KEMA Rail Transport Certification

Rail Interoperability & Safety

Transposition of legislation and progress on the field

Final Report

European Commission
DG TREN
17 October 2007

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Background

The legal acts of the 1st and 2nd railway packages constitute a coherent set of EU legislation which extensively reform market access rules, and enhance the technical and safety related regulatory framework in view of integrating the European rail service market. In August 2001 the Commission engaged a consortium to carry out a study on the implementation of Directive 96/48/EC and the progress made towards high speed interoperability (known as the 'Graband' study). It is now necessary to build upon the findings of the Graband study, and to determine the progress made in both high speed and conventional interoperability since 2001 and also the progress made in the transposition of the safety directive.

Scope of the study

In December 2006 the Commission charged a grouping of international consulting and engineering firm DHV, with headquarters in the Netherlands, and Kema Rail Transport Certification, also based in the Netherlands, with a study consisting of three parts:

1. Identify the national transposition measures in place within each Member State for directives 2004/49/EC, and directives 2001/16/EC and 96/48/EC as amended by 2004/50/EC[I]. Additionally, the transposition measures of 6 countries, chosen in a dialogue between the Commission and the grouping, were evaluated[II].
2. Determine the progress being made on both high speed and conventional rail interoperability. The assessment shall identify any key differences and problems associated with the transposition of the directives and the implementation and progress of interoperability, and in particular consider any problems or issues associated with the separation of railway operations from the infrastructure.
3. Review and describe the different models in place across the Member States for accident investigation bodies and national safety authorities, their comparative benefits and disbenefits (or rather: disadvantages), and evaluate their set up with regards to the provisions of directive 2004/49/EC.

In terms of geographical scope, a total of 27 countries are involved: EU27, minus Malta and Cyprus (because they have no railways), plus Switzerland and Norway.

Methodology

In agreement with EC and ERA representatives, the project team relied heavily on their own critical analysis of the three themes. This directed their information acquisition activities and the input received served to substantiate, complete and correct the analysis.

The information needed to carry out the study was collected by studying websites and documents and by consultations with stakeholders. The analysis was fostered by discussions with EC and ERA officials, and its results were partly fed back to other contacts who had given input.

[I] These directives are referred to hereafter as Railway Safety Directive (RSD), Conventional Rail Directive (CRD), High Speed Directive (HSD) and Interoperability Amendment Directive (IAD), respectively.

[II] Evaluation of the transposition measures for all countries was not contained in the terms of reference for the project and was not feasible within the limits of the project.

The authors have contacted a large number of people in European institutions, the rail sector and governments of the countries involved. They wish to express their gratitude for the information and opinions that were given, with almost no exception, in a spirit of openness and co-operation. This in itself is a positive sign for the advancement of interoperability.

Conclusions and way forward

The study has led to the following conclusions and proposals for the way forward.

Transposition of the Railway Safety and the Interoperability Amendment Directives

1. As per July 2007, four countries have not yet (fully) transposed the Railway Safety Directive or it has not yet entered into force: Greece, Italy, Luxemburg and Switzerland. According to our information, seven[III] countries have not yet transposed the Interoperability Amendment Directive: Greece, Italy, Luxemburg, Norway, Slovenia, Switzerland and Sweden. To tackle this, the Commission has already started an infraction procedure against the Member States concerned.

2. RSD and IAD transposition measures for the following 6 countries were evaluated: Austria, Czech Republic, France, Germany, Slovak Republic and UK. These transpositions were found to be complete and correct, with a small number of exceptions. Some of the (suspected) anomalies in the legislation can lead to serious shortcomings in the level playing field and the related safety guarantees. A dialogue with each MS involved needs to be taken on, to further investigate the correctness and the seriousness of these anomalies and to discuss remedial action.

3. The way in which the directives have been transposed into the national legislation differs substantially between the 6 countries that were assessed. This is not seen as a problem.

4. In all 6 cases the legislation was found to be reasonably to well accessible for the assessors, who are experts in the field. However, accessibility of legislation for a larger target group can be improved. This is an issue with wider scope than just railways. The EC is advised to internally discuss the need for improvement.

Progress of Interoperability

1. Interoperability is progressing. The legal system is in place. Implementations in the Member States are nearly completed. The institutions in the Member States and on European level have largely been established. A large part of the TSIs is available. The first interoperable parts of the network have been put in operation. Interoperable traffic on these lines is starting to take place. Interoperability now can grow further from “pragmatic” to “full”.

2. ERTMS is the most important driver of interoperability. The start of interoperability is clearly visible in this area. The next steps must be to develop a probably global market for ERTMS/ETCS equipment and systems. The development of this market is seen as an important incentive for European industries to improve their competitiveness.

[III] Based on notifications received and processed by the Commission until beginning of June 2007.

3. Confusion about the definition of interoperability and other reasons make the application of the TSIs seemingly difficult and create openings to continue to apply national approaches. Further development of the TSIs, aimed at improving their completeness and ease of application is needed to reduce this trend for national solutions.

4. The separation of responsibilities for infrastructure management and operations is a corner stone in railway policy, which aims at improving the attractiveness and competitiveness of the railways. As consequences of this approach the new notions of interoperability, TSIs and certification must restore the systems structure. In order to reach a stable structure a strict application of these instruments is needed. The TSI OPE is one of these instruments and should also be applied more strictly.

5. A subsystem or interoperability constituent is only really interoperable after its interoperability is demonstrated through certification. This is another consequence of the introduction of separation of infrastructure and operations.

6. Harmonisation of the railway network can only be reached on a long term because of the enormous costs involved. Innovation is not necessarily a goal of interoperability. Interoperability creates conditions for an open railway market, but it does not create the market itself, neither does it solve financial problems of further introduction and improvement of interoperability. The next steps of creating this market depend largely on the political will to define and support effective migration strategies.

7. Future success depends on the use of feedback of experiences, the ability to monitor and measure the progress of interoperability and to recognise the reasons for the lack of progress.

National Safety Authorities

1. The body designated as National Safety Authority could be identified in all countries, except for Bulgaria. For Greece and Luxembourg no information could be collected on organisation of NSA tasks.

2. In Spain[IV] and Italy the current situation with respect to NSA tasks differs significantly from what the RSD requires. In all other countries the NSA's tasks are in line with the RSD's demands and the NSA's meet the requirement of independence. This issue justifies a dialogue with the authorities of the two countries concerned.

3. Several countries report problems with respect to recruitment for the NSA. To tackle staffing problems, NSA's sometimes hire external experts. If this involves people from infrastructure managers or railway undertakings (which is allowed in Belgium and France and is not known for other countries) there may be an independence issue.

4. Although the RSD explicitly allows the NSA to be the MoT or part thereof, a position of the NSA outside the MoT has an advantage, mainly when dealing with infrastructure safety issues.

[IV] Based on information of 2006.

National Investigation Bodies

1. No information on NIB could be collected for Bulgaria and Lithuania. In all other countries a permanent body for accident investigation exists, except in Italy, where the investigation commission is of a non-permanent nature.

2. The requirements with respect to the independence of accident investigation are currently not met in 7 countries. These have announced changes that are expected to solve the problem. There are reasons for doubt about two more countries. In the other countries the requirements with respect to the independence of accident investigation are met.

3. In many countries a conflict of interest could arise during an investigation and its follow-up because the NIB is positioned within or close to the Ministry responsible for Transport. This issue merits a discussion on community level, but cannot be expected to be solved quickly.

4. In Finland the no-blame nature of an investigation could be affected by the fact that its NIB is positioned within the Ministry of Justice (which was done for reasons of independence). This point could be discussed bilaterally. This issue does not occur in the other countries.

5. No problems have been encountered with respect to scope, resources and due process.

Finally

The policy of the EU with respect to the railways can be summarised by the following chain of goals and means (where each line is the goal of the means below and the means to the goal above):

- Keep Europe moving and combat pollution
- Increase the modal share of rail
- Make rail more competitive
- Open up the markets for rail transport services and rail products
- Increase the compatibility of subsystems and parts
- Harmonise technical specifications and safety regimes

where safety is a key condition, to be maintained at least at the current level and to be improved where reasonably practicable.

The state of affairs and problems encountered in this study do not cast doubts upon the essential idea of integrating the European rail market, but reveal a lot of issues concerning its implementation. To tackle these one needs to be consistent in an attitude of ‘count your blessings’ and ‘be realistic in expectations’, knowing it is a long term operation.

Whereas the interoperability provisions on the long run aim at - to put it very simply - allowing any compliant train to run on large portions of the European network, making train and track to work together on a given project in practice seems to be harder now than before infrastructure management and train operations were separated. The main obstacle for new market entrants in concrete terms is still perceived to be the persisting diversity in technical and operational requirements for trains, staff and operations.

To focus interoperability yet again on its goal of opening up the market and to speed up its implementation, the authors have made proposals on:

- strengthening the management of train/track interfaces including operations;
- corridor implementation strategy and financial instruments;
- future development of EU railway legislation;
- culture and knowledge transfer.

1 INTRODUCTION

1.1 Introduction on safety and interoperability

Two directives on interoperability exist: Directive 96/48/EC for high speed rail and 2001/16/EC on conventional rail. The interoperability directives put into place a system for conformity assessment against the TSIs, the placing into service of subsystems, and the placing of interoperability constituents onto the market. The roles of the key actors and bodies are established such as notified bodies, contracting entities and supervisory authorities. Further, the directives mandate the development of technical specifications for interoperability (TSIs) which establish the technical interoperability requirements which subsystems and interoperability constituents shall meet. It is expected that these measures will gradually create an open market for rail products and systems, create true operational rail interoperability at a European level, and reduce the high costs and burdens currently being experienced from the perpetuation of specific national technical solutions and systems. Five TSIs related to high speed rail and three TSIs related to conventional rail are published. The progress of interoperability cannot only be measured through the national transposition of legislation and it is important to determine the actual progress made with regards to the market for interoperable rail products and services, the number of subsystems in place, and the improvement in interoperability and reduction of technical barriers.

Directive 2004/49/EC on the safety of the community's railways, adopted as part of the second package (the 'railway safety directive'), puts into place a harmonised framework and approach to rail safety and establishes the roles and responsibilities of the key actors, such as railway undertakings and infrastructure managers. The directive also requires Member States to establish national safety authorities who are responsible for administering and managing some of the safety provisions described in the directive, and accident investigation bodies who will carry out investigations in order to establish their cause and background. The directive foresees the development of harmonised technical safety measures, such as common safety targets and common safety methods, and it is expected that these will establish links between the safety management of the railway and the technical requirements established by the TSIs. There is thus a clear relationship between interoperability directives and the safety directive, and technical solutions and safety shall be harmonised and established in a transparent manner, facilitating the removal of market entry barriers.

1.2 Purpose and scope of the study

The purpose of the study and the tasks to be performed are stated clearly in the specifications attached to the Invitation to Tender. Section 1.2 of the Specifications reads as follows:

'The purpose of this study is to evaluate the transposition within the Member States of Directives 2004/49/EC, 2004/50/EC, and the progress on the implementation of Directive 96/48/EC (on the interoperability of the trans-European high speed rail system) and Directive 2001/16/EC (on the interoperability of the conventional rail system).

The study shall identify the progress of interoperability on the railways by using subsystem authorisation as metrics, assess the market for interoperability constituents and assess the cost of placing subsystems into service. Further the study shall determine the key problems and difficulties found in the implementation of the interoperability directives in consideration of the

separation of railway operations from the infrastructure, as required by the infrastructure directives.

Additionally, in relation to railway safety, the study shall review the set up of accident investigation bodies and national safety authorities and describe the different models in place, and their relative benefits and disbenefits (disadvantages).'

In summary, the study needs to evaluate the progress that has been made in harmonising technical solutions and safety, both legally and practically. Harmonisation is not a goal in itself, but instrumental in opening up the market for railway services and railway products. Therefore, the Commission's focus is on identifying where and why the European railway legislation possibly fails to meet its goals, and if so, finding ways to remedy this.

In terms of geographical scope, a total of 27 countries are involved: EU27, minus Malta and Cyprus (because they have no railways), plus Switzerland and Norway.

1.3 Tasks to be performed

According to the specifications, the study project shall carry out the following general tasks:

1. Identify the national transposition measures in place within each Member State for directives 2004/49/EC, and directives 2001/16/EC and 96/48/EC as amended by 2004/50/EC.
2. Determine the progress being made on both high speed and conventional rail interoperability. The progress shall be measured in terms of the subsystems authorised to be placed into service, the number of interoperable constituents placed on the market, the effect of the TSIs on the rail market itself, including an assessment of the costs of placing into service and/or placing on the market. The assessment shall identify any key differences and problems associated with the transposition of the directives and the implementation and progress of interoperability, and in particular consider any problems or issues associated with the separation of railway operations from the infrastructure.
3. Review and describe the different models in place across the Member States for accident investigation bodies and national safety authorities, their comparative benefits and disbenefits (disadvantages), and evaluate their set up with regards to the provisions of directive 2004/49/EC.

The entries 1, 2 and 3 above will be referred to as the three parts of the study hereafter.

In terms of specific tasks the study project shall (where point 2a through 2d relate to point 2 above and point 3a and 3b relate to point 3 above):

1. Carry out a survey of all Member States to determine the status of transposition of the legislation.
2a. Carry out a survey of subsystems authorised into service and interoperable constituents placed on the market.
2b. Determine the metrics to be used to identify the progress of interoperability.
2c. Evaluate the progress on interoperability through the application of the metrics
2d. Consult with the key stakeholders who have a role in the implementation and application of the interoperability directives and the related TSIs to determine problems, concerns, successes and failures.

2e. Analyse and draw conclusions on interoperability, it progress, key problems, concerns, issues and proposals for their resolution.
3a. Carry out a survey of all Member States to determine the structures in place for accident investigation bodies and safety authorities.
3b. Carry out a comparative evaluation, analysis and conclusions on the benefits and disbenefits (disadvantages) for each different type of model, whether they meet the provisions of Directive 2004/49/EC, describe any key problems, issues and concerns identified and proposals for their resolution.

The specifications for the project were drafted in the first half of 2006 and the contract was signed at the end of that year. In the meantime developments took place that make some adaptations to the work necessary. As it stands, point 1 of the work break-down structure above has already been done. Therefore, attention shifts from identifying the measures to their assessment. However, it is understood between EC and DHV/Kema that assessment is a much larger task than identification and therefore, only a part of the countries can be involved in the assessment. This report contains the assessment for six countries.

As for point 3 of the work break-down structure above, some more specific questions were added as a result of a meeting between EC, ERA and DHV/Kema:
- are the role, the structure and the administrative position of the bodies newly created or recasted in line with the requests of the directive?
- how do these bodies concretely proceed to deliver certificates or investigation reports.
- do the NSA's perform all the tasks mentioned in art. 16 of the Safety Directive?
- do the NSA's and NIB's have adequate resources?
- how do accident investigation bodies interpret criteria for deciding whether or not to investigate and does the way they are set up affect their reporting? Note: this issue is not a priority and therefore has not been examined extensively.

These will be addressed as far as reasonably practicable within the resources assigned to the project.

1.4 Methodology

The information needed for this study was basically gathered by the following means.

1. Consultations concerning all three parts of the study took place with the following stakeholders:
- European Commission
- European Railway Agency
- Representatives of several countries
- Train operators
- Infrastructure managers
- Railway industry

2. Studying websites and documents.

On this basis, the project team carried out its analysis, which was fostered by discussions with EC and ERA officials, and partly fed back to other contacts who had given input.

More information on the methodology can be found in the following chapters and in the tender document.

1.5 Structure of the report

The results obtained are documented in chapters 2, 3 and 4, corresponding with part 1, 2 and 3 of the study respectively. Each of those chapters has a section with conclusions and proposals for the way forward at the end. Finally, chapter 5 seeks to define a new focus on interoperability from the perspective of opening up the market. Data and detailed analyses are contained in the Annexes.

References and footnotes

Reference to sources is made by arabic numerals in superscript, for example: [4]. When the same reference is used for the second (or even third) time, it may be given in plain text, e.g.: reference 4. The references are listed on page 122.

Footnotes are denoted by Roman numbers in superscript, for example: [VI]. These are explained at the bottom of the pages.

1.6 Acknowledgements

The authors have contacted a large number of people in European institutions, the rail sector and governments of the countries involved. They wish to express their gratitude for the information and opinions that were given, with almost no exception, in a spirit of openness and co-operation. This in itself is a positive sign for the advancement of interoperability.

2 NATIONAL TRANSPOSITION MEASURES

Section 2.1 deals with the Railway Safety Directive and section 2.2 with the Interoperability Amendment Directive. In each of these sections, the need for transposition is examined and an overview of the status of transposition is given. Finally, national transposition measures are evaluated against the directives.

The scope of this project did not allow for an evaluation of transposition measures in all countries. For this evaluation 6 countries have been chosen in a dialogue between the project team and EC and ERA officals, based on the following criteria:
- include both 'old' and 'new' member states
- include both smaller and larger countries
- include countries with different institutional railway system characteristics
They are: France, Germany, the UK, Austria and the Czech and Slovak Republics.

A critical assessment of transposition measures is given separately for each of the 6 countries in 2.1 and 2.2. Based on an examination of all the relevant articles, the authors criticise the completeness and correctness of the transposition, where there is reason to do so. Finally, a conclusion on the transposition is given.

When needed, the findings of the evaluations were sent in draft to state officials in the country concerned. Their responses were used to correct the findings where needed. Their opinions (if any) on the authors' critical assessment are given separately. These are for information only and cannot be regarded as formal positions.

2.1 The Railway Safety Directive

2.1.1 The need for transposition

The Railway Safety Directive (RSD) is directed at the Member States (MS) (art. 35). It obliges MS to 'bring into force the laws, regulations and administrative provisions necessary to comply with this Directive' (art. 33). The other articles of the RSD create obligations and powers for several parties: Member States, the Commission, the Agency, national safety authorities, accident investigation bodies, railway undertakings and infrastructure managers.

It follows that the duties that MS have under the RSD fall in two categories:
- duties directly assigned to them by the RSD;
- the duty to create obligations and powers for other parties, who are under their jurisdiction.

Not all duties necessarily require legislation. For example, art. 4 obliges MS, amongst others, to ensure that railway safety is continuously improved, where reasonably practicable. This can be seen mainly as an issue of policy, rather than legislation, although legislation might have a part to play in carrying out that policy.

Two important duties for the MS are the creation of a National Safety Authority and the creation of an Investigating Body. If these do not already exist, they can be created by law or through non-legal administrative provisions.

The National Safety Authority is generally a state or public service body. It is questionable whether the obligations (and powers?) of the NSA need to be laid down in the legislation. If they do what they should do according to the RSD, then the MS is compliant.

When it comes to creating obligations and powers for parties other than the MS itself, MS would be expected to use their legislative powers. In some case other means, i.e. non-legal administrative provisions, could be used.

Table 2.1 gives an overview of the subjects covered by the RSD and indicates what is to be expected in national laws and regulations as a means for implementation, and what other action would be expected from MS. Against this background a selection of the measures that have been notified by the MS to the EC, as identified in par. 2.1.2, will be evaluated in par. 2.1.3.

Table 2.1. Overview of Member State duties under the Railway Safety Directive

Article(s)	**Subject**	**To be expected in national laws and regulations**	**Other action expected from Member State**
CH. I	INTRODUCTORY PROVISIONS		
1, 2, 3	Purpose, scope, definitions	-	-
CH. II	DEVELOPMENT AND MANAGEMENT OF SAFETY		
4	Development and improvement of railway safety	Safety rules and responsibility for IM's and RU's: open, non-discriminatory, fostering European rail system. Responsibility of other players.	A policy of at least maintaining and, where practicable, improving safety
5, 6, 7	CSI, CSM, CST	-	Provision of information, co-operation
8	National safety rules	Safety rules: public, available, clear.	Notify EC of rules and changes.
9	Safety Management Systems for IM's and RU's	Obligation for IM's and RU's to have Safety Management Systems and to produce annual safety report	-
CH. III	SAFETY CERTIFICATION AND AUTHORISATION		
10	Safety Certificates for RU's	Obligation for RU's to have Safety Certificates. Obligations for Safety Authority: procedure, criteria, information	-
11	Safety authorisation of infrastructure	Obligation for IM's to obtain Safety authorisation. Obligations	-

Article(s)	Subject	To be expected in national laws and regulations	Other action expected from Member State
	managers	for and rights of Safety Authority.	
12	Application requirements relating to (10) and (11)	Obligations for Safety Authority: speediness, guidance.	Or: decide on time and give guidance
13	Access to training facilities	(Rules to) ensure free and fair access to training facilities. Make IM's and RU's responsible for training.	Or: ensure free and fair access to training facilities.
14	Placing in service of in-use rolling stock	Obligations for and rights of Safety Authority (see also art. 16.2.d). Obligations for RU's.	
15	Harmonisation of safety certificates	-	-
CH. IV	SAFETY AUTHORITY		
16-18	Tasks, decision making principles, annual report	Establish a safety authority by law. Lay down tasks, principles and obligations of safety authority.	Or: establish a safety authority (if not already existing)
CH. V	ACCIDENT AND INCIDENT INVESTIGATION		
19-25	Obligation, status, body, procedure, reports, information, recommendations	Establish an accident investigation body by law. Lay down its tasks, obligations and powers.	Or: establish an accident investigation body (if not already existing)
Ch. VI	IMPLEMENTING POWERS		
26-28	Adaptation of annexes, committee procedure, implementing measures	-	-
CH. VII	GENERAL AND FINAL PROVISIONS		
29	Amendments to Directive 95/18/EC	Changes made to existing legislation accordingly.	-
30	Amendments to Directive 2001/14/EC	Changes made to existing legislation accordingly.	-
31	Report and further community action	-	-
32	Penalties	Lay down rules for penalties	Notify those rules

Article(s)	Subject	To be expected in national laws and regulations	Other action expected from Member State
33	Implementation[V]	A reference to the Directive.	Notify laws, regulations and administrative provisions.
34	Entry into force	-	-
35	Addressees	-	-

2.1.2 Notified transposition measures

On its website the EC publishes a table that gives an overview of the notifications sent by Member States to the Commission concerning the measures adopted to implement the EU rail directives. It can be found by the following link:
http://ec.europa.eu/transport/rail/legislation/mne_table_en.htm

For the purpose of this report the table was last consulted in August 2007. A comment added to the table showed that its last update was done on 5 June 2007. By then, the following 17 countries had notified measures for implementation of the RSD: AT, BE, BG, CZ, DK, EE, FI, FR, HU, IE, LV, LT, PL, RO, SK, SI and UK. The website also provides access to the texts of the notified measures.

Additionally, the following information on transposition was gathered.

Germany has implemented the RSD (see 2.1.3.4).

Portugal: in March 2007 the council of Ministers has approved a so-called decree-law, of which the promulgation and publication was expected in May 2007. It transposes partly the RSD, together with Directive 2004/51. The remaining part will be transposed with the decree-law concerning the creation of GISAF (NIB), which is expected soon.

Netherlands: legislative transposition measures came into force 1 May 2007.

This leaves 7 countries who have not yet transposed: Greece, Italy, Luxemburg, Norway, Spain, Switzerland and Sweden. However, apart from Greece and Switzerland, the situation is different according to another source[1]:
- In Italy the 2nd railway package (containing the RSD) is implemented but the RSD is not in force.
- In Luxemburg the RSD is partly implemented.
- In Norway the RSD is implemented.
- In Spain the RSD is implemented.
- In Sweden the RSD will be implemented in July 2007.

[V] This article obliges Member States to implement the Directive. But that obligation does not need to be transposed into national law.

2.1.3 Evaluation

2.1.3.1 Austria

Austria has implemented the Railway Safety Directive. All of the elements are included in two different pieces of legislation, or were already present in existing legislation.

Firstly, the law, issued on 26 July 2006:
125. Bundesgesetz: Änderung des Eisenbahngesetzets 1957, des Bundenbahngesetzes und des Bundesgesetzes zur Errichtung einer "Brenner Basistunnel Aktiengesellschaft"
implements the greater part of the Safety Directive in its article 1, that changes the Railway Act of 1957.

Secondly, the law, issued on 30 October 2005:
"123. Bundesgesetz: Unfalluntersuchungsgesetz sowie änderung des Luftfahrtgesetzes, des Eisenbahngesetzes 1957, des Schiffahrtsgesetzes und des Kraftfahrgesetzes 1967"
implements the section of the Directive 2004/49/EC relating to accident and incident investigation. This is done by the creation of a new law called Unfalluntersuchungsgesetz (Accident investigation Law) in article 1 and by changes to the Railway Act 1957 in article 3.

The new legislation stipulates the establishment of an accident investigation body covering the four transport areas: Air, Shipping, Rail and Cable Cars. This legislation is in force as of 1 January 2006, this is 3 months prior to the date set in the Safety Directive.

Table 2.2 gives an overview of the transposition.

Table 2.2 Transposition of the Railway Safety Directive by Austria.

Articles of the RSD	**Paragraphs of Accident Investigation Law**	**Paragraphs of changed Railway Act 1957**	**Remarks**
4		The Railway Act as a whole is in line with the principles of this article.	
8		19, 21, 21a	These paragraphs give general safety provisions and mandate the Minister for Transport to lay down more detailed requirements. Obviously, national safety rules already exist. Par. 19(6) guarantees accessibility of documentation to all.
9 & Annex III		39 - 39d	
10		37 – 37d, 39c	
11		38 – 38d	
12			Speediness: A general law called

Articles of the RSD	Paragraphs of Accident Investigation Law	Paragraphs of changed Railway Act 1957	Remarks
			'Allgemeines Verwaltungsverfahrensgesetz' (General Adminstrative Procedures Act) stipulates that any authority should reach its decision within 6 months[VI]. Art. 12.1 of the SRD requires 4 months. Guidance: A guidance document is being prepared and will be published[2]. Requiring this by law is not needed.
13		75c - 75e	
14		32b(3)	
16-18		11 – 13b	The MoT is the National Safety Authority. Some tasks are assigned to local and regional authorities.
19-25	All. Most importantly: 5, 11,16	19c	Par. 19c that was added to the Railway Act obliges 'Eisenbahnunternehmen' to report accidents and incidents. The term 'Eisenbahnunternehmen' refers to both the RU and the IM.
29	15e		
30			Not investigated in depth
32	25	124-128	
33	24	130a	Railway Act: Provisions for entering into force and transition are very complicated and have not been investigated in depth.

Critical assessment

Art. 12.1 of the RSD requires the Safety Authority to take a decision on an application within 4 months after all information has been submitted. The legal requirement in Austria is 6 months. It could be argued that if in practice the Austrian Safety Authority, i.e. the Minister of Transport, always decides within 4 months, then Austria complies with the RSD. However, since the period is laid down in law, it should be the correct one.

[VI] Information given orally by Mr. Hartig.

Apart from this one issue, it is concluded that Austria has correctly implemented the IAD.

MS opinion[2]

Austria accepts the criticism regarding the period of 6 months.

2.1.3.2 Czech Republic

The Czech Republic has implemented the Railway Safety Directive (RSD) in two different pieces of legislation, whereas some elements were already present in existing legislation. A concordance table (or transposition table) has been completed as a tool to avoid incomplete transposition.

Firstly, the Railway Act 1994, amended on 5 May 2006:
"Zákon 181/2006 Sb., kterým se mění zákon 266/1994 Sb., o dráhách, ve znění pozdějších předpisů, a zákon 200/1990 Sb., o přestupcích, ve znění pozdějších předpisů"
implements the greatest part of the RSD almost without any necessary changes. However, some changes were made in its amendment in 2006.

Secondly the Railway Safety Public Notice, issued on 17 July 2006:
"Vyhláška 376/2006 Sb., o systému bezpečnosti provozování dráhy a drážní dopravy a postupech při vzniku mimořádných událostí na dráhách"
implements sections of the RSD relating to accident and incident investigation.

Table 2.3 gives an overview of the transposition.

Table 2.3 Transposition of the Railway Safety Directive by the Czech Republic.

Articles of the RSD	**Paragraphs of changed Railway Act 1994**	**Paragraphs of Railway Safety Public Notice 2006**	**Remarks**
4	22, 23a, 34h, 35, 49, 49b, 53b		
8	-		General provisions in the Railway Act.
9 & Annex III	22, 23a, 34h, 35	2, 4	
10	34h	3, Annex 3	
11	23a		
12	64		The General Administrative Procedure Act (Správní řád 500/2004 Sb.) requires every public institution to reach its decision within 60 days. However, it is stated that this time could be prolonged in case of making an expert assessment or sending documents into other

Articles of the RSD	Paragraphs of changed Railway Act 1994	Paragraphs of Railway Safety Public Notice 2006	Remarks
			countries than the Czech Republic. The time limit for decision could be than virtually unlimited, but this is not the practical case. The General Administrative Procedure Act also generally declares the administrative processes and duties of authorities and they are therefore not directly adopted in any piece of legislation regulating the railway sector. Guidance for applicants is given on a website.
13	22, 35, Annex 1		
14	43b		The same issue of speediness as with article 12.
16-18	23a, 34h, 43, 49b, 49d, 49e, 53, 55, 58, 64	6	Processes described generally in the Administrative Procedure Act.
19-25	49, 53a, 53b, 66	9, 11, 12	
29	34h		
30	34g		
32	51, 52		
33	Many references	Many references	

Critical assessment

No missing or incorrect issues have been found. It is concluded that the transposition of the RSD, although some months late, is correct and complete (and sometimes duplicated due to very complicated Czech legal system).

MS opinion

Given the conclusion above, there was no need to contact the MS.

2.1.3.3 France

France has notified 6 legislative transposition measures for the RSD. They are listed below, with a summary of their contents:

1. Decree 2005-101 of 10 February 2005 stipulates that the Minister responsible for Transport delivers the safety certificate after being advised by the Infrastructure manager (*Réseau ferré de France*). However, this decree was cancelled by decree 2006-1279 (nr. 6 in this list).
2. Decree 2005-1633 of 20 December 2005 changes two existing decrees, thereby changing their scope of application in terms of railway lines.

3. Law 2006-10 of 5 January 2006 creates the French Rail Safety Authority (in French: *Etablissement Public de Sécurité Ferroviaire - EPSF*) and regulates its administration, resources and certain rights of its agents. Furthermore, it changes law 82-1153, giving certain powers to EPSF's director and staff.
4. Decree 2006-369 of 28 March 2006 defines EPSF's administrative position, mission (tasks), organisation, functioning and financial regime and holds transitory provisions.
5. Decree of 6 April 2006 nominates EPSF's director.
6. Decree 2006-1279 of 19 October 2006, laying down the conditions for safety and interoperability.

Additionally, the following legislative measures are relevant:
7. Law 2002-3 of 3 January 2002 relating to the safety of infrastructure and transport systems.
8. Decree 2004-85 on technical enquiries.
9. Law 2006-686 of 13 June 2006 holding, amongst others, changes to law 2002-3.

Table 2.4 gives an overview of the transposition.

Table 2.4 Transposition of the Railway Safety Directive by France.

Articles of the RSD	**Articles of Decree 2006-1279**	**Other texts: number (see list above) and article**	**Remarks**
4			The measures as a whole are generally in line with the principles of this article.
8	2, 3, 6, 10		These are general provisions. More specific rules are given by Ministerial decision (arrêté) and in RFF publications and exist already.
9 & Annex III	18		
10	20		
11	19		
12	24		Speediness: If EPSF does not react within 4 months after all necessary information has been received, this counts as a rejection of the application for a

[VII] The related questions in the NSA questionnaire were answered by Mr. Saule as follows:
- Has the NSA documented its procedures for handling applications for safety certificates by Railway Undertakings and for safety authorisations by Infrastructure Managers?
Answer: the working out of such procedures is currently in progress. The schedule is May 2007 for safety certificates and October 2007 for safety authorisations.
- Could you please give a short description of these procedures?
Answer: the procedures aim at determining what are the answers expected by EPSF in an application dossier so as to comply with the rules in force.

Articles of the RSD	Articles of Decree 2006-1279	Other texts: number (see list above) and article	Remarks
			certificate or authorization. Guidance: a Ministerial decision (arrêté) specifies the requirements for application and the conditions for delivering the certificate.[VII]
13	26, 27		
14	57		This article says that a party applying for acceptance in France of rolling stock already admitted elsewhere in the EU, can ask for the rules applied there to be regarded as equivalent to the French.
16-18	4, 17, 24, 43	3: 1-5 4: 2, 16-18	All tasks of art 16.2 are assigned to EPSF, except g: supervision of rolling stock registration.
19-25		7: 14-20, 22, 23	
29			Not investigated
30			Not investigated
32	-	7: 24	Otherwise, not found. Penalties in art. 35 relate to interoperability constituents only.
33	Ref. in heading	-	NIB: no reference in law, because it existed already before the RSD

Critical assessment

1. The French legislation explicitly allows the secondment of permanent employees of SNCF, the main train operator and delegated infrastructure manager, and RATP, the autonomous transport authority of Paris, at EPSF. They are paid by EPSF and function under its internal regime. Their pension rights remain within SNCF or RATP, and their right to advancement is protected by law. It is difficult to see how such staff can retain their independence when involved in issues concerning their permanent employer.

2. If EPSF does not react within 4 months after all necessary information has been received, this counts as a rejection of the application for a safety certificate or authorisation. This implies that no reason for the rejection is given. This is not in compliance with the intentions of the RSD.

3. A party applying for acceptance in France of rolling stock already admitted elsewhere in the EU, can ask, and needs to justify, for the rules applied there to be regarded, with respect to safety, as equivalent to the French. This is not in line with the letter of art. 14 of the RSD,

which limits the need for compliance to a set of technical features. However, the French transposition may be justified in the light of the on-going discussion on cross-acceptance.

4. Provisions on penalties for offences (art. 32 of RSD), other than hindering investigations, have not been found. However, they could be covered elsewhere in general legislation.

Other than these, it is concluded that the French transposition of the RSD is adequate.

MS response[3]

No comments to add.

2.1.3.4 Germany

Germany has implemented the RSD through the following legislation, dated 16 April 2007:
"Fünftes Gesetz zur Änderung eisenbahnrechtlicher Vorschriften".
It changes two existing general railway acts, both originating from 1993.

Not notified (yet) is the following implementation measure, dated 5 July 2007:
Zweite Verordnung zum Erlass und zur Änderung eisenbahnrechtlicher Vorschriften.
Its article 2 is a regulation on railway safety and article 3 is a regulation on investigation of dangerous events.

Table 2.5 gives an overview of the transposition.

Table 2.5 Transposition of the Railway Safety Directive by Germany.

Articles of the RSD	**Articles of *Fünftes Gesetz***	**Changed paragraphs of Railway Act 1993**	**Articles of *Zweite Verordnung***	**Remarks**
4				The Railway Act as a whole is in line with the principles of this article.
8				National safety rules already exist.
9 & Annex III	1.5	7a(2), 7c(2)	2.6	
10	1.5	7a(1)		
11	1.5	7c(1)		
12	1.5	7a(6), 7c(4)	2.4	
13	1.5	7e		
14	-	-	1.8	
16-18	1.2, 1.10 2.2	5(1f), 35a Bundeseisenbahnverkehrs-verwaltungsgesetz: 5	2.7	EBA is the National Safety Authority. A council consisting of State (Länder) authorities representatives has an advisory role in some

Articles of the RSD	Articles of *Fünftes Gesetz*	Changed paragraphs of Railway Act 1993	Articles of *Zweite Verordnung*	Remarks
				matters.
19-25	1.2, 1.3	5(1f-1h), 5a(6a)	3.1-3.3, 3.5-3.7	
29	-	-		Not investigated in depth
30				Not investigated in depth
32	1.8	28	2.8, 3.9	
33	1.2, 1.5	5(1f), 7a(4), 7c(2)	Title, footnote	

Explanation

A German official gave the following explanation[4] of the German transposition with respect to safety authorities.

