels (SRT) and entered in force in 2008. TSIs PRM and SRT are shown in both charts - for CR and HS - TSIs but the two charts show the same TSIs PRM and SRT.

In order to provide the most recent information for the stakeholders, the annexes of the TSIs are updated more regularly than the TSIs. Such examples are CCS TSIs and Operation TSIs.

Annex A to CR and HS TSIs CCS, which provides the list of mandatory specifications and the list of informative specifications for the CCS subsystem, is regularly updated. The first update of Annex A to CR TSI CCS was done in 2006 together with the revision of HS TSI CCS. The following two updates in 2007 and 2008 made one common Annex A for the two TSIs.

The updates of Annexes P9 of CR and HS TSIs Operation related to standard numerical marking of wagons is published on the Agency website every first Wednesday of the month.

4.2.2. European railway standards

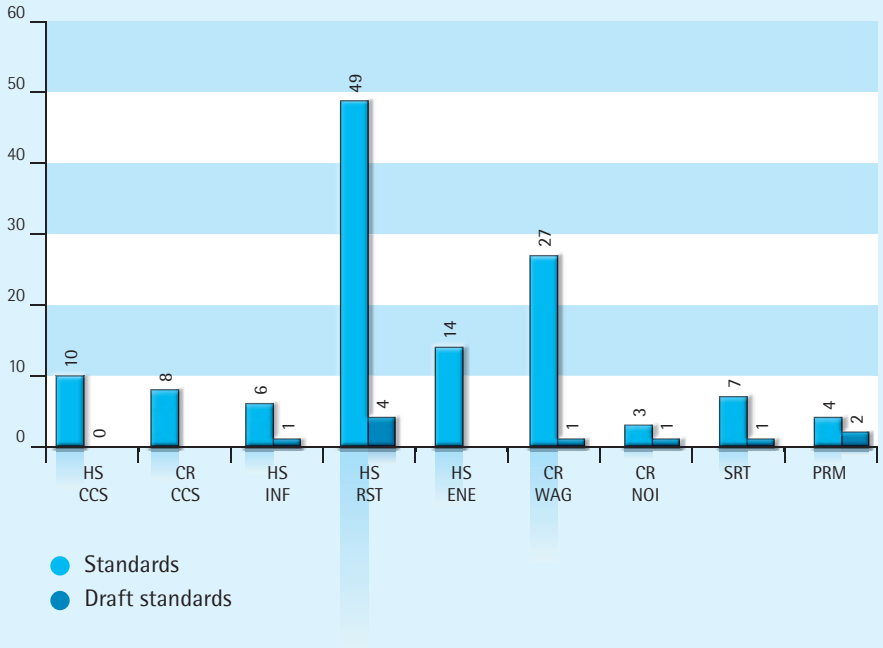
The standardisation in the railway sector has seen considerable progress in the last 20 years. In the end of 2008, the number of railway standards published by the two major European standards organisations in the field – CEN and CENELEC – amounted to approximately 290. A third of these have been developed under the mandate of railway interoperability directives.

4.2.3. Voluntary and mandatory standards related to TSIs

4.2.3.1. Mandatory standards and other relevant technical specifications

The standards play an important role to achieve technical harmonisation of the European railway system. The standards may complement the TSIs either by being used mandatorily when quoted in the TSI or voluntarily when their reference is published in the Official Journal of the EU.

Chart 6. Number of mandatory standards quoted in TSIs, by TSI



Source: European Railway Agency, 2008

When a specific standard or a part of a standard is directly quoted within the TSI, this standard or part of a standard respectively becomes mandatory. In European jargon this is also called 'direct reference'. The TSIs in force quote more than 100 standards which are mandatorily used for fulfilling TSIs requirements. As shown in Chart 6, HS TSI Rolling Stock and CR TSI Freight Wagons quoted the highest number of standards, 49 and 27 respectively. The other TSIs quote between 3 and 14 standards.

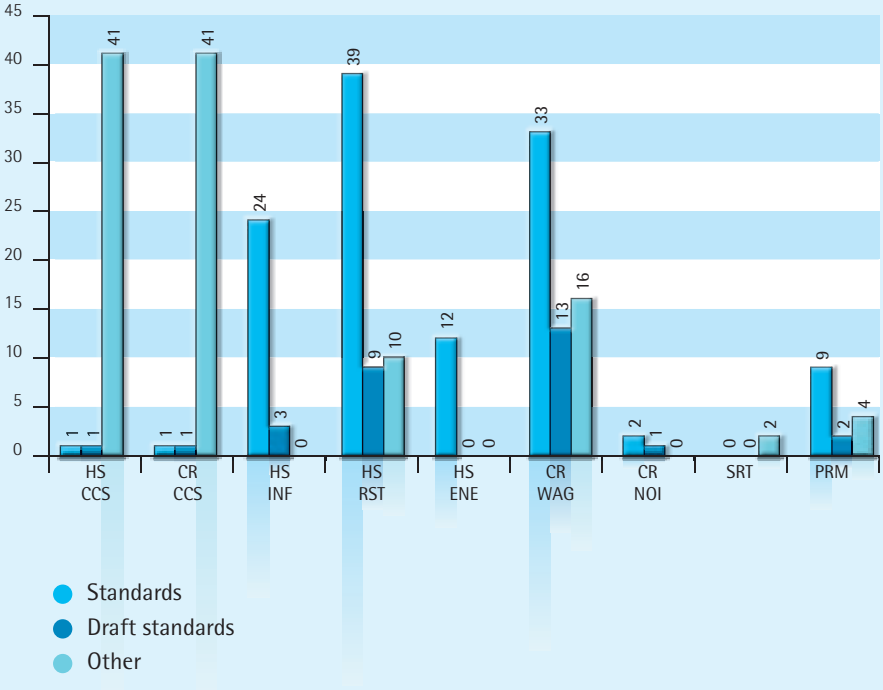
In the TSIs, direct references may also be made to other relevant technical specifications. For example, CCS TSIs make use of more than 40 mandatory specifications. CR TSI TAF uses 4 mandatory CEN Workshop Agreement (CWA) Certification Rules. The mandatory technical specifications quoted in the TSIs are not included in the analysis made above.

4.2.3.2. Voluntary standards and other relevant technical specifications

Unlike the mandatory standards quoted in the direct references, some standards or other relevant technical specifications may be voluntarily used to fulfil the TSI requirements. Standards thus complement TSIs.

One way of fulfilling certain TSI requirements is to comply with harmonised European standards. The references of these voluntary harmonised standards and/or other relevant technical specifications are published in the Official Journal of the European Union. Another way of fulfilling certain TSI requirements is that the manufacturer or the contracting entity uses their own solution which they have to prove meets TSI requirements. The advantage of using harmonised standards or other relevant technical specifications is that they give presumption of conformity of the IC or the subsystem with the applicable TSI(s).

Chart 7. Number of voluntary standards and other relevant technical specifications, by TSI



Source: European Railway Agency, 2008

Further to standards, other relevant technical specifications such as Technical specifications, UIC leaflets, international and sector organisation documents, the Agency documents, etc may be used to fulfil the TSI requirements. As could be seen in Chart 7, there is a relatively large number of voluntary standards and specifications giving presumption of conformity with the TSIs. However, there are certain differences across the TSIs. To meet the requirements of HS TSIs Infrastructure, Energy and Rolling Stock as well as CR TSIs Freight Wagons and Noise and TSI PRM more voluntary standards may be used and less or no other specifications and documents.

The technical specifications listed in Annex A of HS and CR TSIs CCS as informative specifications are used with a different purpose compared with voluntary harmonised standards and relevant technical specifications used in the other TSIs. They have only informative character either because they represent the current state of work for the preparation of a mandatory specification or because they give additional information, justifying mandatory requirements and providing guidance for their application.

The total number of voluntary standards and other relevant technical specifications giving presumption of conformity with the TSIs in force is about 150. It does not equal the sum of the number of voluntary standards and technical specifications of all TSIs for two reasons. Firstly, there are 19 voluntary standards and 8 voluntary draft standards which may be used for two or more TSIs. In some cases these (draft) standards concern interfaces between subsystems such as Rolling Stock and Infrastructure/Energy; Rolling Stock and PRM; Rolling Stock and Noise. In other cases these (draft) standards concern both CR and HS Rolling Stock. Secondly, the informative technical specifications for CR and HS TSIs CCS are not counted as they do not give presumption of conformity but have informative character.

4.2.4. Open points and notified National Technical Rules (nNTR)

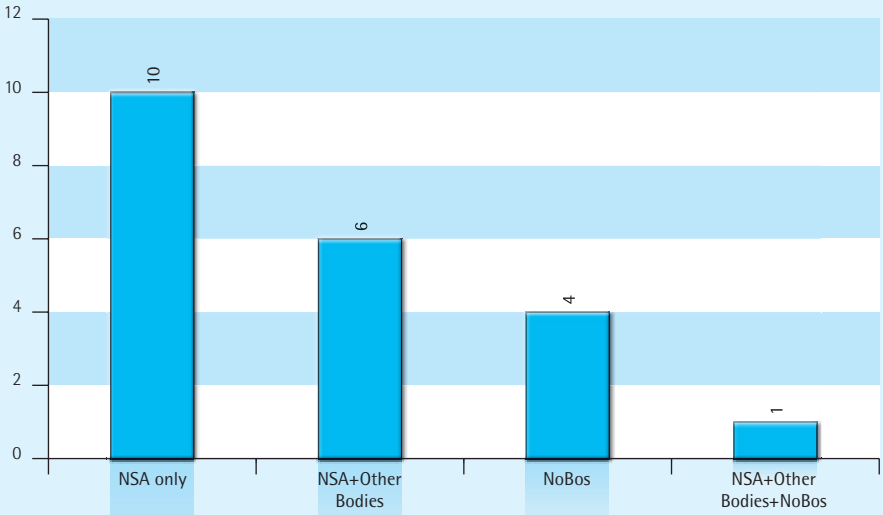
Open points are defined in Art. 5(6) of Directive 2008/57/EC as technical aspects corresponding to the essential requirements which cannot be covered in a TSI. They are identified in an annex to the TSI concerned. Open points are usually considered as the Achilles heel of interoperability because they might lead to emergence of more different solutions and thus hinder harmonisation efforts.

The open points are subject to a procedure specified in Art. 17(3) of the same directive. It provides that Member States notify to the European Commission a list of national technical rules which are applicable for open points. This article also requires that the Member States designate bodies which verify that the subsystem complies with nNTR before its placing in service.

4.2.4.1 Body assessing notified National Technical Rules

The Member States chose different solutions for designated bodies (see Chart 8). In ten Member States, nNTRs are checked only by NSA: Bulgaria, Czech Republic, Germany, France, Lithuania, Hungary, Norway, Slovenia, Finland and Sweden. In six countries nNTR are checked either by the NSA and/or by another body which could be an Independent Safety Assessor (ISA) for example: Belgium, Denmark, Spain, Austria, Portugal and Slovakia. Four Member States chose to delegate this task to Notified Bodies that have been established on the territory of the respective Member States: Latvia, the Netherlands, Poland and the UK. In Italy the NTRs may be checked by three bodies: NSA, ISA or Notified Bodies. In Greece the body is not yet decided upon. There is no information for Estonia, Ireland, Luxembourg and Romania.

Chart 8. Bodies assessing notified National Technical Rules

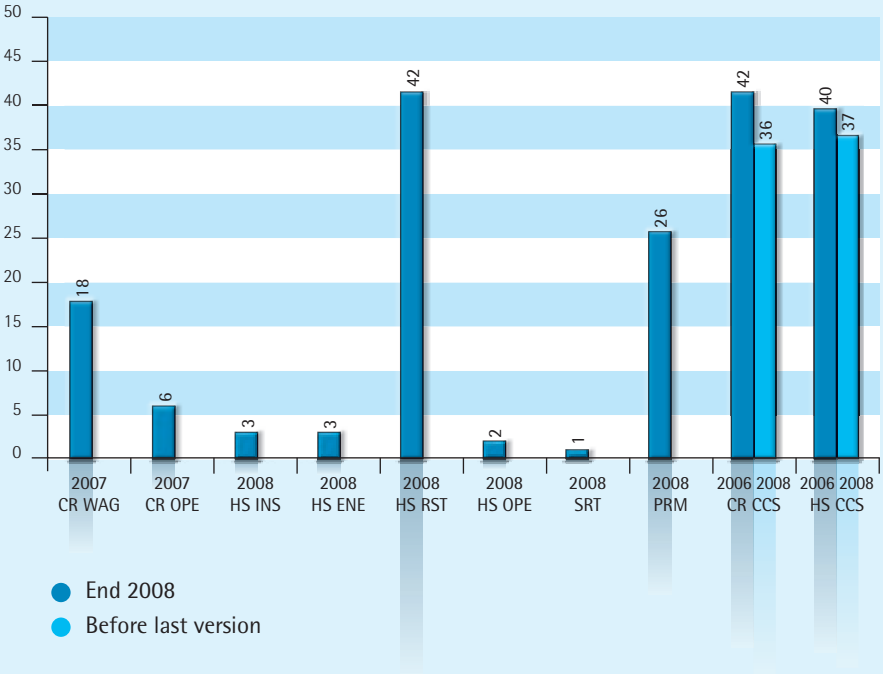


Source: European Railway Agency questionnaire to NSAs

4.2.4.2. Number of open points

Chart 9 shows the number of open points for the TSIs in force. A comprehensive assessment of the effects of open points on interoperability should take account of their content and scope. This would not be done in this analysis as this reports aims to give a broad overview of interoperability progress without going into specific details.

Chart 9. Number of open points by TSI (year indicated the entry in force of the TSI), as of 01/01/2009



Source: European Railway Agency, 2008

Though the indicator 'number of open points' is not sufficient for a comprehensive analysis, it gives some idea of the unsolved areas for harmonisation in the different subsystems.

HS Rolling Stock and CCS TSIs have 40 or more open points. With the 2008 amendment of Annex A of the Decision 2006/679/EC (CR TSI CCS) and Annex A of Decision 2006/860/EC (HS TSI CCS), the number of open points in CR TSI CCS and HS TSI CCS decreased by 7 and 3 respectively.

The on-going work on the amendment of Decision 2006/861/EC concerning CR TSI Freight Wagons is expected to provide solutions for some open points in this TSI.

The closing of open points is a good indicator of progress of harmonisation of the diverse national requirements, but this should not be ultimate goal in all cases. It is important to also take into account economic considerations and regional specifics. For example, in some cases of existing lines interoperability between countries may be reached on a local level.

4.2.5. Specific cases

Specific cases are an important indicator since they show in which parts of the subsystems and in which countries technical harmonisation will not be achieved in medium to long term or not at all. The analysis of the specific cases will be provided in subsequent Agency Reports on progress with railway interoperability.

4.3. Subsystem indicators

Subsystem related indicators were developed to evaluate the progress of introduction of interoperable subsystems and interoperability constituents (ICs) on the railway market. To do this the analysis below looks at EC certificates for ICs and for subsystems as well as the authorisations for placing in service. It also examines the time necessary for the authorisation procedure and the fees charged. Finally, some TSI specific indicators are analysed.

Sections 4.3.1 and 4.3.2 on EC certificates use data from NB Rail database. This data could not be considered as a complete for two reasons. Firstly, only 24 out of 47 Notified Bodies notified by Member States provided data on the certificates issued, requested and withdrawn. Secondly, the data provided by some Notified Bodies dates back to 2005, 2006 or 2007. Nevertheless NB Rail database may be used to have an indicative quantification of the certification process.

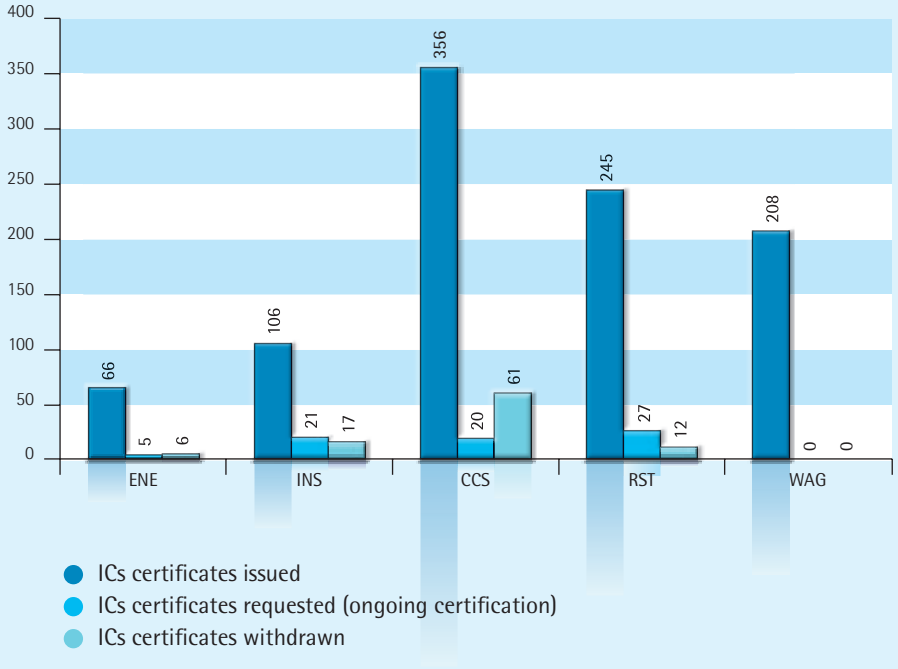
4.3.1. EC certificates for Interoperability Constituents (ICs)

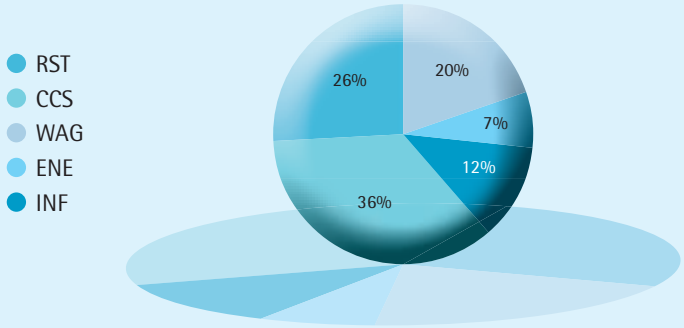
It is difficult to quantify the interoperability constituents placed on the market. There is no obligation for the manufacturers to report their declarations of conformity for interoperability constituents placed on the market. Therefore, the only possible way to assess the market entry of interoperability constituents is by EC certificates of conformity assessment issued by Notified Bodies. However, this would not be an accurate indicator since for ICs which use Module A, such as sleepers and bearers, no certification by a Notified Body is required.

Chart 10 shows the number of EC certificates for ICs which are sorted in three groups. The first group concerns EC certificates for ICs which were issued and renewed by the Notified Bodies. The second group relates to the number of requests for ICs certification; this group includes only requests for which the certification process has not been finalised. Put it another way, the second group indicates the number of requests for which certification is

ongoing and excludes the requests for which EC certificates have been issued or withdrawn. The third group relates to EC certificates for ICs which were withdrawn, refused or expired.

Chart 10. Number of EC Certificates for ICs issued, requested and withdrawn by the end of 2008, by subsystem; and relative share of ICs certificates issued and requested by subsystem





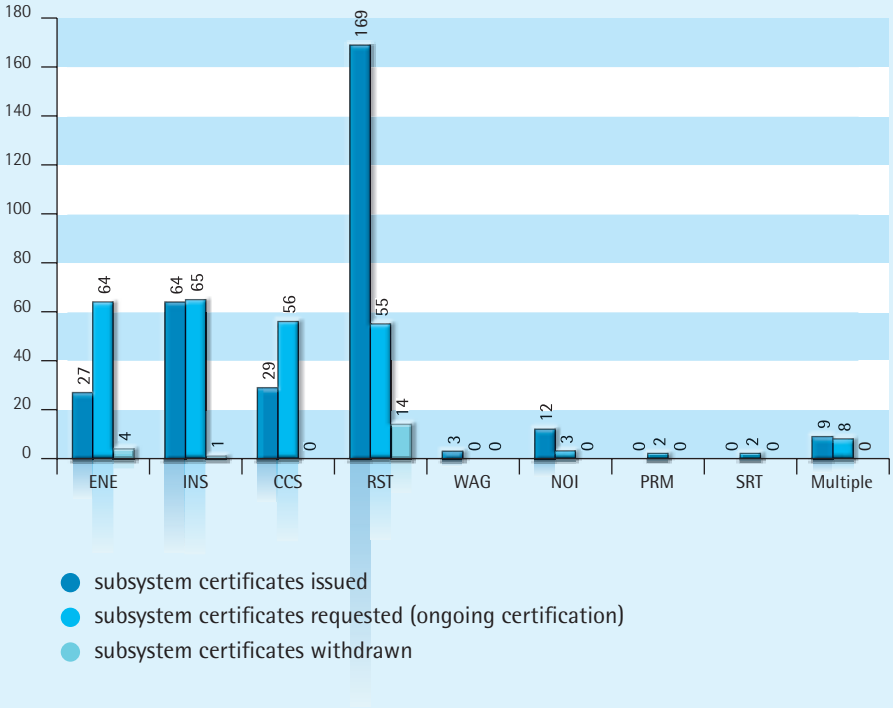
Source: NB Rail Database

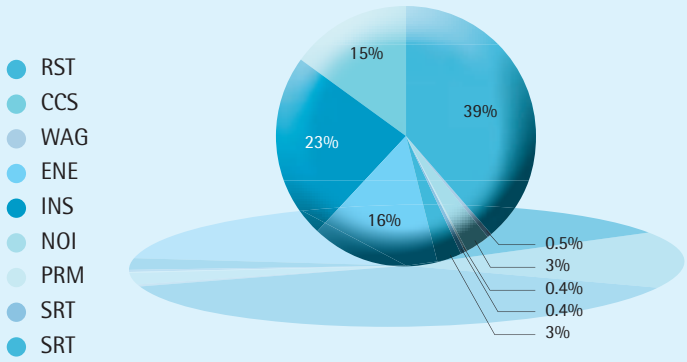
The data highlights the expansion of the market of CCS interoperability constituents such as Eurobalise, ERTMS/GSM-R on-board, etc. The other big markets are the ICs for HS Rolling Stock (26% of the whole ICs certification) and the ICs for freight wagons (20%). The certification rate of the ICs for energy and infrastructure subsystems is smaller than the one for the other subsystems but nevertheless, the number of certificates issued increased two times for each subsystem compared with the number in the mid-2007.

4.3.2. EC certificates for subsystems

The EC certificates for the subsystems are sorted in three groups which are the same as the ones for the ICs. The EC certificates for subsystems may involve verification against CR TSI Noise and TSI Safety in Railway Tunnels; these two are not included in the previous section as these TSIs do not have ICs requiring conformity assessment. PRM TSI entered in force in July 2008 so more requests and certificates for PRM TSI may be expected in the coming years. In the cases where one EC certificate was issued for verification of the requirements of two or more TSIs – e.g. Energy and Infrastructure or Freight Wagons and Noise – it is to be found under the number for 'multiple' subsystems.

Chart 11. Number of EC Certificates for subsystems issued, requested and withdrawn by the end of 2008, by subsystem; and relative share of subsystem certificates issued and requested by subsystem





Source: NB Rail Database

The situation in the subsystem certification differs from the one for the ICs. Here the main share of certified subsystems is of HS Rolling Stock, followed by HS Infrastructure and CCS. There is substantial increase of the requests for certification of energy subsystem compared with the situation in mid-2007.

The data on EC certification of freight wagons (3 EC certificates of verification in total) is somewhat conflicting with the data on authorisations issued by the NSAs (see Chart 14 in section 4.3.6). This may be a result of the incomplete information in NB Rail database which was discussed in the beginning of this chapter.

4.3.3. Fees for authorisation for placing in service

Not all NSAs charge fees for authorisation for placing in service. By the end of 2008, nine NSA provided their services free of charge: Belgium, Denmark, Greece, Latvia, Lithuania, Norway, Austria, Sweden and the UK. However, three of them – Belgium, Lithuania and Sweden – plan to charge fees for authorisation procedure from 2009 or later.

Twelve NSAs do charge fees: Bulgaria, Czech Republic, Germany, France, Italy, Spain, Hungary, the Netherlands, Poland, Portugal, Slovenia, Slovakia and Finland. These NSAs, however, use different methods for pricing. Two main methods of charging fees for authorisation for placing in service may be outlined:

- Fixed rate for each subsystems. There are some differences in the countries using it. For example in Slovakia the authorisation for some subsystems is charged by a fixed rate, for others such as freight wagons, it may be free of charge. The fee for some subsystems may also vary depending on the case but the minimum and maximum amount are being specified usually in a national legislative act. This type of charging is used in Bulgaria, Czech Republic, Spain, Poland, Portugal, Slovenia and Slovakia.
  Different countries opted for fixed rates have different price levels. For example, the rates for authorisation for placing in service in Spain is 1 800 EUR for locomotives, 3 000 EUR for self-propelled units and 100 EUR for coaches, freight wagons and auxiliary rolling stock. In Czech Republic, the rates for type approval amount to 30 000 CZK (1 200 EUR) for locomotives; 15 000 CZK (600 EUR) for carriages and 10 000 CZK (400 EUR) for freight wagons. The authorisation for placing in service costs 500 CZK (20 EUR) for locomotives and 500 CZK (20 EUR) for carriages.

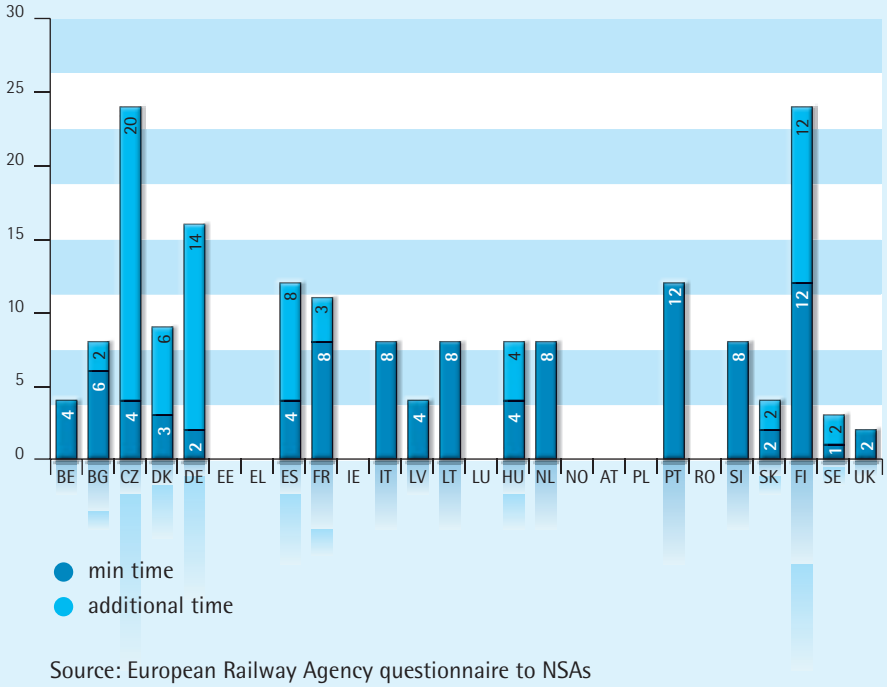
- Hour-based rate. In this charging scheme the total amount of the fee depends on the man-hours needed for the authorization. Some stakeholders criticised this type of charging since they have no certainty what will be the amount of the fee they need to pay. This charging is used in Germany, France and Finland and is planned to be introduced in Belgium. In 2008, the rate in the three countries using it was about 100 euro/hour.

4.3.4. Average time for the authorisation procedure

The average time for the authorisation procedure for placing in service varies across the countries and depends on different factors. Several examples for such factors in different countries may be given. Firstly, the time may be different for the different subsystems: HS rolling stock, freight wagons, and infrastructure. Secondly, the time may be different

depending whether it related to type approval or placing in service of a vehicle of a type. Thirdly, the time may be different for new subsystems and for modified subsystems.

Chart 12. Average time for the procedure for authorisation for placing in service by Member States, in weeks



Source: European Railway Agency questionnaire to NSAs

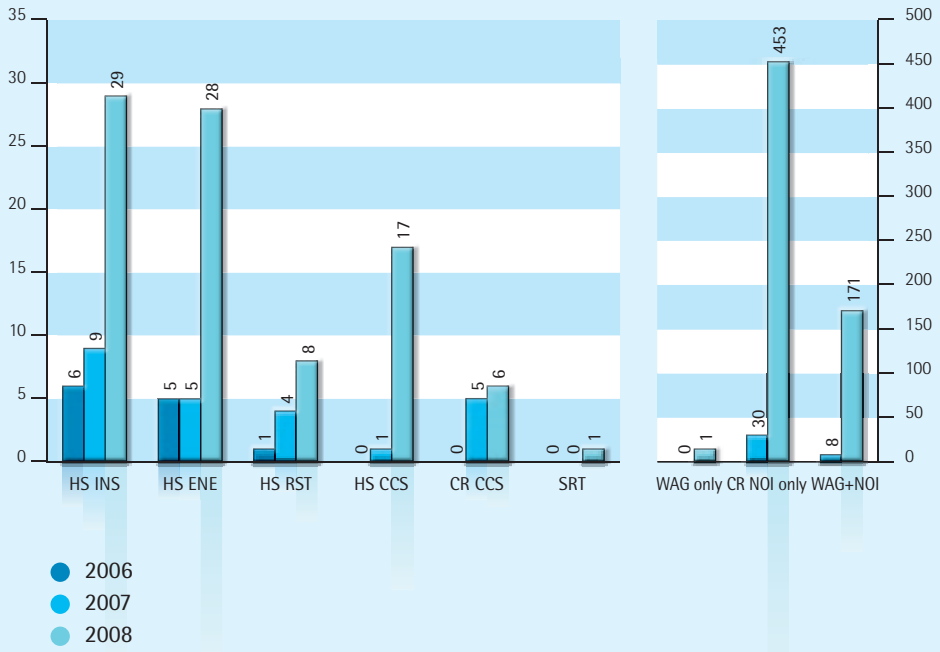
The time for the authorisation procedure is between two weeks and six months (see Chart 12). The EU average is 5-6 weeks. However, this estimate should be used cautiously since the time for authorisation procedure depends very much on the subsystem. The same considerations need to be taken into account when making conclusions for the most time efficient NSAs. In some cases the efficiency is result of the early involvement of the NSA in projects. If NSAs follow the subsystem project from its construction phase, part of the NSA checks are done in this period. Once the project is finished less time for issuing of an authorisation is needed.