According to the German legislation, the competency for the railway system is split to the federation for those undertakings owned by the federal republic - infrastructure managers as well as railway undertakings - and for foreign railway undertakings providing services in Germany on the one side and to the 16 federal countries (Bundesländer) for German infrastructure managers and railway undertakings not owned by the federal republic on the other side. Most of these companies only operate short lines.

For those undertakings in the federal competency (such as Deutsche Bahn Aktiengesellschaft (DB AG)), there is one railway authority: Eisenbahn-Bundesamt (EBA). Most of the federal countries have outsourced contractually a lot of their tasks of supervision to EBA and only kept very few tasks in order to execute their competency. Only three Bundesländer perform their tasks of supervision completely by themselves.

In the frame of transposition of the RSD, the EBA became the only NSA. But nevertheless some infrastructure managers and railway undertakings are not under the supervision of the EBA now because exceptions in the scope had been granted as far as possible for regional railways according to Article 2, paragraph 2, letter b of the RSD. These regional railways remain under the supervision of the Bundesländer.

Critical assessment

1. The requirements regarding the safety management system for RU's that do not provide cross-border services are deemed to be fulfilled when they have employed a railway operations manager whose position is confirmed by the authorities. It is questionable whether this is in conformity with the provisions and intentions of the RSD.

2. The obligation to have a safety certificate is restricted to RU's that take part in regular *public* railway operations. It could be argued that this is not totally in line with the scope of the RSD as stipulated in its article 2. The category at stake here is passenger operations on privately owned infrastructure, which is not functionally separated from the rest of the railway system. This category is included in the scope of the RSD, but excluded in the German legislation. In practice, this category is non-existent.

Other than these, the German transposition of the RSD is assessed as being adequate.

MS opinion

A German official (reference 4) commented on point 1 above as follows.

In Germany all infrastructure managers and railway undertakings were obliged to have a railway operation manager (Eisenbahnbetriebsleiter) who must have passed an examination and who must be confirmed by the competent authority. He is responsible for safe operation and therefore he enjoys – on a legal base - a certain degree of independence related to the board of his company. These requirements are considered in Germany to be equivalent with the requirements regarding the safety management system according the RSD. So in order not to create further obstacles to the railway companies, in the transposition the engagement of a railway operation manager was no longer mandatory. The railway companies got the choice to stick voluntarily to the railway operation manager or to have a confirmed safety management system. For non-regional railways with railway operation manager the confirmation of the safety management system has been facilitated.

A German official expressed doubts[5] about point 2 above[VIII].

2.1.3.5 Slovak Republic

The Slovak Republic has implemented the Railway Safety Directive (RSD) in the existing Railway Act 1996 and its amendments from 2005 and 2007:

Firstly, the Railway Act amendment from 9 February 2005:
"Zákon č. 109/2005 Z. z., ktorým sa mení a dopĺňa zákon Národnej rady Slovenskej republiky č. 164/1996 Z. z. o dráhach a o zmene zákona č. 455/1991 Zb. o živnostenskom podnikaní (živnostenský zákon) v znení neskorších predpisov"
implements mainly the technical parts of RSD (and most of the interoperability directives).

Secondly, the Railway Act amendment from 9 February 2007:
"Zákon č. 109/2007 Z. z., ktorým sa mení a dopĺňa zákon Národnej rady Slovenskej republiky č. 164/1996 Z. z. o dráhach a o zmene zákona č. 455/1991 Zb. o živnostenskom podnikaní (živnostenský zákon) v znení neskorších predpisov"
implements mainly the processes described in RSD.

Table 2.6 gives an overview of the transposition.

Table 2.6 Transposition of the Railway Safety Directive by the Slovak Republic.

Articles of the RSD	**Paragraphs of changed Railway Act 1996**	**Remarks and questions**
4	18, 20, 27, 48b, 48d, 48e, 65	
8	48e, 59	
9 & Annex III	20, 48b, 48d, Annex 5	

[VIII] No attempts were made to bring the discussion to a final conclusion, because the issue is of little practical meaning.

Articles of the RSD	Paragraphs of changed Railway Act 1996	Remarks and questions
10	46, 46a	
11	46a	
12	46a, 65a	
13	48f	
14	50a	
16-18	48b, 64, 65, 65a, 65c, 68	Processes described generally also in the Administrative Procedure Act (Správny poriadok 71/1967 Zb.)..
19-25	48, 48c, 64, 65, 65a, 65c	
29	46a, 48d	
30	-	
32	59, 60	
33	-	The last (and most important) amendment of Railway Act was issued on 9 February 2007, which is later than requested in RSD.

Critical assessment

The transposition of RSD is correct and complete and the changes have been made in one act only which makes it very easy to follow them. However, the transposition was made mostly more than one year later than requested in RSD.

2.1.3.6 United Kingdom

The United Kingdom has notified 5 legislative transposition measures for the RSD:
1. Railways and Transport Safety Act 2003, Chapter 20, issued on 10 July 2003.
2. Statutory Instrument 2005 No. 1992, issued on 20 July 2005:
"The Railways (Accident Investigation and Reporting) Regulations 2005"
These regulations implement the section of the RSD related to accident and incident investigation. Most of the regulations came into force on 17 October 2005, the rest on 31 January 2006.
3. Statutory Instrument 2006 No. 598, issued on 17 March 2006:
"The Railways (Access to Training Services) Regulations 2006"
These regulations implement the section of the RSD related to a fair access to training services. The regulations came into force on 10 April 2006.
4. Statutory Instrument 2006 No. 599, issued on 17 March 2006:
"The Railways and Other Guided Systems (Safety) Regulations 2006 (ROGS)"
These regulations implement the greatest part of the RSD for great Britain. The regulations required by EC came into force on 10 April 2006, the rest on 1 October 2006.
5. The Railways (Safety Management) Regulations (Northern Ireland) 2006, Statutory Instruments 2006, No. 237.

Additionally, Statutory Instrument 2006 No. 397, issued on 23 February 2006:
"The Railways (Interoperability) Regulations 2006 (RIR)"

is related to one issue of the RSD: authorising the bringing into service of structural subsystems. Some of these regulations came into force on 20 March 2006, the rest on 2 April 2006.

Table 2.7 gives an overview of the transposition.

Table 2.7 Transposition of the Railway Safety Directive by the United Kingdom.

Articles of the RSD	**Accident Investigation and Reporting Regulations 2005**	**Safety Regulations 2006**	**Interoperability Regulations 2006**	**Remarks**
4				Basic ideas are included in the concerned regulations.
8				National safety rules exist already.
9 & Annex III		3, 5, 20, Schedule 1		
10		3, 7–9, 13-15, 18		
11		3, 10–14, 16, 18		
12		7, 10, 17, 21, Schedule 2		The ORR adopted an extensive and, most probably comprehensive, guidance document, prepared by the HSE.
13		22		This part is implemented mostly in a special piece of legislation “The Railways (Access to Training Services) Regulations 2006.”
14			4	The UK views all rolling stock as having the potential to operate on a TEN and therefore covered by the Interoperability process. The UK uses Technical Rules as set out under Article 16.3 of the Interoperability Directives as the standards that NoBos assess.[IX]
16-18		7 – 17, 20, 21	4	ORR is the NSA and performs all tasks mentioned in art. 16.2.
19-25	3 – 17			It is explicitly stated that

[IX] Information provided by K. Davies (e-mail 21 June 2007).

Articles of the RSD	Accident Investigation and Reporting Regulations 2005	Safety Regulations 2006	Interoperability Regulations 2006	Remarks
				these regulations were adopted to implement articles 19 – 25 of RSD.
29				Not investigated in depth.
30				Not investigated in depth.
32	16	See remark	34	The ROGS were made under the Health and Safety at Work etc Act 1974. Sections 18 to 20 of this Act deal with inspection and enforcement and section 33 with offences.[X]
33				All obligatory parts of the RSD were brought into force before 30th April 2006. Where applicable, references to RSD were made.

Critical assessment

The Secretary of State for Defence has the right to exempt anybody from any of the safety regulations in the interests of national security. This exemption is not granted by the RSD, but may be justified by other European legislation. Whether this is actually the case, has not been investigated.

Apart from this issue, the transposition is found to be complete, correct and transparent.

[X] Information provided by K. Davies (e-mail 21 June 2007).

2.2 The Interoperability Amendment Directive

2.2.1 The need for transposition

All countries have transposed the High Speed Interoperability Directive 96/48/EC and the Conventional Rail Interoperability Directive 2001/16/EC. The Interoperability Amendment Directive (IAD) changes both interoperability directives. The IAD is directed at the Member States (art. 6). It obliges MS to 'bring into force the laws, regulations and administrative provisions necessary to comply with this Directive' (art. 4).

In general, the interoperability directives contain three categories of provisions:
1. Provisions on a European level, e.g. the drafting of the TSI's and the Committee procedure
2. Obligations, prohibitions and powers directly assigned to MS
3. Obligations, prohibitions and powers that are explicitly assigned to other parties such as infrastructure managers, railway undertakings and manufacturers or that are by nature incumbent on such parties

The first category does not need transposition into national law.

As for the second category:
- MS can comply with prohibitions without writing it into their legislation; it could be argued that MS, in addition to refraining from the action prohibited by the directive, have to forbid everybody else falling under their jurisdiction to perform that same action, but this seems far fetched;
- MS would be expected to assign the obligations and powers, given to them by the directive, to a specific official, e.g. a Minister, or body by law, but in theory they could comply with these provisions without doing that.
Therefore, it can be said that these category 2 provisions do not necessarily need transposition into national law. In any case, where it has been done for the two original directives, a change to that legislation is expected when the provision is changed by the IAD.

When it comes to creating obligations, prohibitions and powers for parties other than the MS itself (category 3), MS would be expected to use their legislative powers. In some cases other means, i.e. non-legal administrative provisions, could be used.

Table 2.8 and 2.9 give an overview, for high speed and conventional rail respectively, of the subjects covered by the IAD and the need to make changes to existing national legislation accordingly.

Table 2.8 Changes to the High Speed Interoperability Directive

Article of Directive 2004/50	**Article of Directive 96/48**	**Subject**	**Changes to existing national legislation needed?**	**Remarks**
1.1	1	Aim and scope	yes	
1.2	2	Definitions	yes	
1.3	2(h)	Definitions	no	Deletes one definition
1.4	5	TSI's: scope, contents,	no	

Article of Directive 2004/50	Article of Directive 96/48	Subject	Changes to existing national legislation needed?	Remarks
		relation with standards and specifications		
1.5	6	TSI's: drafting and adoption	no	
1.6	7	Derogations	Not necessarily	
1.7	9	No hindrance for compliant interoperability constituents	Not necessarily	
1.8	10	Compliance of interoperability constituents	yes	
1.9	11	Withdrawal of European specifications	Not necessarily	
1.10	14	Authorisation of placing in service	yes	Includes obligations for IM's and RU's
1.11	15	No hindrance for compliant subsystems	Not necessarily	
1.12	16.3	Send technical rules etc. in the absence of TSI's and in case of derogations	Not necessarily	
1.13	17	Flaws in TSI's	no	
1.14	18.2	EC verification of subsystems	yes	
1.15	20.5	Coordination of notified bodies	no	
1.16	21	Committee	no	
1.17	-	Committee and Commission	no	New articles 21a, 21b, 21 c
1.18	-	Registers of infrastructure and rolling stock	Not necessarily	New article 22a
1.19	Annex I	Definition of the trans-european high speed rail system	yes	
1.20	Annex II	Subsystems and	yes	

Article of Directive 2004/50	Article of Directive 96/48	Subject	Changes to existing national legislation needed?	Remarks
		areas		
1.21	Annex III	Essential requirements	yes	
1.22	Annex VII	Criteria for notified bodies	yes	

Table 2.9 Changes to the Conventional Rail Interoperability Directive

Article of Directive 2004/50	Article of Directive 2001/16	Subject	Changes to existing national legislation needed?	Remarks
2.1	-	title	no	
2.2	1	Aim and scope	yes	
2.3	2	Definitions	yes	
2.4	5	TSI's: scope, contents, relation with standards and specifications	no	
2.5	6	TSI's: drafting and adoption	no	
2.6	7(a)	Derogation	Not necessarily	
2.7	10	Compliance of interoperability constituents	yes	
2.8	11	Withdrawal of European specifications	Not necessarily	
2.9	14	Authorisation of placing in service	yes	Includes obligations for IM's and RU's
2.10	16.3	Send technical rules etc. in the absence of TSI's and in case of derogations	Not necessarily	
2.11	17	Flaws in TSI's	no	
2.12	20.5	Coordination of notified bodies	no	
2.13	21	Committee	no	
2.14	-	Committee and Commission	no	New articles 21a, 21b
2.15	23	TSI priorities	no	

Article of Directive 2004/50	Article of Directive 2001/16	Subject	Changes to existing national legislation needed?	Remarks
		and work programme		
2.16	24.2	Registers of infrastructure and rolling stock	Not necessarily	
2.17	25.1	Reference system of technical rules	no	
2.18	Annex I	Definition of the trans-european conventional rail system	yes	
2.19	Annex III	Essential requirements	yes	
2.20	Annex VII	Criteria for notified bodies	yes	
2.21	AnnexVIII	General rules JRB	no	Joint Representative Body stops

2.2.2 Notified transposition measures

On its website the EC publishes a table that gives an overview of the notifications sent by Member States to the Commission concerning the measures adopted to implement the EU rail directives. It can be found by the following link:
http://ec.europa.eu/transport/rail/legislation/mne_table_en.htm

For the purpose of this report the table was last consulted in August 2007. A comment added to the table showed that its last update was done on 5 June 2007. By then, the following 18 countries had notified measures for implementation of the IAD: AT, BE, BG, CZ, DK, DE, EE, ES, FI, FR, HU, IE, LV, LT, PL, RO, SK and UK. The website also provides access to the texts of the notified measures.

Additionally, the following information on transposition was gathered.

Portugal: on 8 May 2007 two so-called decree-laws were published to transpose the IAD, one changing the high speed directive (decree-law 178/2007) and one changing the conventional directive (decree-law 177/2007).

Netherlands: legislative transposition measures came into force 1 May 2007.

This leaves 7 countries who have not yet transposed: Greece, Italy, Luxemburg, Norway, Slovenia, Switzerland and Sweden.

2.2.3 Evaluation

2.2.3.1 Austria

Austria has transposed through the following legislation, issued on 26 July 2006:
125. Bundesgesetz: Änderung des Eisenbahngesetzets 1957, des Bundenbahngesetzes und des Bundesgesetzes zur Errichtung einer "Brenner Basistunnel Aktiengesellschaft".
In article 1, it changes the Railway Act of 1957, which was changed a number of times before, and which contains transposition measures for directives 96/48/EC and 2001/16/EC. Point 45 through 75 of article 1 contain the changes pursuant to the IAD. Tables 2.10 and 2.11 give an overview.

Table 2.10 Changes to the High Speed Interoperability Directive – Transposition by Austria

Article of Directive 2004/50	**Article of Directive 96/48**	**Subject**	**Paragraph of changed Railway Act**	**Remarks**
1.1	1	Aim and scope	88	
1.2	2	Definitions	90a, 90b	
1.6	7	Derogations	100	
1.7	9	No hindrance for compliant interoperability constituents	-	
1.8	10	Compliance of interoperability constituents	95, 96	
1.9	11	Withdrawal of European specifications	-	
1.10	14	Authorisation of placing in service	34, 123a – 123c	
1.11	15	No hindrance for compliant subsystems	-	
1.12	16.3	Send technical rules etc. in the absence of TSI's and in case of derogations	-	
1.14	18.2	EC verification of subsystems	101	
1.18	-	Registers of infrastructure and rolling stock	122, 123	
1.19	Annex I	Definition of the trans-	88	

Article of Directive 2004/50	Article of Directive 96/48	Subject	Paragraph of changed Railway Act	Remarks
		european high speed rail system		
1.20	Annex II	Subsystems, areas	88	
1.21	Annex III	Essential requirements	92, 131	Art. 92 was not changed. This article holds a reference to Annex III of the Directive. Art. 131 states that when references to Annexes are made, the amended version of the Directive is to be applied.
1.22	Annex VII	Criteria for notified bodies	91, 131	As above.

Table 2.11 Changes to the Conventional Rail Interoperability Directive – Transposition by Austria

Article of Directive 2004/50	Article of Directive 2001/16	Subject	Paragraph of changed Railway Act	Remarks
2.2	1	Aim and scope	104	
2.3	2	Definitions	107, 108	
2.6	7(a)	Derogation	119	
2.7	10	Compliance of interoperability constituents	114, 115	
2.8	11	Withdrawal of European specifications	-	
2.9	14	Authorisation of placing in service	34, 123a -123c	
2.10	16.3	Send technical rules etc. in the absence of TSI's and in case of derogations	-	
2.16	24.2	Registers of infrastructure and rolling stock	122, 123	
2.18	Annex I	Definition of the trans-	104	

Article of Directive 2004/50	Article of Directive 2001/16	Subject	Paragraph of changed Railway Act	Remarks
		european conventional rail system		
2.19	Annex III	Essential requirements	110, 131	Art. 131 was not changed. This article holds a reference to Annex III of the Directive. Art. 131 states that when references to Annexes are made, the amended version of the Directive is to be applied.
2.20	Annex VII	Criteria for notified bodies	109, 131	As above.

Critical assessment

1. Point 45 of the law implementing the IAD changes § 95 of the Railway Act for high speed and point 62 changes § 114 for conventional rail. Both concern the assessment of conformity or suitability for use of interoperability constituents. The text says that this has to be done by a body that is mentioned in the TSI or in the European specifications developed in elaboration of the TSI. According to a clarification by Mr. Hartig, the formulation in the law means any kind of body, mentioned generally in the TSI or any European specification. This could be a notified body, or could be a manufacturer itself (and so on). It is definitely not meant that the individual notified bodies have to be mentioned in the TSI or in the European specifications.

As a matter of fact, this is in line with art. 13.2 of the HS Directive, which says:
"Where so required by the TSIs, the assessment of conformity or suitability for use of an interoperability constituent shall be appraised by the notified body with which the manufacturer or his authorized representative established within the Community has lodged the application." One of the modules that can be chosen for assessment of conformity of a high speed interoperability constituent is module A, which is self certification by the manufacturer, without notified body involvement. Conversely, for assessment of suitability for use in both domains and for assessment of conformity in the CR domain, notified body involvement is obliged. The wording in the Austrian law can be considered to cover both cases and hence is correct.

2. Point 54 changing § 100 states that the Minister of Transport *has to* declare certain TSI's for high speed not applicable in 4 explicitly mentioned cases. This is related to point 6 of article 1 of the IAD, which changes art. 7 of Directive 96/48/EC. This changed article 7 basically says that a Member State *need not* apply one ore more TSI's in cases and circumstances that are specified. The authors take the following view. Since MS need not apply certain TSI's in those cases and circumstances, they have the liberty to oblige an official, such as in this case the Minister of Transport, to declare certain TSI's not applicable in those same cases and circumstances. Therefore, this portion of the Austrian legislation is deemed to be in compliance with the relative European Directives. Mr. Hartig (e-mail 13 March 2007) adds the following clarification:

By law a RU or IM has to fulfil the TSI. Only in case it is not able to fulfill the TSI, it has to appeal to the Minister, and the Minister can allow the deviation from the TSI in the 4 mentioned cases - which are also written down in Article 7 of the IAD.

It is concluded that Austria has correctly implemented the IAD.

MS opinion[6]

In an earlier version of this report, the conclusion on the first point was more critical. Austria's response to that was: "This is merely a matter of wording without any material relevance. "

2.2.3.2 Czech Republic

Czech Republic has transposed the High-Speed and Conventional Interoperability Directives and their amendments (IAD) in three main pieces of legislation (if they have not already been a part of the legal system):

Firstly, the Railway Act 1994, amended on 5 May 2006:
"Zákon 181/2006 Sb., kterým se mění zákon 266/1994 Sb., o dráhách, ve znění pozdějších předpisů, a zákon 200/1990 Sb., o přestupcích, ve znění pozdějších předpisů"
implements the basic parts of the interoperability directives.

Secondly, the Interoperability Public Notice 2004, amended on 17 July 2006:
"Vyhláška 377/2006 Sb., kterou se mění vyhláška 352/2004 Sb., o provozní a technické propojenosti evropského železničního systému"
implements some parts of interoperability directives in more detail.

Thirdly, the Interoperability Government Decree 2005, amended on 17 July 2006:
"Nařízení vlády. 133/2005 Sb., o technických požadavcích na provozní a technickou propojenost evropského železničního systému"
implements some technical parts of interoperability directives in more detail.

Tables 2.12 and 2.13 give an overview.

Table 2.12 Changes to the High Speed Interoperability Directive – Transposition by the Czech Republic

Article of Directive 2004/50	**Article of Directive 96/48**	**Subject**	**Paragraphs of changed Railway Act 1994**	**Paragraphs of changed Interoperability Public Note 2004**	**Paragraphs of Interoperability Government Decree 2005**	**Remarks**
1.1	1	Aim and scope	49c, 49d, 49e	17, Annex	3, 4, Annex 3	Transposition also included in the Products Technical Specifications Act.
1.2	2	Definitions	44, 49b,	17, Annex	3, 4, Annex 3	Transpositi

Article of Directive 2004/50	Article of Directive 96/48	Subject	Paragraphs of changed Railway Act 1994	Paragraphs of changed Interoperability Public Note 2004	Paragraphs of Interoperability Government Decree 2005	Remarks
			49c, 49d, 49e			on also included in the Products Technical Specificati on Act.
1.6	7	Derogations	49c			
1.7	9	No hindrance for compliant interoperability constituents				Implicitly complied with.
1.8	10	Compliance of interoperability constituents			3, 4	
1.9	11	Withdrawal of European specifications	49e			
1.10	14	Authorisation of placing in service	43, 43b, 44		6	
1.11	15	No hindrance for compliant subsystems	43, 43b			
1.12	16.3	Send technical rules etc. in the absence of TSI's and in case of derogations	49c, 49d, 49e			
1.14	18.2	EC verification of subsystems		4, 5, 17	6	
1.18	-	Registers of infrastructure and rolling stock	49d	21		
1.19	Annex I	Definition of the trans-european high speed rail system		2, 3, 4, 5		
1.20	Annex II	Subsystems, areas		6, 7		
1.21	Annex III	Essential requirements		8, 9, 10, 11, 12, 13, 14, 15, 16,		

Article of Directive 2004/50	Article of Directive 96/48	Subject	Paragraphs of changed Railway Act 1994	Paragraphs of changed Interoperability Public Note 2004	Paragraphs of Interoperability Government Decree 2005	Remarks
				17, 18, 19		
1.22	Annex VII	Criteria for notified bodies			Annex 3	

Table 2.13 Changes to the Conventional Rail Interoperability Directive – Transposition by Czech Republic

Article of Directive 2004/50	Article of Directive 2001/16	Subject	Paragraphs of changed Railway Act 1994	Paragraphs of changed Interoperability Public Note 2004	Paragraphs of Interoperability Government Decree 2005	Remarks
2.2	1	Aim and scope	49c, 49d, 49e	17, Annex	3, 4, Annex 3	Transposition also included in the Products Technical Specifications Act.
2.3	2	Definitions	44, 49b, 49c, 49d, 49e	17, Annex	3, 4, Annex 3	Transposition also included in the Products Technical Specification Act.
2.6	7(a)	Derogation	49c			
2.7	10	Compliance of interope-rability constituents			3, 4	
2.8	11	Withdrawal of European specifications	49e			
2.9	14	Authorisation of placing in service	43, 43b, 44		6	
2.10	16.3	Send technical rules etc. in the absence of TSI's and in case of derogations	49c, 49d, 49e			
2.16	24.2	Registers of	49d	21		

Article of Directive 2004/50	Article of Directive 2001/16	Subject	Paragraphs of changed Railway Act 1994	Paragraphs of changed Interoperability Public Note 2004	Paragraphs of Interoperability Government Decree 2005	Remarks
		infrastructure and rolling stock				
2.18	Annex I	Definition of the trans-european conventional rail system		2, 3, 4, 5		
2.19	Annex III	Essential requirements		8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19		
2.20	Annex VII	Criteria for notified bodies			Annex 3	

Critical assessment

All obligatory and some facultative parts of IAD were implemented into Czech legislation. It is therefore concluded that the transposition is correct.

MS opinion

Given the conclusion above, there was no need to contact a MS official.

2.2.3.3 France

France has notified 2 legislative transposition measures for the IAD. They are listed below, with a summary of their contents:
Law 2006-10 of 5 January 2006 creates the French Rail Safety Authority (in French: *Etablissement Public de Sécurité Ferroviaire - EPSF*) and regulates its administration, resources and certain rights of its agents. Furthermore, it changes law 82-1153, giving certain powers to EPSF's director and staff.
Decree 2006-1279 of 19 October 2006, laying down the conditions for safety and interoperability.

Tables 2.14 and 2.15 give an overview.

Table 2.14 Changes to the High Speed Interoperability Directive – Transposition by France

Article of Directive 2004/50	Article of Directive 96/48	Subject	Article of Decree 2006-1279	Remarks
1.1	1	Aim and scope	30	
1.2	2	Definitions	31	
1.6	7	Derogations	36-38	

Article of Directive 2004/50	Article of Directive 96/48	Subject	Article of Decree 2006-1279	Remarks
1.7	9	No hindrance for compliant interoperability constituents	32	
1.8	10	Compliance of interoperability constituents	32, 33	
1.9	11	Withdrawal of European specifications	39	
1.10	14	Authorisation of placing in service and register.	43, 56	
1.11	15	No hindrance for compliant subsystems		An EC declaration of verification is not enough. A safety dossier needs to be compiled and examined by EPSF.
1.12	16.3	Send technical rules etc. in the absence of TSI's and in case of derogations		No problem.
1.14	18.2	EC verification of subsystems		EC verification by a notified body is not explicitly required by this decree. The safety dossier needs to contain, 'as far as needed', the EC declaration of verification. A decision by the Minister will specify the procedure for EC verification.
1.18	-	Registers of infrastructure and rolling stock	31.II 55	Infrastructure Rolling stock
1.19	Annex I	Definition of the trans-european high speed rail system	30	Shorter than in the Annex, but OK.
1.20	Annex II	Subsystems, areas		Shorter than in the Annex, but OK.

Article of Directive 2004/50	Article of Directive 96/48	Subject	Article of Decree 2006-1279	Remarks
1.21	Annex III	Essential requirements	Annex	
1.22	Annex VII	Criteria for notified bodies		Not explicitly in the decree. A decision by the Minister will specify the criteria.

Table 2.15 Changes to the Conventional Rail Interoperability Directive – Transposition by France

Article of Directive 2004/50	Article of Directive 2001/16	Subject	Article of Decree 2006-1279	Remarks
2.2	1	Aim and scope	30	
2.3	2	Definitions	31	
2.6	7(a)	Derogation	36-38	
2.7	10	Compliance of interoperability constituents	32, 33	
2.8	11	Withdrawal of European specifications	39	
2.9	14	Authorisation of placing in service	43, 56	
2.10	16.3	Send technical rules etc. in the absence of TSI's and in case of derogations	-	No problem.
2.16	24.2	Registers of infrastructure and rolling stock	32.II 55	Infrastructure Rolling stock
2.18	Annex I	Definition of the trans-european conventional rail system	30	See previous table.
2.19	Annex III	Essential requirements	Annex	
2.20	Annex VII	Criteria for notified bodies		See previous table.

Critical assessment

1. In order to obtain an authorisation for putting a structural sub-system into service, an EC declaration of verification is not enough. A safety dossier needs to be compiled in three stages and examined by EPSF. The dossier is meant to direct the safety activities in a project and to demonstrate that the safety objective is met. An expert or body, agreed by EPSF, needs to attest to the fact that the final dossier is in harmony with the objectives set at the beginning. The following can be said about this:
- Since this procedure is an extra 'conditio sine qua non' it seems to be not in line with art. 15 of the Interoperability Directives, stipulating that MS may not hinder the placing in service of subsystems meeting the essential requirements
- However, art. 14 of the Interoperability Directives obliges MS to check the compatibility of the subsystem with the system into which it is integrated and refers to the essential requirements (one of which being safety) with respect to this integration.
- Verification of the interfaces of the subsystem in relation to the system into which it is integrated is also a task for the nobo (art. 18).
- The fact that the French legislation explicitly defines the conditions and process for putting in service is a positive point (transparency, due process).
- The general safety objective against which the dossier is tested is totally in line with the safety goal defined in art. 4.1 of the Railway Safety Directive.
Demanding some proof of safety in addition to the EC declaration of verification is current practice, not only in France, but in many countries. The relationship between conformity assessment and putting into service is analysed extensively in par. 3.2.2 and summarised in fig. 3.1. As for France, it is concluded now that this issue does not constitute a deviation from the European railway legislation, taken in its entirety.

2. EC verification by a notified body is not explicitly required by this decree. The safety dossier needs to contain, 'as far as needed', the EC declaration of verification. The procedure for EC verification will be specified in a decision by the Minister. If this procedure is equal to the one prescribed by the directive[XI], no deviation occurs.

3. Criteria for notified bodies have not been explicitly specified in the decree. These criteria will be specified in a decision by the Minister. If these criteria contain at least those prescribed by the directive[XII], no deviation occurs.

Other than these, the French transposition of the RSD is assessed as being adequate.

2.2.3.4 Germany

Germany has notified the following transposition measure:
Erstes Gesetz zur Änderung des Allgemeinen Eisenbahngesetzes vom 13. Dezember 2006.
It changes the General Railway Act of 1993, which was changed a number of times before, and which contains transposition measures for Directives 96/48/EC and 2001/16/EC.

The changes brought about by this legislative measure hold provisions relating to notified bodies and to the national vehicle register. In summary, the provisions are as follows.

[XI] Mr. Saule from EPSF expects that this will be the case (e-mail 21 June 2007), but obviously the project team cannot assess this now.
[XII] Idem ditto.

Notified bodies:
- it is the obligation of the Federation (*der Bund*) to implement the function of notified body
- therefore, a notified body is established within the federal railway authorities
- the competences of these authorities with respect to other players in the rail sector are widened
- the tasks of the notified body with respect to the trans-European high speed network can be transferred to a private party

National vehicle register:
- it is the obligation of the Federation (*der Bund*) to manage the register
- its goal is described
- access to data in the register can be given through the internet
- powers and limitations with respect to transfer and logging of data

The provisions with respect to the national vehicle register implement art. 1.9 and 2.10 of the IAD, changing the articles 14 of both interoperability directives. One of the provisions with respect to the notified body implements art. 1.22 of the IAD; the others have no direct relationship to the IAD.

Not notified (yet) is the following implementation measure, dated 5 July 2007:
Zweite Verordnung zum Erlass und zur Änderung eisenbahnrechtlicher Vorschriften.
Its article 1 is a regulation on interoperability, implementing both the HSD and the CRD, as changed by the IAD. Tables 2.16 and 2.17 give an overview.

Table 2.16 Changes to the High Speed Interoperability Directive – Transposition by Germany

Article of Directive 2004/50	**Article of Directive 96/48**	**Subject**	**Article of 'Zweite Verordnung'**	**Remarks**
1.1	1	Aim and scope	1.1	
1.2	2	Definitions	1.2	
1.6	7	Derogations	1.5	
1.7	9	No hindrance for compliant interoperability constituents	1.10	
1.8	10	Compliance of interoperability constituents	1.10	
1.9	11	Withdrawal of European specifications	-	
1.10	14	Authorisation of placing in service	1.6, 1.20, 1.21	
1.11	15	No hindrance for compliant subsystems	1.6	To obtain an authorisation of placing in service, proof of compliance with rules needed to fulfil the essential requirements, other than those covered by the EC-

Article of Directive 2004/50	Article of Directive 96/48	Subject	Article of 'Zweite Verordnung'	Remarks
				declaration of verification, is needed. Furthermore, the authorisation can hold additional conditions.
1.12	16.3	Send technical rules etc. in the absence of TSI's and in case of derogations	1.5	
1.14	18.2	EC verification of subsystems	1.6, 1.15	
1.18	-	Registers of infrastructure and rolling stock	1.12	
1.19	Annex I	Definition of the trans-european high speed rail system	1.1, Annex 1	For rolling stock the scope is all rolling stock negotiating the German part of the HS TEN.
1.20	Annex II	Subsystems, areas	Annex 2	
1.21	Annex III	Essential requirements	1.3	
1.22	Annex VII	Criteria for notified bodies	-	EBC is the only notified body.

Table 2.17 Changes to the Conventional Rail Interoperability Directive – Transposition by Germany

Article of Directive 2004/50	Article of Directive 2001/16	Subject	Article of 'Zweite Verordnung'	Remarks
2.2	1	Aim and scope	1.1	
2.3	2	Definitions	1.2	
2.6	7(a)	Derogation	1.5	
2.7	10	Compliance of interoperability constituents	1.10	
2.8	11	Withdrawal of European specifications	-	
2.9	14	Authorisation of placing in service	1.6, 1.20, 1,21	

Article of Directive 2004/50	Article of Directive 2001/16	Subject	Article of 'Zweite Verordnung'	Remarks
2.10	16.3	Send technical rules etc. in the absence of TSI's and in case of derogations	1.5	
2.16	24.2	Registers of infrastructure and rolling stock	1.12	
2.18	Annex I	Definition of the trans-european conventional rail system	1.1, Annex 1	
2.19	Annex III	Essential requirements	1.3	
2.20	Annex VII	Criteria for notified bodies	-	EBC is the only notified body.

Critical assessment

All changes that would be expected from the IAD are found in the German legislation. It is concluded that Germany has correctly implemented the IAD.

MS opinion

Given the conclusion above, the MS opinion was not asked.

2.2.3.5 Slovak Republic

The Slovak Republic has transposed both the Conventional Interoperability Directives and its amendments from the IAD in amendments of the Railway Act 1996 (if they have not already been a part of the legal system).

The Railway Act 1996 was amended on 9 February 2005 by the legislative measure called: *"Zákon č. 109/2005 Z. z., ktorým sa mení a dopĺňa zákon Národnej rady Slovenskej republiky č. 164/1996 Z. z. o dráhach a o zmene zákona č. 455/1991 Zb. o živnostenskom podnikaní (živnostenský zákon) v znení neskorších predpisov"*

Tables 2.18 gives an overview.

Table 2.18 Changes to the Conventional Rail Interoperability Directive – Transposition by the Slovak Republic

Article of Directive 2004/50	Article of Directive 96/48	Subject	Paragraphs of changed Railway Act 1996	Remarks
2.2	1	Aim and scope	-	General proclamations, not transposed.
2.3	2	Definitions	57b	
2.6	7(a)	Derogation	57d	
2.7	10	Compliance of interope-rability constituents	57b, 57c	
2.8	11	Withdrawal of European specifications	-	Not found in interoperability legislation.
2.9	14	Authorisation of placing in service	57b, 57c, 57e	
2.10	16.3	Send technical rules etc. in the absence of TSI's and in case of derogations	57e, 65a	
2.16	24.2	Registers of infrastructure and rolling stock	57e	
2.18	Annex I	Definition of the trans-european conventional rail system	Annex 1	
2.19	Annex III	Essential requirements	Annex 4	
2.20	Annex VII	Criteria for notified bodies	-	Not found in interoperability legislation.

Critical assessment

Annex I of the HSD, containing the definition of the trans-european high speed rail system, was not transposed. There is no part of European high speed rail system operated or planned in Slovakia. This effectively means that the HSD and the parts of the IAD relating to HS were not transposed.