4.3.5. Number of applications for authorisations for placing in service

The period from 2006 to 2008 shows increase in number of applications for placing in service under TSI regime (see Chart 13). The highest number of applications is made for freight wagons. The placing in service of a wagon might involve conformity with one or several TSIs, i.e. CR TSI Freight wagons and CR TSI Noise. Therefore, three distinct types of authorisations are distinguished: (1) for CR TSI Freight wagons only; (2) for CR TSI Noise only and (3) for both CR TSI Freight wagons and CR TSI Noise. Most of the applications for CR TSI Noise only and for both CR TSI Freight wagons and CR TSI Noise are made in Germany.

The ranking in the applications for HS subsystems from highest to lowest number is infrastructure, energy, CCS and rolling stock. The number of applications for freight wagons should not be compared to fixed subsystems since wagon fleets have a different scale of measurement. It may be noted that some NSAs which provided data for the authorisations for placing in service under TSI regime did not provide complete data for the applications. Therefore, there might be some inconsistencies.

Chart 13. Number of applications for authorisation for placing in service under TSI regime, by subsystem

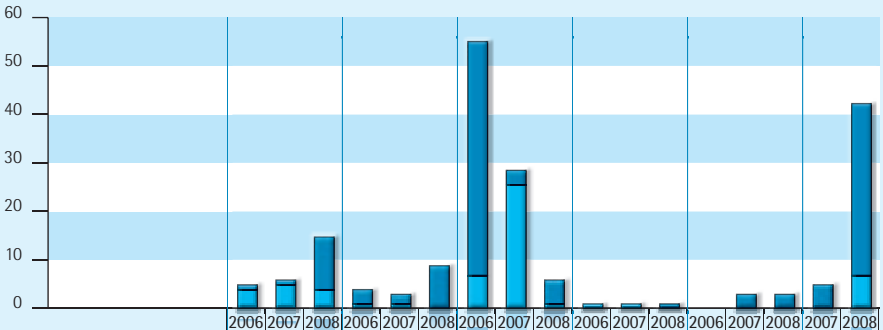


Source: European Railway Agency questionnaire to NSAs

4.3.6. Number of authorisations for placing in service under TSI regime

For the period 2006-2008, there is a trend of increase of the authorisations for placing in service under TSI regime for HS infrastructure and energy subsystems as well as for the CR CCS and freight wagons subsystems (see Chart 14). However, the number of authorisations for HS rolling stock subsystem decreased which may be related to the high level of population with HS rolling stock. Another feature is that for all subsystems except CR CCS and HS energy, a significant number of the authorisations are subject to derogations.

Chart 14. Number of authorisations for placing in service under TSI regime, by subsystem



	2006	2007	2008	2006	2007	2008	2006	2007	2008	2006	2007	2008	2006	2007	2008	2007	2008
	HS INS			HS ENE			HS RST			HS CCS			CR CCS			CR WAG	
authorisations without derogations	1	1	11	3	2	9	49	3	5	0	0	1	0	3	3	5	36
authorisations with derogations	4	5	4	1	1	0	7	26	1	1	1	0	0	0	0	0	7

Source: European Railway Agency questionnaire to NSAs

The data on the authorisations issued under TSI regime indicates that the driver of interoperability is the rolling stock subsystem both for HS and CR (see Chart 14). However, the significant number of derogations for HS rolling stock supposes partial departure from TSI(s). The Member States which issued most authorisations for HS RST are Czech Republic (49 in 2006) and Germany (32 in 2006 and 2007 but all of them with derogations). For freight wagons subsystem most authorisations were issued in the Netherlands (17 in 2007 and 2008 with no derogations), Germany (11 in 2007 and 2008), France (8 of which 6 with derogations in 2008) and the UK (7 of which 1 with derogation in 2007 and 2008). Germany authorised the highest number of HS lines - 19 of which 9 are with derogations. It is followed by Sweden with 3 authorisations.

When interpreting the data for HS rolling stock and CR freight wagons subsystems it may be noted that the actual number of vehicles authorised might be greater than the authorisations issued. This is so since in some cases one authorisation is issued for series of vehicles (see Table 1 and Table 2).

Table 1. Number of authorisations for series of vehicles and the total number of authorised vehicles under TSI regime for HS Rolling Stock

HS TSI RST	Total TSI authorisations	Of which			Total number of authorised vehicles
		Authoris. for vehicles	Authoris. for series	Number of vehicles in the series	
(1)	(2)=(3)+(4)	(3)	(4)	(5)	(6)=(3)+(5)
2008	6	0	6	85	85
2007	29	22	7	296	318
2006	56	48	8	98	146

Source: European Railway Agency questionnaire to NSAs (22 NSAs responded)

For example, in 2008 all the six authorisations for HS Rolling Stock were for series and the total number of vehicles for these six authorisations is 85. Of these, France issued one authorisation for 24 TGV Dasye and the UK five authorisations for a total of 61 vehicles. In 2007, there were 29 authorisations for HS Rolling Stock under TSI regime, of which 7 were for series. The total number of vehicles under these 7 series is 296. The authorisation for placing in service was made in the Member States as follows: 2 series of total 240 vehicles in Germany, 2 series of respectively 19 TGV POS and 6 ICE3 in France, 3 series of total 31 vehicles in the UK.

Table 2. Number of authorisations for series of vehicles and the total number of authorised vehicles under TSI regime for CR Freight Wagons

CR TSI WAG	Total TSI authorisations	Of which			Total number of authorised vehicles
		Authoris. for vehicles	Authoris. for series	Number of vehicles in the series	
(1)	(2)=(3)+(4)	(3)	(4)	(5)	(6)=(3)+(5)
2008	43	15	28	3054	3069
2007	5	2	3	218	220

Source: European Railway Agency questionnaire to NSAs (22 NSAs responded)

In 2008 there were 43 authorisations for freight wagons under TSI regime, of which 28 were for series. The total number of vehicles under these 28 series is 3054. The authorisation for placing in service was made in the Member States as follows: Germany (10 series of total

1569 vehicles), Belgium (4 series of 576 total vehicles), France (8 series of total 570 vehicles), the UK (5 series of total 289 vehicles) and Sweden (1 series of 50 vehicles).

2008 marked significant increase in the number of authorised vehicles under the TSI regime (3069) which is almost 14 times the number in 2007. However, freight wagons authorised under TSI regime are only 2% of the total number of freight wagons authorised across the EU both under national rules and the TSI regime. There might be different reasons for the small share of authorisations for freight wagons issued under interoperability regime. Apart from the problems with the applications of the CR TSI Freight wagons, there are a number of specific cases in the Member States part of which are related to the 1520 mm rail system which means effectively the whole fleet of some Member States. For these cases national rules apply. Another reason may be that some wagons are intended to be used on the non TEN-T rail network and therefore fall outside the scope of the TSIs.

4.3.7. Number of authorisations for placing in service

To better understand the progress with interoperability within the railway system, the data below makes a comparison between total number of authorisations – both under national rules and TSI regime - and the number of authorisations for TSI regime only. The comparison highlights the distinction between HS and CR subsystems (see Table 3).

There is some progress with authorisations of HS subsystems which might be explained with the earlier entry in force of HS TSIs. HS rolling stock showed significant progress in 2006 and 2007 where almost all vehicles were authorised under TSI regime. In 2008, however, for HS RST TSI the number authorisations under TSI regime dropped significantly to 16% of the total number of authorisations for HS RST. Between 2006 and 2008, the other HS subsystems also made some progress: HS energy where 50-75% of the subsystems were authorised under TSI regime, HS infrastructure – 16-23% and HS CCS – 25-50%. The progress with interoperability in HS rail system covers only those parts in Europe where HS rail network exists.

Table 3. Number of authorisations for placing in service for TSI regime only and for both TSI and national regime, by subsystem and by year

Year	2008			2007			2006		
Subsystem	Total number of authoris. (Nat+TSI regime)	Of which authoris. under TSI regime		Total number of authoris. (Nat+TSI regime)	Of which authoris. under TSI regime		Total number of authoris. (Nat+TSI regime)	Of which authoris. under TSI regime	
		Number	% of total authori-sations		Number	% of total authori-sations		Number	% of total authori-sations
HS INS	66	15	23%	38	6	16%	26	5	19%
HS ENE	12	9	75%	6	3	50%	6	4	67%
HS RST	32	5	16%	30	29	97%	56	56	100%
HS CCS	3	1	33%	4	1	25%	2	1	50%
CR CCS	60	3	5%	54	3	6%	35	0	0%
CR WAG	2199	43	2%	5494	5	0.1%	6289		

Source: European Railway Agency questionnaire to NSAs (22 NSAs responded)

In contrast to HS rail system, there is little progress with interoperability in CR system. This is partly because CR TSIs have been developed later and entered in force from 2006

onwards. Another reason is that conventional rail systems in Europe were established more than a century ago without strong emphasis on common technical specifications. Therefore, nowadays they are more fragmented and consequently technical harmonisation difficult to realise. The figures indicate that in 2007 and 2008, 5-6% of the CR CCS subsystems and 0.1-2% of the freight wagons were authorised under TSI regime. This does not necessarily mean that the remaining 98% of the freight wagons are non TSI compliant. Part of them might have been delivered according to established contracts and therefore they have not been checked for compliance.

4.3.8. Acceptance of authorisations from other Member States

There are some cases where certain Member States authorised placing in service of HS rolling stock already authorised in other Member States. For example, in 2007, NSA Germany authorised placing in service 240 vehicles with additional authorisation part of which have already been authorised under TSI regime in the Czech Republic (CDT 680) and the other part – in France (TGV POS).

In 2008, the NSAs in some Members States also authorised placing in service of freight wagons which were already authorised under the TSI regime in other Member States. For example NSA Sweden authorised the placing in service of 50 freight wagons with additional authorisation while in several cases the NSAs of the UK and Slovenia did not require additional authorisations for placing in service of freight wagons already authorised by another NSA.

The following analysis will address specific indicators for those TSIs which have been in force for at least one year when this report has been drafted. The details for HS TSI Rolling Stock and CR TSI Wagon have already been presented in section 4.3.6.

4.3.9. CCS TSIs

4.3.9.1. Current situation

Following the deployment of ERTMS on the TEN-T rail network, a number of successful projects have been accomplished in several Member States. Nevertheless, the deployment speed is quite different in every state. On one hand, some countries have already implemented the system or come close to a first ERTMS project completion, on the other hand, there are countries without any ERTMS experience yet. Hereafter a list of projects already in service or close to enter in operation.

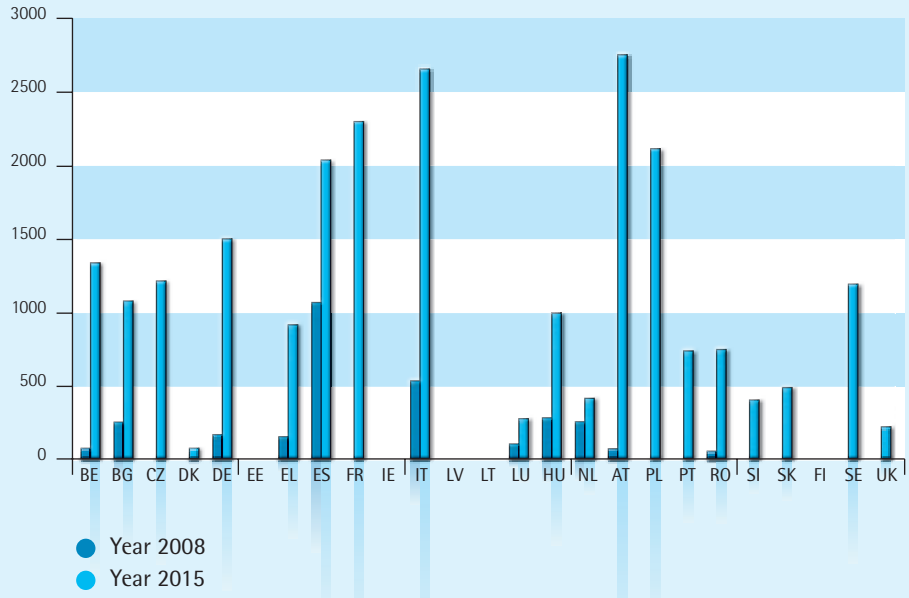
A number of ERTMS projects have demonstrated successful outcomes when involving several manufacturers for trackside and onboard equipment which give a positive sign for market opening and contracting entities' choice. An example is the railway line between Madrid and Barcelona. This project has been divided in two rail sections: Madrid-Lerida (approximately 460 km) and Lerida-Barcelona (approximately 150 km). The trackside control-command assembly for Madrid-Lerida rail section was equipped by Ansaldo while Lerida-Barcelona rail section was equipped by Thales. Three other manufacturers provided the onboard control-command assembly: Alstom, Invensys and Siemens. These 5 ETCS products covering trackside and onboard assemblies proved to be compatible and their use may be considered as a good example of interoperability.