The Slovak transposition of IAD simplified both directives mostly to 5 single paragraphs of the Railway Act. Almost all general parts of IAD were however not transposed. Furthermore, it could not be found any transposition of minimum criteria for notified bodies.

Except for the two above mentioned problem areas, it could be concluded that the transposition is correct.

MS opinion

The non-implementation of the HS parts of the IAD by the Slovak Republic is a logical sequel to its not implementing the HSD in the first place. This is already an issue between the Slovak Republic and the EC. Therefore the MS opinion was not asked.

2.2.3.6 United Kingdom

The United Kingdom has transposed the High-Speed and Conventional Interoperability Directives and their amendments in Statutory Instrument 2006 No. 397, issued on 23 February 2006:
"The Railways (Interoperability) Regulations 2006".
Some of the regulations came into force on 20 March 2006, the rest on 2 April 2006.

Tables 2.19 and 2.20 give an overview.

Table 2.19 Changes to the High Speed Interoperability Directive – Transposition by the UK

Article of Directive 2004/50	**Article of Directive 96/48**	**Subject**	**Interoperability Regulations 2005**	**Remarks**
1.1	1	Aim and scope	3	
1.2	2	Definitions	2	
1.6	7	Derogations	6 (2) (a)	
1.7	9	No hindrance for compliant interoperability constituents	22	
1.8	10	Compliance of interoperability constituents	16, 17	
1.9	11	Withdrawal of European specifications	-	
1.10	14	Authorisation of placing in service	4, 5, 31	
1.11	15	No hindrance for compliant subsystems	4	It is stated in reg. 4 (3) that Safety Authority *may not* require additional checks, if they have been carried out in the past under the appropriate verification assessment procedure.
1.12	16.3	Send technical rules etc. in the	6	The regulation is concerning derogations only. The UK

Article of Directive 2004/50	Article of Directive 96/48	Subject	Interoperability Regulations 2005	Remarks
		absence of TSI's and in case of derogations		has already sent to the Commission technical rules to fill in the gaps left by the TSI's. We do not consider it to be an omission that this has not been written as an obligation in the law (see also table 2.3).
1.14	18.2	EC verification of subsystems	9(2)b	
1.18	-	Registers of infrastructure and rolling stock	31, 32	
1.19	Annex I	Definition of the trans-european high speed rail system	Schedule 1	
1.20	Annex II	Subsystems, areas	Schedule 3	
1.21	Annex III	Essential requirements	Schedule 5	
1.22	Annex VII	Criteria for notified bodies	Schedule 10	

Table 2.20 Changes to the Conventional Rail Interoperability Directive – Transposition by UK

Article of Directive 2004/50	Article of Directive 2001/16	Subject	Interoperability Regulations 2005	Remarks
2.2	1	Aim and scope	3	
2.3	2	Definitions	2	
2.6	7(a)	Derogation	6 (2) (a)	
2.7	10	Compliance of interoperability constituents	16, 17	
2.8	11	Withdrawal of European specifications	-	
2.9	14	Authorisation of placing in service	4, 5, 31	
2.10	16.3	Send technical rules etc. in the absence of	6	The regulation is concerning derogations only. The UK has already sent to the

Article of Directive 2004/50	Article of Directive 2001/16	Subject	Interoperability Regulations 2005	Remarks
		TSI's and in case of derogations		Commission technical rules to fill in the gaps left by the TSI's. We do not consider it to be an omission that this has not been written as an obligation in the law (see also table 2.3).
2.16	24.2	Registers of infrastructure and rolling stock	31, 32	
2.18	Annex I	Definition of the trans-european conventional rail system	Schedule 2	
2.19	Annex III	Essential requirements	Schedule 6	
2.20	Annex VII	Criteria for notified bodies	Schedule 10	

Critical assessment

All changes that would be expected from the IAD are found in the British legislation. It can be concluded that the United Kingdom has correctly implemented the IAD.

MS opinion

Given the conclusion above, the MS opinion was not asked.

2.3 Differences and recommendations

The way in which both directives have been transposed into the national legislation differs substantially between the 6 countries that were assessed. This is mainly due to the differences in legal systems and traditions between the countries. This is no surprise and is not seen as a problem.

Sections 2.1 and 2.2 above hold critical remarks on the transposition in France and Germany and, to a much lesser extent, in Austria and the UK. It appears to the authors that the (suspected) flaws in the transposition can only for one issue be traced back to problems (such as inconsistencies, unclarities, or 'unfeasibilities') associated with the provisions of the directives themselves: cross-acceptance of rolling stock not yet fully covered by TSI's.

However, a general concern is the transparency of the legislation. In all 5 cases the legislation was found to be reasonably to well accessible for the assessors, being experts in the field. For railway professionals who are not used to reading legal texts, their accessibility can be

cumbersome. In order to help readers find the relevant sections and understand what they are reading we recommend that:
1. clear headings are used for text elements, such as chapters, paragraphs and possibly also articles;
2. each text has a table of contents;
3. consolidated versions are made available;
4. transposition tables are attached[XIII].

In the 6 countries studied, this was done in part already.

2.4 Conclusions, problems and way forward

1. As per July 2007, four countries have not yet (fully) transposed the Railway Safety Directive or it has not yet entered into force: Greece, Italy, Luxemburg and Switzerland. According to our information, seven[XIV] countries have not yet transposed the Interoperability Amendment Directive: Greece, Italy, Luxemburg, Norway, Slovenia, Switzerland and Sweden.

Importance and way forward:
The lagging behind of the transposition means that the legal basis and certainty is lacking for those who could benefit from it and in some cases that institutional reforms, meant to be brought about by the legislation, have not taken place. Even in the case where the institutions and processes actually exist and are operational, not having the legal basis can be a problem.[XV]. To tackle this, the Commission has already started an infraction procedure against the Member States concerned.

2. RSD transposition measures for the following 6 countries were evaluated: Austria, Czech Republic, France, Germany, Slovak Republic and UK. These transpositions were found to be complete and correct, with the following exceptions:
- In Austria the period in which the NSA has to decide on an application for a safety certificate or authorisation is not correct.
- In France a) the requirement for the NSA to decide timely on an application for a safety certificate or authorisation is not implemented correctly and b) the degree of independence of its NSA EPSF relative to SNCF and RATP can be criticised.
- For Germany, implementation of the requirements on safety management systems for RU's appear not to be fully correct.
- In the UK is there is a general possibility for exemption[XVI] for security reasons.

3. IAD transposition measures for the following 6 countries were evaluated: Austria, Czech Republic, France, Germany, Slovak Republic and UK. These transpositions were found to be complete and correct, with the following exceptions:
- In France a) the procedure for EC verification of subsystems has not yet been specified and b) the criteria for notified bodies have not yet been specified.

[XIII] Perhaps not very interesting to the end-users, but a great help to assessors.
[XIV] Based on notifications received and processed by the Commission until beginning of June 2007.
[XV] This is exemplified by the case of Norway and Sweden where safety certificates for RU's issued in Sweden, largely already according to the RSD principles, could not formally be accepted in Norway as part A certificates, because Sweden had not yet transposed the RSD. In order to harmonise the process Sweden, Denmark and Norway have recently started to look over at the procedure in each country and if possible see if some harmonisation can be done.
[XVI] This may be justified by other community legislation, but this has not been checked.

- In the Slovak republic a) the criteria for notified bodies have not yet been specified and b) the HS related parts from the IAD are not transposed[XVII].

Importance and way forward (2 and 3):
Some of the (suspected) anomalies in the legislation can lead to serious shortcomings in the level playing field and the related safety guarantees. A dialogue with each MS needs to be taken on, to further investigate the correctness and the seriousness of these anomalies and to discuss remedial action.

4. The way in which the directives have been transposed into the national legislation differs substantially between the 6 countries that were assessed. This is not seen as a problem.

5. In all 6 cases the legislation was found to be reasonably to well accessible for the assessors, who are experts in the field. However, accessibility of legislation for a larger target group can be improved.

Way forward:
This is an issue with wider scope than just railways. The EC is advised to internally discuss the need for improving accessibility of national legislation and possibly produce guidance on such issues as legislation formats, transposition tables and availability of consolidated versions.

[XVII] As reported earlier by the Commission, the Slovak Republic has not transposed the HSD.

3 PROGRESS OF INTEROPERABILITY

This chapter deals with the progress of interoperability. Information was collected both by studying information from the internet and by interviews with stakeholders. A number of questions concerning the progress of interoperability were asked to a selection of authorities, infrastructure managers, railway undertakings and the supply industry.
The answers and comments were collected and reviewed by the interviewees. The detailed results are given in Annex E.

3.1 Introduction on the development of directives and TSIs

In 1996 after the publication of the High Speed Directive 96/48/EC (HSD) for the interoperability of the trans-european high speed network, the AEIF (Association Européenne pour l' Interopérabilité Ferroviaire) started the work for setting up the TSIs. The Directive 96/48/EC and the mandate of the European Commission gave the references for that work. Finally, after adoption of the drafts by the Article 21 Committee and decision by the European Commission, in 2002 the first set of TSIs for high speed was published.
Today these TSIs are under reconstruction. The committee has already adopted these revised high speed TSIs and the Command and Control TSI is already in force. The other revised TSIs will be published soon.

In 2001 the interoperability Directive 2001/16/EC for the conventional rail network (CRD) was published. For this Directive, TSIs had to be developed too. In article 23 of that Directive three groups of TSIs are distinguished. The AEIF received a mandate for setting up the first two groups. Later on the Railway Agency received a mandate for the third group of TSIs.
The first group of TSIs is already available and has come into force in 2006 and the start of 2007.
The second group of TSIs is adopted by the committee and now under translation and is being prepared for decision by the European Commission. These TSIs are planned to be published in autumn 2007 and to come into force six month later in 2008.
The third group of TSIs is under construction by the Agency. The mandate MA04EN02 of EC gives the time planning.

Both interoperability directives were amended by directive 2004/50/EC, dated April 2004.

The detailed dates of completion for each TSI and a planning for the future TSIs is given in Annex C.

3.2 Qualitative analysis

3.2.1 Definition of interoperability

Before starting the analysis of how to measure interoperability and progress in the development of interoperability, it is important to first define the notion of interoperability. The HSD gives the following definition of interoperability in Article 2.b:

Interoperability means the ability of the trans-European high-speed rail system to allow the safe and uninterrupted movement of high-speed trains, which accomplish the specified levels of

performance. This ability rests on all the regulatory, technical and operational conditions, which must be met in order to satisfy Essential Requirements.

The CRD gives the same definition for the conventional rail network. This definition is definitely comprehensive and all-embracing, nevertheless for different reasons much simpler and more limited definitions are found in practical use. The most common misunderstanding is that interoperability is reduced to the much more simplified concept of technical compatibility[XVIII]. This simplified interpretation of interoperability has large consequences.

In our survey we have taken the definition from the Directives as stated above as the starting point. This means that we will try to measure the progress of interoperability against the above definition.

3.2.2 Conformity assessment principles and processes

Once (a part of) the railway network is constructed or upgraded to interoperability, the interoperability must be demonstrated and accepted. According to the processes described in the HSD and CRD, interoperability must be verified in two steps. The first step of the check on interoperability is the verification of technical conformity. Constituents and Subsystems are checked by Notified Bodies against the requirements written in Annex III of the interoperability directives: the Essential Requirements. These Essential Requirements are the basis for the basic parameters in the TSIs and their requirements in chapter IV and V of the TSIs. A number of items of the metrics that will be discussed further in this chapter are based on these elements of certification against the Essential Requirements and Basic Parameters during the certification process.

The second step is different for Interoperability Constituents and Subsystems.

Interoperability Constituents
The second step for constituents is placing on the market. In our survey we have seen that there are little incentives for placing constituents with a certificate on the market. When the railway industry and system integrators do not request that their colleagues suppliers of Interoperability Constituents deliver certificates for components in the subsystems, the need for certification is effectively not present. In the Directive two possible incentives were available:

- The surveillance by the Member State on the products on the market. We have not been able to detect market surveillance by the Member States. There seems to be no mechanism of registration of this type of surveillance.
  The Agency has to register the certificates in a public database, based on article 19 of the

[XVIII] The investigators think to have found this same misunderstanding in EC documents, e.g. COM(2007) 94 final: Trans-European transport network, Report on the implementation of the guidelines 2002-2003 pursuant to article 18 of Decision 1692/96/EC {SEC(2007) 313}of 13.3.2007 in paragraph 2.1.1. This contains the following text:

2.1.1 Interoperability
One of the main objectives of TEN-T is interoperability of national networks. Interoperability of the rail networks should integrate the national conventional and high-speed rail systems in order to make international services more efficient and thus competitive. Greater interoperability, i.e. the capacity for trains to cross national frontiers without the need to stop or even out technical differences, significantly enhances transport performance and reduces operational costs.

Agencies Regulation 881/2004/EC. The Agency has now started asking the Member States to deliver the information to the Agency for this database.

- At the moment of certification of the subsystem the Notified Bodies can and must detect non-conformity of constituents. In NB-RAIL the issue of interoperability constituents that are delivered and used in a subsystem without having an IC certificate has been discussed. It has been concluded that a contracting entity has to arrange a certificate for these components afterwards. This has now also been described in the latest issue of the TSIs. A number of examples of this type of certification of IC's used in a subsystem has been seen by the investigators, but an exact statistic seems not to be registered.

The study team has found that at Member States level the information about certification of constituents is almost never available. For interoperable subsystems, there is – as written above - surveillance by Notified Bodies. In principle the mechanism for a Member State to detect missing certification for Interoperability Constituents is through the Technical File that must accompany a Declaration of Verification for a Subsystem, which in turn is necessary to obtain the authorisation from a Member State to put a subsystem into service. This Technical File must contain a list of the applied ICs and the certificates of these IC's. If IC's without certification are applied this can be seen from the list of ICs. However, because the process of subsystem certification itself is not very mature yet this mechanism is not yet fully functioning. For non-interoperable lines it is possible that non certificated constituents are on the market and in use without surveillance by Notified Bodies or by the national governments. This is allowed and cannot be prevented, but it constitutes a backdoor. The constituents could well be used on interoperable lines without any further verification. In case of an incident it is possible that a non certified constituent causes the event. In that case the company that uses the product could be blaimed for using non certified products and the company that produced it will refer to the restriction of use on non-interoperable lines. Until now no jurisprudence exists on this subject. However, this mechanism is extremely difficult to counteract because for instance non-interoperable rolling stock could be allowed to run on interoperable lines when they are compatible and not necessarily complying with all requirements from the TSIs.

Because the requirement on Member States to survey the market of Interoperability Constituents is so difficult to implement it raises the question what to do with it. It should be improved in the sense that all constituents of a certain kind become Interoperability Constituents and must follow the TSI or it should be abandoned.

Subsystems

The second step for subsystems is the authorisation for putting into service. In many Member States this may be associated with a license to operate the subsystem. For this step the contracting entity (Railway Undertaking, Infrastructure Manager) asks the Member State to give a license for the putting into service of the subsystem. In this way the interoperability Directives give the Member State the task to monitor the process of certification of the conformity with the Essential Requirements.

As shown in Figure 3. 1 the investigators define two levels. The upper level, indicated as "conformity assessment" is the certification process on regulatory technical conditions. On the lower level is the putting into service. In practice before a subsystem may be put into operation, it is necessary to integrate it into the railway system.

The two-step approach is analysed in more detail in the following. This will include a brief analysis of:

- The interfaces between the subsystems and with the rest of the railway system
- The degree of coverage by the TSI requirements
- The aspects of system integration
- The fulfilment of the Essential Requirements
- In particular the fulfilment of safety requirements
- National requirements

Interfaces
For the TSIs there is a link between track side applications and on board applications. The TSIs must guarantee the cooperation between both parts of the subsystem. These subsystems have to work together in the railway system. In the TSIs these interfaces were recognised and described. Although the different parts of track side and on board functions may be described in one single TSI in order to ascertain consistency of the two sides of the interface, in practice different parties are responsible for delivery, installation and certification of on board and track side. This may also be the case for parts of the track side or on board functions itself. A subsystem (project) may be split in deliveries of different manufacturers or contractors. This means that the theory of the TSI does not correspond with the practice of subsystem projects. This can also be the case for interoperability constituents. Some TSIs already address this point, but his may be a general point of improvement of the TSIs.

Degree of coverage of functional requirements by TSIs
The aim of the TSIs is to harmonise the requirements for interoperability. In the past the TSIs were developed from a perspective of limited interpretation of the notion of interoperability. As explained in section 3.2.1 a common misunderstanding is that interoperability only covers technical compatibility. This would mean that the TSIs do not contain all the specifications for the subsystems. In the survey the investigators have still found proof of this limited interpretation of interoperability.
At the same time an interpretation exists in which the TSIs are seen as the documents with all functional requirements of subsystems. This results in a discussion between parties and uncertainty about the value of the conformity assessment process. Consequently the National Safety Authorities don’t accept the NBs certificate as the only basis for granting an authorisation for putting into service. In some cases this is justified because the coverage of the TSI is insufficient, in other cases it is unjustified because the TSIs give complete coverage of functions. This is an important point where the TSIs may be improved and interoperability may be stimulated.

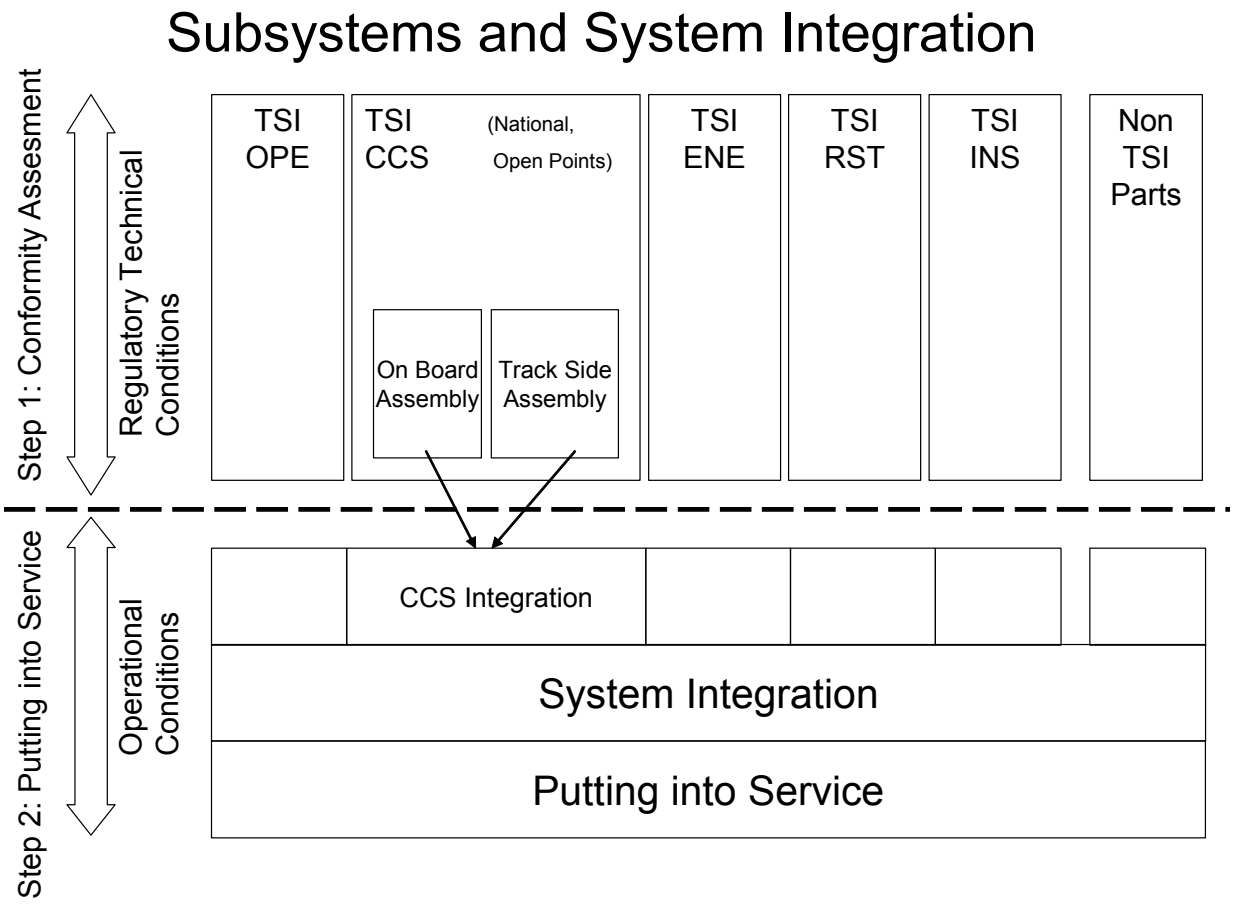


Figure 3. 1 Structure of the TSI Subsystem approach

Integration of subsystems into the railway system
A second item related to the putting into service, which is not covered in detail by European regulations, is the integration of all subsystems into the railway system. Before a NSA gives a license for putting into service, the subsystem must be shown to be compatible with the railway systems as a whole. This verification is now only specified on the national level. The Directives and TSIs mention this but they do not give details, although the integration also implies integrating with other subsystems that are covered in the TSIs. In particular this is the case for the TSI and the subsystem operation. Because of this there is a risk that requirements that are not covered (sufficiently) in the TSIs are solved by operational procedures. This in turn can create unforeseen hazards, but also it can introduce further differences between operational procedures and thus reduce the interoperability.
This point may be improved by introducing the railway system aspect within the structure of the TSI, e.g. through a system integration TSI, and by making the TSI Operation less free of engagement and obligations.

Clarity about Essential Requirements
The specification of the railway system as a whole and the safe operation of the railway network are supposed to be inside the TSIs. In the interoperability Directives five Essential Requirements are the basis for the content of the TSIs. These five Essential Requirements are:

1. Safety,
2. Reliability and availability,
3. Health,

4. Environment,
5. Technical compatibility.

However, the investigators conclude that in practice safety of the railway system and the compatibility between subsystems are not available as a transparent description in the interoperability directives and the TSIs.
The investigators recognise that there is therefore a lack of confidence in the certification process. The use of interoperability certificates gives the Member States not enough confidence that the railway system is safe enough, although safety is one of the Essential Requirements. The consequence is that many Member States still use their national rules for licensing the subsystems (for example in France, see 2.2.3.3).
If the requirements for subsystems in chapter four of the TSIs and the certification by Notified Bodies would give a transparent link to the Essential Requirements, it would be easier for National Safety Authorities to accept the evidence in the verification and certification documents and deliver a license for putting into service faster.

Procedures of Interoperability and Safety Directives
The Safety Directive only covers the safety aspect and the procedures for safety management and safety certification of organisations (Railway Undertakings and infrastructure managers). The Safety Directive was meant to fill in the gap in the Interoperability Directives and the TSIs. Meanwhile the Safety Directive has been published and has come into force in the majority of the Member States. However the Common Safety Targets and Methods are not yet defined, the process for a comprehensive safety approach is being written.
The requirements from the Safety Directive for licensing the safety management systems address elements that are also described in the TSI, like Rolling Stock, Infrastructure and Operation. In this way the Safety Directive recognises that a system integration process is required in order to come to a safety certification. This forms part of the non TSI assessment and putting into service steps depicted in Figure 3. 1.

According to the Interoperability Directives, after a subsystem has been certified, the contracting entity asks the Member State to give the authorisation for putting into service. At the same time the National Safety Authority has to supervise the safety of the railway system, based on the Safety Directive. The first issue here is that in a number of Member States it is not the NSA that authorises the putting into service. In practice this can sometimes still be done by a part of the Infrastructure Manager. In many cases the NSA is part of the Ministry of Transport. This issue is further discussed in sections 4.2 and 4.4.1.

The second issue, more influencing the safety and interoperability of railways, is that the NSA has to supervise the railway safety on a political level. So they must assure themselves that a subsystem license for putting into service does not hinder the overall railway safety. The applicant has to deliver the information for this check by the NSA. A normal method is that each applicant has to deliver a report of an Independent Safety Assessor for these items and each applicant railway undertaking or infrastructure manager must have a Safety management System (SMS). This SMS has to recognise the gaps with safety performance organised by other parties. The information of the SMS has to be given to the NSA together with the ISA report for their examination.
In order to eliminate differences the following could be improved:

- Make an accreditation of ISAs mandatory, that could help the NSA to trust the ISA report.
- Establish a transparent procedure for putting into service after the certification process.

National requirements
National requirements still exist and will probably exist for a long time. A coherent network requires however that the differences are reduced to the extent that the result is technically compatible and acceptable. This is exactly the aim of the Essential Requirements. These national requirements clearly fill in a part of the non-TSI assessment and putting into service steps.

The notion of cross acceptance of rolling stock that has recently been developed to bridge the gap between the EU and national rules is a very logical and useful step in this perspective. This notion tries to respect the national requirements while at the same time trying to guarantee fulfilment of the Essential Requirements.

3.2.3 Railway operation and development of the railway system

The operation of the railway system is a complex process that depends on a large number of contributions from technical and human resources. The Directives for interoperability follow an approach that is based on the so-called subsystems. However this approach has the disadvantage of being somewhat artificial and not being complete as a description of the railway system as was explained in the previous section.
Alternative models may have the advantage to be more practical and cover the railway system more completely. Multiple models could be necessary to define the different aspects of the railway system. In the following the aspects of distribution of the functions over the railway system and development, putting into operation and use of these functions during the useful lifetime will be investigated.

A general model that summarises the functional behaviour of the railway system with widespread practical use is the following:
Infrastructure: the fixed part of the technical system. This allows for a number of technical functions like carrying and guiding trains, protecting train movement, supply trains with energy etc. It includes the structural subsystems Infrastructure, Energy and Control, Command and Signalling as defined in the TSI (but only for the track side part of these 2 latter subsystems). However it is not limited to these structural subsystems, it also includes for instance communication systems, essential parts of the train protection function etc. These latter parts are not covered by the existing TSIs because they were thought not to be contributing to the notion of interoperability. Therefore important parts of the railway system, including parts that largely determine the safety of the system, are not covered by the TSIs.
Rolling Stock: the moving part. This allows for the function of safely containing passengers and goods during the journey and corresponds with the structural subsystem Rolling Stock from the TSI and the on board parts of the Energy and CCS subsystem.
Operation: the human part. This includes the processes and procedures to operate the infrastructure and the rolling stock separately and as an integrated system. It includes the subsystem Operations from the TSI.

A particular way of modelling this process is the fish bone diagram in Figure 3.2. This shows the contributions from different elements to the functioning of the railway system as a whole.

In the current situation, the interoperability Directives define the technical resources with the aim to specify the Essential Requirements. However two conclusions may be drawn:

- The interoperability Directives and the TSIs do not cover the technical resources completely;
- The TSIs do not specify the Essential Requirements completely.

For this reason the interoperability Directives, but above all the TSIs are insufficient to operate the railway system. While the TSIs describe the technical conditions, the specifications and requirements to operate the railway system are distributed over several documents: the TSI OPE, the Safety Directive and other Directives for licensing, safety certification etc. The progress in the implementation of these "non-interoperability" Directives is outside the scope of the current survey, however the non-interoperability Directives and interoperability Directives interact with each other (Figure 3. 2). This complicates the measurement of the progress on interoperability. Further effects of these observations will be studied in later sections.

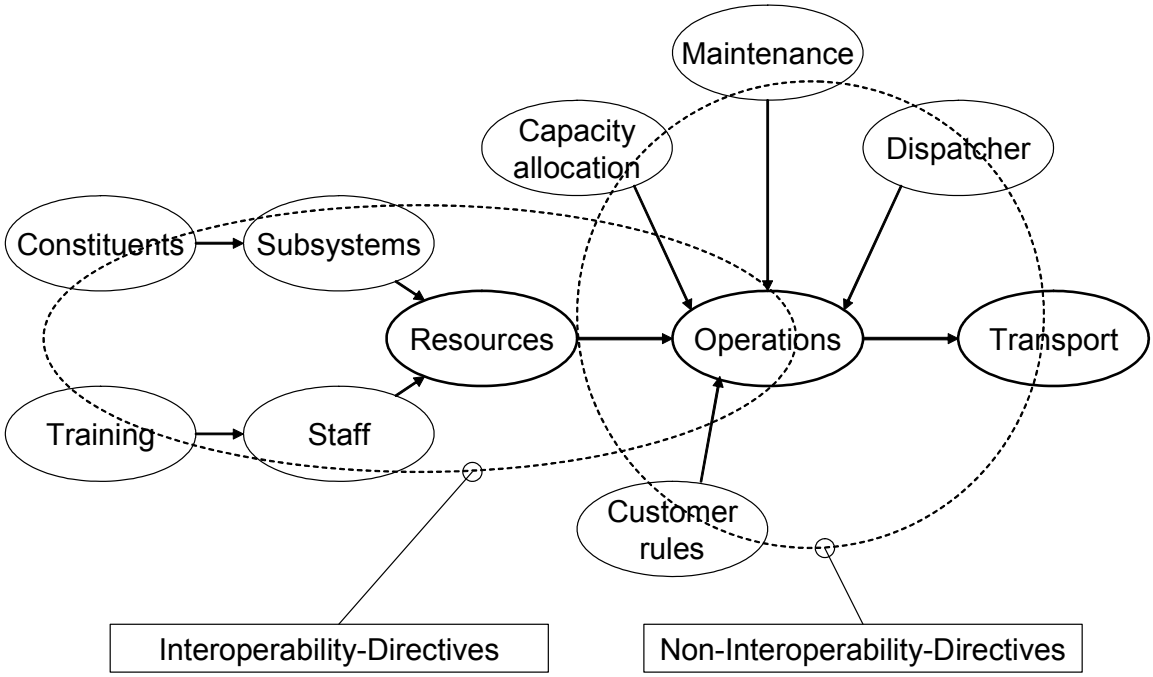


Figure 3. 2 Interoperability and Non-Interoperability Directives

The functional model explains how the railway system works, but does not necessarily show how it develops over time. The model from the TSIs uses a very simple approach for this purpose that consists of two stages:

- The development or design stage. With development is meant the preparation for the production (not the fundamental research that may precede this). It can also be seen as the design stage or the engineering stage.
- The production stage. This stage comprises the production of interoperability constituents, but also the assembling of subsystems. Within this stage testing and commissioning takes place.

This model has been taken directly from the new and global approach. The existing legislation of the new and global approach has served as a basis for the interoperability Directives, both for Interoperability Constituents and for Subsystems.

The conformity assessment procedures from the TSIs are related to the two stages of the above described model. This can be seen in the structure of the so-called conformity assessment models in the TSIs. Some modules only cover the development stage, others only cover the production stage, but modules that cover both stages also exist.
The two-stage model has a number of limitations. Alternative models are also in use. In the following the V-model that is used for the development of railway safety systems will be discussed briefly.

For the development of systems, standards exist that are based on a life cycle approach. This same approach can be applied to the description of the development of the railway system as a whole. This leads to the so-called V-diagram as shown in the Figure 3.3.

The formal V-cycle from the EN standards has 14 phases. In this study we limit ourselves to 4 important clusters:

- System design (The interoperability Directives and TSIs serve as specifications for system design in this model)
- System realisation (Based on these specifications the system is built)
- System acceptance (Certification is the corner stone in the system acceptance phase)
- System operation (The non-interoperability Directives regulate the phase of system operation and use)

In the V-diagram shown in Figure 3.3, the structure of certification and putting into service from the TSIs has been projected.

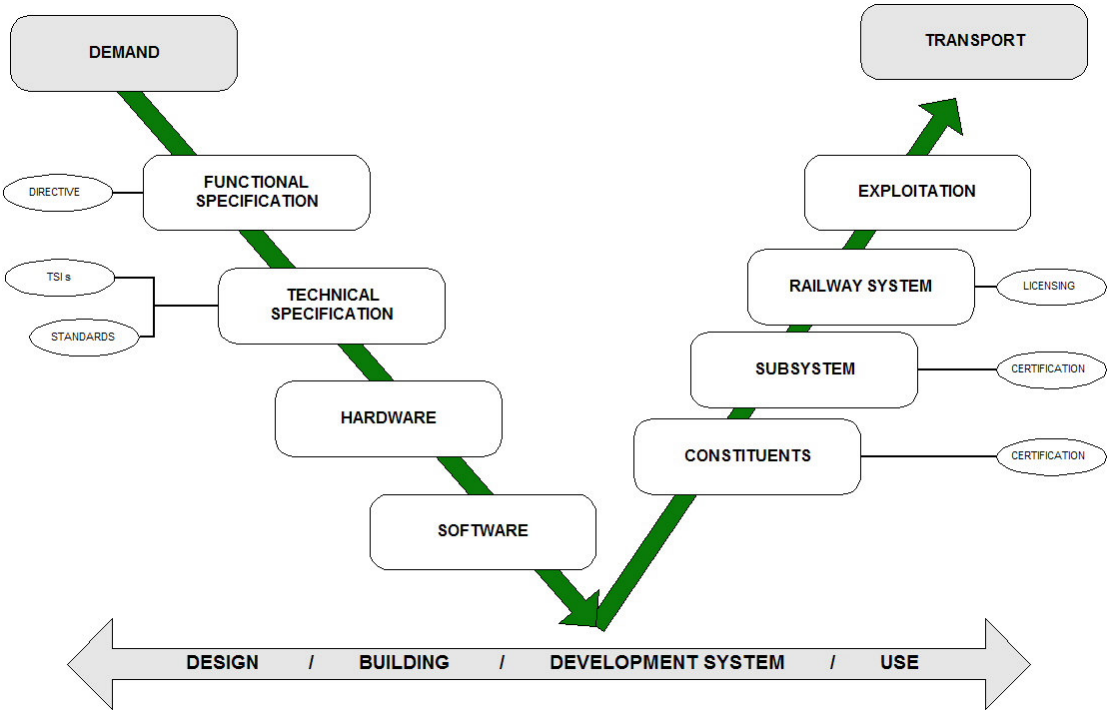


Figure 3. 3 V-cycle from the EN standards

The following conclusions can be drawn:

- The TSIs only cover a part of the life cycle. At the start, but most of all at the end of the life cycle important parts are missing and incomplete.
- Some discrepancies exist between the simple two stage TSI model and other life cycle models, like the CENELEC model described above. Therefore it may be difficult to map the certification and conformity assessment strategies for Interoperability Constituents and Subsystems from the modules of the TSIs onto the CENELEC life cycle model.

3.2.4 Influence of interoperability on the Railway market

The main reason for the introduction of interoperability in the railway sector is to improve competition within the railway market. With railway market in this respect two areas of market mechanisms are meant:

- The market of railway transportation of passengers and freight. This has to do with free access, level playing field, cross acceptance of technical resources (rolling stock) and staff and other issues. For this purpose, market liberalisation measures have been taken such as separation of responsibilities for infrastructure and transport operation.
- The market of railway products and systems. Interoperability must support the development of the open market for railway transportation by creating common technical specifications. This should allow the railway industry and the manufacturers of railway systems and products to compete throughout and outside Europe and end the nationally or regionally protective or favourable atmosphere, which existed before.

The authors observe that in many cases the background and reasoning behind the interoperability Directives does not seem to be the driving force of the policy and actions of the parties involved. In most cases the Interoperability Directives are seen from the perspective of the simplified interpretation of technical compatibility as described above and not from the

perspective of opening up the railway market. These problems will be studied further in a following section 3.6.
The different stakeholders react on different ways on interoperability:

The Infrastructur Managers (IM)
In case of new lines Infrastructure Managers have to follow the rules and to equip these new lines with equipment according to the regulations. The consequence is that all new lines will be specified and equipped with interoperable subsystems although for Control Command and Signalling in some cases fall back systems based on Class B systems may be added.
An important opportunity for introducing interoperability is the upgrading of existing lines for example in the framework of a corridor project. In these cases IMs will want to maintain the conditions for the existing traffic and add interoperability to enable operation of interoperable trains.
A complicating factor is the fact that it is often considerably cheaper to upgrade an existing subsystem than to install a completely new subsystem. For instance for the Energy subsystem it is cheaper to upgrade the dc power supply or for the Control, Command and Signalling subsystem it is cheaper to install a (modified) Class B system than to install a completely new ERTMS track side assembly. If the track side characteristics are changed in the process this forces also the Railway Undertakings to invest in upgrading their rolling stock.

The Railway Undertakings
Although Railway Undertakings are considered the beneficiaries of interoperability they are at this moment not necessarily in favour of it. For the time being, if they are not buying new trains for exclusively interoperable lines, it means installing supplementary systems on their trains in order to remain compatible with non-upgraded existing lines with corresponding costs. Especially for freight operators it is known that they operate in a competitive market and are reluctant to invest in equipment that in principle does not increase their business volume.

The Supply Industry
The supply industry has to invest heavily in the interoperable systems if they want to survive in the long term. It is obvious that in the long run non-interoperable systems can not be sold anymore. All new railway projects, at least in Europe, require interoperable equipment. For the time being they will obviously prefer to sell non-interoperable systems in relatively well protected markets at high margins to compensate for the high costs of development.

Another issue that came up during this study is the eminent position of ERTMS in interoperability. There are many different TSIs that have to be applied in order to obtain interoperability. Many of those seem to be easy to apply or do not seem to give any cause for discussion. The TSI CCS however is always an important issue of discussion. Especially the issue of the application of version 2.3.0 and the possible development of version 3.0.0 of ERTMS receive much attention and is deemed by many stakeholders to be important for the future success of Interoperability. For that reason ERTMS issues may seem relatively over-represented in this report. This seems however to be justified by the importance that most interviewees attach to this subject.

3.3 Description of the metrics to evaluate the progress of interoperability

3.3.1 Development process of the metrics

The process of developing the metrics will be stepwise. The current report gives a first proposal and analysis that may be further refined later. Once the principles of the metrics have been proven sound, more information can be collected in a structured way to come to a higher precision. The first aim is now to come to a general system of metrics. It is self understood that a metric is only useful if the unit and the scale are known. Figure 3.4 shows the stepwise approach of refinement.

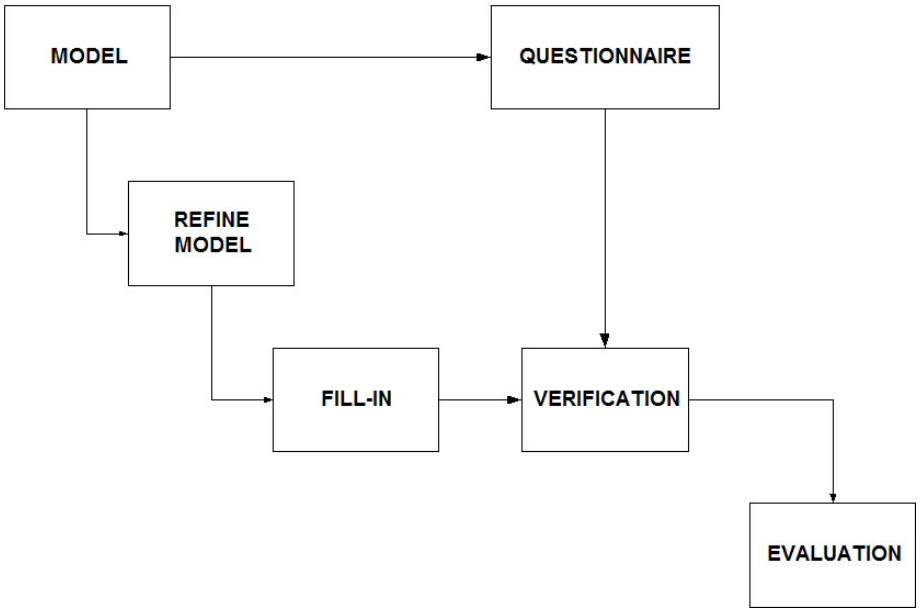


Figure 3. 4 Process for Development of Metrics

A reference model, that allows the analysis of the progress of interoperability, will be described in the next sections.

3.3.2 Description of different issues for metrics

Any metric is only usable if a reference exists against which a measurement can be held. What is much, what is little, what is sufficient, what is insufficient? This is the starting point. Looking at the aim of interoperability - opening up the market and developing a coherent network – the main orientations for the reference would be:

- What is the development of the network: what is the plan for the development of the network?
- What is the development of the market: what is the plan for the development of the market?

Plans for the development of the network have been proposed over the past years and are being executed. Therefore, the development of the network is not in the scope of this report. It is only used as a reference for the metrics. But in this phase we must acknowledge that there is no plan for the development of the market (yet). The development of the market (products, systems and transportation services) follows as the consequence of the development of the network.

This leads to the conclusion that only the plan for the development of the network can be taken as the reference for the development of interoperability. This is the overall reference.

Interoperability development is not just one big step, but a complex process consisting of two types of phases and multiple smaller steps and sub-processes:

A. Definition of the policy, preparation and building the conditions:
1. Establishing the rules through the Directives (3.4.1)
2. Establishing the requirements through the TSIs (3.4.2)
3. Establishing the organisations Article 21, AEIF, NB RAIL, ERA (3.4.3)

B. Implementation of the rules and the TSIs and establishment of the responsible organisations:
4. Transposition in the Member States of the Directives and the TSIs (3.4.4)
5. Implementing the rules and the TSIs (3.4.5)

C. Realisation and consolidation:
6. Using the rules in the process of developing the network and realizing interoperability (3.4.6)

D. Creating feedback from any of the above phases

E. Improving the processes in any of the above phases

These last two phases are partly subject of this report and partly subject of the responsibility of the Commission.

On a state level this list is much longer and more detailed. The metrics that can be developed may take this phasing somewhat into account.

For the metrics our analysis distinguishes between three different areas in which progress of interoperability may be measurable and that can be used in the two phase types mentioned above:
1. Political issues: this aspect explains the driving force behind the progress of interoperability, it is related to the persons involved in the process of implementing and developing interoperability, their (relative) numbers and their way of thinking and acting in accordance with the interoperability directives (3.3.3).
2. Legal issues: under this heading the progress of the legal obligation of the parties such as the transposition into national rules are analysed (3.3.4)
3. Quantitative issues: under this heading the number of certificates, the number of IC's on the market, the number of subsystems put into service, length of network, number of rolling stock and volume of interoperable operations can be considered (3.3.5).

The metrics 2 and 3 will be mainly relevant for phase A, the metrics 1 is aiming at phase C. In an intermediate step a relation should be found with the overall reference of network development.

For each of these items, the possibility to develop metrics will be investigated. An important issue still is the use of the metrics. The development of metrics is only useful if the metrics can be applied in practice. For this a unit to describe the scale is needed and it must be decided when it is a high level, average or low level, i.e. one has to compare the actual situation with a reference. The metrics are being developed to be used in this study, but also with a view to a

possible longer term use. For the application of the metrics within this project, from the total list of possible metrics those have to be picked that are deemed to be best feasible on the short term.

3.3.3 Political and human issues

The progress of interoperability is depending on the co-operation of many parties on national and international level. This includes Member States officials, Railway Undertakings, Infrastructure Managers, industrial parties etc.

From the political point of view the development of progress of interoperability can be seen as an inertial system that accelerates under the influence of a number of forces: economical needs, social development, governmental pressure and priorities, employment growth and influences from external parties such as trade unions. Many other factors could be identified.
For example on a national level, there can be initiatives from governmental bodies or NSA's to participate in European parties and to work on European interoperability Directives and TSIs. This participation can be expressed by the following items (this is not a limitative list):

- Is more than 10% of the staff at Member States level involved with interoperability issues?
- Is the General-Director involved with interoperability issues?
- Is there a policy to take part in ERA working parties, not only for governmental parties but also for representatives coming from railway undertakings, infrastructure managers, industry, standardisation committee, etc.?
- Is there an influence of railway partners on national representatives concerning discussions about interoperability issues?
- Does the NSA take part in the NSA network?
- Is there an acceptance of certificates coming from other Member States?
- Does a Member State representative intervene in A21-Committee meetings?
- Is the railway sector at large being informed about interoperability and to which extent has this knowledge penetrated the organisations of railway players?

Here we see that we also can define a scale YES or NO. But not necessarily this figure will grow to 100% YES. For this part of the metrics we can define levels, for instance:
- less then 10 % YES: poor interoperability
- 10 to 40 % growing interoperability
- 40 to 60 % reasonable interoperability
- 60-75 % good interoperability

Member States could be compared against these metrics.

These metrics are most prominent during the first phase A of interoperability development and to a certain extent also in phase B. Given the current progress of interoperability, as will be demonstrated in the following sections, interoperability is now mainly in phase C. Therefore the emphasis will not be on the metrics for phases A and B, but on the metrics for phase C.

3.3.4 Legal issues

For this issue the following items can form part of the development of the metrics:
1. Are the High Speed and Conventional Rail Directives, as amended by 2004/50/EC transposed into national law (cf. section 2.2)?
2. Is there a regulation for appointment and surveillance of Notified Bodies?

3. Is there a regulation to transpose TSIs into national regulation?
4. Is there a regulation for market surveillance of interoperability constituents?
5. Is there regulation for the "open points" in TSIs and are they notified to European Commission?

These items of the metrics require a scale YES or NO. We can compare the interoperability level between Member States. We also can say that the level must be YES in all cases. The progress of this measurement could be expressed as the increase in numbers of YES. Legal issues play their most important role in the first phase A of interoperability development. Because much of the progress in the area of the implementation in the Member States is already addressed in chapters 2 and 4 of this report and the emphasis is on the metrics for phase C of the interoperability development, the use of legal issues as metrics is not further elaborated.

3.3.5 Quantitative issues

Several characteristics can be identified that enable the progress of interoperability to be measured in a quantitative way. The following figure illustrates the principle. A theoretical curve, representing the planned value of a certain parameter, is the basis for making the comparison with the actual value that can be measured or counted. Note that Figure 3. 5 is only an illustration of a principle and not a measurement of an actual situation. The reason for the delay should then be investigated.

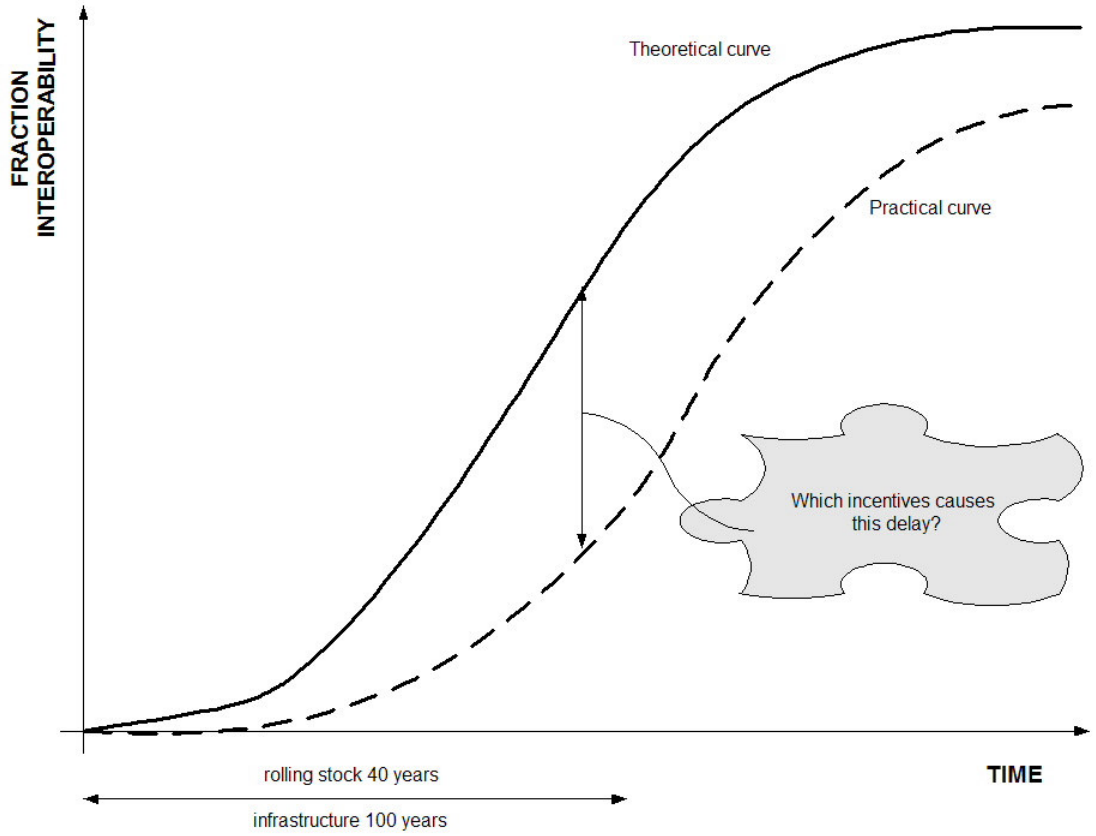


Figure 3. 5 Example of an "interoperability growth curve"

For each of these characteristics, the absolute number of certificates, putting into service and so on has to be collected. It is self understood that the interpretation of the curves should be carried out with the utmost care. If one looks for instance at the number of certificates for

constituents over the years and sees an increase, one should consider that of course not only the number of certificates will be growing, but also the total number of constituents (or subsystems) that should be receiving a certificate. So this does not necessarily mean that there is an increase in the percentage of constituents that receives a certificate. Also it takes some time to perform the certification. These effects complicate the interpretation of the figures in this particular case.
The metrics based on the quantitative issues play their most prominent role in the phase C of the interoperability development. Therefore the investigators have found it useful to study them into greater depth. The progress of interoperability by the use of these quantitative metrics is detailed in section 3.4.

3.4 Progress of interoperability by use of the metrics

In section 3.3.2 the authors have summed up the different parameters proposed for the metrics. These parameters are illustrated in Figure 3. 6 below and will be discussed in the following sections. The references to the section numbers are given in the figure.

Comments about details of data collection are given in Annex A.

In sections 3.4.1 through 3.4.6 the different metrics will be illustrated with examples. Section 3.4.6 contains the metrics for constituents, subsystems, lines, trains and operation. In 3.4.7 the results of the previous subparagraphs, being the interoperability progress, will be evaluated.

The whole process that was already analysed in section 3.3.2 is illustrated by the figure below:

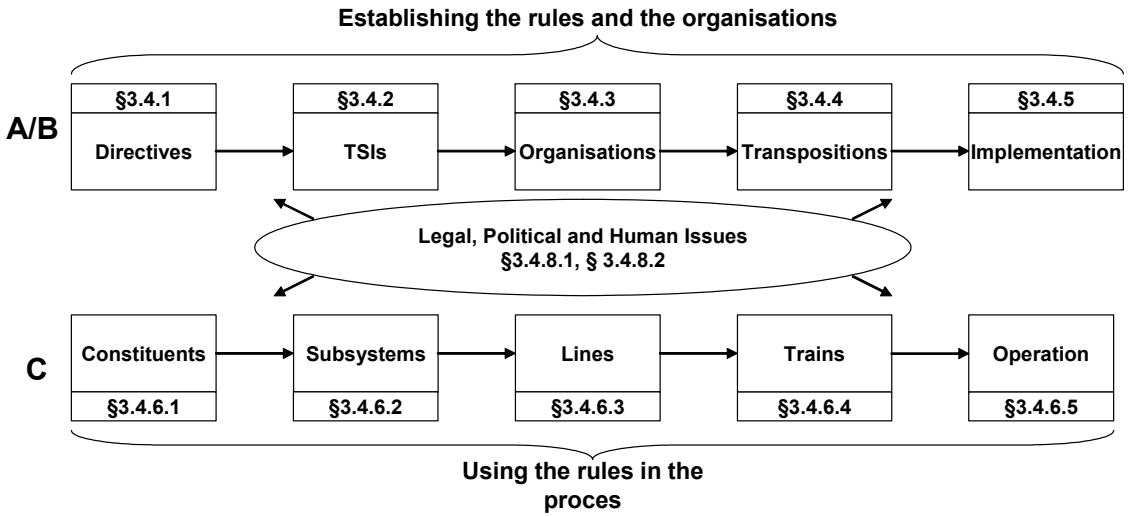


Figure 3. 6 Progress of developing interoperability by use of metrics

During phases A and B, the authorities have a leading role, whereas the other stakeholders such as Infrastructure Managers, Railway Undertakings and Supply Industry have a supporting role, especially in establishing the rules.

During phase C, Infrastructure Managers and Railway Undertakings are leading in contracting equipment supplied by the industry and putting it into operation. The authorities have a supervising role in assuring that the rules are followed and in supervising the process as a whole.

In phase C it turns out that we cannot give reference numbers for constituents and subsystems, because there is no clear reference for these numbers as explained in section 3.3.5. For lines and trains these references are evident. In this stage of the introduction and development of interoperable lines, trains and operations however there are not yet many items that can be counted and the definition of the items to be counted has to be carefully chosen.

3.4.1 Establishing the rules through the Directives

For the the dates of the establishment of the directives, please refer to section 3.1.

3.4.2 Establishing the requirements through the TSIs

The following graph shows the progress of establishing the rules for high speed and conventional lines. The details forming the basis for the graph are given in Annex C

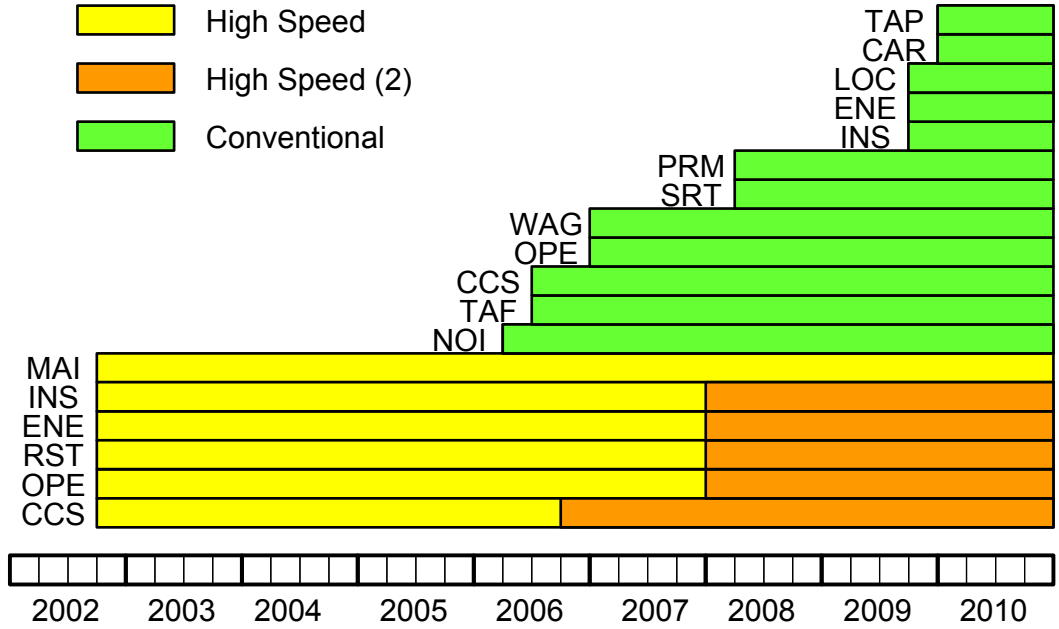


Figure 3. 7 The progress of establishing the rules (date in force)

During our interviews with representatives from Sweden and the United Kingdom we encountered scepticism regarding the quality of the TSIs.

One of the major concerns for SRA is the inconsistency in some TSIs, especially in the TSI Freight Wagons. The situation today is that the acceptance of another countries freight wagons is much more problematic now than when the COTIF-RID agreement existed. When one considers that one of the main goals of the EC is to make freight transport easier between the different EU countries, this development is undesirable.

In the UK railway industry there is concern about the impact of interoperability, some of the reasons being:

- fear of additional cost;
- lack of well defined scope in the TSIs;
- technical flaws in the TSIs (e.g. freight wagons) and related ENs;
- lack of practical assessment criteria (e.g. data recorder crash/ fire resistance);
- lack of flexibility;
- slowness of response when dealing with apparent errors and problems.

As a result, UK industry is sceptical about the benefits. UK operators are linked to the continental railway system via the channel tunnel with its own particular requirements and this means that the key benefits for the UK from interoperability will relate to standardisation rather than cross-border operation. The UK government is starting a campaign to increase awareness of interoperability and its potential benefits through a programme of briefings and stands at exhibitions.

3.4.3 Establishing the organisations Article 21, AEIF, NB RAIL, ERA

The bodies both establishing the requirements and enabling the process were established at the following dates:

Article 21	21.11.1996
AEIF	1994
NB Rail	08.12.2000
ERA	01.01.2005

3.4.3.1 Number of Notified Bodies

Member States have to notify the bodies that can certify Interoperability Constituents and subsystems in the European Union. A number of Member States have done this (see Figure 3.8). Today there are 33 Notified Bodies (NBs) for railway products and subsystems in 15 Member States. Of these, 30 have a license for certifying high-speed rail and 28 are licensed for conventional rail. Some Notified Bodies were licensed for all constituents and subsystems, other Notified Bodies have a license for one or more subsystems and related constituents. This restriction is based on the knowledge available in the Notified Body.

The information about the notification of Notified Bodies can be found on the NANDO web site of the European Commision DG TREN: http://ec.europa.eu/enterprise/newapproach/nando/

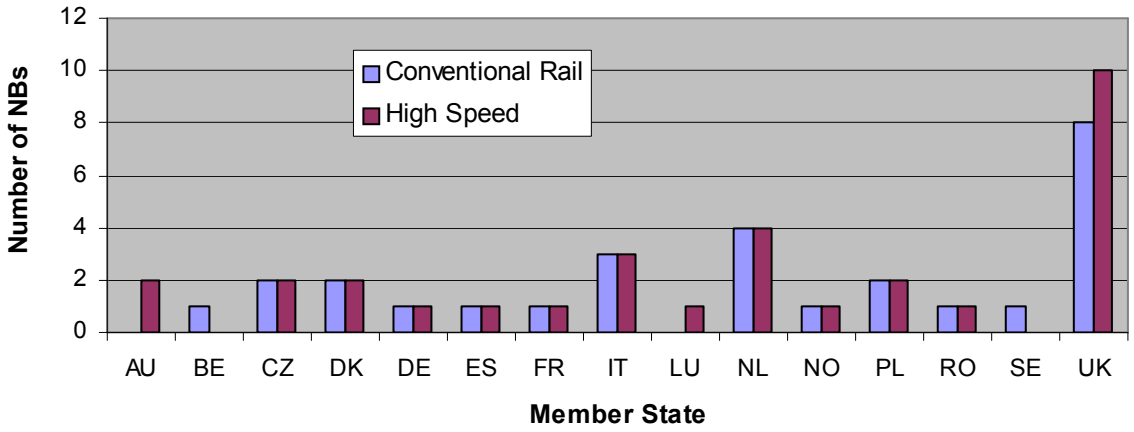


Figure 3. 8 Number of NBs per Member State

The Member States have based them selves on the principle of subsidiarity and are allowed to follow their own policy for recognition and notification of Notified Bodies. Germany for example has chosen for one body linked to the National Safety Authority. Other countries like United Kingdom and the Netherlands have a free market policy and a number of Notified Bodies entered the market by accreditation of these countries.

As a metrics this parameter may be useful. The progress over time can be evaluated to increase the usefulness. However in itself it has no significance other then that the number should grow. It is not clear what the objective is. The investigators propose the following to refer the growth to:

- NBs in each Member States
- Multiple NBs per Member State

The real objective is the existence of a market mechanism. This can be seen from the dynamics, the number of NBs should vary positively (grow at first) and also negatively (reduce later) over time.

3.4.4 Transposition in the Member States of the Directives and the TSIs

Norway and all EU Member States have implemented both interoperability directives, except for the non-implementation if the HSD by the Slovak Republic. Switzerland has not implemented the HSD, not the CRD[7]. The transposition of the IAD has been studied in section 2.2. The results show that some countries have not transposed it and in some transpositions certain elements are missing. Of those countries that have completed the transposition, quite a number did so considerably later than required. There are indications that in some countries the implementation of the original HSD and CRD was only finalised when implementing the IAD. It is therefore concluded that the creation of the legal basis is behind schedule.

3.4.5 Implementing the rules and the TSIs

3.4.5.1 Derogations and open points

According to the Article 7 of the interoperability Directives (both HSD and CRD) a Member State has the possibility not to use s TSI or a part thereof. The precise conditions are described in the Directives. In all cases the Member State must justify its actions with a dossier explaining the character of the derogation. Some derogations have a structural background, like the case where a network is separated from the rests of the European network by sea, others are of a more incidental and case by case nature. The Commission Document DV 10/EN04 of March 2006 sums up the derogations announced by the Member States up to that date. It describes some 18 letters and communications, but gives no details. A similar overview DV76/EN 4 of 20 April 2007 contains 20 communications, the scope and extent of which vary largely. In some cases only minor details are subject of the derogation. In other cases it concerns a long list of entire railway lines. The Commission has issued the document 96/48-DV76-EN06 of 30-06-2005 explaining the rules for derogations. It is not clear how this process is working. Partly this is due to the fact that the information is not publicly available for the interested parties. Although it is clear that the individual member States are responsible to inform the Commission and each other about their derogations, it is highly recommended to set up a publicly accessible database containing the derogations.

3.4.5.2 Certification activity in Member States

In order to gain an impression of the geographical spread of the certification process, the origin of certificates was investigated. The next figure shows the number of certificates per Member State. This figure is based on the Member State of the Notified Body that has issued a certificate or received the application to issue a certificate. Both certificates issued and certification requests have been taken into account in Figure 3.9.

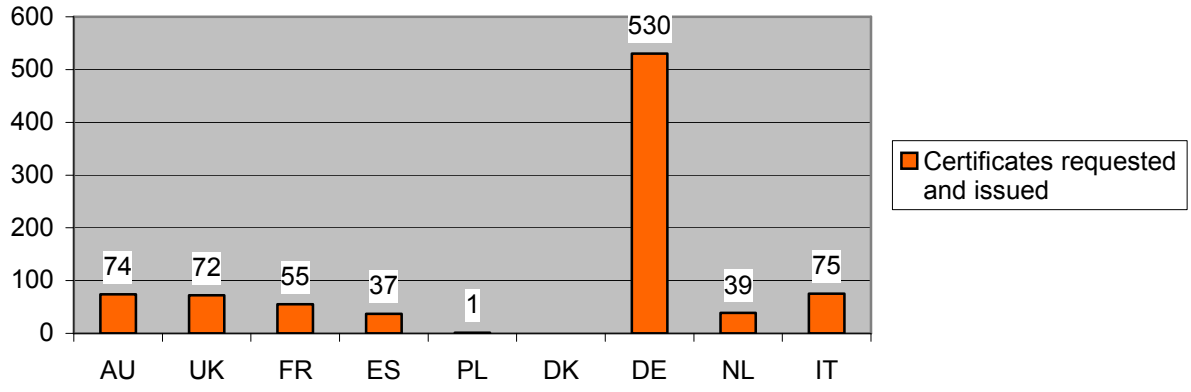


Figure 3. 9 Number of certificates by country of origin of Notified Bodies

A detailed analysis of the market for certification and the relation between states is reported in Annex D. In this annex it is concluded that on average 81% of the applications for certification comes from the Member State of origin of the Notified Body. The market for certification therefore is considered not to be open.

3.4.6 Using the rules in the process of developing the network and realising interoperability

In the previous sections the main actors in the process of creating interoperability are the European Commission and its agencies as well as the ministries of the states and their agencies. In the following sections the attention shifts to Infrastructure Managers, Railway Undertakings and Industries.

3.4.6.1 Interoperability constituents: certificates and placing on the market

For the interoperability constituents an overview was created of the parameter "certificates for interoperability constituents issued and the requests for certification received". The results are shown in Figure 3. 10.

In total 584 certificates for interoperability constituents and 53 requests for certification are registered on the NB RAIL web site on August 27, 2007. At the end on June 2007 only 224 certificates where issued and 52 requests were registered. This large increase was mainly due to a large number of certificates issued by the German NB, most of them for ICs of the newly introduced WAG subsystem. This shows to some extent that the growth rate is measurable and a quantitative approach will be feasible. It probably also shows that the quality of the NB Rail database is increasing because of the raising interest.

It is important to note that as a matter of principle the NB RAIL database will not be complete under the current rules for certification. The TSIs also recognise self-certification by manufacturers using the module A (with the exception of the Control Command System). In this case of certification no Notified Body is involved and no obligation to register the certificate or the application exists. These module A certificates are registered only through the subsystem certification process when referenced in the Technical File of a subsystem.

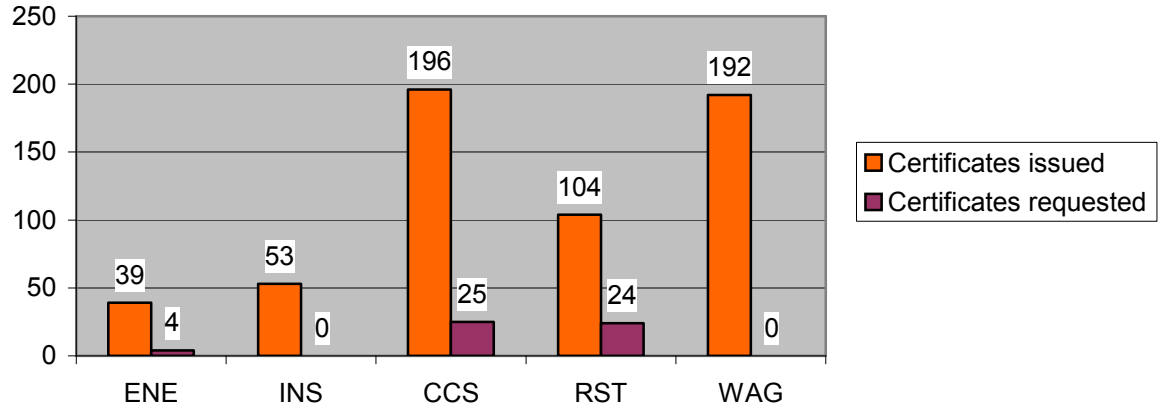


Figure 3. 10 Requests and Certificates for Interoperability Constituents

Apart from the module A aspect, the metrics "number of interoperability constituent certificates issued and the requests for certification received" is practicable and useful.

However, it is not possible to measure the parameter "Interoperability Constituents put on the Market" with sufficient accuracy. There are important sources of error in this metric because of the following reasons:

- Manufacturers do not tend to apply interoperability certification of their Interoperability Constituents willingly; they do not promote their certified constituents actively.
- Interoperability Constituents can sometimes be used in non-interoperable systems. This leads to uncertainties whether a constituent should be seen as an interoperability constituent or not.
- There is no obligation for manufacturers to have their declaration of conformity for Interoperability Constituents registered. Notified Bodies must issue lists of numbers of applications for certification, issued and refused certificates, but such an obligation does not rest on the manufacturers for their declarations. In case the manufacturer has the possibility to choose for self-certification using module A there may be no registration of the certificate at all (not the case for CCS).
- In the Directive 96/48/EC the requirement to certificate an interoperability constituent depended on this being required in the TSI text. In 2001/16/EC this dependency of the TSI text has been removed and later the requirements in both directives were harmonised by the IAD. This means that today certification with NB involvement is required for all interoperability constituents. However it will probably take some time before this can take effect, because the earlier TSIs have been used for some time in the past and are still the basis for a number of projects.

Therefore, for the moment an estimate using this metrics "number of interoperability constituents put on the market" does not seem very useful. These uncertainties will still remain if the ERA takes over the responsibility to collect certification information from the Notified Bodies. Improvement could be achieved by the following measures:

- Extend the definition of Interoperability Constituents;
- Require certification by a Notified Body for all IC's;
- Oblige manufacturers to publish their certifications and declarations of conformity.

In order to illustrate the use of the metrics "certificates for interoperability constituents issued and the requests for certification received" we have carried out a detailed analysis of the Trackside Control Command System. Please refer to this analysis in Annex B. The analysis of

Annex B demonstrates for the example of the CCS subsystem, that the interoperability Constituents that have a large market, like Eurobalise, LEUs and GSM-R on board equipment, all have received certification and only about 25% of ICs with a small market size and volume, like RBCs and also STMs have been certificated. It also shows that the progress for interoperability constituents from the Track Side Assembly is larger than for the On Board Assembly, with the exception of GSM-R equipment, which is unmistakeably one of the drivers for interoperability.
For other subsystems in principle the same reference could be constructed. In the framework of this study it did not appear feasible however to collect all the information needed for such an analysis.

3.4.6.2 Subsystem: certificates and placing into service

This section gives an overview of the parameters "number of subsystem certificates" and "number of subsystems placed into service". We have carried out a detailed analysis of the Trackside Control Command System to serve as an example and to demonstrate the use of these metrics. This demonstration will be further explained in section 3.4.6.3.1, after the discussion on the development of the length of the interoperable network.

3.4.6.2.1 Subsystem certificates

A measure of the progress of the interoperability is the number of Subsystems that have been certified. Certified means that appropriate certificates have been issued in accordance with the EU directives 96/48/EC or 2001/16/EC. Notified Bodies are obliged to register issued and requested certificates on the NB Rail portion of the CIRCA web site. A survey of the records on this web site was made and all the certificates that have been issued by Notified Bodies to date were listed and counted. Also an overview of the applications (requests for certification) was made. A distinction was made between Subsystems ENE, INS, CCS, RST, WAG, NOI and OPE. For other subsystems no certificates have been issued or certifications are ongoing. The results of the analysis are shown in Figure 3. 11.

From the numbers in Figure 3.11 it can be concluded that the subsystem CCS is driving the progress. The total of certificates issued and requested, both ICs and Subsystems taken together is 883. Of this total CCS takes 30 %, the second largest is WAG with 22 %, the third RST with 20%.

In the registration some NoBos have not only entered certificates for ERTMS/ETCS Track Side Assemblies and On Board Assemblies, but also for Class B systems. Figure 3.11 only shows the ERTMS/ETCS certificates.

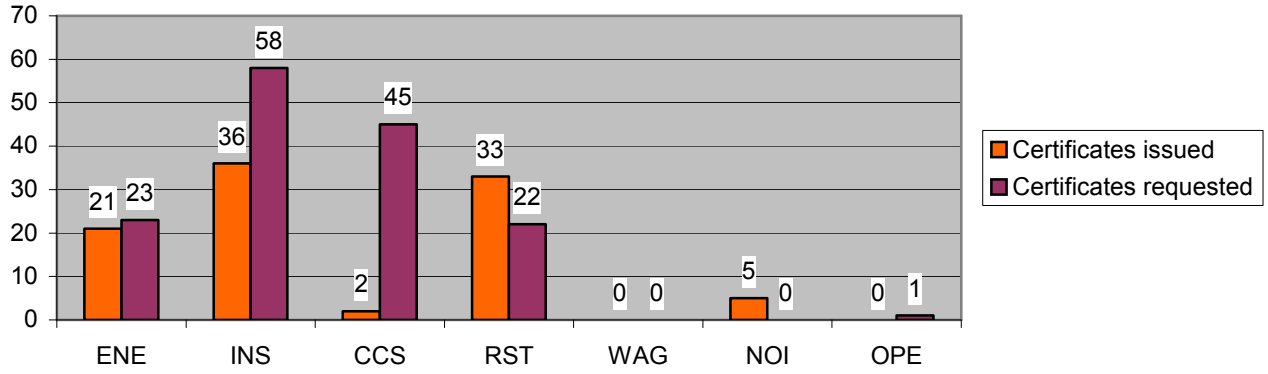


Figure 3. 11 Requests and certificates for Subsystems

In total 97 certificates issued for subsystems are registered on the NB RAIL website and 149 requests for certification. Compared with end of June 2007: 66 certificates and 150 requests. This also shows the level of growth.