Line	Country	Status	Version	Km	Put into service
Wien – Nickelsdorf	Austria	In service	SRS 2.2.2 + Subset 108 v110 (only level 1 related)	67	2006
Wien – Linz	Austria	Under Construction	tbd	190	2009
Attnang P. – Salzburg	Austria	Under Construction	tbd	71	2009
Wels – Passau	Austria	Under Construction	tbd	83	2009
Antwerpen-Luchtbal – Ned. Grens (L4)	Belgium	In service	SRS 2.3.0 + some error Corrections	40	2008
Angleur – Walhorn – Fre (L3)	Belgium	In service	SRS 2.3.0 + some error Corrections	30	2008
Sofia-Burgas	Bulgaria	In service	SRS 2.0.0	250	2001
Paris-Meuse-Lorraine (LGV Est)	France	Testing	SRS 222 + list of CRs	300	2009
Luxembourg Border-Baudrecourt	France	Under Construction	tbd	80	2009
Spanish Border (Figueras)-Perpignan	France	Testing	SRS 2.3.0	25	2009
Juteborg-Halle/Leipzig	Germany	In service	SRS 2.0.0	40	2005
Berlin-Juteborg	Germany	In service	SRS 2.0.0	124	2006
Belgium Border (L3)-Aachen	Germany	Under Construction	tbd	15	2009
Corinthe-CCA (Communication Center in Acharnes)	Greece	In service	SRS 2.2.2	110	2006
CCA - Athens Airport	Greece	In service	SRS 2.2.2	40	2006
Bajánsenye(border)-Boba	Hungary	In service	SRS 2.0.0	102	2001
Hegyeshalom(border)-Hegyeshalom-Komárom-Budapest	Hungary	In service	SRS 2.0.0	178	2001
Torino-Novara	Italy	In service	SRS 2.2.2 + several CR's	91	2006
Austrian Border (Brenner)- Bolzano-Trento - Verona - Bologna	Italy	Under Construction	tbd	236	2009
Bologna - Firenze	Italy	Under Construction	tbd	78	2009
Roma - Napoli	Italy	In service	SRS 2.2.2 + several CR's	204	2005
Milano - Bologna	Italy	In service	SRS 2.2.2 + several CR's	219	2008
Novara - Milano	Italy	Under Construction	tbd	34	2009
Luxembourg network (partially)	Luxembourg	In service	SRS 2.3.0	100	2007
Bucharest-Campina	Romania	In service	SRS 2.0.0	50	2002
Bratislava - Leopoldov	Slovakia	Under Construction	tbd	64	2009
Leopoldov – Puchov	Slovakia	Under Construction	tbd	94	2009
Madrid-Lerida	Spain	In Service (L1) / Testing (L2)	SRS 2.2.2 + Some national functions	460	2005 (L1)
Lerida-Tarragona	Spain	In Service (L1) / Testing (L2)	SRS 2.2.2 + Some national functions	98	2006 (L1)
Tarragona-Barcelona	Spain	In Service (L1) / Testing (L2)	SRS 2.2.2 + Some national functions	60	2008 (L1)
Figueres-French Border (Perpignan)	Spain	Testing	SRS 2.3.0	20	2009
Madrid-Segovia	Spain	In Service (L1) / Testing (L2)	SRS 2.2.2 + Some national functions	90	2007 (L1)
Segovia-Valladolid	Spain	In Service (L1) / Testing (L2)	SRS 2.2.2 + Some national functions	110	2007 (L1)
La Sagra-Toledo	Spain	In Service (L1) / Testing (L2)	SRS 2.2.2 + Some national functions	21	2005 (L1)
Cordoba-Antequera	Spain	In Service (L1) / Testing (L2)	SRS 2.2.2 + Some national functions	100	2007 (L1)
Antequera-Malaga	Spain	In Service (L1) / Testing (L2)	SRS 2.2.2 + Some national functions	55	2008 (L1)
Zargoza-Huesca	Spain	In Service (L1)	SRS 2.2.2 + Some national functions	80	2006
Umea - Nyland	Sweden	Under Construction	tbd	190	2009
Betuwe line (Totterdam-German Border)	Netherlands	In Service	Based on ERTMS SRS 2.2.2 + Subset 108 v110+ C2007	160	2007
HSL South	Netherlands	In Service	Based on ERTMS SRS 2.2.2 + Subset 108 v110 + C2007	93	2008
Amsterdam-Utrecht	Netherlands	Testing	tbd	30	2009
Cambrian Line	UK	Under Construction	tbd	218	2009

4.3.9.2. ERTMS deployment

Chart 15 shows the evolution between the current ERTMS situation and the expected situation for 2015.

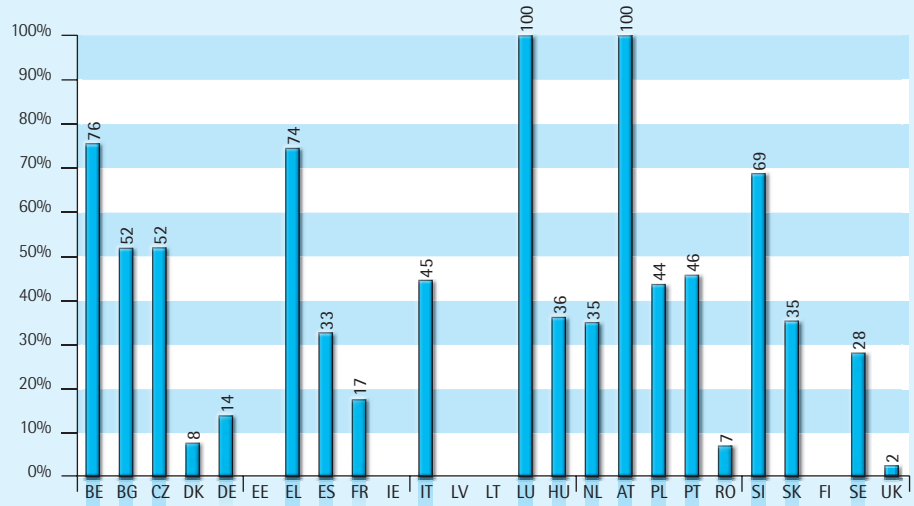
Chart 15. ERTMS kilometres per Member State by 2008/2015



4.3.9.3. Percent of the TEN-T rail network equipped with ERTMS

To compare the effort committed by every member state it is important to calculate the percentage of TEN-T rail network that will be equipped with ERTMS by a certain time period. Hereafter a picture showing the percentage committed till 2015 by Member State.

Chart 16. Percent of TEN-T rail network equipped with ERTMS by 2015



Austria and Luxembourg decided to deploy ERTMS not only on TEN-T part of their national rail network but also in the non-TEN-T one.

4.3.10. HS TSI Infrastructure

4.3.10.1. Length of the TSI compliant infrastructure

In the end of 2007 the EU HS railway network covered 5540 km (see Table 4). The analysis below compares these data with the status of authorised HS lines verified against HS TSI Infrastructure as of the end 2008. Since there are no data available for the status of the HS railway network for 2008, the assessment made might be considered as an estimate of the existing situation.

Table 4. Length of authorised HS lines based on verification against HS TSI Infrastructure, 2008, by Member State

MS	Total HS lines, km in 2007	Length of authorised lines based on verification against HS TSI INF in 2008					
		without derogation		with derogation		total	
		km	% of total HS lines	km	% of total HS lines	km	% of total HS lines
(1)	(2)	(3)	(4) = (3)/(2)	(5)	(6) = (5)/(2)	(7)	(8) = (7)/(2)
BE	120		0%		0%	0	0%
DE	1300	6	0.5%	201.6	15.5%	207.6	16%
ES	1552	999	64%	0	0%	999	64%
FR	1893	0	0%	304	16%	304	16%
IT	562	n.a.		n.a.		n.a.	
SE	n.a.	500				500	
UK	113	0	0%	108.1	96%	108.1	96%
Total*	5540	1005	18%	613.7	11%	1618.7	29%

* SE excluded from the totals of column (3) and (7) since no data is available for column (2) total HS lines in km

Source: European Railway Agency questionnaire to NSAs, EU Energy and Transport in Figures, Statistical Pocketbook 2007/2008

Almost a third of the HS rail network (1619 km) was verified against HS TSI Infrastructure before its authorisation for placing in service. However, part of it was subject to derogations: 11% of the total length of HS lines. Thus, 1005 km or 18% of the length of HS lines are TSI compliant. The leading countries in terms of total length of the railway lines authorised according to the requirements of HS TSI Infrastructure are Spain and Sweden. Spain authorised significant part of its HS rail network (64%) under the TSI regime. The HS lines authorised in France, Germany and the UK are subject to derogations.

4.3.10.2. Register of Infrastructure

The Register of infrastructure was introduced first in the provisions of Directive 96/48/EC (Art. 22). In 2008 with the recast of the interoperability directives the provisions for the register of infrastructure have been revised in Art. 35 of Directive 2008/57/EC. This register must indicate the main features of each subsystem or part subsystem involved (e.g. the basic parameters) and their correlation with the features laid down under the applicable TSIs. The Agency has the task to prepare draft specifications on this register regarding its presentation and format, its revision cycle and instructions for use. This Agency task is still ongoing and therefore, the development of the Register of infrastructure is not mandatory at the time of drafting this report.

Yet the Agency studied what actions the Member States have taken to implement this provision since the data in the register of infrastructure is a valuable tool to measure interoperability progress. In the end of 2008, eight of twenty-two Member States[6] have started setting up registers of infrastructure. The stage of development of registers of infrastructure differs in these eight countries. In Germany and France the register of infrastructure is already in use while in Austria it is in implementation phase. Bulgaria, Spain, Lithuania, Poland and Sweden are in a preparatory phase.

The total length of the lines covered by registers of infrastructure in the EU amounts to 43971 km, part of which includes conventional rail lines. This represents approximately 20% of the length of the rail lines in use in EU 27. Germany covered 34000 km in its infrastructure register, Sweden – 6600 km, Spain – 1500 km, Austria – 1459 km, France – 304 km and the UK - 108,1 km.

4.3.11. HS TSI Energy

4.3.11.1. Length of the TSI compliant infrastructure

Similarly to the analysis of implementation of HS TSI Infrastructure, the data used here compare status of HS lines in the end of 2007 with status of authorised HS lines verified against HS TSI Energy by the end of 2008. Therefore, the assessment made might be considered as an estimate of the existing situation.

Table 5. Length of authorised HS lines based on verification against HS TSI Energy, 2008, by Member State

MS	Total HS lines, km in 2007	Length of authorised lines based on verification against HS TSI ENE in 2008					
		without derogation		with derogation		total	
		km	% of total HS lines	km	% of total HS lines	km	% of total HS lines
(1)	(2)	(3)	(4) = (3)/(2)	(5)	(6) = (5)/(2)	(7)	(8) = (7)/(2)
BE	120	0	0%	0	0%	0	0%
DE	1300	729	56%	0	0%	729	56%
ES	1552	999	64%	0	0%	999	64%
FR	1893	304	16%	0	0%	304	16%
IT	562	n.a.		n.a.		n.a.	
UK	113	0	0%	108	96%	108	96%
Total	5540	2032	37%	108	2%	2140	39%

Source: European Railway Agency questionnaire to NSAs, EU Energy and Transport in Figures, Statistical Pocketbook 2007/2008

Almost 40% of the HS rail network (2140 km) was verified against HS TSI Energy before its authorisation for placing in service. The leading countries in terms of total length of the railway lines authorised according to HS TSI ENE are Spain, Germany and France. Spain and Germany authorised significant parts of their HS rail network, respectively 64% and 56%. The HS lines authorised in the UK (108 km) are subject to derogations. Consequently, the derogations cover 2% of the length of HS lines while TSI compliant HS lines cover 37%.

[6] The information is based on the replies of the 22 NSAs that replied to European Railway Agency questionnaire (for more information see the beginning of this chapter).

4.3.12. CR TSI Operation and Traffic Management

In contrast to the structural TSIs, CR TSI Operation does not have specific deadlines from which the subsystems must comply with. This is a consequence of the need to first harmonise the structural subsystems such as infrastructure, CCS, etc. As TSI Operation treats processes and procedures, a natural migration cannot be done. Therefore, the Member States are required to develop tailor made migration strategies.

The implementation of CR TSI Operation is based on national implementation plans which had to be submitted to the European Commission by February 2008. The analysis of this very important element of CR TSI Operation is not subject in this report since it is within the competence of the European Commission.

The analysis here will address how CR TSI Operation is being taken into account in the safety certification/authorisation of railway undertakings and infrastructure managers during the transitional period till CR TSI Operation is fully enforced[7].

The assessment whether a procedure for the implementation of CR TSI Operation is in place is made by seven NSAs when they award safety certificates or safety authorisations. These include NSAs of Belgium, Greece, Hungary, Poland, Portugal, Finland and the UK. However, this assessment is not done in a uniform way in the different Member States. In Denmark, the NSA does not assess whether a procedure for the implementation is in place, but it does ensure that the applicant has procedures for ensuring compliance with the requirements in CR TSI Operation. Similarly in Poland, the NSA checks if the CR TSI Operation requirements were taken into consideration during working out of the Safety Management System (SMS) by the applicant for the Safety Certificate Part A. Greece legislation envisages procedure for assessment of the implementation of CR TSI Operation for obtaining safety certificate but it will be enforced in the near future. The implementation of CR TSI Operation is planned to start in the near future also in Germany, Austria and Sweden. Other Member States such as Latvia have a transitional period.

The statistical data shows that the assessment of implementation procedures of CR TSI Operation is limited. In 2008, only 4 of the 36 safety certificates/safety authorisations in 11 Member States[8] involved such an assessment; three of them were issued in Belgium and one in Portugal. In 2007, there were only 2 out of 30 safety certificates/safety authorisations and they were issued in Finland.

The NSAs which assess implementation procedures of CR TSI Operation during safety certification/authorisation procedure check different elements of the TSIs. NSAs Greece, Poland and Portugal check both rule books and route books. NSAs Belgium and the UK check only rule books. Additionally, some other elements might be checked such as train composition rules (Greece), train schedule, list of speed limits (Poland) or specific operational conditions (the UK).

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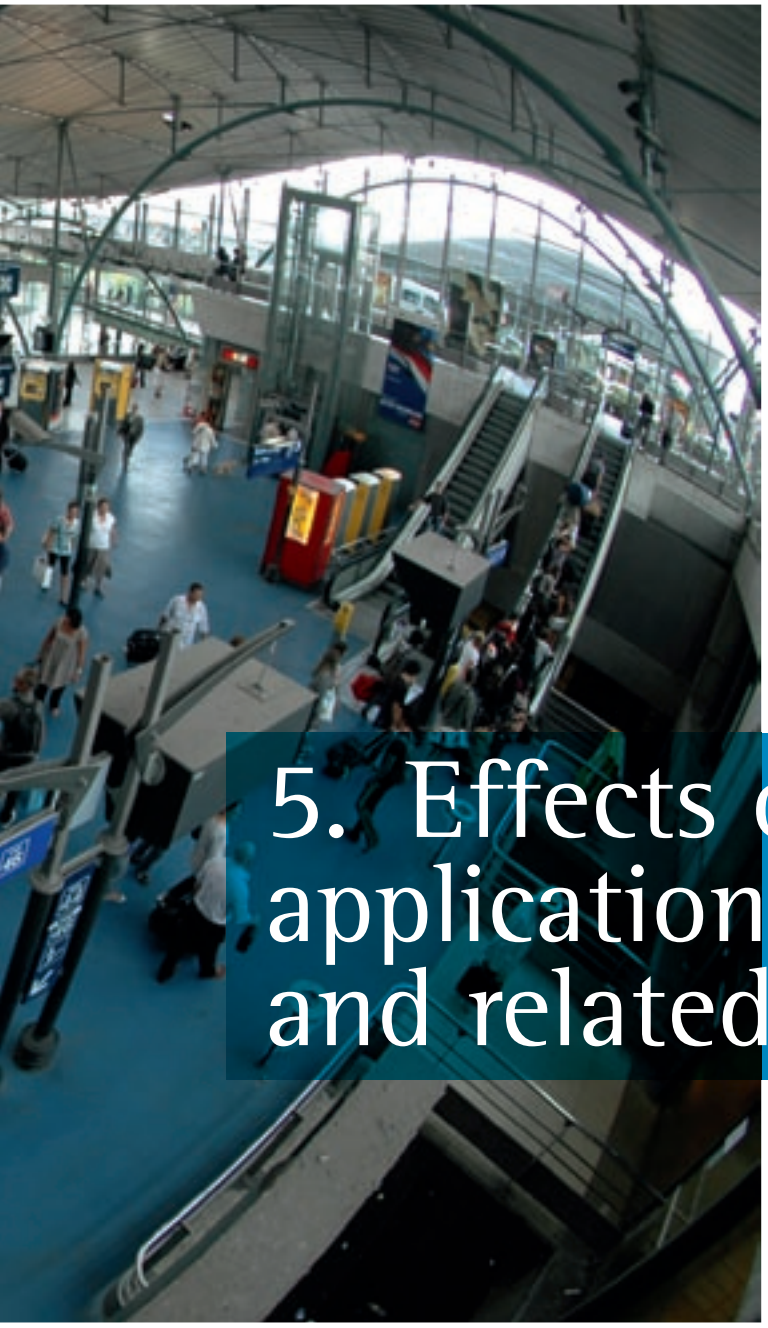
[7] The analysis is based on the responses of 22 NSAs which replied to European Railway Agency questionnaire. For more information see the beginning of the chapter.