It may be concluded that this parameter serves well as a metric. However the progress over time needs to be evaluated by repeated measurements. Secondly the parameter taken separately has no significance. Therefore a reference for this parameter will be further developed in the next sections.

3.4.6.2.2 Subsystems put into service

The number of subsystems that are put into service may be developed as a very useful metric. For the moment it is difficult to do a measurement based on this parameter because of the following reasons:

- Data for subsystems that are put into service do not indicate the degree of interoperability of the subsystem because the certification process is not uniformly applied. In most cases, even if the subsystem is put into service using a formal approach the Interoperability Directives are not applied fully or not at all.
- A structured database for the subsystems that are put into service will only be created once the Registers of Infrastructure and Rolling Stock will be created uniformly and the data will be collected.

For these reasons it is too early to give an estimate of this metric.

3.4.6.3 Number of lines in operation in a corridor or as a percentage of the TEN-Network

In order to get a meaningful impression of the progress made with interoperability the next step in the development of the metrics is to develop a method to evaluate the position of the realised interoperability on the interoperability growth curve as presented in section 3.3.5. This will enable us to refer the numeric values found in the previous sections to some kind of “theoretical” or ”predicted” value that expresses the progress and relates it to the development of the performance on the European network. In order to establish a relationship between this

level which is measured through the certification process and the overall level of interoperability on a European scale, the TEN network model is used.
On the highest level we distinguish between the High Speed and the Conventional Rail TEN network (Figure 3. 12). In the development of the Conventional Rail network the next step is aiming at the realisation of a number of corridors for freight transport. Therefore it is also useful to look at this freight network (Figure 3. 13).

Figure 3. 12 TEN high speed and conventional network

Both the high speed network and the corridors of the TEN freight network are developed gradually. The length of realised and interoperable network will increase over time. For this process a plan exists. Based on this plan and on the structure of the certification process the progress of the parameters from section 3.3.5 can be predicted. The realisation can then be monitored by comparing the measured parameters over time with the predicted ones.

Figure 3. 13 Corridors of the European Freight Network

The realisation of the TEN Network is different for the high speed network and the freight corridors.
The high speed network tends to develop from the start as a largely interoperable network, because many lines of the high speed network are newly built and the requirements for an efficient use of the network with high speeds are rather severe. This requires a high level of technical standardisation rather then only technical compatibility.
The freight corridors generally start from existing lines with existing (non-interoperable) characteristics. This relates to all Essential Requirements, not only technical compatibility, but also safety, reliability, environmental protection and health. Therefore the corridors start as an incoherent network on which interoperability has to be implemented stepwise. Two important steps characterise the development of the freight corridors:

- The strategy to implement ERTMS/ETCS to a maximum extent
- The strategy to apply cross acceptance of rolling stock and operational procedures associated to the use of rolling stock within the limiting conditions of a minimal technical compatibility: safety systems, supply voltage, loading gauge, axle loads etc. must be minimally compatible and therefore acceptable.

The state of development of the TEN high speed network and the freight corridors is subject to many other studies and statistics. Therefore this metric is not further developed here.

3.4.6.3.1 Reference for the metrics Subsystem certification and putting into operation

In the previous sections the metrics “number of issued and requested certificates for subsystems” and “number of subsystems put into operation” were introduced and studied. Also the development of the interoperable network was discussed. In the current section we will take the development of the network as a reference for the two subsystem metrics in order to evaluate the progress of interoperability in an example and demonstrate the use of the metrics. Because ERTMS is the driving force behind the development and progress of interoperability, we will base our example on the introduction of ERTMS on the European interoperable network.

Within the TEN network, several ERTMS-projects are carried out. In the table in Annex F an overview of the European ERTMS projects are listed (this list is not necessarily complete). The table contains high speed projects, freight projects on corridors and also conventional rail (passengers and freight) projects. It only contains the Track Side Assembly projects. On Board Assembly projects are not listed. In the table the length of a track side assembly project is given and also the year of coming into operation (planned or realised). For further reference the type of module might be added. In general Module SG or Module SH2 would be used for CCS Track Side Assembly projects. Module SG would deliver one single certificate, Module SH2 would deliver 3 certificates. With this information the progress of certificates being issued and subsystems coming into service can be completely determined.

It is also important to incorporate the structure of track side projects in this analysis. In some case a longer line is split in parts that are separately contracted and separately certificated. The list should contain all project parts separately in order to determine the forecast and the realisation accurately.

The progress of putting into operation of the ERTMS projects can be determined from the Table in Annex F. The results are shown in the next figures.

Of course Figure 3. 14, Figure 3. 15 and Figure 3. 16 only give a demonstration of the method of using the metrics. Figure 3. 14 is only a first estimate, but Figure 3. 15 and Figure 3. 16 follow immediately from Figure 3. 14 in combination with the information about the certificates and subsystems put into service. The method described above may be further refined by adding also the requested certificates to the model.

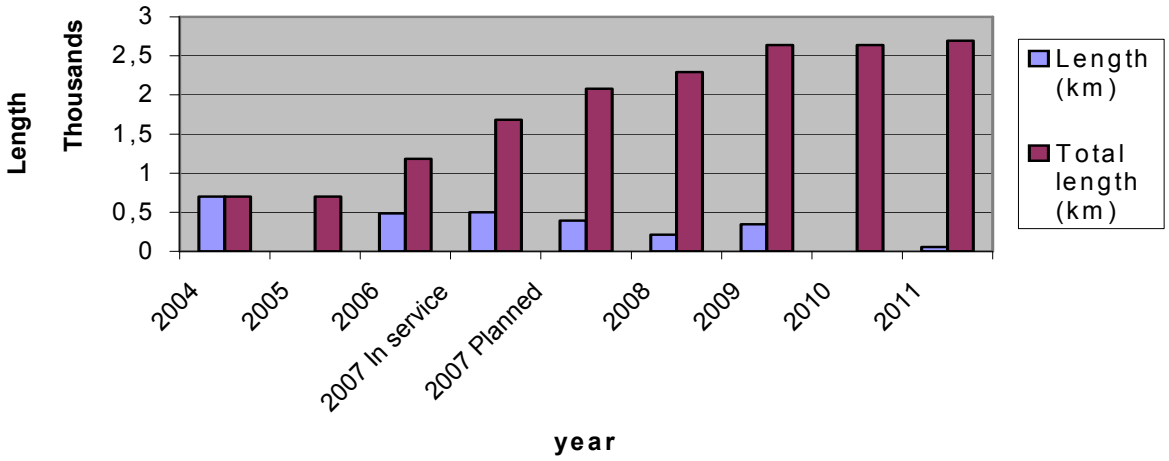


Figure 3. 14 Length of interoperable network; length added per year vs. total length

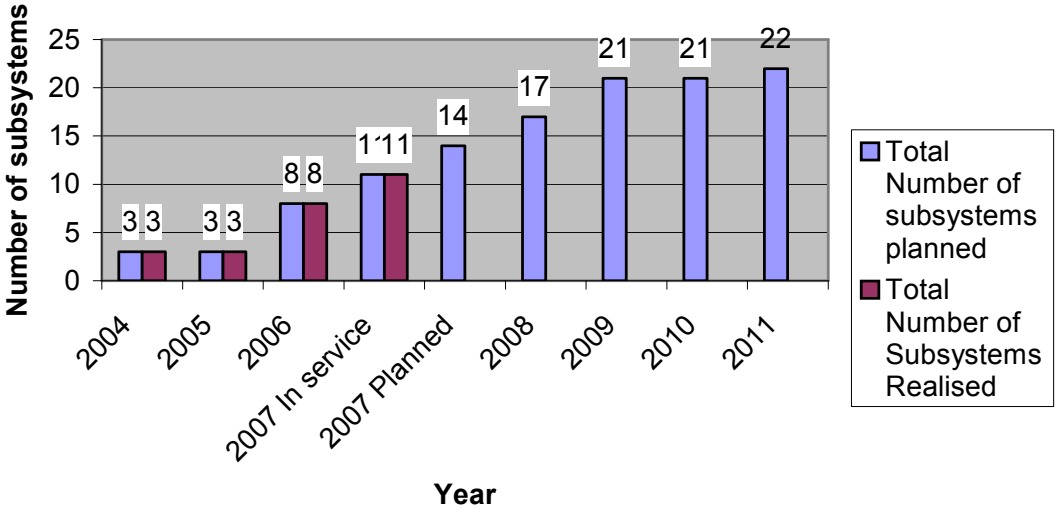


Figure 3. 15 Development of the number of subsystems

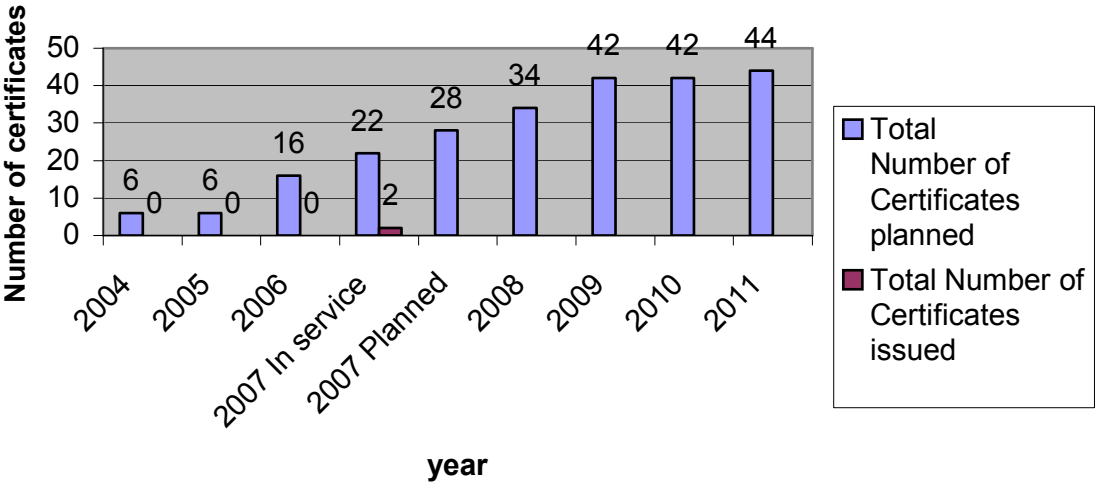


Figure 3. 16 Development of the number of CCS subsystem certificates

The analyses shows that the number of certificates for CCS Track Side Assemblies is much too low. The figures may be imprecise, but the difference between expected (22, derived from Annex F) and issued certificates (2) is large.

The reasons why contracting entities seem to hesitate to start the certification process may be multiple:

- Where the project was already started before the TSIs where issued. In this case there should be a derogation. In the framework of this study the number of derogations has not been evaluated.
- The uncertainty about the completeness of the ERTMS specifications in particular (and the TSI specifications in general) leads many Contracting Entities (together with their Member States) to choose for the installation of secondary class B systems on ERTMS lines. The strategy they follow here is to put the class B system in operation first before putting the ERTMS/ETCS system into operation.
- The relatively rapid rate of change and the signs of insufficient stability of ERTMS/ETCS requirements made and still makes many Contracting Entities decide to first install and put into operation the ERTMS/ETCS system and once this works properly and has reached its final version start the certification process.
- Unfamiliarity and lack of expertise sometimes leads the Contracting Entity to think that national approvals and safety verification and safety certification by an Independent Safety assessor (ISA) is sufficient.

In conclusion, there is an important difference between realising an interoperable subsystem and showing the interoperability of the subsystem. The first process can be done without doing the second one, but inversely the second one can only succeed if the first one has succeeded. It is good to keep this in mind during the transition phase of interoperability development.

The Analysis of the CCS projects from Table in Annex F further leads to the following conclusions:

- In total 33 CCS projects have been registered in Europe (status 28-08-07). It is not clear whether this list contains all the ERTMS projects in Europe. No official register of ERTMS projects exists, but further use and development of the interoperability metrics will certainly require that such a register is set up.
- For 7 projects no NB has been assigned yet, but will be assigned in future. One of the projects concerned is in Switzerland.
- For 8 projects up to now no NB has been registered. For these projects it is not certain what will happen, maybe a NB will be assigned still.
- For the remaining 18 projects NBs have been assigned.

Three particular cases deserve special attention because no certification has taken place until now:

- Spain: This is a good example of the mechanism described above where first the national system is put into service, then ERTMS is put into a stable condition and finally the certification is started. In Spain the preparations for certification are ongoing.
- Italy: the strategy here has been to build the first Roma –Napoli line in the same way as the Spanish have done, further lines, like Milano - Bologna are only ERTMS. The preparations for certifications are ongoing. In the interviews it was said that certificates for Track Side Assemblies exist, up to now 2 certificates for subsystems have been registered in the NB RAIL database. Both of these are for Italian lines.

- Netherlands: the strategy here is more tailor made depending on the projects. For HSL Zuid a full certification is ongoing and in the stage of finalisation. For Amsterdam-Utrecht ERTMS is not yet in service and so it has not been certified. Only the class B system on this line is now operational. On the Betuweroute ERTMS has only been subject to IC certification and safety assessment by an ISA. Rolling stock for this line receives a full EC certification by a NB.

It may be clear that although first progress can be seen on the lines of the corridors equipped with ERTMS/ETCS, the currently realised length of 1600 km is only a very small percentage of the total corridor length and the complete TEN network of which the corridors from a part. Nevertheless, this metrics ultimately represents the goal.

Although the strategy for the high speed network and the freight corridors is clear and seems logical, the TEN Network is larger than this. The next question is: what will be the priority and strategy for development after the high speed network and the corridors. This could be the regional network, the railway hubs or the extension and interconnection of the corridors. A decision has to be taken about this in the next years. The plan must be extended.

3.4.6.4 Number of trains on the TEN network

Associated with the opening and development of the railway market, it is expected that the number of operators on the TEN network will grow and that the variety of (existing or new) operators on particular lines of the network will increase. These operators should then support interoperability in order to get free and easy access to the lines of the TEN network. It leads to interoperable operations and services on the TEN network. The number of interoperable trains would be a tangible parameter to capture this metric.

This parameter could be split into the different parts of the network:
- High speed
- Freight corridors
- General CR network

These networks have differing characters:
- High speed networks will generally be dedicated to high speed traffic. In many cases it concerns newly built lines that are exclusively equipped with ERTMS. All trains that run on these lines will therefore have to be equipped with ERTMS
- Freight Corridors and conventional networks will generally carry mixed traffic. ERTMS trains as well as trains with Class B systems will run on these lines. The ERTMS trains will have to be equipped with Class B systems in order to be able to run on the parts that are not equipped with ERTMS or to make use of diversion routes. An exception is represented by the Betuweroute that is exclusively equipped with ERTMS Level 2 and therefore forces all trains that will pass to be equipped with ERTMS.

In the end the growth of rail transport and the market share of rail transport in the railway market is the objective. Because these parameters already receive high attention elsewhere[8], the investigators have decided not to include the evaluation of this parameter in the current survey.

3.4.6.5 Operation on interoperable networks

As a final step, the measurement of interoperable traffic as a percentage of total traffic could be measured. At this stage it is too early to measure this value, but as interoperability evolves it

could obviously be a useful addition to the other metrics. However in this period of introduction there will not be many lines and many trains that comply fully with the interoperability requirements. A line or a train is only interoperable if all interoperability constituents in use, all subsystems and the operation meet the Essential Requirements and the TSIs. If for instance a locomotive without ERTMS is running on a line with dual signaling is this interoperable traffic? So it will then be necessary to define the borders between interoperable and non-interoperable traffic exactly, especially in those cases where interoperability constituents and subsystem are technically compatible, but do not comply fully with all Essential Requirements. . This applies also to the aspects of operations. We would like to define this situation as the state of "practical interoperability": the interoperability requirements are not completely met, but in a sufficient way to allow for uninterrupted and safe movement of trains.

3.4.7 Evaluation of interoperability progress

In the previous sections, interoperability is approached by analyzing the main factors that enable manufacturers and operators to build infrastructure and trains according to European Interoperability Standards and Legislation. The planning and development of the TEN network serves as a reference to judge about the progress over time.
By doing this and applying appropriate metrics, it is possible to gain an impression about the factors that enable or disable interoperability.
Especially during the start of the development of the TSIs and their implementation and integration in national legislation these figures give valuable information on the progress of the process towards interoperability.
As soon as a point is reached where manufacturers, infra managers and train operating companies have ample possibilities of buying interoperable equipment for their infrastructure and trains, the focus shifts to considering the interoperable equipment. It is supposed that as a system has been recognized to be interoperable, the subsystems and constituents will sufficiently fulfil interoperability requirements.
Metrics for interoperability can then be established by analysing existing interoperable systems. Depending on the way the system is built, an important impact on interoperability can be reached. If a line doesn't have a secondary signalling system, all trains that are operated on this line need to have ERTMS onboard equipment.
In order to draw meaningful conclusions from ERTMS-projects, it is important to consider how exactly interoperability is planned to be established. During the transition phase the co-existence of ERTMS and one or more Class B signaling systems on the track side and/or on board seems inevitable. This holds in general for all problems associated with difference in technical solutions and thus lack of technical compatibility.

In general it can be stated that a line that is only equipped with ERTMS has a considerable impact on rolling stock that has to be adapted. From the Table in Annex F it can be seen that this is only the case for a few lines, most lines still have multiple signalling systems.

In order to make a judgment about the progress of interoperability the figures shown above in sections 3.4.6.1 and 3.4.6.2, being the most tangible indicators, have been further analysed. A number of conclusions can be drawn:

- For Subsystems 97 certificates have been issued on 28-08-2007, for interoperability constituents 584.

- Progress and improvement of the quality of information can be demonstrated: end of June 2007 the count was 66 issued Subsystem certificates and 224 IC certificates.
- The certification of interoperability constituents shows some emphasis on CCS (30% of total), WAG (22% of total) and RST (20% of total) certification. This seems explicable. ENE and INS are more "traditional" subsystems where probably also the value of having a certificate is not (yet) fully appreciated. These subsystems tend to be based on already long existing and accepted technologies.
- Certificates for CCS Interoperability Constituents outnumber the others. CCS, and in particular ERTMS/ETCS and GSM-R, can be regarded as a driving force for interoperability.
- Certificates for WAG Interoperability Constituents are second after CCS Interoperability Constituents, closely followed by RST ICs. Probably this is because the nature of Rolling Stock and cross border traffic assures a higher demand for interoperability. However the difference between RST and INS is not very large.
- Historically established constituents (INS, ENE) enjoy less attention in the sense of an urgency for certification by their manufacturers.
- The number of requested certificates for interoperability constituents is surprisingly low. This seems to support the assumptions that the registration by the NB's is incomplete and that the interest for certification of established technology constituents is low.
- The number of issued certificates for the CCS subsystem is surprisingly low. The possible explanation for this has already been given above in section 3.4.6.3.1.
- The number of certificates for Germany and the United Kingdom is surprisingly high. In Germany this is caused by high numbers of certificates for IC's, mainly for WAG, CCS (GSM-R) and RST. In the UK it seems to be caused by the high number of Notified Bodies.
- For a better understanding of the data it is necessary to have the reference of the number of certificates that would be expected to be issued or requested. In principle this might be calculated or estimated as already demonstrated in section 3.4.6.3.1.
- Care should be taken with the interpretation of the data without having studied the reference. In many cases certificates for Interoperability Constituents seem to be follow-up for already existing constituents that are upgraded (such as Eurobalise certificates). In other cases, e.g. for infrastructure projects, a line is divided into sections, depending on the number of construction companies contracted, and each part is certificated separately. In such a case there may not be just one certificate for the line, but a number of certificates each covering only a small part (such as a bridge or a viaduct).

3.5 Costs of placing into service and placing on the market

In this section the additional costs are discussed that are caused by the mandatory certification of constituents and subsystems. One might argue that certification costs would not exist if there is no mandatory European certification. However, in that case another method for conformity assessment than applied today (please refer to § 3.2.2) would have to be followed.

Cost of placing into service and placing on the market is highly debated. In particular the prevailing opinion about the cost of certification is that certification is costly. The basis for this opinion is not clear. Very little reliable information about the cost of certification is available. Some estimates exist, but these seem to be inadequate. A further observation is, that although the contribution to the cost of interoperability is believed to be considerable according to the current opinion, these costs are not calculated in the economical analysis and cost/benefit analyses of the TSIs by the ERA and in the past by the AEIF. This is an indication that the cost of certification as the main driver for the cost of putting on the market of ICs and placing in service of subsystems is not significant in relation to other costs that drive the cost of interoperability.

The same applies in a very similar way to the cost of the new and global approach. Not much information is available about the cost and benefits of the new and global approach. Nevertheless based on the information collected in the interviews and on the experiences of the investigators some observations can be made.

The cost of certification consists of internal and external costs. Here we only look at the external costs because internal costs should normally not be influenced in an important way when a manufacturer operates a modern quality system. All documents for certification, including test results should be available anyway.
The external costs are additional and may consist of the cost for testing and the cost for certification. Of these two cost types the cost for testing is by far the largest. Based on the investigators experiences it is estimated at maximum between 1 and 5 % of the total cost of a project, typically about 3%. The cost of certification is estimated between 0,2 and 1% of the total cost of a project, typically about 0,6%. Only for very small projects (less then 5 to 10 M€) this rule of thumb does not apply. The cost per kilometer line or per unit of rolling stock tends to decrease with the length of a infrastructure and the number of vehicles. This can be quite significant. Unfortunately retrofitting of signaling equipment into existing rolling stock can be counted under the smaller projects, certainly where it concerns a small number of trains or locomotives from a small operator. The same absolute amount is then easily seen as a large part of the budget and thus expensive. Although there is no difference in the absolute costs of testing and certification of a CCS on Board Assembly for a series of new locomotives or for a series of existing locomotives, for old locomotives it is quickly seen as expensive because the amount is related to a much smaller budget then in the case of new locomotives.

Macro-economically there is only a shift of cost position. Where in the past the testing and certification was done by the laboratories of the railways and by the technical departments of the railway, today the laboratories are separate from the railways and Notified Bodies are independent organisations. The main effect is that the cost that was also made in the past is now made visible because it has become external. The efficiency of avoiding the repetition tests and certifications will eventually lead to reduction of costs.

The interviews have shown that Infrastructure Managers generally believe that interoperability in specific cases can lead to considerably lower costs of transportation for freight operators. A cost reduction of 15% for the operation of freight trains was mentioned.

3.6 Effects of TSI on the rail market

Following the general model as described in section 3.2.2 the effects of the TSIs on the rail market might be seen in several ways:

- In the realisation of railway products and systems: manufacturers that use the TSIs to design and build their products and systems. System integrators that use certified interoperability constituents.
- Through the verification and certification process and the registered results of this process.
- Through the use of interoperable systems: in particular where these systems support cross border traffic or in those cases where train operators demand access referring to the interoperability of the rolling stock they intend to use.

It would be expected that the progress of interoperability follows this process also in time.

Looking at the results of the survey, the investigators found that several effects slow down the process:

Product manufacturing
For manufacturers interoperability is only interesting if it enables them to improve themselves, for instance by cutting cost or by improving the competitiveness of their product or by innovating their product. In this respect the TSIs are of only limited interest. Cost savings for manufacturers through standardisation is not a goal of the TSIs as such. Even if standardisation would be a goal, the results of standardisation can never be seen on the short term, but only on the long run. For existing railway products on the market, having an EC certificate alone does not improve the competitiveness because it increases the cost. The only remaining interest for manufacturers is innovation because that is the only way they can distinguish themselves from their competitors. The large number of CCS certificates seems to prove this.
The number of interoperability constituents is limited. In the subsystem ENE for instance there are only 3 IC's: the pantograph, the contact strip and the overhead line. In this situation it is normal that the number of certificates is also limited.

Rolling stock
For the subsystems the considerations may be slightly different than for interoperability constituents. System integrators of rolling stock and train operators expect improvement of the acceptance process. This improves the competitiveness of their product: both the train as such and the transportation service. This may be the background of the relatively high number of rolling stock certificates. A number of CCS certificates also relate to rolling stock on board equipment. The investigators have the impression that ETCS applications in conventional rolling stock start to drive the progress of interoperability.

The activities related to the cross acceptance of rolling stock (also existing rolling stock) and the rolling stock registers seem to confirm the interest of the railway industry as described above. The state of affairs is as follows. The Working Party on Registration of Rolling Stock started work on 25 October 2005 and completed its tasks 28 June 2006. The European Railway Agency sent the draft final report of these activities to both the working party members and the National Safety Authorities (NSA) for comment on 4 July 2006. The final report took into account the comments and was amended accordingly. The Agency delivered its recommendation[9] and the Final Report[10] to the Commission on 28 July 2006. If the Commission approves this recommendation, the Agency will undertake the feasibility study of the proposed architecture as described in section 5 of the final report.

This development will give very valuable information in the future. However for use at this instant to find information about the progress of interoperability the registers of rolling stock seem not yet sufficiently available.

Infrastructure
The subsystems associated with the fixed part: INS, CCS and ENE have their own dynamics, determined by the very long lead times of infrastructure projects. The relatively high number of requested INS certificates supports this view. For the same line a number of separate certificates for separate objects on the line may be issued. The study has taken this into account.
In general the structure of the TSIs does not combine with the practical way of working in the infrastructure projects. The reasons for splitting up a project are normally of a commercial nature. In many cases the Contracting Entity also requests the certificate from the construction company.

A coherent market approach
A number of participants participate in the railway market:
- The Infrastructure managers
- The Railway Undertakings
- The Manufacturers and System Integrators

In the previous sections, the parties in the railway market have been mainly characterised individually. In practice the market is dominated by interactions between the parties and their interests. Some of these factors are:
- The technical elements of Infrastructure (INS, ENE and CCS) and Rolling Stock (RST)
- The operational elements (OPE)
- The functions to be executed by the technical and operational elements
- The interfaces between the technical elements
- The performance to be delivered by each of the elements and the entire system
- The requirements for Reliability, Availability, Maintainability, Safety, Health and Environment (RAMSHE)

This is not a new analysis. It is traditional. What makes it new is the perspective of the market. In the past all of these factors have been present in a setting of integrated railways. The change is found in the opening of the market, the liberalisation and eventually the separation of organisations into infrastructure and operation. This change enforces us to develop a completely new view on the balance between the above-mentioned factors. This new view is the basis for interoperability.

Interoperability has been introduced into a market that had already recognised the importance of the above elements. This insight as such is not an achievement of the TSIs, but existed already when the TSIs were created. It forms the basis for the technical information contained in the TSIs. From a market perspective, a number of developments have taken place to support a larger use of railway equipment. Most of these technical innovations aim at reducing barriers related to incompatibility at interfaces, for instance:
- Adaptation of the track gauge in the vehicle by gauge changing axles or in the track by three rail track.
- Adaptation of the supply voltage by multi-current locomotives or in the infrastructure by multi–voltage catenary systems.
- Adaptation to the loading gauge by switching between pantograph with different gauges.

- Adaptation to different platform heights by retracting steps.
- Integration of safety systems into one single computer platform, like the Belgian – Dutch ATBL, which combines ATB and TBL into one unit.

As long as technical interoperability is not completely realised, these and similar adaptations will assist in eliminating the barriers for cross border traffic. However this may be improved by additional measures. The goal of these measures is:

- Prevent that further differences develop.
- Maximum use of the existing compatibility by eliminating unnecessary rules.
- Improvement of the compatibility by selected migration strategies.
- Improvement of the (RAMSHE) performances.
- Make sure that elements are only allowed into the system if they comply with the requirements.

All of this of course needs to take place within certain established and agreed limits of safety and availability.

One of the most important consequences of the open market and associated separation is that the a priori knowledge about the combination of factors has disappeared. Where in the past it was clear from the start of a project where a particular (new) piece of rolling stock would run or what rolling stock would be running on a (new) line or what railway would operate a certain rolling stock or line, today this is no longer a certainty. In the past only one variable in the combination was changed at a time. Today all the variables may change simultaneously. This means that the requirements that define the complete system must change accordingly and takes this situation into account. Exactly this is the purpose of the TSIs: make the definition of the elements of the railway system independent of the context. The effect on the market is enormous.

The biggest problem now is the lack of understanding of the purpose of interoperability and its measures. Understanding the background from the market perspective may help to improve the TSIs and to accept the use in specifying, designing, building and putting into operation the parts that constitute the European railway system.

Slowing down the development of interoperability may introduce risk in the railway market. The notion of interoperability is not a fiction, but a fact. Europe has taken this turn. Although the current study shows some reluctance, for the parties in the railway sector the only choice is to accept and implement the rules and regulations. This is easier if the background is better understood. Risk comes form different sources:

- Directly from the loss of productivity.
- Indirectly from the loss of competitiveness.

In the current situation it appears that European parties think only European. The development of interoperability urges the need of thinking global. The introduction of non-European products that comply with interoperability requirements seems very real.

The consequence of the approach to interoperability will certainly be that the diversity of technical solutions will reduce. This is not necessarily a negative development. Room for innovation remains, as long as this innovation serves the above purposes.

3.7 Key differences and problems associated with the progress of interoperability

3.7.1 Key differences between states

During the survey a number of aspects were discovered that differ from one state to another. These differences are collected in this section.

Number of certificates: large differences between countries, but also within countries: some projects have an integral certification, other projects in the same country none at all.

Number of Notified Bodies: large differences between countries.

The market for certification is strongly oriented towards the own state, but some interesting exceptions exist, e.g. NL.

Characteristics of Notified Bodies: large differences exist between countries (completely independent – part of Infrastructure manager or associated with Ministry).

Interest in and vision on interoperability: large differences between countries, exemplified by the following quotes from state officials in talks to one of the authors:
- Germany: For Germany, having 9 neighbouring countries, interoperability is a relevant and practical issue.
- Poland: The IM's ambition is to make main lines interoperable. The main obstacle for the progress of interoperability looking from IM's perspective is lack of money as IM has difficulties in using EU funds for railway transport. This is mainly due to decisions of Regional Development Ministry which is responsible for co-ordination of all projects using EU funds. Additional problems and bottlenecks are expected in design and construction due to lack of experts.
- Portugal: Interoperability is a strategic objective within the government's railway policy.
- Romania: Interoperability is very important for Romania, for integrating the Romanian rail network in the trans-European rail system; it also could accommodate (future) traffic between some traditional freight clients from Western or central Europe and Romania or passing (in transit) to the southeastern part of Europe.
- Slovenia: Interoperability is important. The Slovenian network is small and is in need of renovation. It can be developed sensibly only in conjunction with the networks of neighbouring countries. If Slovenia does not become interoperable, it runs the risk of being by-passed by international traffic.
- UK: To the UK government, standardisation is important for cost reduction and to make the process simpler and more transparent. Both add to the competitiveness of the railways, from which the sector as a whole can benefit. Industry representatives with knowledge of the Class 66 locomotives claim 30% cost reduction through standardisation. At present the Class 66 is not authorised against TSIs and therefore are not necessarily interoperable. The UK considers the test for conventional interoperability will be how the Class 66 locomotive is handled in the process and in particular how type approval can operate for small batch orders by different railway companies.

Different definitions of interoperability between countries and within countries.

The strategy towards Notified bodies and National verification Bodies (who check against national requirements) differs in the States. Sometimes NBs are also National verification Bodies, but not in all States.

The key problems that hinder the progress of interoperability that were encountered in the study have been collected in the following sections.

3.7.2 Key problems of the authorities associated with the progress of interoperability

- The interpretation of the definition that is used for interoperability differs across Europe. This definition is given in the Interoperability Directives, but sometimes it is misinterpreted and associated only with technical compatibility. This misinterpretation has large consequences. It has led to incompleteness of the TSIs, it is the reason why Member States have little confidence in the EC verification that is incomplete in respect to safety and hinders the opening of the market.

- Large differences still exist between NB models and methods. This leads to differences in the evaluation of interoperability Constituents and Subsystems. These differences in evaluation have a negative impact on the value and acceptance of certificates issued by the NBs.

- The TSIs do not line up with a practical approach in terms of practical organisational responsibility and life cycle management of the railway system. In particular the aspect of system integration is missing in the TSIs.

- The registration of all issues that form the basis for interoperability is insufficient. This makes it virtually impossible to follow the progress made on a regular basis and to take the necessary measures for improvement.

- The differences in the status of interoperability constituents (some need to receive a certificate and others have self certification by the manufacturer), the difference related to the certification of interoperability constituents themselves or as a part of a subsystem and the lack of matureness of the market of interoperability constituents in general make it hard for the supervising authorities to execute their surveillance tasks.

3.7.3 Key problems of the Infrastructure Managers associated with the progress of interoperability

For new lines Infrastructure Managers have to guarantee interoperability and apply the TSIs. In case that it seems logical that existing Rolling Stock will have to run on this line they may be pressed to equip this line additionally with a Class B system. As a result, Railway Undertakings do not have to equip existing trains with interoperable equipment. It obviously would cause high additional costs for Railway Undertakings if they were forced to modify their rolling stock.

In some cases Infrastructure Managers have installed Class B systems as a fall back system on ERTMS lines because there was not enough confidence in the performance of the ERTMS system as a whole.

In case of existing lines there are barely incentives to upgrade to interoperability. The corridor approach has proved an important measure to overcome this situation.
On the Corridor Rotterdam-Genoa, ERTMS is installed on several parts in the Netherlands and Switzerland. In order to obtain the required functionality on the whole corridor, Infrastructure Managers consider a future upgrade to version 3.0.0 necessary. It seems that some Infrastructure Managers are reluctant to upgrade their lines to this version with regard to the expected high costs.

3.7.4 Key problems of Railway Undertakings associated with the progress of interoperability

Not seldom, Freight Operators are not very profitable and their interest in having sophisticated systems on board of their trains (like ETCS) is not evident. Sometimes they even struggle for economic survival and any extra cost for installing ETCS-equipment on their trains would place them out of the market. This situation was encountered in the Netherlands where many freight operators compete for business between the Rotterdam Harbour and Germany. These companies had to equip their trains with ETCS if they wanted to make use of the Betuweroute. The European Commission has allowed to subsidise the retrofitting of ETCS in existing ProtoType Trains[11]. If this would not have happened, probably very few operators had been able to make use of the multi-billion € Betuweroute.

On high speed lines the competitive situation might change in future if more operators take advantage of the opportunity created by European Legislation to buy new High Speed Trains and to offer passenger transportation services.

3.7.5 Key problems of the Industry associated with the progress of interoperability

During discussions with representatives of the industry the authors have encountered the reluctance to invest in further developments of ERTMS without support from outside. The industry claims to have spent more than a billion Euro's[XIX] in the development so far and seems now to hope for some return on the investments. The industry considers the ERTMS version 2.3.0 appropriate for most applications as opposed to some Infrastructure Managers who think version 3.0.0 will be needed to be able to operate corridors adequately. Both parties seem to agree that it is important to create a stable version 2.3.0 in first instance and prepare the specifications for 3.0.0 at the same time.

Parties, in particular industries have low expectations about positive effects of interoperability. Cost reduction of equipment is not a short-term goal of interoperability but is only expected on the long run. States remain reluctant in accepting subsystems and constituents. On the one hand a certificate is not seen as a sufficient proof of compliance to all requirements, including safety on the level of the integrated railway system, on the other hand a certificate is seen as a minimum requirement to proof compliance of interoperability. This means that if there is no certificate the Member State may hesitate about acceptance, but if there is a certificate, the

[XIX] This figure cannot be supported by official data

Member State may also hesitate. This situation stimulates the application of national requirements and does not provide a stimulus for improvement and progress of interoperability.

3.8 Problems and issues associated with the separation of railway operations from infrastructure

- The experience of some new projects already certified against TSI requirements reveals the following. A great number of Notified Bodies is available in Europe. Most of their work is safety assessment work as an ISA (Independent Safety Assessor), only a small part of their work is certification work. We have investigated that a number of certificates is available. For the certification of projects we see that the certification process is an integral process, with a great number of stakeholders, interfaces, products, certificates. To manage such a process you have to start at an early stage in the project to define all items for certification, contracts of Notified Bodies, see the integration of all issues a.s.o. The separation of functions makes this hard to do.

- Certification needs a transparent way of working, so all interfaces must be known, the requirements must be clear and the timeframe is very strict. The separation leads to multiple interfaces and thus less transparency.

- The parties that have to play a part in the certification process must be involved with the certification process and have to accept that other bodies have a look at their processes. This is a different way of working than parties have done for a long time. They have to show their way of working to other parties, they have to be clear and transparent. This can be seen by the employees of that companies as a threat to their company.

- Is the process clear to everybody? Are all the participants at the same level of information? We are living in a new world. Everybody has to find a new place in the process. Everybody has to find out what he thinks is the best way and has to communicate his role and boundaries to other parties.

- Only a few people have knowledge of this way of working. In other industries (e.g. oil and gas) this way of working is more familiar than in the railway field. The few experts available for this work are busy with discussions in Europe for new changes of the system.

- We can conclude that the certification process is not yet used in a stable world.

- Co-ordination e.g. Traffic Control, must be formalised.

- Problem: Some operators are more popular with the Infrastructure Manager than others...

- The Infrastructure Manager has a geographical monopoly.

- Knowledge of "the other aspects" disappears. E.g. The Infrastructure Manager is not conversant anymore with rolling stock.

- The separation of operation and infrastructure means for infrastructure projects that the rolling stock that will be running on a line is not known when the construction of a line

starts because it is not (yet) known who will operate the line. As such and in theory this would plead for interoperability. In practice interoperability is still insufficiently evolved to guarantee complete compliance with all requirements and complete technical compatibility. The risk exists that after the operator and its rolling stock is known modifications to the infrastructure and/or rolling stock appear necessary.

3.9 Final analysis and way forward

In this section the conclusions and recommendations from the previous sections of chapter 3, have been integrated into a final analysis of the state of interoperability and proposals for the way forward.

Achievements
Considering the immense complexity of interoperability in the European railway world, it must be stated that huge progress has been made in the past years. The legal system is in place and, although not complete, a large portion of the supporting TSI's have been published. The rapid publication of the remaining TSIs for Conventional Rail must be encouraged. Not only the awareness of the importance of interoperability has increased, but also the first tangible results can be seen on several locations. In this report the progress is eventually measured against the developing interoperability of the TEN network. Here it may be concluded that the development occurs along a clearly visible line:

- Introduction on the high speed network was led by a pragmatic approach to allow international traffic: this we have called "pragmatic interoperability".
- ERTMS is the key factor to introduce "full interoperability".
- On the corridors for freight traffic the combination of ERTMS and pragmatic interoperability is realised.
- In Southern Europe and also parts of Western Europe fully interoperable parts of the TEN network have come into service and will come into service shortly. These experiences will help to generate practical feedback for the next steps.
- In Eastern Europe a strong desire exists to extend the European network based on full interoperability. Projects are in preparation and some have already been realised.

Interoperability is progressing. The legal system is in place. Implementations in the Member States are nearly completed. The institutions in the Member States and on European level have largely been established. A large part of the TSIs is available. The first interoperable parts of the network have been put in operation. Interoperable traffic on these lines is starting to take place. Interoperability now can grow further from "pragmatic" to "full".

ERTMS
Although interoperability encompasses a lot more than ERTMS, the importance of this signalling system is so paramount that, understandably, most attention is focussed on its implementation. We can observe and understand the logical fact that large countries already equipped with sophisticated systems do not take the lead in replacing their systems with ERTMS.
Only new lines as for instance the high speed lines in Italy and Spain are equipped with ERTMS. Next to that, small countries like Switzerland and the Netherlands that highly depend on their neighbours for transportation play an important role in this area. The same holds for the new EC Member States that start to equip their lines with sophisticated signalling systems. The issues encountered while planning the corridor Rotterdam-Genoa or the commissioning of the Belgian-Dutch border crossing high speed line have shown the serious problems that arise in realising interoperability in practice, both on the infrastructure and train side.
Many interviewed parties from the infrastructure side have argued that ERTMS version 3.0.0 is necessary to create sufficient functionality for the Rotterdam-Genoa corridor mentioned above as well as for other future applications. On the other side all parties strive for a stable 2.3.0

version in order to consolidate the present situation and to attain broader confidence in the system. These study results demonstrate the importance and impact of ERTMS.
Industry is reluctant in putting in more development money without having returns on the enormous investments already done. This is an important point for concern. If the European industry is not able to develop its products in time and bring the functionalities that are requested by the Infrastructure Managers and Railway Operators to the market, the consequence might well be that non-European players take over their role. European industries will need to become more aware that they are players in a *global* market.

Railway Undertakings strive for borderless traffic without raising the cost by permanently upgrading their (safety) systems. In general an approach in which functionalities and interfaces are well specified, but technical solutions are left to the choice of the manufacturer meets the requirements of the Infrastructure Managers and Railway Undertakings.

Notwithstanding the progress made there is still a large amount of work to be done. A number of important issues still exist and need to be addressed.

ERTMS is the most important driver of interoperability. The start of interoperability is clearly visible in this area. The next steps must be to develop a probably global market for ERTMS/ETCS equipment and systems. The development of this market is seen as an important incentive for European industries to improve their competitiveness.

Scope and development of the TSIs
The definition of interoperability is often misunderstood and misinterpreted as only being technical compatibility. The TSIs do not recognise operational boundaries of responsibility. This means that no complete set of rules for train operation has been agreed. Not all technical requirements, necessary for interoperability, have been captured in TSIs, e.g. requirements for train detection and interlocking. This adds to the need for national requirements. The TSIs do not cover all aspects of the life cycle of the railway system, which is in general used to evaluate the safety of the railway system and its parts. As a result every railway project considered has its own national procedure for putting into operation. This issue is independent of the Common Safety Targets that will be required for subsystems of the railway system. Another issue is the observation that safety is not sufficiently guaranteed in an explicit/transparent way in the TSIs. The TSIs must be further developed to close out open points, to minimise the number of alternative interface solutions and special cases, to be more in line with the practical way of working in projects and additionally to cover the essential requirements completely. This will boost the confidence in the future of interoperability. On the other hand it should be considered that not all requirements have to be fulfilled under all circumstances for obtaining interoperability. This is especially important for existing lines, were interoperability between countries may be reached on a local and isolated scale. In this view, interoperability is a goal that can only be reached in steps and over a longer period of time. Technical changes are costly and time consuming. Changes in working methods, acceptance and behaviour may result in success sooner. A well prepared and prioritised investment plan will support this approach.
The intrinsic quality of TSIs is a basic requirement which is not always fulfilled as we understood from some of the interviewees.[XX]

[XX] The technical quality of the TSI's was criticised by a Swedish official. A UK official said that in the UK railway industry there is concern about the impact of interoperability, one of the reasons being the existence of (perceived) technical flaws in the TSI's (e.g. freight wagons) and related EN's

Confusion about the definition of interoperability and other reasons make the application of the TSIs seemingly difficult and create openings to continue to apply national approaches. Further development of the TSIs, aimed at improving their completeness and ease of application is needed to reduce this trend for national solutions.

Effects of separation of operations and infrastructure

This is a major change in the European railway sector. It must be considered as one of the important means to achieve the European policy goals to make rail more competitive and open up the market. The consequence is that, because the technical railway system still works by the virtue of controlling the technical interfaces, these interfaces must be meticulously described and specified. Today it is no longer possible to design and build a railway infrastructure or railway line for a specific type of train or rolling stock. Because the (future) use and the future user of a railway line and his rolling stock are not known when starting an infrastructure project, the specification of the infrastructure can only be based on a previously defined set of infrastructure requirements that assume a number of characteristics of the future trains. This is the purpose of the TSIs: interoperability in technical and operational sense. Of course this is not only valid for designing and building infrastructure, but maybe even more for designing and building rolling stock. In this perspective, the publication of the Directive 2007/32/EC, modifying annex VI of the interoperability Directives and giving manufacturers (of rolling stock) the possibility to start the certification process, is a major step forward.

Although the requirement to make the technical compatibility of the track and train independent of the a priori knowledge of one of them at the start of a project is normally well understood, this is much less accepted for the operational aspect. However, the approach should be the same, as not only the rolling stock, but also the operator and his specific rules are not a priori known because of the separation. The TSI OPE should be more seen as an instrument to achieve the independence of a priori knowledge about a future operator on a line or rolling stock.
If relevant for the assignment of financial support on a European level, the complete pursuit of the corresponding rules should be demanded.

A downside of the separation is the negative development of the availablity of expertise and experience in the railway sector. This adds to the fact that in general there is little familiarity with the topic of interoperability within the railway organisations and the industry, outside the limited circle of experts who take part in or are directly connected to the various European rail fora.

The separation of responsibilities for infrastructure management and operations is a corner stone in railway policy, which aims at improving the attractiveness and competitiveness of the railways. As consequences of this approach the new notions of interoperability, TSIs and certification must restore the systems structure. In order to reach a stable structure a strict application of these instruments is needed. The TSI OPE is one of these instruments and should also be applied more strictly.

Certification

The need for certification when placing interoperability constituents on the market or when ordering them is not well understood in the rail sector. The same applies to the putting into

service of subsystems, demonstrated by the fact that a considerable number of certificates for in service CCS trackside assemblies are missing. The consequence is that interoperability is not always documented by certificates and therefore not obtained in a transparent way. This also means that in such cases there is no mechanism to detect shortcomings in the specifications. This means that the corresponding corrections are not carried out and that the confidence in the whole system is undermined. Certification should be enforced, starting with transparent comprehensive registration of certificates, in order to obtain interoperability eventually.

Where the goal of the TSIs is to specify the subsystems in a coherent way, in order to make it possible to construct and maintain them on a separate basis, the certification process is necessary to determine that these requirements are met in practice. It is not sufficient to design and build a system to achieve interoperability, it is only interoperable once this is demonstrated through certification. In order to guarantee interoperability, certification must be further developed to become more impartial, transparent and balanced.

A subsystem or interoperability constituent is only really interoperable after its interoperability is demonstrated through certification. This is another consequence of the introduction of separation of infrastructure and operations.

Market and economic incentives

It is obvious that interoperability can only be reached by small steps in the long term by consistently following a clear migration path. Vast sums of money are necessary to attain full interoperability. The short term economic incentives for creating interoperability for existing subsystems are insufficient to motivate parties involved for action. Therefore there is hardly "market pull" apart from the new lines (requiring new interoperable equipment). This pitfall can only partly be overcome by special stimulating measures. The corridor approach is a promising measure to overcome this pitfall. From our interviews we have learned that a migration by first adapting trains in an interoperable way next to the existing system is far less expensive than double equipping the infrastructure (e.g. dual signalling, dual catenary voltages, dual track gauges). This probably means that migration should start at the side of the Railway Undertakings as opposed to the Infrastructure Managers. Looking at the issues that drive investment decisions of Railway Undertakings, in many cases not having a long term financial horizon, these are not the best placed players to initiate successfully the migration to interoperability. For the existing infrastructure and rolling stock the only economical viable moment for refurbishment/renewal seems to be the moment that it has to be replaced for other reasons such as end of technical/economical life. Such moment can be chosen to adapt to interoperability requirements. This is a regulatory obligation in case of a major infrastructure upgrading project. Considering the huge investments necessary, it is obvious that full interoperability can only be reached by implementing long term, well coordinated, migration strategies of all parties involved, at the same time improving the necessary systems. This can only be done if European policy makers stay fully committed, pursuing an active intervention with the objective to optimise the long term costs made by Railway Undertakings and Infrastructure Managers and by doing so improving the competitiveness of the sector. They can expect the RU's and IM's cooperation only if they can convince them that the overall effect in the end is positive and that those who have to invest disproportionally are somehow compensated, and in time.

Harmonisation of the railway network can only be reached on a long term because of the enormous costs involved. Innovation is not necessarily a goal of interoperability. Interoperability creates conditions for an open railway market, but it does not create the market itself, neither does it solve financial problems of further introduction and improvement of interoperability. The next steps of creating this market depend largely on the political will to define and support effective migration strategies.

Monitoring and managing the process

The use of selected metrics on the basis of sound data and the execution of corrective action, counteracting the possible shortfall of interoperability behind the targets, will be supportive in effectively stimulating the progress of interoperability. Detailed proposals on how interoperability progress can be determined have been developed and demonstrated in the report. These metrics will certainly need further development in the future.

Future success depends on the use of feedback of experiences, the ability to monitor and measure the progress of interoperability and to recognise the reasons for the lack of progress.

4 NATIONAL SAFETY AUTHORITIES AND INVESTIGATION BODIES

Section 4.1 describes the methodology used for collecting the information about NSA's and NIB's. Sections 4.2 and 4.3 document and evaluate the results for NSA's and NIB's respectively. Section 4.4 holds the critical assessment of different implementation models. Finally, section 4.5 summarises the conclusions and proposes steps for the way forward.

4.1 Methodology and sources

General

The following websites and documents served as a starting point for identifying the bodies designated as NSA's and NIB's in the countries concerned:

- the country monographs, prepared by a consortium led by NEA, available on the EC's website (http://ec.europa.eu/transport/rail/countries/be/passengers_en.htm);
- country information collected by ERA, available on its website (http://www.era.europa.eu/public/Safety/Networking_with_national_bodies.aspx).

Subsequently, the websites of these bodies themselves could be identified and provided the next source of information. A broader picture, more background and more up-to-date information was gathered through talks with state officials. The remaining gaps in information were then identified and questionnaires, tailored to each state on a case by case basis, were sent to the 17 States that, according to the EC's website, had implemented the RSD at that point in time (beginning of April 2007), except Bulgaria[XXI], plus Portugal and Switzerland. The questionnaire was also used to ask for confirmation or correction of the information gathered earlier. Finally it gave the opportunity to raise issues of concern or interest related to NSA's and NIB's, but this option was not used often. The following countries responded to the questionnaires: AT, BE, CH, CZ, EE, FI, FR, HU, IE, LV, LT (NSA part only), PT, RO, SK, SI. The answers received varied in completeness and detail.

Completeness in information was strived for and nearly obtained with respect to the following issues:

- identification of NSA's and NIB's
- administrative position of NSA's and NIB's
- tasks of NSA's

The remaining issues were addressed as far as reasonably practicable (see end of 1.2):

- scope of NIB's
- resources of NSA's and NIB's
- due process for NSA's and NIB's

The texts contained in Annexes G and H on these issues are in principle the literal answers[XXII] provided in the responses to the questionnaires.

For 6 countries the legislation that was evaluated (see ch. 2) provided an additional source of information.

[XXI] A Bulgarian official advised us to use the Quarterly Report N°6 of the Twinning project with France. This document is not available to DHV/Kema.

[XXII] Some linguistic alterations were made for the sake of clarity.

As a result of the methodology used, the level of information differs from one country to the other.

The information contained in this chapter generally represents the situation in April/May 2007.

Tasks of NSA's

In 2006 the ERA reported on a survey[12] launched in 2005 to collect basic information on several topics of the Safety Directive. The geographical scope of this survey was the same as for our study, except Switzerland, Rumania and Bulgaria, so 24 countries in total.

One of the questions in the survey related to the tasks to be performed by the NSA The results show that 14 countries have a NSA that performs all tasks mentioned in art. 16 of the RSD. In 6 other countries the NSA performs a subset of these tasks. For 4 countries no information was given.

Given this result, for 14 countries information collection was not needed. In order to clarify, complete and where needed update the information for the other 13 countries, material provided by ERA underlying their report was studied and additional information was acquired in this project as stated above (see General).

NSA resources

An additional source for the number of staff employed by the NSA's was the meeting between Mr. Barrot and the NSA's (reference 1).

NIB's

In the framework of the ERA Network of Investigation Bodies, a summary of NIB status was compiled[13]. This information was used together with the results of the questionnaires. In case of controversy, the questionnaires prevailed because it was deemed to be more up to date.

4.2 National Safety Authorities

This section is organised as follows. Section 4.2.1 reports on the information acquired about NSA's per country. Section 4.2.2 holds the evaluation of the setup of the NSA's with regards to the provisions of the RSD (administrative position, tasks), as well as the additional issues of resources and due process. Finally, section 4.2.3 lists issues of concern or interest, raised by state officials in the context of this project.

4.2.1 Results of fact finding

Annex G gives for each country the original name(s) of the body that is appointed as or acts as the National Safety Authority (NSA) and its translation in English. Furthermore it gives a short description, with an emphasis on the administrative position of the body, relative to other players (but not if the NSA is the MoT). After that, information on tasks, resources and due process is given in as far as available (see 4.1).

4.2.2 Evaluation

4.2.2.1 Administrative position

Art. 16.1 of the RSD requires a safety authority to be independent in its organisation, legal structure and decision making from any railway undertaking, infrastructure manager, applicant[XXIII] and procurement entity.

From the descriptions above, it can be seen that all safety authorities are state bodies. In terms of their administrative position, they are independent from both railway undertakings and infrastructure managers.

Quite a number of NSA's say that they can hire external staff. When these come from railway undertakings or infrastructure managers, an independence issue may – but not necessarily does - arise. The need for hiring external staff should be understood against the background of the difficulty in recruiting enough competent permanent staff, which several countries have voiced. From our survey we only know for Belgium and France that the NSA can hire people from the main rail operator SNCB and SNCF, respectively. In the case of France this is covered by legal provisions (see section 2.1.3.3) and hiring consultants is not EPSF's policy.

In many countries the NSA is either part of the Ministry responsible for transport, or an agency separate from that Ministry, but subordinated to it or supervised by it. That same Ministry often has some involvement or another with the railway infrastructure, e.g. where the state holds all or the majority of the shares of the infrastructure manager and by managing the budget for railway projects. To which extent this weakens the NSA's independence in decision making on infrastructure matters, is hard to judge. The MoT may also be responsible for managing the State's relationship with a (main, 'national', 'traditional') train operator, whose shares it often owns. The RSD explicitly allows the NSA to be the MoT. The relationship NSA-MoT will be revisited in par. 4.4.1.

In Italy the IM, through a specifically identified function, performs, under the supervisory of the Ministry, many of the tasks of the national safety authority. Here the NSA's independence from the IM is clearly violated. Work for creating an independent body is going on. Italy has not yet transposed the RSD.

A critical remark on the independence of EPSF in France is given in 2.1.3.3.

4.2.2.2 Tasks

Given the findings with respect to tasks reported in annex G, the items g and f of the list of NSA tasks in art. 16.2 of the RSD deserve special attention.

Item g concerning rolling stock registration is mentioned several times as a task not (yet) performed, because the registers are still in the process of being developed. Once the registers are operational, the NSA's are expected to pick up these tasks.). However, in Latvia this is done by a body other than the NSA, but we do not consider this to be a problem.

With respect to item f, the text in the RSD reads as follows:

[XXIII] Applicant is taken to mean an organization applying to become an IM or a RU.

Monitoring, promoting, and where appropriate, enforcing and developing the safety regulatory framework including the system of national safety rules.

Estonia, Latvia, Slovak Republic and Slovenia have taken item f to mean, among other things, that the NSA should promulgate legally binding safety rules. They point to the fact this is a competence of some other state institution. As an example, a Latvian official commented: *(f): According to Latvia's legislation, State Railway Technical Inspectorate (SRTI) has no rights to issue safety rules. The rights to issue safety related rules are only the Cabinet of Ministers. It relates to every field, neither the Ministry of Transport nor Inspectorate has any authorization to issue safety related rules. The inspectorate monitors if national safety rules are applied in companies.*

The fact that this task is not performed by the NSA should not be seen as a problem, because of the words 'where appropriate' in the RSD text cited above. These words were inserted deliberately to cover cases such as in these 4 states.

In summary, the status with respect to NSA tasks is:
- in Spain and Italy the current situation differs significantly from what the RSD requires;
- in all other countries the NSA's tasks are in line with the RSD's demands.
However, for Bulgaria, Greece and Luxembourg no information could be collected.

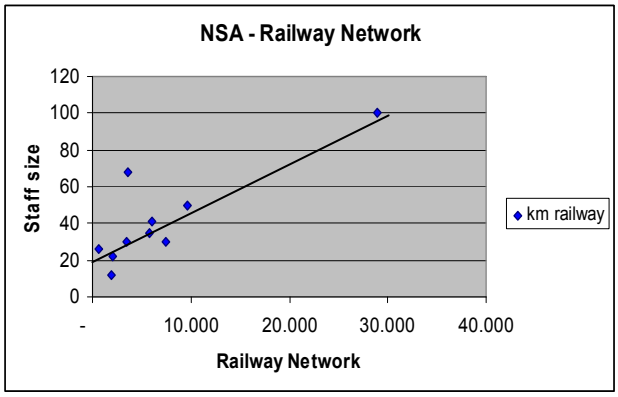


Figure 4.1 NSA versus the length of the railway networks

4.2.2.3 Resources

Figure 4.1 shows that there is a correlation between the length of the railway network and the size of the NSA.

Figure 4.2 shows that there is hardly any correlation between the volume of the passenger transport and the size of the NSA. The correlation between the volume of the transported goods and the size of the NSA however is stronger. Although the line is only an average relation between the factors, the positive correlation is obvious.

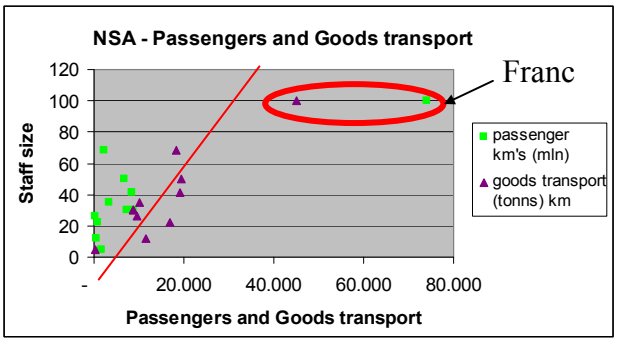
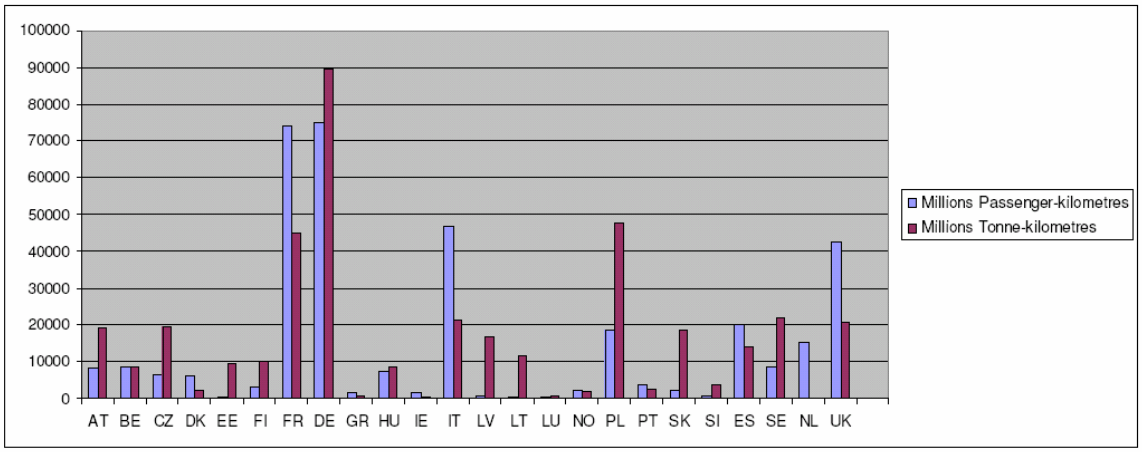


Figure 4.2 NSA versus volume of the passengers transport and transport goods

Not all NSA are free to use external capacity for their tasks.
There is no relation between the size of the NSA and the ability to use external capacity.

The next graph shows data used for this analysis and also for the one on NIB's resources in 4.3.2.6.



source: *Basic Railway Related Data of the EU Member States*, European Railway Agency

4.2.2.4 Due process

The countries that provided information on due process form the greater part of those that have implemented the RSD. Their responses show that there is an increasing transparency in these matters. Many countries have documented the procedures and others are in the process of doing so. The documentation often specifies what has to be provided by the applicants, as well as the criteria used by the NSA for evaluation.

Some interesting differences are:
- the involvement of a notified body or an accredited body for SMS evaluation; this was mentioned explicitly only by Austria and Czech Republic
- the involvement of the IM; this was mentioned explicitly only by Portugal.

4.2.3 Issues of concern or interest

The following issues were raised by MS officials.

Czech Republic
- The legislation is sometimes very difficult to understand. Cooperation with ERA and other member states seems to be very helpful.
- From our point of view sometimes requirements are too strict and bureaucratic.
- Sometimes is quite difficult, that something is required by the directive but guidelines are not developed. It is complicated to make decisions or approve subsystems if the TSIs are not in the force, or run a register when the content of it is still in discussion.

Finland
Lack of resources - one of the main problems is the very limited number of experts specialized in rail safety issues and other tasks of FRA.

Hungary
The extent of the compensation for the third customer is not regulated in the directive 49/2004/EC, it means there are no uniform judgment for the acceptance in other Member States NSA's.

Slovak Republic
There are several applicants applying for the safety certificate, but they do not own the rail vehicles, nor do they employ the staff with professional competence, mental, health and sensual fitness. The rolling stock as well as the staff is contracted based on the agreement as needed.

Our analysis of this problem is as follows:
It is quite a frequent issue in the Central and Eastern Europe: there has not been any real competition in the rail sector two or three years ago and if local market newcomers (and most of them are local) want to bid for providing a service (i.a. in the regional public transport), due to financial instability of regional governments and the risk of cancelling of the public contract, they do not buy (expensive) rail vehicles, do not employ staff etc. – they just have an agreement with a company which has the necessary resources. To have a closer view: currently, there is only one private public transport operator in Slovakia – and the small company uses rail vehicles leased from the dominating operator (and its competitor - which makes it even more full of paradoxes). The situation in the Czech Republic is very similar – the only difference is, that instead of one private company there are three. Because of large underfinancing there has not been yet any private company, which could afford to buy/lease its own rail vehicles.
But we do not see this as a problem – it is virtually the same situation as leasing of rail vehicles from a vehicle pool. And the requests for providing of the safety standards are (at least in theory) the same.

4.3 National Investigation Bodies

This section is organised as follows. Section 4.3.1 reports on the information acquired about NIB's per country. Section 4.3.2 holds the evaluation of the setup of the NIB's with regards to the provisions of the RSD (administrative position, scope), as well as the additional issues of resources and due process. Finally, section 4.3.3 lists issues of concern or interest, raised by state officials in the context of this project.

4.3.1 Results of fact finding

Annex H gives for each country the original name of the body that is appointed as or acts as the National Investigation Body (NIB) and its translation in English. Furthermore it gives a short description, with an emphasis on the administrative position of the body, relative to other players (but not if the NIB is the MoT). After that, information on scope, resources and due process is given in as far as available (see 4.1).

4.3.2 Evaluation

4.3.2.1 RSD requirements

Art. 21 of the RSD requires the NIB to be a permanent body, employing at least one investigator able to perform the function of investigator in charge.

Secondly, the NIB shall be independent in its organisation, legal structure and decision making from any infrastructure manager, railway undertaking, charging body, allocation body and notified body, and from any party whose interests could conflict with the tasks entrusted to the investigation body. It shall furthermore be functionally independent from the safety authority and from any regulator of railways.

The set up of the NIB has been evaluated against these two criteria and the results will be given below. Before doing that, some words will be devoted to the status of NIB formation.

4.3.2.2 Status of NIB formation

From the descriptions in Annex H it can be seen that the formation of the NIB's is still in progress in the following countries:

- Greece
- Italy
- Poland
- Portugal
- Romania
- Slovenia
- Spain

For these countries both the existing and the planned situation will be evaluated in the next sections.

As for Bulgaria and Lithuania, it is not clear whether the formation of an independent investigation body has started.

In the remaining countries the situation with regard to NIB is stable, i.e. no changes have been announced.

4.3.2.3 Permanent body comprising at least one investigator

From the descriptions in Annex H it can be concluded that in all but one country the bodies to which the task of accident investigation is or will be assigned are of a permanent nature. Although not explicitly mentioned in every case, it is also clear from the descriptions that each of those bodies employs at least one investigator and it is reasonable to assume that this person is able to perform the function of investigator in charge.

The exception is Italy. Investigation of accidents is undertaken by a Ministry Commission in case of an incident. No permanent body exists and as such the requirement is not fulfilled. There is no permanent investigator. The founding of a permanent national investigation body is in process.

4.3.2.4 Independence

The requirement on independence in Art. 21 of the RSD can be split into three parts:
1. The body conducting investigations shall be independent in its organisation, legal structure and decision making from any infrastructure manager, railway undertaking, charging body, allocation body and notified body,
2. and from any party whose interests could conflict with the tasks entrusted to the investigation body.
3. It shall furthermore be functionally independent from the safety authority and from any regulator of railways.

<u>First part of the independence requirement</u>

As for the first part[XXIV] of the independence requirement, there is reason for criticism (or doubt) in the following cases.

Germany:
Whereas the MoT is formally the investigating body for serious accidents, a staff unit within EBA can and according to the authors' expectations will be charged with carrying out investigating activities. The notified body EBC is also part of EBA (see 2.2.3.4). Therefore, the requirement of organisational independence is not fully met.

MS opinion
A German official (reference 4) explained the situation as follows.

Since 1994 a unit of EBA investigates accidents and dangerous happenings. With the transposition of the RSD the responsibility for accident investigation had been shifted to the Ministry of Transport (in German: Bundesministerium für Verkehr, Bau und Stadtentwicklung (BMVBS)) following also postulations of the German Parliament for independence.
The staff remained inside EBA (which became NSA according the RSD) together with the notified body EBC. But EBA is only an organisational umbrella for limitation of administrative costs. There are no functional links, neither between EBC and NSA EBA, nor between NIB

[XXIV] This part is later on referred to as the strict part of the requirement.

and NSA EBA, nor between EBC and NIB. Draft reports of accident investigations as well as draft annual reports are adopted in the BMVBS. This measure prohibits an attempted disguising of wrong NSA decisions.

Greece:
Greece does not answer to the requirement at the time, if charging and/or allocation are among the tasks of the FRA. An Investigation Board is going to be established after a presidential decree is adopted. The new body is intended to be independent from any other body.

Italy:
In the current situation, the Ministry Commission uses people from RU's and the IM. The requirement of organisational independence is not met. The founding of a permanent national investigation body is in process.

Lithuania:
No assessment could be made on the basis of the information available.

Poland:
If charging and/or allocation are among the tasks of the UTK, the requirement is not met in the current situation. In the planned situation, judging by the name of the new body, the independence criterion is expected to be met. However, future independence depends on the precise positioning within the new law.

Portugal:
If charging and/or allocation are among the tasks of the INTF, the requirement is not met in the current situation. In the planned situation the requirement is met, which is substantiated by documents underlying the short description in 4.1.3[14].

Romania
The requirement is not fulfilled, because one of the branches of the RRA is a notified body. However, it is expected that the investigation body will be separated from RRA within the next years, according to an RRA official.

Slovenia
In the current situation the requirement is not met because investigation of accidents and incidents is done within the Railways. The establishment of an independent Accident Investigation Body is expected before 1 August 2007.

Spain
In the current situation, the investigating Commission uses people from RU's and the IM. The requirement of organisational independence is not met. A new law is said to provide independence, but no further information is available to asses this.

<u>Second part of the requirement</u>

As for the second part of the independence requirement, it could be argued that any party involved in railways, other than the ones mentioned explicitly in parts 1 and 3 of the requirement, is affected by this clause, because each such party has interests that could conflict with the tasks entrusted to the investigation body. To be more concrete: each party in the

railway sector can be involved in the events and circumstances that potentially lead to a serious accident.

Most importantly, the Ministry responsible for Transport would come under this clause when following this interpretation. In that case a critical note would have to be directed at those countries where the investigating body is part of or closely related to the MoT. Taking into account the plans for reorganising investigations, that is the case in all countries with the exception of Finland, Ireland, Netherlands and Sweden. For Bulgaria, Greece, Italy, Lithuania and Poland it cannot be concluded whether this will be the case on the basis of the information available. Therefore, the number of countries where this problem could arise lies between 18 and 23.

The issue for these countries is that, due to the investigating body being positioned in this manner, it could not be ruled out that an inquiry would generate conflicts with the aims and interests of the Ministry in general. The relationship NIB – MoT will be revisited in section 4.4.

Third part of the requirement

As for the third part of the independence requirement, the notion 'functionally independent' is not clearly defined and hard to judge on the basis of the information available. In many cases the information acquired confirmed 'on paper' the functional independence of the investigating body. No evidence of the contrary was found, but there is some reason for doubt in one case. In the Czech Republic, 'NSA and NIB also do state supervision at operation', as a Czech official put it. This fact appears to harm the NIB's functional independence from the Rail Authority, the latter being both NSA and regulatory body. However, that same official stated that he is sure that this is a misunderstanding. No final conclusion could be drawn in the course of this project.

4.3.2.5 Scope

Art. 19 of the RSD obliges MS to independently investigate serious accidents as defined in art. 3(l).

The scope of the kind of incidents investigated by the NIB, varies from country to country. Obviously, all permanent NIB's have under their responsibility the investigations of serious railway accidents and thus answer to the basic requirement from the RSD. Serious accidents are defined as those incidents that bring about either fatalities, at least five severely injured persons, and a minimum of 2 million euro in damages. When it comes to the NIB's that have answered to our query, in most cases the scope is broader than only the basic requirement of investigating serious railway accidents. Slovakia and Belgium only answer to the minimum requirement. In all the other cases described above, also lesser railway incidents may be investigated.

It is noticed that in a number of the responses, accidents on railway crossings are specifically named as either within or outside the scope. In the Finnish case, although the NIB has a wide scope of investigations, accidents on railway crossings are not investigated by the NIB when they are not classified as serious.

4.3.2.6 Resources

Figure 4.3 points out that there is a relation between the network length and the size of the NIB. The red line shows the average correlation between these factors.
Most NIB's are free to use external capacity for the investigations, i.e. the size of the work force can be adjusted to the work load. The number of fixed staff employed by BEA-TT in France is relatively small, but since it can hire external experts, this number in itself is of little meaning as far as the strength of the organisation is concerned.

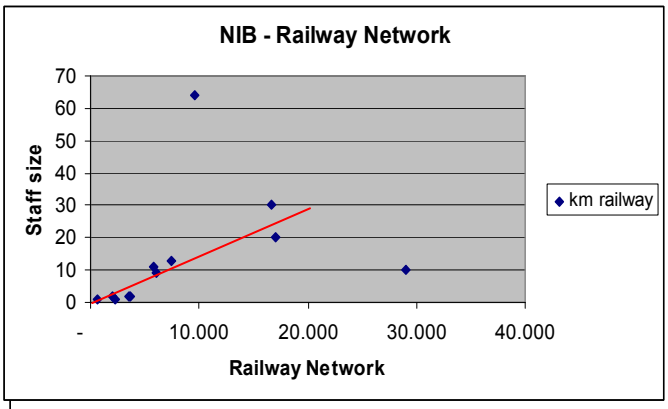


Figure 4.3 NIB staff versus the length of the railway

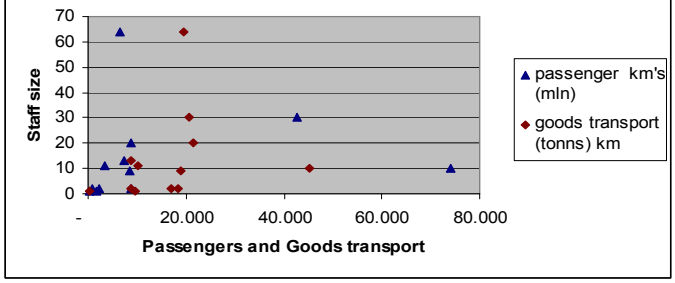


Figure 4.4 NIB staff versus volume of the passengers transport and transport goods

Figure 4.4 shows the relation between the size of the NIB and the volume of transported goods and passengers. This figure shows that there is hardly any relation between the size of the staff and both factors.