[8] The NSAs which provided information are Belgium, Bulgaria, Germany, Greece, Latvia, Hungary, Poland, Portugal, Romania, Slovenia, Slovakia, Finland and the UK.



5. Effects of the application of the TSIs and related problems

This chapter of the report looks into how the introduction of the TSIs affected the market players. The entry in force of the TSIs changed to a certain extent the existing ways of making business both for manufacturers and for railway companies. It necessitated good understanding and application of the new legislative requirements. Then new procedures for conformity assessment of interoperability constituents and verification of subsystems were introduced. Most importantly, the TSI regime affected the stakeholders in different ways: bringing additional costs, decreasing other costs and possibly producing some benefits.

In order to analyse these aspects, the Agency conducted a number of meetings with most sector organisations acting as Representative Bodies[1]. It also collected feedback from them or their members by questionnaires. Seventeen respondents replied to European Railway Agency questionnaire, of which two Representative Bodies and 17 members of Representative Bodies[2]. The assessment made in this chapter is largely based on the responses to this questionnaire.

5.1. Application and use of TSIs

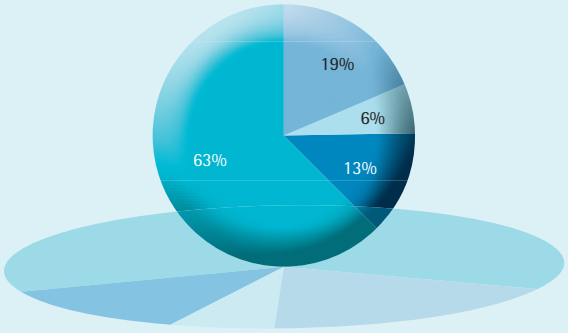
5.1.1. Accessibility to the TSIs and related information

An efficient application of the TSIs depends substantially on good understanding of their provisions by the players who apply TSIs. The first step of gaining knowledge is getting the necessary documents and the information about their application. In general, the stakeholders find the TSIs easily accessible (see Chart 17). The information related to the TSIs such as TSI application guides, technical opinions and TSIs errors is more difficult to access for users.

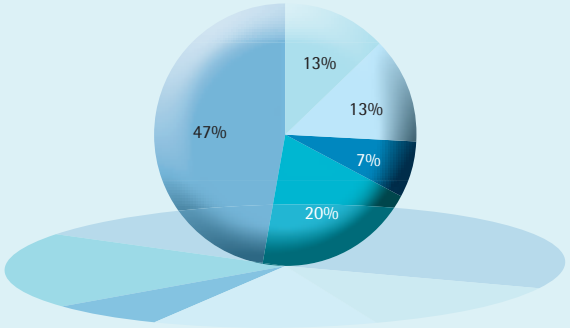
The Agency has already taken some steps to improve the situation by publishing on its website not only the TSIs but also lists of applicable standards and technical opinions. The Agency envisages publishing a list of minor errors on its website in the near future. The update of the TSIs application guide is being done and when ready it will be published on the Agency website and, afterwards, regularly updated.

Chart 17. Accessibility to the TSIs and related information

Do you agree that existing TSIs are easily accessible?



Do you agree that in general the information related to TSIs is easily accessible?



- STRONGLY AGREE
- AGREE
- PARTLY AGREE & PARTLY DISAGREE
- DISAGREE
- NO OPINION

Source: European Railway Agency questionnaire to Representative Bodies

5.1.2. Application and use of the TSIs

Though the access to the TSIs is satisfactory there are some problems with their use. These involve translation errors, TSI content and accessibility to draft standards referenced in the TSIs. The original TSIs are drafted in English and then translated in all official EU languages. At this stage some errors mainly relating to terminology appear. The second problem is related to the TSI content. A lot of respondents noted that the TSIs might be difficult to understand for those who are not interoperability experts due to their complexity and the structure of their content. Furthermore information on interfaces between subsystems is difficult to locate due to the complicated scheme of cross references. The third problem concerns the availability of the draft standards (prEN) quoted in the TSIs. These are available only to the companies that participated in their drafting. The

[1] Meetings were held with CER, EIM, ETF, UIP and UNIFE.

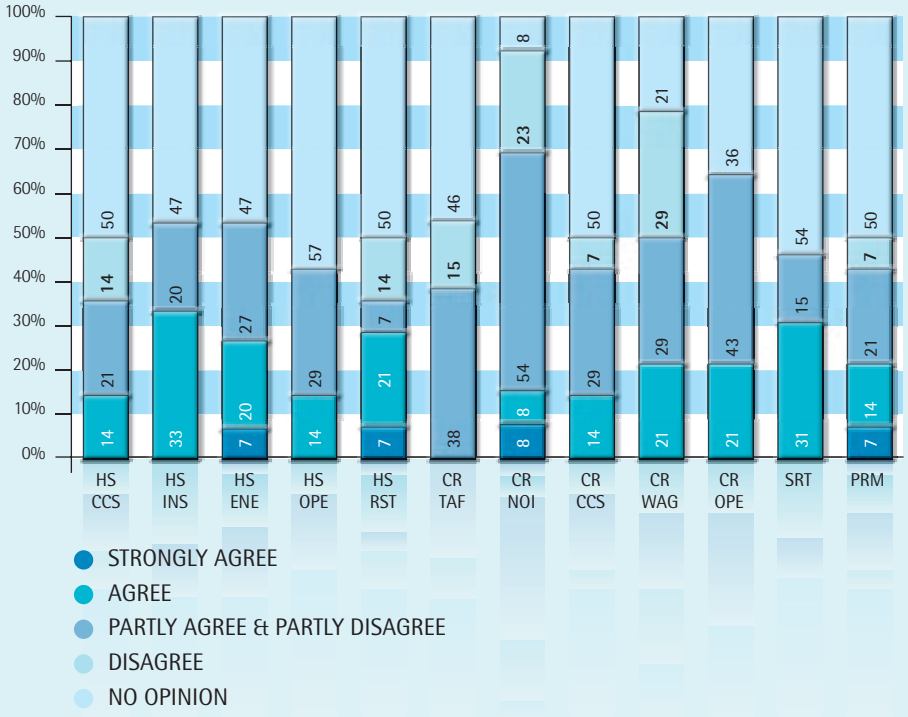
[2] The sector organisation and their members which responded to European Railway Agency questionnaire are CER, UNIFE, EIM, Network Rail, Banverket, Infrabel, Prorail, JBV, REFER, RFF, Transwaggon Switzerland, Transwaggon Germany, VTG Austria, ZVKV Slovakia, VPI Germany, European Rail Rent and AAE Switzerland.

references to draft standards (prEN) in the TSIs are undesirable and this is taken into account into the process of drafting new TSIs and revision of the existing ones. Such references to draft standards may be used exceptionally when no other viable solution is available.

The stakeholders find that the different TSIs require different amount of efforts to be applied (see Chart 18). HS TSIs Infrastructure and Energy together with Safety in Railway Tunnels appear to be the most acceptable in regard to easiness of their use and application.

The most problematic TSIs for the stakeholders are CR TSIs Freight Wagons, Noise and Telematic Applications for Freight. The problems in CR TSI Freight Wagons are related to a high number of errors and open points and costly requirements for parking brakes. Another concern is that vehicle keepers and railway undertakings are required to keep duplicate stocks of

Chart 18. Application and use of the TSIs



Source: European Railway Agency questionnaire to Representative Bodies

certified and non-certified ICs within the area of deployment of their freight wagons. This leads to increased costs for additional storage place and modifications in the software systems. The main problem with CR TSI Noise is that no cost efficient sustainable solution for freight wagons is available.

The main critical remarks for CR TSI TAF concern the legislative act used for its adoption and omission to take into account 1520 mm system in its elaboration. CR TSI TAF was adopted by a Commission Regulation and thus national implementation plans were excluded as a possibility to respond to national specificities. The second problem concerns lack of clarity whether it is legitimate to use 8-digit wagon numbers and data from SMGS consignment note.

For all TSIs except HS TSI Rolling Stock, a significant number of respondents - between 20% and 54% - found that TSIs are not easy to use and apply but did not necessarily find them as difficult. This percentage is higher compared to the respondents who replied positively for HS and CR TSIs CCS and Operation which signals that areas for improvement exist.

A common problem for the application of all TSIs is the relatively big number of open points for which national rules apply. This is a major hindrance to achieving interoperability. Another consequence of the need to take account of the national specifics are the specific cases which result in diverse rules.

The study also identified that rail sector organisations and Member States have difficulties to cope with the difference between existing national legislation and the new EC legislation. The assistance and coordination in the implementation of the TSIs at EU level is recognised as efficient approach to streamline the process. The European coordination activities related to ERTMS deployment proved to be a useful tool for the ERTMS implementation.

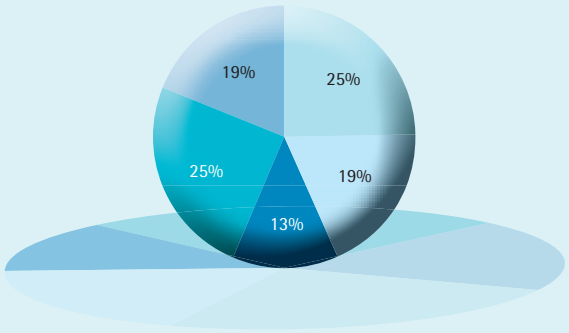
5.1.3. TSI simplification

The procedures for developing TSIs are the same for both HS and CR systems, as are those for the certification of the interoperability constituents and the subsystems. The essential requirements are identical, as are the subsystems. Therefore, the new Interoperability Directive 2008/57/EC provided the basis for developing a single TSI for certain subsystems which might cover both high speed and conventional rail systems.

The feedback on this measure shows support from the railway stakeholders. Railway manufacturers found such a development as beneficial since a lot of the rolling stock products are designed for operations on both HS and CR networks. The same applies for infrastructure and energy subsystems as well as for CCS with exception of the chapter on the implementation of the TSI. The merging of the technical requirements of the common subsystems will reduce the extra costs of keeping and managing two different systems.

Chart 19. Feedback on merging of HS and CR TSIs

Do you agree that the stakeholders find approach to TSIs covering both HS and conventional rail systems simpler and less confusing?



- STRONGLY AGREE
- AGREE
- PARTLY AGREE & PARTLY DISAGREE
- DISAGREE
- NO OPINION

Source: European Railway Agency questionnaire to Representative Bodies

The merging of the CR and HS TSIs, however, needs to take account of certain differences of the two systems. Where values for the basic parameters for HS and CR are different, the TSIs might introduce categorisations or structure the TSI content to accommodate the distinction between the two. Thus additional cost and over-demanding standards for conventional rail will be avoided.

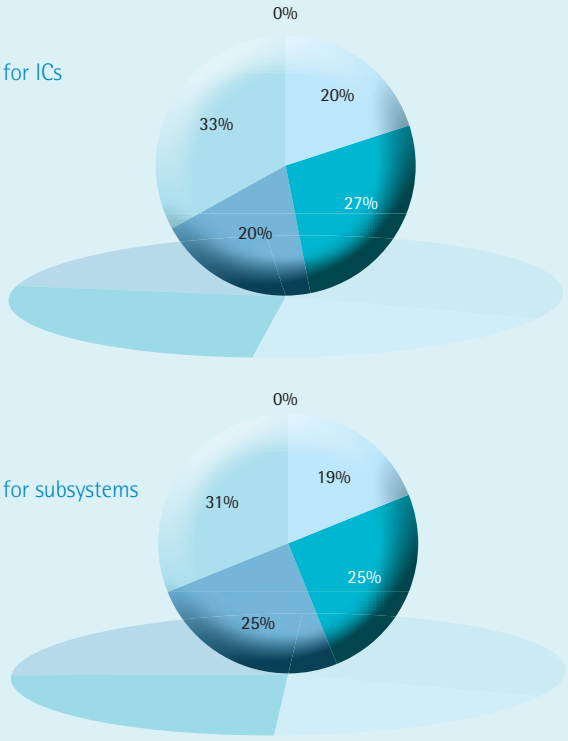
5.2. Conformity assessment, verification and placing in service

5.2.1. Information provided by Notified Bodies on conformity assessment and verification procedures

The feedback from users signals that information provided by Notified Bodies on the procedures for conformity assessment of interoperability constituents and verification of subsystems is not sufficient (see Chart 20). Only a quarter of the respondents are satisfied with the available information.

Chart 20. Availability of information provided by Notified Bodies on conformity assessment and verification

Do you agree that the stakeholders are satisfied with the availability of information related to conformity by assessment by the Notified Bodies?



- STRONGLY AGREE
- AGREE
- PARTLY AGREE & PARTLY DISAGREE
- DISAGREE
- NO OPINION

Source: European Railway Agency questionnaire to Representative Bodies

The respondents who were not satisfied or partly satisfied commented that in most cases the procedures are not published on Notified Bodies websites. The lack of information poses difficulties to applicants with no experience in the procedures and may be an obstacle to organise the application in the right manner. This is particularly relevant for the manufacturers of interoperability constituents. Another problem for applicants is that the Notified Bodies work differently which entails different requirements for documents. Different requirements for documents, however, exist in other commercial sectors and therefore this is a normal development. Last but not least in importance are the errors in the TSIs for which there is no clear procedure in the conformity assessment.

5.2.2 Transparency of fees for conformity assessment and verification

There is a general problem with the transparency of fees of the Notified Bodies. More than 40% of the respondents are not satisfied with the available information of their fees for conformity assessment and verification (see Chart 21). Only 18% of the respondents are satisfied with the existing situation.

The Notified Bodies that charge at an hourly rate make it difficult for applicants to accurately forecast and audit the costs of the conformity assessment and verification. Furthermore, some applicants complained of the excessive quality audits which increase the costs. Another point of concern is the extra cost and prolongation of the procedures when Notified Bodies outsource certain works for which they have no competence.

5.2.3. Applicants criteria for selecting Notified Body

Although price has significant weight in the process of applicants' selection of the Notified Body, quite often it is not the main factor in the choice. Often Notified Bodies clients make their choice based on previous experience with Notified Bodies. Others would look firstly either at the language used by the Notified Body, or whether it acts as a designated body for assessing nNTRs, or service level and secondly on the price offered. The country of establishment is least important when selecting the Notified Body for conformity assessment or verification.