4.3.2.7 Due process

For 15 countries information on the question whether procedures are described or not is available.

Five countries (Belgium, Ireland, Poland, Romania and Slovakia) state that they are in the process of describing procedures. Probably, this has been initiated by the adoption of the RSD. The others have already documented their procedures, either by law or by internal documents such as manuals or guidelines. In general these procedures appear to cover the main issues of the investigation process.

4.3.3 Issues of concern or interest

The following issues were raised by MS officials.

Belgium
" It is not easy to find people who are interested in doing investigation work and have the required knowledge and skills"

Latvia
"Training courses for the investigators"

Slovakia
"In order to investigate the given accident, Chairman of the URZD appoints the investigation committee. Nevertheless, the main investigator is appointed by the MDPT SR based on the Chairman´s proposal. This may lead to long process of the main investigator approval. The

question of financial reimbursement for the committee members not being employed by the URZD has not been solved so far."

4.4 Critical assessment of the different implementation models

4.4.1 NSA's

Models

From the description in 4.1.1, it appears that three models are used. These are listed below. In some cases it is not totally clear from the information available which model is used in a specific country, but this does not affect the overall picture.

Model 1.
The NSA is the Ministry responsible for Transport or part of that Ministry:
This model is used in AT, BE, DK, FI (or model 2?), GR, HU, IT, LU, PO, NL and ES.

Model 2.
The NSA is outside the Ministry responsible for Transport, but subordinated / supervised by it
This model is used in CZ, EE, FR, HU, LV, LT, NO, RO, SK, SI, SE and CH.

Model 3.
The NSA is a government body, independent of all ministries.
This model is used in DE, IE (or model 2?), PL (or model 2?), and UK.

Benefits and disadvantages

When it comes to independence in infrastructure matters, the position of the NSA relative to the Ministry responsible for Transport, which usually has responsibilities with respect to infrastructure, is of importance. It appears that in this respect models 2 and 3 have an advantage over model 1.

This advantage was worded well by an official from the Norwegian NSA, as follows:
'The decisions of the Inspectorate affect the railway industry, including the Infrastructure Manager, which is controlled by the MoT. The advantage of the model chosen is that the Inspectorate can have its emphasis on safety, independent from financial considerations or societal issues. If the inspectorate had been part of the MoT, a consequence could have been that it took into account the impact of its decisions on infrastructure cost and on the service to the public. For example, when the inspectorate closed down a station because it was not safe, it did not feel the direct burden of the impact this had on the transport opportunities for passengers.'

Similarly, an official from the Swedish NSA said:
'Each year, the MoT determines the budget and gives an outline for the main tasks to be performed by the Agency and the focus. It does not interfere with individual cases, but if it receives complaints from the actors in the sector, it may correct the Agency, but only in longer time-period. Any interference in a specific matter is actually forbidden by other Swedish laws and regulations. The Agency is also the regulator for competition.'

Nonetheless, also for model 1 there can be provisions to avoid an undue influence of those parts of the Ministry involved in control of infrastructure planning and management on the NSA part of the Ministry. These can be of a legal and/or an organisational nature. For example, they could give the head of the inspection, as the NSA is often called, the ability to directly inform the Minister, by passing other 'layers' within the Ministry, or even have the authority to decide and speak publicly without the Minister's consent.

On the other hand, model 3 could run the risk of being 'too remote' from the Ministry and its current infrastructure business. But such a disadvantage can in turn easily be repaired by all sorts of informal bonds, that are likely to exist anyway.

4.4.2 NIB's

When the various NIB's are put into a comparative perspective and are put into categories, the following picture emerges.

a) NIB's which are either part of or attached to the transport Ministry, but are functionally independent
This category amounts for the vast majority of today's NIB's in Europe. In these cases, the NIB is intended to answer to the minimum requirement of functional independence. When it comes to this category, it is of importance to take into account the precise provisions for functional independence that actually exists for an individual NIB. Any omission would immediately put the independence of the NIB at risk. Such a detailed scrutiny has not taken place here. It is important to notice that the adoption of the RSD has led to a predominant trend of countries answering to the minimum requirement of functional independence.

The precise positioning under the MoT varies from case to case. In some cases, the NIB is described as an independent agency. In other cases, it appears as a department with a functionally independent status. Not scrutinized in this report, but relevant for future research, is the precise hierarchical status of the employees of the NIB and to what extent they may be vulnerable to other than functional influence from the MoT (for example the determination of salaries, of the budget etc.). In some cases, it has been found that the NIB has a protected status also with respect to budget determination. In Hungary and France there is legal protection for the investigators against instruction from anybody. In the UK the Chief Inspector reports directly to the Secretary of State for transport.

b) NIB's which are part of another Ministry than the Transport Ministry
In these cases the NIB is situated with another Ministry than the Ministry of Transport in order to guarantee its independence. This way of positioning in this category is rare within the EU. In Finland, the NIB is located within the Ministry of Justice and investigates also maritime and aviation accidents. In Sweden, the Accident Investigation Board is a state authority reporting to the Ministry of Defence.

Positioning the NIB with the Ministry of Justice, as is the case in Finland, may carry the risk that an investigation will start to look like a judicial inquiry, which is not what an investigation should do. A Finnish official commented on this issue as follows[15]:

'The NIB has been set up in Finland already in the 1990`s. It is responsible for accident investigations, not only in rail transport, but also in maritime and civil aviation. It was set up in the field of administration of the Ministry of Justice just in order to guarantee its independence.

According to the Act concerning accident investigations (373/1985, am. 282/1995), the NIB is not responsible for the judicial inquiry.'

In more general terms, locating the NIB with another Ministry than the MoT could lead to a situation where a potential lack of sectoral knowledge may hamper the quality of investigations.

c) NIB's which are totally autonomous entities
In the cases of Norway and The Netherlands, the NIB is a totally autonomous state agency or board. In Poland, this will soon also be the case. In the case of Latvia, an autonomous, independent agency exists which deals with railway accidents and also with accidents in aviation. This way of positioning is rare within the EU.

d) NIB's which are part of the railway regulator, but are functionally independent
This is the case in Ireland and the Slovak Republic.

It should be mentioned that in several cases, the process of repositioning the NIB in order for it to comply with the RSD is still ongoing. In Italy for example, investigations are still dealt with by temporary committees pending the new NIB coming into existence. In one rare case (Romania), the process of repositioning does not seem to have started. In Romania, the safety authority and the investigative body are part of the same organisation, though this is expected to change at some time in the future, according to one Romanian official.

Mono-modal, multi-modal and multi-sectoral

Most bodies are mono-modal, i.e. deal with railway only. Eight bodies are multi-modal, i.e. also investigate accidents for other modes of transport, such as shipping, aviation, and/or road traffic. Only two bodies are multi-sectoral, i.e. also investigate accidents other than transport.

The multi-modal and multi-sectoral bodies can have an advantage over the mono-modal ones in terms of sharing expertise and learning form accidents and incidents on a broader basis. However, mono-modal bodies could also get that opportunity by liaising with other bodies.

4.5 Conclusions, problems and way forward

NSA's

1. The body designated as National Safety Authority could be identified in all countries, except for Bulgaria. For Greece and Luxembourg no information could be collected on organisation of NSA tasks.

2. In Spain[XXV] and Italy the current situation with respect to NSA tasks differs significantly from what the RSD requires. In all other countries the NSA's tasks are in line with the RSD's demands and the NSA's meet the requirement of independence.

This issue justifies a dialogue with the authorities of the two countries concerned, where these possible anomalies are investigated further, taking into account recent and on-going development, and if the problems are confirmed and persist, possible solutions are examined.

[XXV] Based on information of 2006.

3. Several countries report problems with respect to recruitment for the NSA. To tackle staffing problems, NSA's sometimes hire external experts. If this involves people from infrastructure managers or railway undertakings (which is allowed in Belgium and France and is not known for other countries) there may be an independence issue.

4. There is only one problem associated to the implementation of NSA tasks: supervision of rolling stock register. NSA's are expected to pick this up once the registers are operational. With some exceptions, there is an increasing degree of documentation and transparency of procedures.

5. Although the RSD explicitly allows the NSA to be the MoT or part thereof, a position of the NSA outside the MoT has an advantage, mainly when dealing with infrastructure safety issues.

NIB's

1. No information on NIB could be collected for Bulgaria and Lithuania. In all other countries a permanent body for accident investigation exists, except in Italy, where the investigation commission is of a non-permanent nature.

2. There are indications that the strict part of the requirement with respect to the independence of accident investigation is not fully met in Germany. As far as known to the authors there are no plans to change this.
The strict part of the requirement with respect to the independence of accident investigation is currently not met in Greece, Italy, Poland, Portugal, Romania, Slovenia and Spain. These countries have announced changes that are expected to solve the problem. This could however not be confirmed definitively in our assessment, except for Portugal. There are some indications that the requirement on the NIB's functional independence from the safety authority and any regulator of railways may not be (fully) met in the Czech Republic, but no final conclusion could be drawn. In the other countries the requirements with respect to the independence of accident investigation are met.

3. In many countries a conflict of interest could arise during an investigation and its follow-up because the NIB is positioned within or close to the Ministry responsible for Transport.

This issue merits a discussion on community level, but cannot be expected to be solved quickly. The fact that independent investigation of accidents has been or is being set up, is very positive. The choice that the investigating body is positioned within the MoT has to be respected for some years to come, if only for practical reasons, because changes in set-up and legal structure cannot be brought about on the short term.

4. In Finland the no-blame nature of an investigation could be affected by the fact that its NIB is positioned within the Ministry of Justice (which was done for reasons of independence). This point could be discussed bilaterally. This issue does not occur in the other countries.

5. In most cases the scope of the NIB is broader than only the basic requirement of investigating serious railway accidents. The NIB's resources in terms of fixed staff and opportunity to hire external support seem to be generally adequate, but the latter may under circumstances affect their independence. In those countries for which information on the

existence of procedures could be collected, procedures for accident investigation are either available or in the process of being made.

5 SYNTHESIS AND FOCUS

Introduction

Interoperability is all about creating the technical and operational conditions for opening the market of rail products and rail transport services. Europe's leaders want this because they believe this will make rail more competitive, thereby increasing the modal share of rail at the expense of road and air travel shares. This is needed to keep Europe moving and to fight air pollution, which is to the benefit of all.

The foundation for a unified, open market has been laid by the separation of infrastructure management and the provision of train services and by the step-wise liberalisation of the transportation market.

Open market

What an open market for transport services is, had best be described from the perspective of a new railway company wanting to enter the market or an existing company seeking to expand its business to other countries or regions. Such a company would want to find:

- infrastructure managers that are easily accessible and readily responding, tailoring infrastructure capacity to transportation needs and providing transparent information on their infrastructure and its conditions for use;
- national authorities that are easily accessible and readily responding, organised roughly along the same pattern throughout Europe, providing transparent information on requirements and procedures;
- technical and operational requirements for trains, staff and operations that are unambiguous, justified, up to date and harmonised throughout Europe as much as possible;
- procedures for assessment and putting into service that are harmonised throughout Europe;
- a railway supply and support industry capable to deliver products and services complying with legal requirements and business needs.

Let's see where we are now. The restructuring of the railway sector and division of tasks and responsibilities are well advanced, although the new government institutions such as NSA's and NIB's sometimes have problems in staffing adequately and may need more time to really get going. Procedures for assessment and putting into service are partly unified and partly in the national realm, which is related to the issue below.

In our analysis, the main obstacle for new entrants is (still) the third item in the list above. It is heavily related to the issue of separation and interfacing and will be treated under the next heading.

The system and its parts: dividing and bringing together

Infrastructure, trains consisting of rolling stock and operations (of both infrastructure and trains) together make up the railway system. While the management of the infrastructure and its operation has been separated from managing the trains and their operation, they have to be brought together and to match in every detail to make the system work. Practical experience shows that when both sides of the interface are practically – albeit not formally – in one hand

this works quite well. If however both sides are in different hands and both development processes (track and train) run largely separately, only to be brought together at the system integration stage, then problems are amounting. The introduction of new, still developing technology (ERTMS) and the increasing commercial pressure on organisations, making them focus on their own interests rather than the totality of the railway system, adds to these problems.

As it stands today, the crucial issue of the track/train interface (in the broadest sense, i.e. making the combination to operate safely, healthily, environmentally friendly, etc.) is not tackled fully. In other words, we are still far from a situation where a prospective train operator can order a limited diversity of locomotives and train sets, teach his staff a limited number of operational procedures, and then is equipped to enter large parts of the European network.

Our analysis is that this is so:
(1) partly because it is inherent to the scale of the European network and basic railway system features;
(2) partly because the existing regulations fail to address this issue comprehensively;
(3) partly because, certainly for conventional rail, we have only just started and it simply takes a lot of time and money to migrate to the desired state from where we are now.

These three reasons will be looked at in more detail below.

(1) Transportation needs, geographical conditions and business opportunities for rail will remain to differ from one region of Europe to the other. On a system level, this means varying demands for performance indicators such as speed, capacity and what is to be transported. Therefore, also in the future different types of infrastructure, rolling stock and operations in various combinations will be needed.

The challenge is to limit the diversity in infrastructure and rolling stock to the minimum that is needed to meet the differing functional demands of the railway systems into which they will be integrated…..

because only then technical and operational requirements for trains, staff and operations can be harmonised throughout Europe to a high degree and the degree of diversity in demand for railway products will decrease.

(2) For high speed, in principle all the system is covered by the 5 TSI's. However, the interface issue addressed above, even with respect to the future desired state, is not tackled comprehensively, because:
- a number of open points remain to be filled in;
- the TSI's allow for alternative solutions on interfaces, e.g. traction energy supply voltage;
- the existence of permanent specific cases.

Track/train compatibility has to be organised partly on a case by case basis, involving national requirements and procedures.

For conventional rail, practical interoperability of coaches and wagons exists for quite some time already. It is worrying that, although already a lot of interoperability constituents for freight wagons have been certified, still so far no complete wagons have been certified on the basis of the TSI Freight Wagons. Technical flaws could be among the reasons for this.

The challenge of specifying the interfaces between train sets, locomotives and the infrastructure (apart from control command and signalling) is now in the hands of ERA, developing the TSI's for infrastructure, locomotives & traction units and energy. We recommend that the ERA would tackle all interface issues in a pro-active and comprehensive manner, which is not an easy task.

A structure that might be helpful in this respect is described in Annex I.

(3) Apart from ERTMS, which has its own dynamics, not a great deal of lines, rolling stock and operations have been made interoperable in the sense that they fully meet the TSI's and have received a certificate.

For conventional rail, again apart from ERTMS, making lines, locomotives, train sets and operations interoperable in TSI-terms has obviously not started, given the fact that crucial TSI's are not available yet. However many bilateral and corridor-wise initiatives are promising and developing well.

Actual (technical) interoperability may be better than on paper. Vagueness and inaccessibility of requirements, especially on such issues as maintenance and testing, are obstacles of a bureaucratic rather than a technical nature. Implementation of the rolling stock cross-acceptance provisions now being put into legislation, together with adapting operational procedures, will help interoperability to advance even without TSI's.

Implementation strategy and financial instruments

The notion that on a Europe-wide scale benefits are expected to outweigh the costs – why else should we do it? – should be connected to short term choices to be made on a national and regional scale. For the migration strategy, it is advisable to extend the corridor approach now used for ERTMS to the other subsystems, as exemplified by some corridor co-operations taking place already. To get things going and create a critical mass, one cannot do without financial instruments, duly compensating those that run the risk of paying more than their fair share, using profits generated elsewhere.

Future development of EU railway legislation

While aiming at creating more transparency, the totality of European rail regulations, because of its complexity and volume, runs the risk of being less transparent and effective than those who created it intended. Since the 27 countries have only recently or not yet fully implemented the existing EU railway legislation and the system is just about beginning to work, a basic restructuring on the short term does not seem to be a good idea. However, a coherent but global framework, could be developed to connect the existing pieces of regulations and to direct future development, aiming at filling in the gaps and at removing the superfluous and possible inconsistencies, eventually leading to more clarity and simplification.

Such a framework:
- should cover all aspects of the railway system and its organisation;
- had best be based on the well accepted railway system architecture backbone of infrastructure, rolling stock and operations, rather than the existing structure of subsystems, and connect the railway product level to it in a coherent fashion;

- could bridge the (seeming) controversy between ‘just technical compatibility’ and ‘meeting all essential requirements’ by deriving requirements for parts of the system from the concept of ‘proper (i.e. effective, safe, healthily, etc.) functioning of the system to be obtained after integration’;
- must address all lines, rolling stock and operations within its scope an integral manner, e.g. by acknowledging connections between high speed and conventional lines, and the fact that trains of both types can run on both infrastructures;
- should be compatible with the practical way of working in infrastructure and rolling stock projects;
- should cover putting into service and compatibility management comprehensively.

In the long run, integration of all EU Rail legislation into one Railway Directive could be considered, without violating the principle of subsidiarity. Existing national railway legislation architectures can help to structure such a Directive. Also a consolidation of the TSI’s according to the division of infrastructure, rolling stock and operations could be considered to make them easier to use and more tailored to the needs of different user groups.

Culture, knowledge transfer and feedback

The railway culture in Europe, although changing, is still not very much interoperability oriented. The word ”interoperability” is now being heard, but the meaning is still not very much in line with the eventual goals of an open railway market. It is necessary that this cultural change is further stimulated.

A better understanding of EU rail policy objectives and instruments in the railway community at large (i.e. outside the limited circle of those directly involved) is a key success factor. The complexity of the legislation and the associated TSIs and their application is such, that only experts are capable of applying these rules properly and even then this is not always guaranteed. The only way to familiarise with interoperability is to apply the rules. However, the process of familiarisation could be supported pro-actively by organising the necessary transfer of knowledge in seminars, trainings etc.

Feedback from working with specifications and assessment procedures is vital, which is one of the reasons why not only making things interoperable, but also assessment and certification should become normal practice. At the end, all efforts to reach interoperability and create interoperable constituents and subsystems and integrate them into the railway system are in vain if the concrete results of these efforts, the interoperable constituents and subsystems are not recognised and accepted.

COLOPHON

Client	: European Commission
Project	: Rail Interoperability & Safety
File	: A3230.01.001
Editors in chief	: R.J. Houben, F. Walenberg
Contributors	: C. de Bruijn, H. de Bonte, O. Fábera, L. v.d. Ham – v. Hulten, S. v.d. Linden - IJsselstijn, R.B. te Pas, M. Scheerders
Project Manager	: R.J. Houben
Date	: 17 October 2007

REFERENCES

[1] Annex to minutes of meeting on 12 June 2007 of Mr. Barrot with NSA's
[2] E-mail from K. Hartig, 15 May 2007.
[3] E-mail from Th. Saule, 20 June 2007.
[4] E-mail from W. Neuhöfer, 14 October 2007.
[5] Private conversation between W. Neuhöfer and R. Houben on 12 October 2007.
[6] E-mail from K. Hartig, 15 May 2007.
[7] M. Friedli, M. Liechti, Europa auf dem Weg zu freier Fahrt für Eisenbahnen, 8. Juni 2007 / 2. Juli 2007
[8] Competition in Europe's rail freight market, published by the CER, ISBN 978-3-7771-0356-3
[9] http://www.era.eu.int/public/Interoperability/documents/RRS/ERA-REC-INT-01-2006%20Recommendation%20Registration%20of%20rolling%20stock.pdf
[10] http://www.era.eu.int/public/Interoperability/documents/RRS/IU-REG-060727-%20Final%20Report.pdf
[11] http://www.acts-nl.com/NL/publicaties/persberichten/witboek-dwarsliggersofvrijebaan.pdf
[12] Evaluation of the Survey to the NSA network, ERA, P. Mihm, version 1.4, 19 October 2006.
[13] ERA Network of Investigation Bodies report to the European Commission, Summary of Accident Investigation Board Status: December/January 2006.
[14] Diário da República, 1a serie, no. 208, 27 October 2006
[15] E-mail from H. Pennanen, 24 September 2007.

Annex A Comments about details of the data collection

Part of the data presented in section 3.4 comes from the database that is kept by NB RAIL, the European Co-ordination Meeting for railway Notified Bodies. It is clear that the completeness and preciseness of the conclusions that are drawn here are influenced by the information in this database. As to the completeness and preciseness of the data in the NB RAIL data base the following remarks need to be made:

- The information corresponds with the status on the date of August 27, 2007
- Since only 20 Notified Bodies have entered a certificate list, while the total number of Notified Bodies is now approximately 30, there may be more certificates.
- Not every list of a Notified Body seems to be up to date since far less recent "issue dates" are indicated than would be expected based on a logical and steady progress of certification work.
- Not all Notified Bodies list certificates which are "requested" or "in progress", but from the lists of Notified Bodies who do, we may conclude that the number of certificates that are "requested" or "in progress" is smaller than the number of certificates issued. This would indicate that the growth rate of the number of certificates is decreasing. In a starting process one would expect the inverse, i.e. less certificates issued then requested. However this conclusion seems premature without checking first whether the register is really up-to-date.
- No certificates for TAF and WAG Subsystems have been registered in the data base and 6 for NOI (5 issued, 1 request)
- Certifications following module A (self certification by the manufacturer of an Interoperability Constituent) do not appear in the database because the manufacturers have no duty to register their certificates or Declarations of Conformity for ICs
- Only one certificate for the OPE Subsystem has been registered
- A limited number of refused certificates have been registered. However these are not listed in the certificate count
- In the certificate count the renewed certificates that have been registered in the data base are counted as one and not as two
- The expired certificates that are registered in the data base are only counted if they are not renewed
- Interim Statements of Conformity (ISCs) are also counted as a certificate
- Certifications that have been stopped and abandoned before completion are nor counted when they have not led to a certificate at a later date
- Some NBs have entered also certificates for Class B on board or track side assembly certificates: of all 24 issued CCS TSA and OBA certificates 22 are Class B. Only 2 ETCS Class A TSA certificates are issued and no Class A OBA certificates. Therefore figure 3.11 in par. 3.4.6.2.1 only gives the number (2) of Class A certificates.
- In some cases the GSM-R Track Side Assembly or the GSM-R On Board Assembly is also certified separately, i.e. independent from ERTMS/ETCS. For GSMR-only 12 certificates are registered and of these, 11 certificate are On Board, 1 Track side
- A large number of certificates for On Board Interoperability Constituents concern GSM-R. In total 145 certificates for On Board ICs have been issued. Of these 145 certificates 125 are GSM-R and only 20 are ERTMS/ETCS)
- Of all CCS certificates (196 issued), when corrected for the GSM-R portion, most CCS certificates for ICs concern Track side ICs (51 of 71 issued)
- In many cases more then one certificate for one single constituent or subsystem has been issued because:
    - Expiry and consecutively renewal of certificates

- Modules prescribe more then one certificate
- Newer versions of the constituents
- Projects are cut in smaller portions
- Certificates are cut in smaller portions (ISCs)

Annex B Detailed analyses of the trackside CCS System

B.1 Interoperability Constituents certification and putting onto the market

We have chosen to examine the Trackside Control Command Subsystem in more detail, because for this subsystem it is possible to "calculate" the number of certificates, the number of Interoperability Constituents on the market and the number of Subsystems put into operation.

The Interoperability Constituents of the Control, Command and Signalling Subsystem have been defined in the TSI and are mentioned for the Track Side Assembly in Table 3 and the On Board Assembly in Table 4. In Table 3 an Table 4 also the information regarding the certification of these interoperability Constituents is entered. The tables show the (current) result of the survey. The blanks are unknown and do not follow from the available information on the date of 27-08-2007.

Although the Tables B.1 and B.2 are not yet complete, the survey seems to lead to the conclusion that the certification for the Track Side Interoperability Constituents is relatively complete. All Eurobalises and LEU types on the market have a certificate. The RBC's seem to be certificated in the framework of the Track Side Assembly up to now with one exception. This demonstrates the transition phase. RBC's are not yet fully TSI compliant because not all TSI functions are offered in the commercially available applications.

Manufacturer / Constituent	Thales (Alcatel)	Alstom	Ansaldo	Bombardier	Invensys (Dimetronic)	Siemens
RBC	Ongoing	Ongoing	Certified			
Radio In-fill unit	-					
Eurobalise	-	Certified	Certified	Certified	Certified	Certified
Euroloop	-	-	-	-	-	-
LEU (Eurobalise)	-		Certified			Certified
LEU (Euroloop)	-	-	-	-	-	-
Safety Platform Trackside	-					

Table B. 1 Overview of certificates for CCS TSA

Manufacturer / Constituent	Alstom	Bombardier	CSEE	Siemens	Frequents	Kapsch	Nortel	Sagem	Selex	Wenzel
ERTMS/ETCS On Board	Certified				-	-	-	-	-	-
Safety Platform On Board					-	-	-	-	-	-
Safety Information Recorder	Certified				-	-	-	-	-	-
Odometry	Ongoing				-	-	-	-	-	-
External STM	ATB (NL) Certified (USSB)	ATB Ongoing			-	-	-	-	-	-
ERTMS/GSM-R On Board	Certified	-	-			Certified	Certified	Certified	Certified	Certified

Table B. 2 Overview of certificates for CCS OBA

For the On Board Assembly the situation is different, with the exception of GSM-R. For on Board equipment the first certifications are recently completed. More will have to follow. For the GSM-R on board equipment 75% of the manufacturers have received certification. Out of the 584 IC certificates 125 are GSM-R on board. This is 21% of the total. GSM-R may be considered a driver for interoperability.

From the Tables B.1 and B.2 by counting the number of certificated ICs and relate this number to the number of ICs offered in the market a degree of certification in the market is calculated. This is shown in table B.3

Constituent Track Side	% Complete	Constituent On Board	% Complete
RBC	17	ERTMS/ETCS On Board	25
Radio In-fill unit	0	Safety Platform On Board	0
Eurobalise	100	Safety Information Recorder	25
Euroloop	0 (no specification)	Odometry	0
LEU (Eurobalise)	100	External STM	25
LEU (Euroloop)	0 (no specification)	ERTMS/GSM-R On Board	75
Safety Platform Trackside	0		

Table B. 3 completion of the certification for CCS ICs

The overall conclusion for this section can be that there is a market for CCS ICs. From the above tables a number could be deduced for the degree of completion of the CCS ICs.

By relating the number of IC certificates (and Declarations of Conformity where these exist and the information about this is available) to the totality of the market on every moment a useful metrics has been found.

For other subsystems like ENE, INS and RST a similar analysis is feasible, but this will require more effort and time, mainly to collect the necessary information. Therefore the demonstration is now limited to the CCS subsystem.

Annex C Development of the TSIs

Summary of the dates for each TSI and a planning for the future TSIs:

C.1 High Speed Rail

MAI: 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
Commission decision 2002/730/EC of 30 May 2002

CCS: 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
Commission decision 2002/731/EC of 30 May 2002

INS: 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
Commission decision 2002/732/EC of 30 May 2002

ENE: 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
Commission Decision 2002/733/EC of 30 May 2002

OPE: 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
Commission Decision 2002/734/EC of 30 May 2002

RST: 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
Commission Decision 2002/735/EC of 30 May 2002

C.2 High speed revision

CCS(2): 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
EN Commission decision 2006/860/EC of 7 November 2006
Annex A: 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
Commission Decision 2007/153/EC of 06.03.2007

C.3 To be decided and published soon

INS: EC-Decision for TSI Infrastructure Sub-System. Directive 96/48/EC - Interoperability of the trans-European high speed rail system

ENE: EC-Decision for TSI Energy Sub-System. Directive 96/48/EC - Interoperability of the trans-European high speed rail system

RST: EC-Decision for TSI Rolling Stock Sub-System. Directive 96/48/EC - Interoperability of the trans-European high speed rail system

OPE: EC-Decision for Traffic management and Operations TSI. Directive 96/48/EC - Interoperability of the trans-European high speed rail system

C.4 Conventional Rail

TAF: technical specification for interoperability relating to the telematic applications for freight subsystem of the trans-European conventional rail system
Commission Regulation 2006/62/EC dd 23.12.2005

NOI: technical specification for interoperability relating to the subsystem 'rolling stock noise' of the trans-European conventional rail system
Commission Decision 2006/66/EC dd 23.12.2005

CCS: technical specification for interoperability relating to the control-command and signalling subsystem of the trans-European conventional rail system
Commission decision 2006/679/EC dd 28.03.2006
Annex A: 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
Commission Decision 2007/153/EC dd 06.03.2007

WAG: technical specification of interoperability relating to the subsystem 'rolling stock freight wagons' of the trans-European conventional rail system
Commission decision dd 28 July 2006

OPE: technical specification of interoperability relating to the subsystem 'Traffic Operation and Management' of the trans-European conventional rail system
Commission decision dd of 11 August 2006

C.5 To be decided and published at the end of 2007

SRT: EC Decision for TSI "Safety in Railway Tunnels" of Directive 2001/16/EC on the Interoperability of the trans-European conventional rail system and Directive 96/48/EC on the Interoperability of the trans-European high speed rail system

PRM: EC Decision for TSI "Persons With Reduced Mobility" of Directive 2001/16/EC on the Interoperability of the trans-European conventional rail system and Directive 96/48/EC on the Interoperability of the trans-European high speed rail system

C.6 Under construction by the Railway Agency

This mandate concerns the drawing up of draft technical specifications for interoperability (TSI) related to

- infrastructure,
- passenger carriages,
- locomotives and traction units,

- energy,
- telematic applications for passengers.

These are pursuant to Council and EP Directive 2001/16/EC on the interoperability of the trans-European conventional rail system (hereafter called "the Directive"), as modified by Council and EP Directive 2004/50/EC 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.
Deadlines for the final draft TSIs are the following:

- 30 months after submission of the mandate for infrastructure, energy as well as locomotives and traction units;
- 36 months after submission of the mandate for passenger carriages and telematic applications for passengers.

Annex D Countries of NoBo's and Contracting Entities

The distribution over Member States was studied in more detail. The following Figures D.1 and D.2 show the result.

In order to develop an impression of the market for certification, we examined the relation between member states of origin of the applicant and the state of origin of the NB. Again both issued certificates and requests for certification were taken into account.

Figure D.1 shows the result for the absolute number of certificates issued and requested.

Figure D.2 shows the result of the distribution over Member States for the relative number of issued and requested certificated. In this approach the reference value is the total number of issued and requested certificates over all Notified Bodies in one Member State. It is then determined what percentage of this total comes from applicants in the same Member State and what fraction comes from applicants in other Member States.

From these figures it can be concluded that the Market for certification is largely related to the Member State of origin of the Notified Body. Some exceptions exist, the most striking one is NL where only 21% of the certifications come from the Netherlands itself and 79% of the certifications come from other Member States. In average 81% of the certifications come from the Member State of origin of the Notified Bodies. The remaining 19% come from applicants in other Member States. Although the incompleteness of the NB RAIL database will certainly influence these figures, it seems that the conclusion is justified that the market for certification is not yet open.

Also the very high amount of certificates in Germany is very striking. Most of these are for Interoperability Constituents. The largest part is associated with WAG and GSM-R.

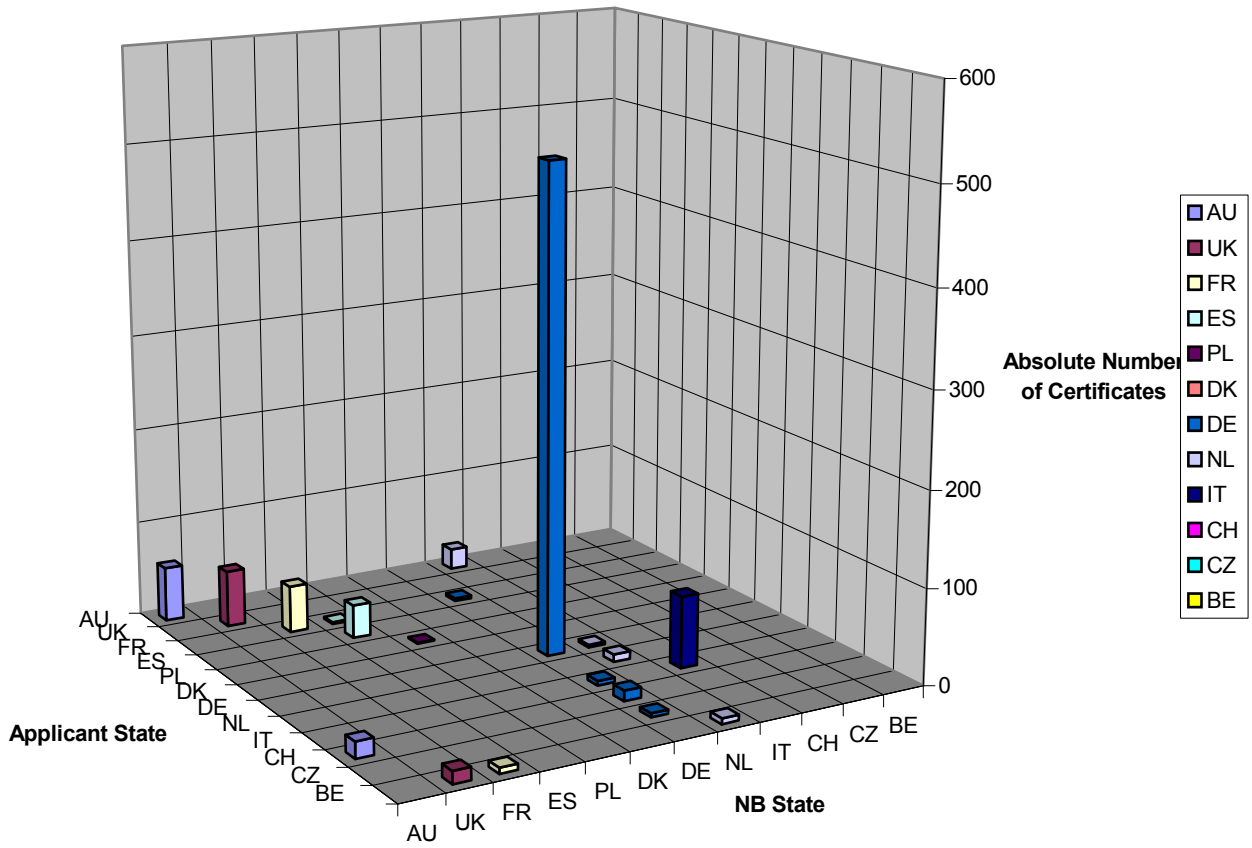


Figure D.1: Distribution of applications, absolute numbers

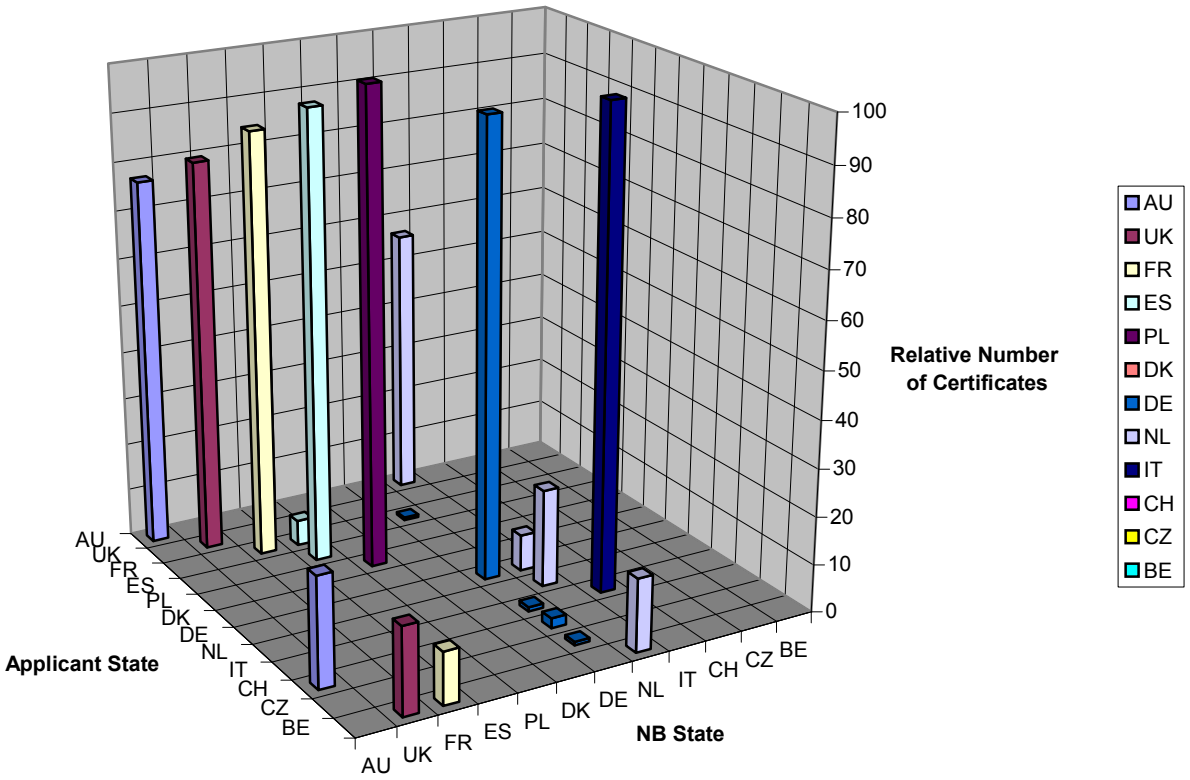


Fig. D.2: Distribution of Applications, relative numbers

Also it may be concluded that this parameter serves well as a metrics. Taken alone it has however no significance. It is difficult to find a reference for this parameter: what is the objective. If the market would be in perfect (relative) balance with Notified Bodies in 15 Member States the relative number of certifications per member State would be 6.7% Although it may be clear that this figure is not very realistic, it is also clear that the current situation is still far from this balance.