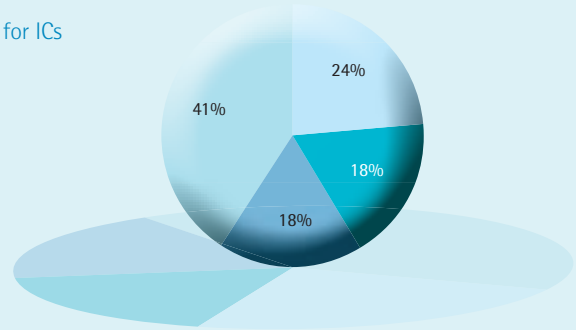
5.2.4. Information provided by NSAs on authorisation procedure for placing in service

Generally, the applicants, especially infrastructure managers and wagon keepers, are satisfied with the information provided by

Chart 21. Transparency of Notified Bodies fees for conformity assessment and verification

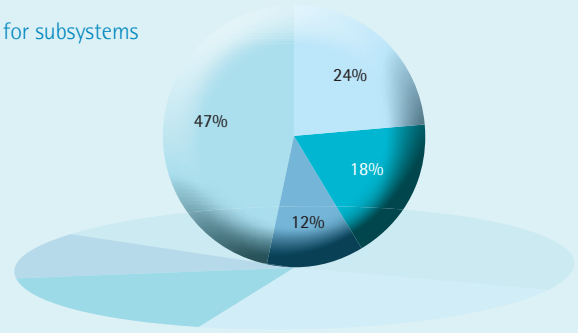
Do you agree that the stakeholders are satisfied with the transparency of fees for NoBos conformity assessment?

for ICs



Do you agree that the stakeholders are satisfied with the transparency of fees for NoBos verification?

for subsystems



- STRONGLY AGREE
- AGREE
- PARTLY AGREE & PARTLY DISAGREE
- DISAGREE
- NO OPINION

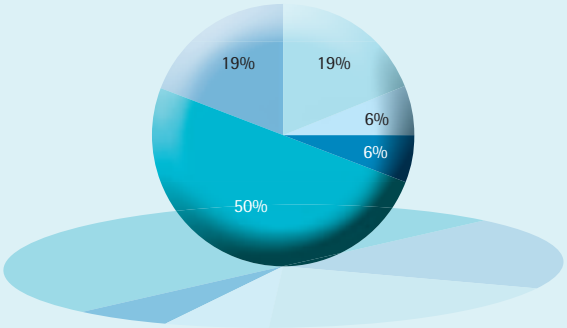
Source: European Railway Agency questionnaire to Representative Bodies

NSAs about the authorisation procedure for placing in service (see Chart 22). However, some sector organisations such as CER and UNIFE recognised some problematic areas.

In some cases the process involves several actors – infrastructure manager, contracting entity, NSA, designated body and possibly other authorities – which makes it difficult to get all necessary information. The feedback indicates that some NSAs are supportive of contracting entities and work with them throughout the process when requested. However, this is not applicable to all NSAs and therefore there is a risk of serious delays of the authorisation of products already having EC certificate of verification.

Chart 22. Availability of information provided by Notified Bodies on authorisation procedure for placing in service

Do you agree that the stakeholders are satisfied with the availability of information related to NSA authorisation procedure for placing in service?



- STRONGLY AGREE
- AGREE
- PARTLY AGREE & PARTLY DISAGREE
- DISAGREE
- NO OPINION

Source: European Railway Agency questionnaire to Representative Bodies

Another concern of the stakeholders is problematic access to nNTRs which leads to lack of clarity in the procedures and makes authorisation procedure more difficult and time-consuming for the applicants.

Most importantly, during the authorisation procedure some companies experienced double checks of documents and test results already approved by a Notified Body. In some cases this was done for wagons already approved in another Member State. Such a development is inacceptable and must be avoided since it not only undermines the efficient functioning of TSI regime but also leads to excessive costs and time delays for railway stakeholders.

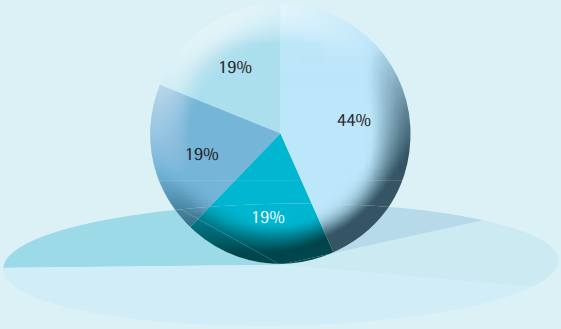
5.2.5. Transparency of fees for authorisation procedure

As already noted in section 4.3.3., not all NSAs charge fees. Those who do charge use two type of charging:

- fixed rate for the whole authorisation procedure where the fees might differ for different subsystems;
- hour-based rates.

Chart 23. Transparency of NSAs fees for authorisation procedure

Do you agree that the stakeholders are satisfied with the transparency of fees for NSA authorisation procedure for placing in service?



- STRONGLY AGREE
- AGREE
- PARTLY AGREE & PARTLY DISAGREE
- DISAGREE
- NO OPINION

Source: European Railway Agency questionnaire to Representative Bodies

The feedback shows that many applicants are not satisfied with the transparency of fees. The dissatisfaction concerns mainly the NSAs charging hourly rates. These hourly rates usually are well known but this is not the case for the estimate of the hours needed for the authorisation procedure. Thus, the applicants could not forecast the costs for authorisation for placing in service.

5.3. Interoperability costs and benefits

To avoid high costs, the interoperability directives provided for gradual approach for achieving interoperability. This means that TSIs apply only to new and upgraded subsystems on TEN-T rail network, the only exception being ERTMS for which more rigorous measures for harmonisation have been implemented. The gradual transition to interoperability was pursued in view of the existing national infrastructure and rolling stock which require high investment costs for renewal. In addition such a gradual approach attempts not to penalise railways economically against other transport modes.

The gradual transition to interoperability is well justified. However, it resulted in two regimes applied in parallel: the TSI regime applied to new and upgraded subsystems on TEN-T rail network and the national rules applied in all other cases.

Consequently, the full benefits of the cost reductions from TSI regime are difficult to realise.

With this caveat in mind, it may be asserted that the TSI regime impacted all rail actors – infrastructure managers, freight and passenger railway undertakings, railway manufactures, wagon keepers – but the impact was different in the different markets. The analysis provided in this section aims to outline the costs and benefits encountered by these actors and where possible to quantify them. The effects on Small and Medium-sized Enterprises (SMEs) will be considered in a separate section for the sake of clarity.

5.3.1. Costs

Most of respondents encountered adverse effects from introduction of the interoperability regime. In the initial phase, the actors needed time to clearly understand their roles and responsibilities. These uncertainties resulted in extra costs and time delays of the projects. In some cases, project managers sought to cover both TSI and national rules and therefore doubled the costs to ensure that project deadlines were met. These negative effects are likely to diminish with time when the interoperability regime is well established, familiarity with it increases and the processes become more efficient.

Costs arising from the interoperability regime are related to additional staff in charge with interoperability, additional costs for complying with TSIs, costs for certification and authorisation/approvals and other costs specific for the subsystem or type of industry. The quantification of these costs is difficult since there is only scarce data available, mainly provided by the Representative Bodies and their members in response to European Railway Agency questionnaire.

5.3.1.1. Additional staff

The new TSI requirements necessitated additional staff in the rail companies and manufacturers to deal with them. For example the infrastructure managers in France, Sweden, the Netherlands and Norway have assigned between 8 and 20 people each to be in charge with interoperability issues. At present, it is not possible to give an estimate of the new staff recruited specifically due to insufficient manpower to address interoperability and those staff reallocated from elsewhere in the organisation to deal with the issues in the reorganised situation.

Additionally to the human resources dealing internally with interoperability issues, some rail stakeholders devoted considerable time and staff to the TSI drafting and revision as well as to development of standards. Many of the rail sector organisations have allocated full time and/or part time staff to these works.

For example, UNIFE members allocated 20 experts as permanent representatives of the manufacturing industry in the Agency working parties. Each of them spent about 20 percent of his/her time to contribute to this work. They are supported by a network of about 200 other experts members of the UNIFE Topical and mirror groups, each of them spending about 10 percent of his/her time in these activities. UNIFE participation in CEN and CENELEC work could be estimated at about 200 experts spending from 10 to 20 percent of their time. Additionally, the equivalent of three to four full time UNIFE staff members are permanently employed to support standardisation activities of the members and each of the seven biggest companies employed at least one or two people for the same purpose.

5.3.1.2. Additional costs related to the TSIs

The new requirements of the TSIs entailed certain costs for the rail companies and manufacturers. Responses to European Railway Agency questionnaire have provided few data which could not show a comprehensive picture for all markets and stakeholders. Nevertheless, some estimates may be done for manufacturers and infrastructure managers.

Smaller infrastructure projects of up to 5 million euro saw a cost increase by up to 5% due to additional costs related to TSIs. For rolling stock additional costs represent 2-3% of the total design, manufacturing and delivery costs. This is considerable cost rate compared with one-digit operational margin of the railway manufacturing business.

5.3.1.3. Costs for certification by Notified Body

The interoperability regime introduced a new procedure for certification of interoperability constituents and subsystems made by the Notified Bodies. The Notified Bodies charge a fee for conformity assessment of the ICs and for verification of subsystems. However, to assess objectively the additional costs of the verification procedure, the Notified Bodies fees must be compared with the costs for internal procedures of checks made within railway companies during the previous regime. The data for these costs are not available in the Agency and often even former railway incumbents could not accurately assess these costs as they were not monitored separately from the other costs. Therefore, it may be concluded that the interoperability regime brought about more transparency as well as European-wide recognition of EC certificates issued by the Notified Bodies.

Taking in consideration that costs for Notified Bodies could not be accounted fully as extra costs since Notified Bodies certification reduced costs for similar activities in the railway undertakings, the scale of these costs may be illustrated with several examples. UNIFE estimate of the costs for international certification is between one and five million euro per Member State.

Infrastructure managers estimate the costs for certification as 0.5-5% of the project costs. There are some cases where the infrastructure managers repeat the checks and tests made by the Notified Body to ensure '*a high safety level*'. An example is the British infrastructure manager - Network Rail – for which these repeated checks and assessments double the work, costs and time of the projects. This doubling of checks is not required by the EC interoperability legislation. Such a development demonstrates that some infrastructure managers do not entirely trust the work done by the Notified Bodies during the certification process.

In certain cases the potential benefits from demonstration of conformity for HS rolling stock are jeopardised by the need to also demonstrate conformity to national technical rules. This situation arises because HS rolling stock is also operated on conventional lines, including non TEN-T rail lines. Significant benefits are expected when the scope of application of TSIs related to rolling stock subsystem extends to the whole rail network and the application of national rules is limited to specific cases or open points.

5.3.1.4. Costs for authorisation for placing in service

The costs for authorisation for placing in service have already been discussed in sections 4.3.3 and 5.2.5. As noted there the situation varies from one Member State to another: some do not charge fees, others do and those which charge use different methods.

The responses of stakeholders to European Railway Agency questionnaire draw the attention to the problems experienced with freight wagon approvals. The interoperability regime aimed to simplify the process of wagon approvals but in practice time and costs for approval increased substantially in some cases. An estimate suggests that the overall approval time for a freight wagon under TSI regime (3½ - 12 months) depends to a great extent on the NSAs. In case both the Notified Body and the NSA are efficient the overall time for approval of freight wagon under TSI regime may be less up-to 2 months compared with previous regime (6-8 months). However, some stakeholders reported an increase of 2-4 months in some cases which creates financial risk for the applicants.

Another concern of the stakeholders is that the costs for approval of a freight wagon under interoperability regime increased by a factor 2 compared to those in the former UIC/RIV system.

5.3.1.5. Other costs

Railway stakeholders identified some other costs related to the TSIs, some of which may be specific for the projects:

- Extra costs of complying with two parallel regimes of checks and approvals – TSI system for TEN-T rail network and national system for non TEN-T rail network.

- Costs for certified spare parts where reserve of interchangeable non-certified spare parts exists.

- Tests for brake-blocks. The assessment of composite brake-blocks is an open point and therefore national rules apply. As a result, brake-blocks need to be tested during authorisation procedure in each Member State which incurs extra costs. Moreover, the different Member States apply different procedures.

Problems with time schedule for approvals under CR TSI WAG.

1) Starting production and finishing first serial wagon	
2) Verification by Notified Body (Modules SB and SD + TSI NOI):	3 - 6 months
3) Procedure for authorisation for placing in service by the NSA	2 weeks up to 6 months
Total required time for full approval after starting production of the wagons	3½ - 12 months

With a weekly production of 5 wagons, the number of wagons produced by the end of the approval process will be 50 to 130 wagons. In case of prolonged procedure, this creates certain financial risk for the applicant who has paid for the wagons with no possibility to place them in service before they are authorised.

- K-blocks. A method to reduce the noise and thus fulfil the requirements of CR TSI Noise for limits of pass-by noise is to use K-blocks. At present, there are only two products (K-blocks) approved for international use. The use of the K-blocks for retrofitting existing wagons is costly due to required changes in brake equipment to comply with CR TSI Freight wagons. A new type of K-blocks requires tests which cost approximately 40-50 thousand euro. Another option is the use of LL composite brake-blocks but for them there is not approved product for international use.

- Costs for external expertise.

- Costs related to delays in certification and authorisation processes, e.g. late delivery penalties due to delays caused by the more complex approval process.

Another weakness of some TSIs is the cost of the transitional measures for implementation. The stakeholders gave an example of the double use and doubled costs for communication and signalling systems in migration phase of trackside modernisation. This, however, is a choice made by the Member States and is not required by the TSIs. The TSIs in this case give Member States the possibility to decide how to implement the CCS TSI(s) without restricting the possible options so that national circumstances may be taken into account.

When introduced, 'TEN' marking of vehicles created some obstacles to smooth rail cargo movement across Europe. The stakeholders claimed that the new regime has caused significant losses to the train operating companies and wagon owners. These problems arose mainly because 'TEN' marking was not applied and used in a uniform way which in turn resulted in coordination problems between keepers and railway undertakings. To ensure more clarity, in 2008 the Agency has developed a recommendation for the closure of the open points in the CR TSI Freight wagons which are creating barriers to rail freight movement. The adoption of recommendation expected to be done in 2009 will clarify the use of 'TEN' marking.

5.3.2. Benefits

For the time being, respondents found few benefits from the introduction of TSI regime. However, a number of them have expectations for benefits in the long term, especially if the TSIs extend their scope to the whole rail network and national rules are limited to those which are necessary. At present, cross acceptance is limited and national regulations still prevail over EC harmonisation. The reason lies in different operational regulations and infrastructures having their origins in historical development of rail systems based on national cultures.

Possible benefits from the TSI regime may be related to new business opportunities, optimisation of costs, easier market entry, time savings. Yet most of the respondents did not experience them at this stage.

- optimisation of costs

Some positive effects are found in the introduction of GSM-R and ETCS. The Norwegian Infrastructure manager (JBV) gave an example of a case study on re-signalling with the implementation of ERTMS Level 2 for a particular line which demonstrated approximately 30% better CBA during the lifetime compared with renewing the existing sub-signalling system.

- easier market entry

UNIFE notes that the market entry for rail products became easier but only to a certain degree and not for all type of products. There is no clear benefit for system manufacturers for the time being in any visible opening of the supply market of interoperability constituents. The benefit in terms of easiness of demonstration of conformity is clear for the CCS subsystem, even though this efficiency is somewhat undermined by the current variations of specifications from one Member State to another and in the lack of cross-acceptance agreements concerning in particular the onboard equipment.

- harmonised rules

A clear benefit from the introduction of the TSIs is convergence to the same requirements. The TSIs may provide the basis for elaboration of national rules related to certain aspects not regulated at national level before the entry in force of the TSI concerned. However, in some countries, the entry in force of the TSIs, and in particular HS TSI Rolling Stock, has had an adverse effect as a trigger of rapid elaboration of technical rules related to open points that did not exist before.

At this stage the benefits seem to be rather limited and difficult to quantify. This difficulty is not only result of the lack of data but also because interoperability impact is difficult to be separated from other EU actions to revitalise railways, e.g. the EC liberalisation packages.

5.3.3. Small and Medium-sized Enterprises

For the time being, the interoperability regime is to a large extent related to placing in service of the subsystems, and therefore mainly relatively big companies are concerned. The additional costs are considerable and the benefits still relatively low, but the business is not significantly affected due to the big size of the concerned orders. There are no profound changes in the nature of the railway business. Exceptions are CR TSI Freight Wagons and CR TSI Noise applied to freight wagons. In this case, the impact of the interoperability regime affected significantly Small and Medium-sized Enterprises (SMEs)[3] because they have fewer human and financial resources to cope with the new requirements. This is equally the case for independent SMEs and for SMEs which are part of big (multi-)national company.

The SMEs face constraints in regard to the additional staff required to deal with Notified Bodies certification and NSA authorisation procedures. The amount of work in applying interoperability requirements is the same as for the bigger companies who have more human resources. Furthermore, most SMEs do not have all international contacts to find the best deal offered amongst the Notified Bodies and NSAs. Another limitation may be the lack of technical and project management know-how required for the conformity assessment, verification and authorisation procedures. Finally, it may be noted that manufacturers, that are SMEs, do not have sufficient resources to represent themselves in the TSI drafting and revision to ensure that TSIs are not disadvantageous for them.

The SMEs have also financial difficulties to bear the extra costs incurred by the interoperability regime. Their production orders are not high enough to compensate the additional costs related to the certification and approval procedures. SMEs usually have small or medium sized freight wagon series of less than 50 wagons. Additional costs related to the TSIs and certification are difficult to be covered by these SMEs to get competitive wagon costs. Therefore, for small orders the additional costs result in very high wagon prices where profitability is almost impossible to achieve.

The comparison with bigger companies shows another disadvantage of the SMEs. The SMEs do not have the financial back-up to cover the costs and effect of the time delays of the certification and approval/authorisation procedures. The effect on SMEs which are part of big companies may be somewhat mitigated; this depends to a large extent on the contractual conditions with their parent companies.

At present, there is no data to assess the impact of interoperability regime on SMEs producing interoperability constituents. The likely effects for these companies are increased costs for conformity assessment made by the Notified Bodies. This may well be compensated by opening of the markets. However, existing studies show that not all Member States open their markets to an extent they should.

5.3.4. Is interoperability regime better than the previous regime for checking, approvals and standards?

Almost half of the respondents assess the interoperability regime to be neither better nor worse than the previous regime for checking, approvals and standards (see Chart 24). A significant number found it worse and 15% suggested it is better. Such an assessment is indicative of a potential of interoperability regime which has not materialised yet. The majority of respondents recognised it has certain advantages such as bringing about more clarity and transparency. However, these advantages are offset by some negative effects. The rail players invested time and efforts to become acquainted with the new procedures for conformity assessment, verification and authorisation. These procedures also entail time and costs which at present are not compensated by short-term benefits. Therefore railway stakeholders have difficulties to make a positive assessment of the new interoperability regime for possible future benefits.

All respondents who assessed that interoperability regime has not brought improvement compared with the previous regime are wagon keepers. They perceive that the RIV and UIC regulation previously used in freight wagon business were faster,

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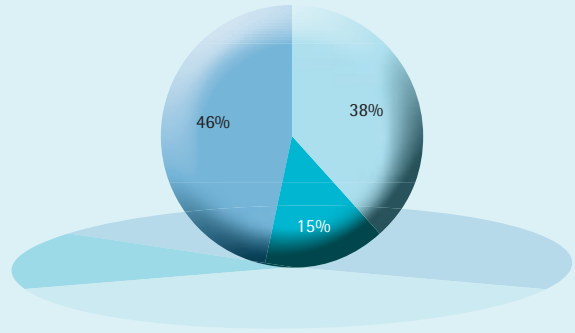
[3] According to Art. 2 of Commission Recommendation 2003/361/EC, the SME are defined as follows:

1. The category of micro, **small and medium-sized enterprises (SMEs)** is made up of enterprises which employ *fewer than 250 persons* and which have an *annual turnover not exceeding EUR 50 million*, and/or an annual balance sheet total not exceeding EUR 43 million.
2. Within the SME category, a **small enterprise** is defined as an enterprise which employs *fewer than 50 persons* and whose annual turnover and/or *annual balance sheet total does not exceed EUR 10 million.*
3. Within the SME category, a **microenterprise** is defined as an enterprise which employs *fewer than 10 persons* and whose annual turnover and/or *annual balance sheet total does not exceed EUR 2 million.*

less complicated and less expensive. The interoperability regime introduced some independent players such as NSAs and new procedure which may have entailed more time for checks but certainly improved the transparency of the procedures. Previously the checks were made by the railway companies themselves.

Chart 24. Feedback on interoperability regime

The stakeholders assess the interoperability regime as better than the previous regime for checking, approvals and standards.



- STRONGLY AGREE
- AGREE
- PARTLY AGREE & PARTLY DISAGREE
- DISAGREE
- NO OPINION

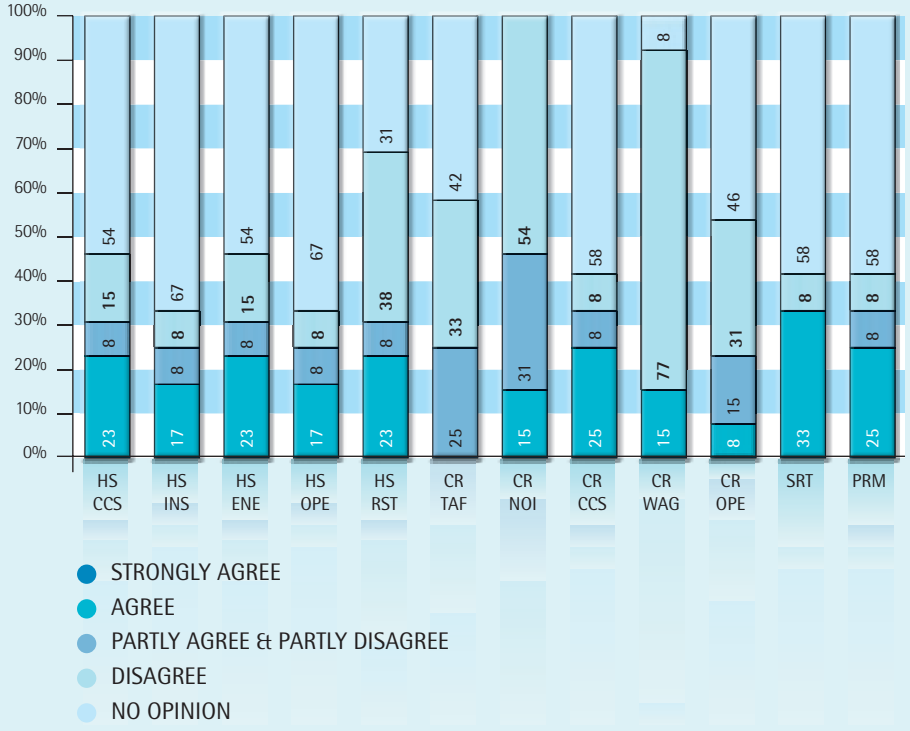
Source: European Railway Agency questionnaire to Representative Bodies

To gain better understanding of railway stakeholders' feedback, we will look into each TSI (see Chart 25).

The TSI regime regulates some subsystems which have not been regulated in the previous regime. From all TSI, the ones which are mostly supported are Safety in Railway Tunnels, People with Reduced Mobility, HS TSIs Infrastructure and Energy and CCS TSIs. However, there is certain percent of respondents which have different opinion. Some who gave positive assessment have also concerns. For example, UNIFE assessed positively CCS since this is support for ERTMS in general but they do not find the situation totally satisfactory. Others noted that closing open points might make interoperability more effective than current arrangements.

Rolling Stock TSIs and CR TSI TAF have attracted relatively high percentage of discontented rail stakeholders. The effect of CR TSI Freight Wagons has already been analysed in section 5.3.3. There was no analogous regulation to CR TSI Noise in the past. Therefore, meeting its requirements and consequent certification increased the life cycle costs of freight wagons. This is why the costs for the first approval are perceived as an additional burden for the industry. CR TSI TAF has been already been discussed in section 5.1.2.

Chart 25. Feedback on TSIs



Source: European Railway Agency questionnaire to Representative Bodies

6. Conclusions

The analysis made in this report shows that interoperability is making progress. The institutions and competent authorities at European and national level are established and functioning. However, some National Safety Authorities face problems with staff recruitment. Most Member States have Notified Bodies carrying out conformity assessment and verification procedures. Nevertheless, there is not much competition between them and where it exists it is competition on national or regional level. One reason is that the Notified Bodies and most applicants outside the country of establishment of the Notified Bodies use different languages. Another reason is the advantageous position of some companies which act as Notified Bodies and designated bodies to assess notified National Technical Rules which gives a possibility for package offers difficult to compete with.

In general, the interoperability legal framework is well developed. Five HS TSIs, five CR TSIs and two transversal TSIs applying to both high-speed and conventional rail system are in force. However, the development of the legal framework varies between high speed and conventional rail systems. While the TSI framework is already completed for high-speed rail systems, this is not yet the case for conventional rail system.

Railway interoperability is not only advanced within the regulatory framework but also shows progress on the railway market. The market of interoperability constituents is expanding, especially for CCS and rolling stock interoperability constituents. The authorisations for placing in service of subsystems also increased over time for most subsystems. A number of interoperable trainsets, wagons and infrastructures have been placed in service.

The total number of subsystems authorised under interoperability regime increased each year for both high-speed and conventional rail vehicles fleets. Between 2006 and 2008, the other high-speed subsystems also indicate some progress. The high-speed energy subsystems authorised under TSI regime amount to 50-75% of all high sped energy subsystems authorised in this period. The respective figures for high-speed infrastructure subsystem are 16-23% and 25-50% for high-speed CCS subsystems. A fifth of high-speed rail network is compliant to HS TSI Infrastructure and more than a third to HS TSI Energy.

In contrast to high-speed rail system, there is less progress with interoperability of the conventional rail system. This is partly because CR TSIs have been developed later and entered in force from 2006 onwards. Another reason is that the European conventional rail systems were established more than a century ago without strong emphasis on common technical specifications. Therefore, nowadays they are more fragmentised and consequently technical harmonisation more difficult to realise. The figures indicate that in 2007 and 2008, 5-6% of the conventional rail CCS subsystems and 0.1-2% of the freight wagons were authorised under TSI regime.

Another important aspect dealt with in the report is how interoperability regime affected the market players. To avoid high costs the interoperability directives provided for gradual approach for achieving interoperability. Consequently, TSIs apply only to new and upgraded subsystems, the only exception being ERTMS. The gradual transition to interoperability was pursued in view of the existing national infrastructure and rolling stock which require high investment costs for renewal. In addition, such an approach was adopted as an attempt not to penalise railways economically against other transport modes.

The gradual transition to interoperability is well justified. However, it resulted in two regimes applied in parallel: the TSI regime applied to new and upgraded subsystems on TEN-T rail network and the national rules applied in all other cases. Consequently, at present the full benefits of the cost reductions from TSI regime are difficult to realise.

The introduction of interoperability regime had substantial impact on rail market players. The new procedures entailed additional costs for staff, certification and authorisation as well as more time to understand and comply with them. TSIs also incurred some additional costs for complying with technical requirements specified in them. These effects are especially strong for SMEs which are wagon keepers. Nevertheless, attention must be paid in the evaluation since for some of the previously mentioned activities the additional costs need to be compared with the costs of internal checks and approvals in the railways done in the previous regime. Some of the negative effects experienced at present are likely to diminish significantly by the time when the interoperability regime is well established, familiarity with it increases and the processes become more efficient.

At present the stakeholders find few benefits from the introduction of interoperability regime. However, a number of them have expectations for benefits in the long term, especially if the TSIs extend their scope to the whole rail network and national rules are limited to those which are necessary. Possible benefits from the TSI regime may be related to new business opportunities, optimisation of costs, easier market entry, time savings. Yet most of the stakeholders did not experience them at this stage. A widely recognised benefit of the interoperability regime is that it brought about more transparency and clarity to market players, especially for new entrants.

Railway interoperability requires huge investments. These costs, together with the possibility to apply national approaches where the legal framework is not yet developed, could act as a hindrance to achieving interoperability targets. Furthermore while the benefits of interoperability arise at a European level, the costs of implementation arise at a national level. This creates an inevitable tension with the potential to slow the implementation of interoperability. Therefore, the future progress depends to a large extent on the political will at European and national level to support efficient interoperability strategies.

Annexes

Annex 1. EC Interoperability Legislation

	Legislative Act	Published	Amendments
Directive 96/48/EC	Council **Directive 96/48/EC** of 23 July 1996 on the interoperability of the trans-European high-speed rail system	17/09/1996 OJ L 235, pp 6-24	Directive 2004/50/EC Directive 2007/32/EC will be repealed as of 19 July 2010 by Directive 2008/57/EC
Directive 2001/16/EC	**Directive 2001/16/EC** of the European Parliament and of the Council of 19 March 2001 on the interoperability of the trans-European conventional rail system	20/04/2001 OJ L 110, pp 1-26	Directive 2004/50/EC Directive 2007/32/EC will be repealed as of 19 July 2010 by Directive 2008/57/EC
Directive 2004/50/EC	**Directive 2004/50/EC** of the European Parliament and of the Council of 29 April 2004 amending Council Directive 96/48/EC on the interoperability of the trans-European high-speed rail system and Directive 2001/16/EC of the European Parliament and of the Council on the interoperability of the trans-European conventional rail system	21/06/2004 OJ L220, pp 40-57	
Directive 2007/32/EC	Commission **Directive 2007/32/EC** of 1 June 2007 amending Annex VI to Council Directive 96/48/EC on the interoperability of the trans-European high-speed rail system and Annex VI to Directive 2001/16/EC of the European Parliament and of the Council on the interoperability of the trans-European conventional rail system	02/06/2007 OJ L 141, pp 63-66	
Directive 2008/57/EC	**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)	18/07/2008 OJ L 191, pp 1-45	
Regulation 881/2004/EC	**Regulation (EC) No 881/2004** of the European Parliament and of the Council of 29 April 2004 establishing a European railway agency (Agency Regulation)	30/04/2004 OJ L 164, pp 1-43	Corrigenda, OJ L 220, 21/06/2004, pp 3-15 Regulation 1335/2008/EC
Regulation 1335/2008/EC	**Regulation (EC) No 1335/2008** of the European Parliament and of the Council of 16 December 2008 amending Regulation (EC) No 881/2004 establishing a European Railway Agency (Agency Regulation)	31/12/2008 OJ L 354, pp 51-59	
NVR	Commission **Decision 2007/756/EC** of 9 November 2007 (notified under C(2007)5357) adopting a common specification of the national vehicle register provided for under articles 14(4) and (5) of Directives 96/48/EC and 2001/16/EC	23/11/2007 OJ L 305, pp 30-51	

High-speed Technical Specifications for Interoperability

HS TSIs	Adopted by	Published	Entry into Force	Amendments
MAI	Commission **Decision 2002/730/EC** of 30 May 2002 concerning the technical specification for interoperability relating to the *maintenance* subsystem of the trans-European high-speed rail system referred to in Article 6(1) of Directive 96/48/EC	12/09/2002 OJ L 245, pp 1-36	To be withdrawn	Corrigenda, OJ L 275, 11/10/2002, pp 1-2
CCS Basic Parameters (not in force)	Commission **Decision 1999/569/EC** of 28 July 1999 on the basic parameters for the *command-and-control and signalling* subsystem relating to the trans-European high-speed rail system	14/08/1999 L 216, p 23	Not in force	Corrigenda, OJ L 236, 07/09/1999, p 38 Repealed by Commission Decision 2002/731/EC
CCS Basic Parameters (not in force)	Commission **Decision 2001/260/EC** of 21 March 2001 on the basic parameters of the *command-control and signalling* subsystem of the trans-European high-speed rail system referred to as 'ERTMS characteristics' in Annex II(3) to Directive 96/48/EC	03/04/2001 OJ L 93, pp. 53–56	Not in force	Repealed by Commission Decision 2002/731/EC
CCS TSI (not in force)	Commission **Decision 2002/731/EC** of 30 May 2002 concerning the technical specification for interoperability relating to the *control-command and signalling* subsystem of the trans-European high-speed rail system referred to in Article 6(1) of Council Directive 96/48/EC	12/09/2002 OJ L 245, pp 37-142	Not in force	Repealed by Commission Decision 2006/860/EC
CCS Annex A (not in force)	Commission **Decision 2004/447/EC** of 29 April 2004 *modifying* Annex A to Decision 2002/731/EC of 30 May 2002 and establishing the main characteristics of Class A system (ERTMS) of the *control-command and signalling* subsystem of the trans-European conventional rail system referred to in Directive 2001/16/EC of the European Parliament and of the Council	30/04/2004 L 193, pp 53-63		
CCS revised TSI	Commission **Decision 2006/860/EC** of 7 November 2006 concerning a technical specification for interoperability relating to the *control-command and signalling* subsystem of the trans-European high speed rail system and modifying Annex A to Decision 2006/679/EC concerning the technical specification for interoperability relating to the control-command and signalling subsystem of the trans-European conventional rail system	07/12/2006 OJ L 342, pp 1-165		Decision 2007/153/EC Decision 2008/386/EC
CCS Annex A	Commission **Decision 2007/153/EC** of 6 March 2007 modifying Annex A to Decision 2006/679/EC concerning the technical specification for interoperability relating to the *control-command and signalling* subsystem of the trans-European conventional rail system and Annex A to Decision 2006/860/EC concerning the technical specification for interoperability relating to the control-command and signalling subsystem of the trans-European high speed rail system	07/03/2007 OJ L 67, p. 13–17	07/12/2006	

HS TSIs	Adopted by	Published	Entry into Force	Amendments
CCS Annex A	Commission **Decision 2008/386/EC** of 23 April 2008 modifying Annex A to Decision 2006/679/EC concerning the technical specification for interoperability relating to the *control-command and signalling* subsystem of the trans-European conventional rail system and Annex A to Decision 2006/860/EC concerning the technical specification for interoperability relating to the control-command and signalling subsystem of the trans-European high-speed rail system	24/05/2008 OJ L 136, p. 11-17	01/06/2008	
INF TSI (not in force)	Commission **Decision 2002/732/EC** of 30 May 2002 concerning the technical specification for interoperability relating to the *infrastructure* subsystem of the trans-European high-speed rail system referred to in Article 6(1) of Council Directive 96/48/EC	12/09/2002 OJ L 245, pp 143-279	Not in force	Corrigenda, OJ L 275, 11/10/2002, pp 5-7 Repealed by Decision 2008/217
INF TSI	Commission **Decision 2008/217/EC** of 20 December 2007 concerning a technical specification for interoperability relating to the *'infrastructure'* sub-system of the trans-European high-speed rail system	09/03/2008 OJ L 77, pp 1-105	01/07/2008	
ENE TSI (not in force)	Commission **Decision 2002/733/EC** of 30 May 2002 concerning the technical specification for interoperability relating to the *energy* subsystem of the trans-European high-speed rail system referred to in Article 6(1) of Directive 96/48/EC	12/09/2002 OJ L 245, pp 280-369	Not in force	Corrigenda, OJ L 275, 11/10/2002, pp 8-10
ENE	Commission **Decision 2008/284/CE** of 6 March 2008 concerning a technical specification for interoperability relating to the *'energy'* sub-system of the trans-European high-speed rail system	14/04/2008 OJ L104, pp 1-79	01/10/2008	
OPE TSI (not in force)	Commission **Decision 2002/734/EC** of 30 May 2002 concerning the technical specification for interoperability relating to the *operation* subsystem of the trans-European high-speed rail system referred to in Article 6(1) of Council Directive 96/48/EC	12/09/2002 OJ L 245, pp 370-401	Not in force	Corrigenda, OJ L 275, 11/10/2002, pp 11-12 Repealed by Commission Decision 2008/231/CE
OPE	Commission **Decision 2008/231/CE** of 1 February 2008 concerning the technical specification of interoperability relating to the *operation* subsystem of the trans-European high-speed rail system adopted referred to in Article 6(1) of Council Directive 96/48/EC and repealing Commission Decision 2002/734/EC of 30 May 2002	26/03/2008 OJ L 84, pp 1-131	01/09/2008	
RST TSI (not in force)	Commission **Decision 2002/735/EC** of 30 May 2002 concerning the technical specification for interoperability relating to the *rolling stock* subsystem of the trans-European high-speed rail system referred to in Article 6(1) of Directive 96/48/EC	12/09/2002 OJ L 245, pp 402-506	Not in force	Corrigenda, OJ L 275, 11/10/2002, pp 13-16 Repealed by Commission Decision 2008/232/CE
RST	Commission **Decision 2008/232/CE** of 21 February 2008 concerning a technical specification for interoperability relating to the *'rolling stock'* sub-system of the trans-European high-speed rail system	26/03/2008 OJ L 84, pp 132-392	01/09/2008	

Conventional Rail Technical Specifications for Interoperability

CR TSIs	Adopted by	Published	Entry into Force	Amendments
BP NOI, WAG, TAF	Commission **Decision 2004/446/EC** of 29 April 2004 specifying the basic parameters of the *Noise*, *Freight Wagons* and *Telematic applications for freight* Technical Specifications for Interoperability referred to in Directive 2001/16/EC	30/04/2004 OJ L 155, pp. 1–64	Not in force	Corrigenda, OJ L 193, 01/06/2004, pp. 1–52 Repealed by Decision 2006/66/EC, Decision 2006/861/EC and Regulation 62/2006/EC
TAF	Commission **Regulation 62/2006/EC** of 23 December 2005 concerning the technical specification for interoperability relating to the *telematic applications for freight* subsystem of the trans-European conventional rail system	18/01/2006 OJ L 13, pp 1-72	19/01/2006	
NOI	Commission **Decision 2006/66/EC** of 23 December 2005 concerning the technical specification for interoperability relating to the subsystem '*rolling stock – noise*' of the trans-European conventional rail system	08/02/2006 OJ L37, pp 1-49	24/06/2006	
CCS Basic parameters	Commission **Decision 2004/447/EC** of 29 April 2004 modifying Annex A to Decision 2002/731/EC of 30 May 2002 and establishing the main characteristics of Class A system (ERTMS) of the *control-command and signalling* subsystem of the trans-European conventional rail system referred to in Directive 2001/16/EC of the European Parliament and of the Council	30/04/2004 L 193, pp 53-63		Article 2 deleted by Decision 2006/679/EC
CCS TSI	Commission **Decision 2006/679/EC** of 28 March 2006 concerning the technical specification for interoperability relating to the *control-command and signalling* subsystem of the trans-European conventional rail system	16/10/2006 OJ L 284, pp 1-176	29/08/2006	Decision 2006/860 Decision 2007/153 Decision 2008/386/EC
CCS Annex A	Commission **Decision 2006/860/EC** of 7 November 2006 concerning a technical specification for interoperability relating to the *control-command and signalling* subsystem of the trans-European high speed rail system and modifying Annex A to Decision 2006/679/EC concerning the technical specification for interoperability relating to the control-command and signalling subsystem of the trans-European conventional rail system	07/12/2006 OJ L 342, pp 1-165		Decision 2007/153/EC
CCS Annex A	Commission **Decision 2007/153/EC** of 6 March 2007 modifying Annex A to Decision 2006/679/EC concerning the technical specification for interoperability relating to the *control-command and signalling* subsystem of the trans-European conventional rail system and Annex A to Decision 2006/860/EC concerning the technical specification for interoperability relating to the control-command and signalling subsystem of the trans-European high speed rail system	07/03/2007 OJ L 67, pp. 13–17	07/03/2007	

CR TSIs	Adopted by	Published	Entry into Force	Amendments
CCS Annex A	Commission **Decision 2008/386/EC** of 23 April 2008 modifying Annex A to Decision 2006/679/EC concerning the technical specification for interoperability relating to the *control-command and signalling* subsystem of the trans-European conventional rail system and Annex A to Decision 2006/860/EC concerning the technical specification for interoperability relating to the control-command and signalling subsystem of the trans-European high-speed rail system	24/05/2008 OJ L 136, p. 11-17	01/06/2008	
WAG	Commission **Decision 2006/861/EC** of 28 July 2006 concerning the technical specification of interoperability relating to the subsystem *rolling stock – freight wagons* of the trans-European conventional rail system	08/12/2006 OJ L 344, pp 1-467	29/01/2007	
OPE	Commission **Decision 2006/920/EC** of 11 August 2006 concerning the technical specification of interoperability relating to the subsystem *Traffic Operation and Management* of the trans-European conventional rail system	18/12/2006 OJ L 359, pp 1-160	12/02/2007	

Transversal Technical Specifications for Interoperability

HS and CR TSIs	Adopted by	Published	Entry into Force	Amendments
SRT	Commission **Decision 2008/163/EC** of 20 December 2007 concerning the technical specification of interoperability relating to "*safety in railway tunnels*" in the trans-European conventional and high speed rail system	07/03/2008 OJ L 64, pp 1-72	01/07/2008	
PRM	Commission **Decision 2008/164/EC** of 21 December 2007 concerning the technical specification of interoperability relating to "*persons with reduced mobility*" in the trans-European conventional and high speed rail system	07/03/2008 OJ L 64, pp 72-207	01/07/2008	

Annex 2. List of acronyms

the Agency	the European Railway Agency
A21C	Article 21 Committee
AEIF	European Association for Railway Interoperability
ALE	Autonomous Train Drivers' Unions of Europe
CCS	Control-command and signalling
CEN	European Committee for Standardisation
CENELEC	European Committee for Electrotechnical Standardization
CER	Community of European Railway and Infrastructure Companies
the Commission	the European Commission
CR	Conventional rail
CR TSI CCS	Conventional rail Technical specification for interoperability Control-command and signalling
CR TSI ENE	Conventional rail Technical specification for interoperability Energy
CR TSI INF	Conventional rail Technical specification for interoperability Infrastructure
CR TSI NOI	Conventional rail Technical specification for interoperability Noise
CR TSI OPE	Conventional rail Technical Specification Operation
CR TSI TAF	Conventional rail Technical specification for interoperability Telematic applications for freight
CR TSI WAG	Conventional rail Technical specification for interoperability Freight wagons
CR TSI(s)	Conventional rail Technical specification(s) for interoperability
DG TREN	Directorate-General Energy and Transport
DREAM Database	Database for Railway Economic Analysis Management

EC	European Communities
EC Treaty	Treaty establishing the European Community
ECVVR	European Centralised Virtual Vehicle Register
EEA	European Economic Area
EIM	European Rail Infrastructure Managers
ENE	Energy
ERFA	European Rail Freight Association
ERTMS	European Rail Traffic Management System
ETF	European Transport workers' Federation
EU	European Union
EU12	Bulgaria Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Romania, Slovenia and Slovak Republic
EU15	Belgium, Denmark, Germany, Greece, Spain, France, Ireland, Italy, Luxembourg, the Netherlands, Austria, Portugal, Finland, Sweden and the United Kingdom
HS	high speed
HS TSI CCS	High speed Technical specification for interoperability Control-command and signalling
HS TSI ENE	High speed Technical specification for interoperability Energy
HS TSI INF	High speed Technical specification for interoperability Infrastructure
HS TSI MAI	High speed Technical specification for interoperability Maintenance
HS TSI OPE	High speed Technical specification for interoperability Operation
HS TSI RST	High speed Technical specification for interoperability Rolling stock
HS TSI(s)	High speed Technical specification(s) for interoperability
IC(s)	interoperability constituent(s)
INF	Infrastructure

ISA	Independent Safety Assessor
LOC&PAS RST	locomotives and passenger RST
MAI	maintenance
MS	Member States
Nando	New Approach Notified and Designated Organisations Information System
NB-Rail	Coordination group of Notified Bodies for railway products and systems
nNTR	notified national technical rules
NoBo	Notified Body
NOI	noise
NSA	National Safety Authority
NSA Network	National Safety Authorities Network
OPE	Operation
prEN	draft European standard
PRM	persons with reduced mobility
RB	Representative Body
RISC	Railway Interoperability and Safety Committee
RST	Rolling stock
SMEs	Small and Medium-sized Enterprises
SMGS	Agreement concerning International Freight Traffic by Rail (of the OSJD)
SMS	Safety Management System
SRS	System Requirements Specification
SRT	safety in railway tunnels

TAF	telematic applications for freight
TAP	telematic applications for passengers
tbd	to be determined
TEN-T rail network	Trans-European transport rail network
TSI PRM	Technical specification for interoperability Persons with reduced mobility
TSI SRT	Technical specification for interoperability Safety in railway tunnels
TSI(s)	Technical specification(s) for interoperability
UIP	International Union of Private Wagons
UIRR	International Union of combined Road-Rail transport companies
UITP	International Association of Public Transport
UNIFE	Association of European Railway Industries
WAG	freight wagons

Country abbreviations

BE	Belgium
BG	Bulgaria
CZ	Czech Republic
DK	Denmark
DE	Germany
EE	Estonia
EL	Greece
ES	Spain
FR	France
IE	Ireland
IT	Italy
LV	Latvia
LT	Lithuania

LU	Luxembourg
HU	Hungary
NL	Netherlands
NO	Norway
AT	Austria
PL	Poland
PT	Portugal
RO	Romania
SI	Slovenia
SK	Slovakia
FI	Finland
SE	Sweden
UK	United Kingdom

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