Annex E SUMMARY OF INTERVIEW RESULTS ON INTEROPERABILITY

This Questionnaire formed the basis for market information for chapter 3.

The questions were preceded by the following information:

In the directives Interoperability is defined as follows:

Interoperability means the ability of the trans-European high-speed rail system to allow the safe and uninterrupted movement of high-speed trains, which accomplish the specified levels of performance. This ability rests on all the regulatory, technical and operational conditions, which must be met in order to satisfy essential requirements

The main reason for the introduction of interoperability in the railway sector is to improve the competitiveness of the railway market. With railway market and in this respect two areas of market mechanisms are meant:

- *The market of railway transportation of passengers and goods. This has to do with free access, level playing field, cross acceptance of technical resources (rolling stock) and staff and other issues. For this purpose, market liberalisation measures have been taken such as separation of responsibilities for infrastructure and transport operation.*
- *The market of railway products and systems. This must support the development of the open market for railway transportation by creating common technical specifications. This should allow the railway industry and the manufacturers of railway systems and products to compete throughout and outside Europe and end the nationally or regionally protective or favorable atmosphere, which existed before.*

Multiple choice questions (Yes/No/Don't know) were asked to a selection of authorities, infra managers, railway undertakings and the supply industry.

Nr	Question	Answer	Comment
1	Do you think there is a mechanism in your member state checking if constituents that are used in subsystems are officially certified according to European regulations?	Yes Don't know No	Formally the answer is yes, but the regulations are not complete There should be more emphasis on the European role

2	Do you think there is a mechanism in your member state to check if subsystems that are certified according to European regulations contain certified constituents?	Yes No Yes/No/ Don't know	It exists in the Netherlands; It has been applied for HSL-South. For the Betuweline there is an exemption because the project started before the TSI's were finished. So the Betuweline hasn't to be judged by a NoBo There is no Dutch organisation that does the auditing of Prorail. ProRail makes its own OVS (Maintenance instructions EIM should introduce self-regulation
3	Do you think Certification of Constituents for interoperable Infrastructure or Rolling stock is always required before a line is put into operation?	Yes No No	Should be done We don't want to issue new certificates all the time for minor changes
4	Do you think Certification of Subsystems for interoperable Railway Systems is always required before a line is put into operation?	Yes Yes No	Should be done, but then it has to be sure that the line is safe and it is not clear yet how the responsible European organisations are going to realise this Only if it is relevant for safety Can be put into service without a certificate
5	Do you think that Interoperable Certified Trains can run on interoperable Certified Infrastructure without any further testing? If not, for what reason?	Don't know No No	The specifications are not finished yet; for example the test specifications do not correspond with the actual version of the SRS. UNISIG states that these test do not guarantee for interoperability, because the maturity of the corresponding specifications is insufficient. There is no certified interoperable infrastructure. There are always problems like different platform dimensions or trains with steps. Angle of view from locomotives. We always test by driving slowly over a new track. For safety equipment it should be possible. You need operational rules
6	Do you think that technically compliant subsystems (i.e. train and infrastructure) are a sufficient precondition for putting into operation a railwaysystem?	No No	Refer to 5) In theory yes, in practice there are always disturbing details
7	Do you think the national Safety Authority would accept this?	No No	This depends on your country of origin. The procedures of NSA's differ. The Dutch NSA called IVW leans strongly on the NoBo's. In Germany, EBA investigates into extreme details. Also the Inframanager and Railway Undertaking would like to check first. Because a

			certified train has a so called certificate for operation because there are many other aspects that differ over the network
8	Does your National Safety Authority have to give the authorisation for putting into service a system on the basis of certified subsystems(is there enough confidence)	No No	See previous answers You have to do some checks, i.e. the detection of the train
9	Does your National Safety Authority use national rules for licensing the subsystems?	Yes	Yes, because they have their own procedures for acceptation. The European rule do not offer a solution in this case
10	Does your National Safety Authority give the authorisation for putting a line into service?	No Yes Yes	It is the Inframanager who does so, but the NSA can block the authorisation in case there are indications that it is not safe. No further comment Advises the Minister
11	Would you consider it an advantage if the national safety authority would be placed outside the Ministry?	No Yes Yes	There is no doubt whatsoever concerning the impendence of the dutch NSA IVW. NSA struggles with independence ; i.e. temporary speed restrictions, necessary for safety, are a problem for operation Total independence would be the optimal solution
12	Do you think most people see interoperability as technical compatibility and not in the broader perspective of opening the railway market?	Yes Yes Yes	Many people are not aware of this You have to harmonize operation. (Dutch driver who can drive to Frankfurt) There is a technical approach; you never hear people talk about the objectives of interoperability
13	Do you think manufacturers of constituents see certification as promotion (a marketing instrument) for their products?	Yes No No	 They see it as a cost driver and a factor causing delay Because nobody buys anything without a certificate
14	Do you think there is any official registration if a manufacturer chooses for self-certification according to module A	Yes/No/ Don't know Don't know No	ERTMS cannot be certificated according to module A. It must be B and D or H not aware of anything like this
15	Do new products (Interoperability constituents) appear on the market with a certificate?	Yes/No/ Don't know No	Not so often, but what is the use of it, regarding the incomplete specifications?

16	Are they used to realise interoperable systems?	Don't know Don't know	
17	Do these systems receive the EC Certificate and EC Declaration of Verification?	Don't know Don't know	
18	Do you think the industry sees interoperability as a driver for market-growth?	Yes Yes	They see it as a driver to buy new equipment
19	Do you think interoperability is an opportunity for the industry to improve themselves?	Yes Yes	As it is for all players, caused by liberalisation and competition. New Railway Undertakings play an important role
20	Do you think that innovation is the driving force for industry to participate in the interoperability process?	No	They have to participate, because otherwise they will lose market share or disappear from the market
21	Do you think ETCS applications in conventional Rolling Stock drives the progress of interoperability?	Yes Yes/No/ Don't know	But only in case the corresponding trains cross borders It gave a boost
22	Do you think one of the following causes might be the reason for contracting entities not to start the certification process:		
22a	The project started before the TSI was issued	Yes Yes/No/ Don't know	The case for the Betuweline
22b	Uncertainty about the completeness of the ERTMS specifications (this could lead to installing national systems as a back-up or fall-back)	Yes Yes	The Betuweline is equipped with ERTMS only without certification
22c	The relatively rapid change and insufficient	No	This is not the issue; there is no stable baseline as a basis for certification; that is the

	stability of ERTMS specifications	Yes	bottleneck. ProRail as a contracting entity would prefer to buy certified products
22d	Insufficient knowledge of the regulations (sometimes leads the contracting entity to think that national approval and safety verification and certification by an ISA is sufficient)	No Yes	This is not an issue; someone will draw their attention to it (i.e. IVW, the Dutch NSA)

Another set of open questions were asked to a selection of people with knowledge of corridor projects:

Nr	Question	Comment
1	What are the key problems of the different Inframanagers with interoperability?	Different national systems, incomplete ERTMS-specifications and unclearness about what will be in the specs in future. It will be expensive to migrate to 2.3.0 and generically it is not yet there. In the two years to come we will see if we will have problems with technical interoperability. On top the operational problems will be hard to solve. Costs and long lead times for realization Apart from the regulated items by TSI there are still specific national requirements like platformheight and train detection, especially on the conventional infrastructure. ERTMS should be stabilized first and that should be it for the time being, because there is much money involved.
2	How important is it for their operations?	It jeopardizes progress of projects National safety systems should be phased out; New trains come with ERTMS The market should be opened and it should also be of interest for the Infra manager. For capacity or safety it is not needed.
3	What would be a possible way forward?	High level commitment (CEO's) is important. We have to stick to the specs. The first thing to do is to guarantee that the current projects run smoothly. It is important to solve all problems around 2.3.0 in practice. Refurbish all trains with ERTMS; let the government pay for it. It will save money on

		the Rolling Stock and Infrastructure side. (Equipping the infrastructure with ERTMS is 10 times more expensive than equipping Rolling stock) The discussion about 2.3.0 should be closed.
4	What are the key problems of Railway undertakings, especially those offering rail freight services, with interoperability?	We should not underestimate the upgrade of a software version in the locomotives. Operators are afraid to loose income during refurbishment. How many more will there be? They don't like to invest in 2.3.0 now if some time later they have to upgrade to 3.0.0. This means repeated testing. Operators would like to wait until 3.0.0 Rolling Stock and Infrastructure not being at our disposal during migration. Railway Undertakings lose their comfortable position because the monopoly is blown up by interoperability Railway Undertakings see advantages in inter-changeability of trains.
5	How important is it for their business?	For the Betruweroute operators have to adapt. The transportation business is very competitive. They cannot afford to accept an increase in transportation costs. Most important issue for them is to realize their logistic planning. The trust in ERTMS still has to be proven.
6	What would be a possible way forward?	Take out the bugs of 2.3.0 so that no locomotives have to return to the workshop. European measures are important.
7	What are the key problems of the supplying industry with interoperability?	The railway market is a niche market with scarce capacity and changing requirements. The complexe development of ERTMS tends to lead to a loose/loose situation. ERTMS requires high investments and has a poor reputation. Industry doesn't want to develop new ERTMS systems (e.g. 3.0.0) with incomplete specifications. The rest of the railway world doesn't realize that they are giving industry a hard time.

		They want to finish the development. They want to sell now the existing product.
8	How important is it for their business?	It affects their profitability. As long as there is enough confidence in ERTMS they have to participate.
9	What would be a possible way forward?	Packet Switching for GSM-R does not form part of 3.0.0. but DB needs it. A freeze of specs is extremely important. Progress has to be made step by step. It has to be a very well managed process. A stable market; 3.0.0 would be the wrong direction
10	Any other suggestions?	
11	What are problems and issues associated with the separation of Railways and Infrastructure?	For interoperability between countries it is an advantage, but it is hard to get sufficient commitment of all parties involved. Inframanagers will have to take the lead. ProRail would not like to return to the old situation.
12	Do you consider 2.3.0 sufficient for the corridor?	No, especially for Germany and Switzerland (they need limited supervision) the corridor goes through existing knots and for those functionality is missing. Also key management still is a problem. For the Netherlands (projects HSL-South, Betuweline and Amsterdam-Utrecht) 2.3.0. would do because they only have level 2. If the Netherlans would be completely equipped with ERTMS, 2.3.0 would not be sufficient. For level 1 capacity problems could emerge.
13	Does interoperability lead to lower costs?	ERTMS is not a goal but an instrument for interoperable, faster, more reliable, higher capacity and safer railways. Harmonisation of operational rules is an important issue like TAF (Telemetric Applications for Freight). Finally 15% lower transportation costs per train could be reached.

Annex F Table of Interoperable lines [XXVI]

Project	Industry	NB CCS	Level 1/2	Version Actual/Future	Dual Signalling	Length (km)	In operation
Betuweroute	Alstom	-	L2	2.3.0	No	160	2007
Amsterdam – Utrecht	Bombardier	-	L2/ATB	2.2.2/2.3.0	Yes	40	2007 In service without ERTMS
HSL Zuid	Siemens	Railcert	L1/L2	2.2.2+/2.3.0	No	85	2008
Belgium L3	Alstom	Certifer		2.2.2+/2.3.0		42	2008
Belgium L4	Alstom	Certifer	L1/L2	2.2.2+/2.3.0	No	87	2008
Belgian network	Siemens	T.b.d.	L1		TBL1+		
Luxemburg network	Alcatel	T.b.d.	L1				
Paris – Baudrecourt	Ansaldo	Certifer	L2/TVM	2.3.0 & DC	TVM430	300	2007 In service without ERTMS
Figueras – Perpignan	Ansaldo/CSEE	Certifer / Cetren	L1/L2	2.3.0	No	44	2009
Lleida – Tarragona	Siemens / Alcatel	Cetren	L1/L2/ASFA	2.2.2+/2.3.0-	Yes	91	2006 In service with L1
Tarragona - Barcelona	Siemens / Alcatel	Cetren	L1/L2/ASFA	2.2.2+/2.3.0-	Yes	60	2007 (planned)
Zaragoza – Huesca	Alstom	Cetren	L1	2.2.2+/2.3.0-		80	2006
Madrid – Lleida	Ansaldo/CSEE/ Siemens	Cetren	L1/L2/ASFA	2.2.2+/2.3.0-	Yes	492	2004 In service with ASFA
Madrid – Segovia – Valladolid	Siemens / Alcatel	Cetren	L1/L2/ASFA	2.2.2+/2.3.0-	Yes	180	2007 (planned)
La Sagra - Toledo	Siemens / Alcatel	Cetren	L2/L2/ASFA	2.2.2+/2.3.0-	Yes	21	2006 (In service with ASFA
Córdoba- Málaga	Invensys	Cetren	L1/L2/ASFA		Yes	155	2007 (planned)

- [XXVI] ERA report: Tender ERA/2006/ERTMS/OP/01 Survey of Safety Approvals for the first ERTMS implementations, NB RAIL website status 27-08-2007, Interviews and research by the study team

Juteborg - Halle/Leipzig	Siemens / Alcatel	EBC	L2/LZB	2.2.2+	Yes	145	In operation
Verona – München		Luxcontrol					
Mattstetten – Rothrist	Alstom	No NB required for Swiss project			Yes		
Lötschberg Basistunnel	Alcatel	T.b.d.					
Brenner Basistunnel	T.b.d.	Arsenal/RINA				56	2011
Wien – Nickelsdorf	Siemens / Alcatel	Arsenal	L1/PZB	2.2.2+	Yes	64	2004
Wien – Salzburg	?????	Arsenal					
Budapest – Szolnok	Siemens / Alcatel						
Budapest – Kimle	Siemens / Alcatel						
Sofia – Burgas	Alcatel						
Bucharest – Campina	Siemens / Alcatel						
Bologna – Firenze	Alstom / Ansaldo	T.b.d.	L2	2.2.2+/2.3.0	No	78,5	2009
Roma – Napoli	Alstom / Ansaldo	SciroTÜV	L2	2.2.2+/2.3.0	No	205	2006
Milano – Bologna	Alstom / Ansaldo	T.b.d.	L2	2.2.2+/2.3.0	No	182	2009
Torino – Novara	Alstom / Ansaldo	SciroTÜV	L2	2.2.2+/2.3.0	No	85	2006
Novara - milano	T.b.d.	T.b.d.	L2	2.2.2+/2.3.0	No	40	2009
Italian Network	Ansaldo	-			SCMT		In operation

Annex G National Safety Authorities – fact finding

This Annex gives for each country the original name(s) of the body that is appointed as or acts as the National Safety Authority (NSA) and its translation in English. Furthermore it gives a short description, with an emphasis on the administrative position of the body, relative to other players (but not if the NSA is the MoT). After that, information on tasks, resources and due process is given in as far as available.

For an explanation on the methodology of information collection and the sources used, please refer to section 4.1.

Austria - NSA

Bundesministerium für Verkehr, Innovation und Technologie /
Ministry of Transport, Innovation and Technology.

Tasks:

The situation reported in the ERA survey refers to the period before the RSD was implemented. Meanwhile it has been implemented (cf. section 2.1.2 and 2.1.3.1) and all tasks mentioned in art. 16 of the RSD are assigned to the NSA. Some of those tasks are assigned to local and regional authorities.

Resources:

The part of the Ministry acting as NSA employs 41 people. Furthermore the NSA can use external experts for temporary work, which can be about 10 to 15 manyears.

Due process:

We have just worked out a guidebook for safety certification and authorisation, which is just discussed with the sector and will be published afterwards (probably autumn 2007). In order to obtain a part A certificate, the RU has to show, amongst others, an SMS handbook and an SMS-Certificate from an accredited body and a license. There is a possibility for a RU to get a part B Safety certificate with reduced requirements, if the RU operates cross border only from the border to the next station.

Belgium - NSA

Federale Overheidsdienst van Mobiliteit en Vervoer, Dienst Veiligheid en Interoperabiliteit der Spoorwegen /
Service Public Fédéral de Mobilité et Transports, Service Sécurité et d'Interopérabilité des Chemins de Fer /
Federal Public Service Mobility and Transport, Service Rail safety and interoperability.

Tasks:

The situation reported in the ERA survey refers to the period before the RSD was implemented. Meanwhile it has been implemented (cf. section 2.1.2) and all tasks mentioned in art. 16 of the RSD are assigned to the NSA. The NSA has taken up these tasks from the 2nd of February 2007, so they are just starting to deliver the required documents, to develop the foreseen registers and safety rules and also to set up the obliged controls.

Resources:

On the first of May 2007 the NSA Belgium will employ twenty-three people and our goal is to have a staff of thirty people on a fixed basis. For some specific tasks we will employ on short term a safety consultant: the resources of the NSA Belgium for that purpose for 2007 is fixed on € 395.000. The NSA can also (temporarily) employ people from the main rail operator SNCB/NMBS[XXVII].

Due process:

The NSA has developed a Business Process Management Document and a Process Description Flow-chart for the delivery procedures of safety authorisation, safety certificate part A and safety certificate part B. They contain the following: scope; definitions; responsibilities; references and tools; used documents; indicators for control and detailed description of the sub-activities (trigger, input, how to handle, what to use, output).

Bulgaria - NSA

No information available.

[XXVII] E-mail from B. Debusschere, 21 September 2007.

Czech Republic - NSA

Drážni úřad /
Rail Authority.

This body is subordinated to the Ministry of Transport and financed from the state budget.

Tasks:

All tasks mentioned in art. 16.2 of the RSD are assigned to the NSA.
Decisions are based on document issued by NOBO.

Resources:

This question is difficult to answer exactly, because we have got many responsibilities defined by the national law, and we are also the regulatory body. I estimate the work for NSA at approximately 50 employees. The staff in the Rail Authority is 128. The plan of employees is recounted average once a year. It is possible to call an extra staff but we do not do it.

Due process:

The requirements for the safety certification off railway undertakings are defined by the decree of the Ministry of Transport which transposed the safety directive. The guideline for safety certification is being developed in ERA and we are waiting for a final version. We have issued only the safety certification for three small undertakings which did not require international transport.

Denmark – NSA

Trafikstyrelsen for Jernbane og Faerger /
National Rail Authority.

The National Rail Authority is an agency within the Danish Ministry of Transport and Energy. The National Rail Authority is responsible for planning and coordinating public transport, and is furthermore in charge of inviting tenders for operation of railway and ferry transport on behalf of the Danish Government. As the authority responsible for the public transport, the National Rail Authority is obligated to ensure compliance with the safety and interoperability regulations governing railway transport. Their purview includes the following functions:

- The government's railway authority, responsible for regulation, planning, safety and transport co-ordination nationwide and internationally.
- Adviser to the Ministry of Transport and Energy on matters relating to policy and strategic development of the transport sector.
- Putting out to tender the contracts for operation of railway and ferry services selected by the government.
- Administrator of the newly established education for future engine drivers.
- Collecting data and displaying statistical information regarding railway safety, punctually etc.

Tasks:

All tasks mentioned in art. 16.2 of the RSD are assigned to the NSA.

Estonia – NSA

Raudteeinspektsioon /
Estonian Railway Inspectorate.

The Estonian Railway Inspectorate is a governmental organisation under supervision of the Ministry of Economic Affairs and Communications of the Republic of Estonia that represents in fulfilling its tasks the State. The objective of the Railway Inspectorate is to perform national surveillance in the scope stipulated by the law and apply national enforcement in the railway field on the basis and in the scope stipulated in the law. The Inspection also carries the functions of the implementation agency of the European Union funds and performs, in the scope stipulated by the law, as the distribution organ of the railway infrastructure capacity. The Estonian Railway Inspectorate is an organisation in a rapidly changing economic environment, i.e. ongoing development and continuous specification of its role and tasks as a national regulator. The Ministry of Economic Affairs and Communications is, amongst others, responsible for Transport.

*Tasks**:***

As regards the tasks with respect to safety regulatory framework (art. 16.2.f), the Estonian Railway Inspectorate has no right to enforce legal acts. Safety regulations are enforced by the Minister of Economic Affairs and Communications. Supervising the national vehicle register is a task that is not yet performed, because the registers are not yet operational. Apart from this, all tasks mentioned in art. 16 of the RSD are assigned to the Inspectorate.

*Resources**:***

The Inspectorate employs 26 people. The NSA can call in extra staff on a temporary basis if needed.

*Due process**:***

The procedure is mainly stated in railway act and is as follows:

- Application and relevant documentation;
- Treatment 30 days, including:
- revising correctness of documents (reports about railway infrastructure facilities and their condition, profession certificates of workers);
- surveillance of railway infrastructure and documents that organize IM's or RU's daily work;
- inquiry of additional documents (if needed);
- decision making and delivery of safety certificate if RU or IM is able to manage its railway safely enough.

Checking the correctness of documents includes primarily the revision of profession certificates to identify if the worker has a competency to carry out his/her tasks. Also the correctness of reports that concern railway infrastructure facilities and their condition are checked during the surveillance of railway infrastructure. If some mistakes are observed the official protocols are composed and deadlines stated.

Finland – NSA

Rautatievirasto /
Järnvägsverket /
Finnish Rail Agency.

FRA belongs to the field of administration of the Ministry of Transport and Communications (MinTC). FRA is a new permanent Authority – it is independent from the Infrastructure Manager (Rail Administration) and rail operators. It started its activities 1 September 2006. The new Railway Act entered into force at the same time.

*Tasks**:***

All tasks mentioned in art. 16.2 of the RSD are assigned to the NSA.

*Resources**:***

There are about 35 civil servants working in FRA (Regulatory Body included). FRA can call in extra staff on a temporary basis (under budget limit) , but only occasionally and only a limited number of experts. The difficulty is that there are only a few experts available (specialized in rail safety and interoperability issues).

*Due process**:***

The process description is in drafting. FRA uses the application form proposed by Commission and registers the application in the archiving system. At least three staff members read the application and its appendices. Staff involved discuss the application and decide on suitable actions regarding any shortcomings and asking for further clarifications. Once all relevant disquisitions have arrived, the FRA deliberates and makes the decision. FRA sends the decision and certificate to the applicant.

France – NSA

Etablissement Public de Sécurité Ferroviaire (EPSF) /
French Rail Safety Authority.

The EPSF is the French rail safety authority that acts on behalf of the Ministry in charge of transport, and within the framework of national regulations. In creating the EPSF authority, the French state satisfied the need for a technical regulatory authority independent of railway operators. EPSF will accordingly be a major player in the liberalisation of the rail transport market. It will guarantee equitable treatment for operators, harmonized technical and operating safety conditions, and will contribute to the interoperability of European rail networks. Its work will contribute to promoting a safe, energy-efficient transport mode. EPSF was created the 5th of January 2006 and is fully operational since the1st of June 2006.

Tasks:

All tasks mentioned in art. 16.2 of the RSD are assigned to the NSA.

Resources:

To date (May 2007) 80 people were hired by EPSF. EPSF hopes to attain one hundred people or so by the end of the year. Although, according to its status as a public company, EPSF can hire consultants, it's not in its policy to do so. The aim of EPSF is to be self-sufficient.

Due process:

The working out of such procedures is currently in progress. The schedule is May 2007 for safety certificates and October 2007 for safety authorisations. The procedures aim at determining what are the answers expected by EPSF in an application dossier so as to comply with the rules in force.

Germany – NSA

Eisenbahn-BundesAmt (EBA) /
Federal Railway Authority.

The EBA is part of the Federal Administration. It is independent of the Ministry that is responsible for, amongst others, Transport (in German: Bundesministerium für Verkehr, Bau- und Stadtentwicklung) and, for that matter, independent of any other Ministry.

Tasks:

All tasks mentioned in art. 16.2, of the RSD are assigned to the NSA. There is however a question about the inspection task, which is part of item f in art. 16.2 (see section 2.1.3.4).

Resources:

1300 people (including many other tasks).

Greece – NSA

Υπουργειο Μεταφορών & Επικοινωνιών /
Ministry of Transport and Communications.

Tasks:

No information. Greece has not yet implemented the RSD.

Hungary – NSA

Nemzeti Közlekedési Hatóság (NKH) /
National Transport Authority.

The National Transport Authority was established by the Hungarian Government on January 1st, 2007. This central bureau is an independent organization supervised by the Minister of Economy and Transport.

Tasks:

All tasks listed in art 16.2 of Directive 2004/49/EC are performed by the National Transport Authority.

Resources:

More then 1800 people are working within the Hungarian NSA (NKH), but directly on the railway sector about 30 people. Currently the staff of the railway sector will be reinforced by the President.

Due process:

The NSA is working according to the regulation of the EN ISO 9001:2001. The NSA worked out an information letter for the RU's and IM's. The RU's and IM's hand their application on preprinted forms, and the procedure is concluded with a decision of the NSA.

Ireland – NSA

Coimisiún Sábháilteachta Iarnróid (CSI) /
Railway Safety Commission (RSC).

The principal functions of the CSI are to:
- Foster and encourage railway safety.
- Enforce the Railway Safety Act 2005 and any other legislation relating to railway safety.
- Investigate and report on railway incidents.

*Tasks**:***

All tasks mentioned in art. 16.2 of the RSD are assigned to the NSA. However, the National Rolling Stock Register is not established. RSC will use the model supplied by ERA, once it is available.

*Resources**:***

The number of people working for Railway Safety Commission is 9, consisting: 5 Inspectors including 1 Commissioner; 2 Administrators; 1 Inspector position vacant (1 consultant is temporarily assisting with rolling stock approvals). The RSC is free to buy in consultant support as required.

*Due process**:***

The statutory requirements are documented in Railway Safety Act, No 31 of 2005. The Safety Case guidelines indicate approach and information required to enable certification of safety management systems of Railway Undertakings and Infrastructure Managers. The Guidelines for the Design of Railway Infrastructure and Rolling Stock outline good practice. The guidelines attempt to identify the issues to be addressed to secure safety in design of infrastructure works and rolling stock for use on Irish railways. The Guidelines for the Safety Assessment of New Infrastructure Works & New Rolling Stock cover the process of safety authorisation.

Italy – NSA

Ministero delle Infrastrutture e dei Trasporti, Dipartimenti per i trasporti Terrestri,
Direzione Generale del Trasporto Ferroviario /
Ministry of Infrastructure and Transport.

*Tasks**:***

The IM, through a specifically identified function, performs, under the supervisory of the Ministry, many of the tasks of the national safety authority under the principles of the RSD, until an independent body is set (work is going on). The Italian legislation transposing the RSD. is not yet in force.

Latvia – NSA

State Railway Technical Inspectorate.

The State Railway Technical Inspectorate is a state administrative institution, subordinate to the Ministry of Transport in a form of supervision.

The State Railway Technical Inspectorate supervises all companies which are related to railway safety. They are infrastructure managers, railway undertakings, vehicle keepers, repairing services, etc.

*Tasks**:***

All tasks mentioned in art. 16.2 of the RSD, with the exception of f and g paragraphs, are assigned to the NSA.
(f): According to Latvia's legislation, State Railway Technical Inspectorate (SRTI) has no rights to issue safety rules. The rights to issue safety related rules are only the Cabinet of Ministers. It relates to every field, neither the Ministry of Transport nor Inspectorate has any authorization to issue safety related rules. The inspectorate monitors if national safety rules are applied in companies.
(g): Rolling stock registration into national register is the task of State railway technical Administration.
Note: The RSD requires the NSA only to supervise the registration.

*Resources**:***

According to staff–roll 22 persons are there. But at the moment 17 persons are employed, where 8 persons are involved in supervision work, three persons in certification work, two persons in developing of railway policy, two persons in railway statistics items and two in administrative work.
The Inspectorate can call an extra staff for consultation or expertise on temporary basis.

*Due process**:***

We have issued internal guidelines where the procedures are prescribed according to the certification rules. There are put registration requirements, proceeding, appealing, and revocation and withdrawal procedures.

A safety certificate shall be issued to carriers that meet safety requirements. Safety certificate includes the requirements of safety management system as well as information about validity period, area of use, and railway undertaking's data on rolling stock, staff and technological processes.
According to the rules, railway undertaking submits to Inspectorate application form and all relevant documents. Inspectorate examines documents. If some information is missing, it informs railway undertaking about missing information. If all documentation is in line with requirements, the package is sent to infrastructure manager. The SRTI issues a safety certificate, based on the findings of the railway infrastructure manager. The examination procedure takes one month.

Infrastructure managers and railway repairing companies must obtain a safety authorization (safety permit) issued by the State Railway Technical Inspectorate. Safety authorization (safety permit) includes the requirements of safety management system as well as information about validity period, area of use, and railway undertaking's data on rolling stock, staff and technological processes.
According to the rules, railway companies submit to Inspectorate application form and all relevant documents. Inspectorate examines documents. If some information is missing, it informs railway company about missing information. If all documentation is in line with requirements, the SRTI issues a safety authorization (safety permit). The examination procedure takes one month.

The SRTI has right to renew, prolong or revoke as safety certificate or safety permit. If a safety certificate or safety permit is revoked, the SRTI has to give a reason for that decision. The certificate is valid for 2 years. Safety authorization (safety permit) is valid for 5 years. For safety authorizations (safety permits) there are transitional period for what time the companies must obtain safety authorizations (safety permits).

Lithuania – NSA

State Railway Inspectorate.

The State Railway Inspectorate is related to the Ministry of Transport and Communications.

*Tasks**:***

All tasks mentioned in art. 16.2 of the RSD are assigned to the NSA.

Luxembourg – NSA

Ministère des Transports / Ministry of Transport.

*Tasks**:***

No information. Luxembourg has partly implemented the RSD.

Netherlands – NSA

Inspectie Verkeer en Waterstaat /
Transport and Water Management Inspectorate.

The Transport and Water Management Inspectorate is part of the Ministry for Transport. It monitors and promotes the safety of transport by road, ship, air and rail. The inspectorate helps ensure that the Netherlands are safe, liveable and accessible with as few accidents, incidents and instances of environmental pollution as possible.

*Tasks**:***

All tasks mentioned in art. 16.2 of the RSD are assigned to the NSA.

Norway – NSA

Statens Jernbanetilsyn /
Norwegian Railway Inspectorate.

The Norwegian Railway Inspectorate is the practical control and supervisory authority for rail traffic, which also includes tramways and underground in Norway. The Norwegian Railway Inspectorate directs its efforts towards ensuring that rail traffic is operated in a safe and appropriate manner in the best interests of passengers, rail company employees and the general public. The Inspectorate is responsible for ensuring that rail operators meet the conditions and requirements set out in rail legislation that governs the traffic. The authority is also responsible for drawing up regulations, awarding licenses for rail activity and approving rolling stock and infrastructure.

The Inspectorate is separate from the Ministry of Transport and reports to it. The inspectorate sets program and priorities comprising input from the MoT. The MoT does not interfere with individual cases. This works well.

*Tasks**:***

All tasks mentioned in art. 16.2 of the RSD are assigned to the NSA, except point g: supervision of rolling stock registration. The register is currently being established.

Resources:

30 people (including tram and light rail).

Poland – NSA

Urzad Transportu Kolejowego (UTK) /
Railway Transport Office.

The UTK performs all the tasks mentioned in art. 16.1 of the Safety Directive. It is independent from all other players in the railway sector. Before UTK came into existence, inspection tasks were performed by the Main Inspection for Railways within the Ministry of Transport (MoT). Most of UTK's employees used to work there.

*Tasks**:***

All tasks mentioned in art. 16.2 of the RSD are assigned to the NSA.

Resources:

149 people.

Portugal – NSA

Instituto da Mobilidade e Transportes Terrestres – IMTT /
Institute of Mobility and Land Transport.

By Decree-Law 147/2007 of 27th April, a new entity called IMTT was created at 1st of May 2007, which will be in charge of all modes of land transport. Transferring the functions from INTF (Instituto Nacional do Transporte Ferroviário, the former Portuguese rail regulator) to IMTT is now in progress (information given in May 2007).
The IMTT will be the NSA for railways and the road regulatory body. It will be an independent entity within the Ministry of Transport.

*Tasks**:***

All tasks mentioned in art. 16.2 of the RSD are assigned to the NSA.

*Due process**:***

INTF, which is the predecessor of the newly created IMTT, has procedures for handling applications for safety certificates that can be found on its website (www.intf.pt). A brief description of these procedures, provided by an INTF employee, states that applications will be handled in conjunction with the infrastructure manager and that INTF will decide within 30 days after receiving all information. A certificate will be granted to companies that comply with legal safety requirements and demonstrate that they have:

- competent staff;
- authorised rolling stock;
- an adequeate safety management system, ensuring compliance with national operating rules;
- adequate procedures for their services and operations.

Romania – NSA

Autoritatea de Siguranta Feroviara Romana (ASFR) /
Romanian Railway Safety Authority.

It is part of Autoritatea Ferroviara Romana (AFER), the Romanian Railway Authority.
AFER has 4 branches (institutions):
1. Railway Safety Authority
2. Notified body
3. Licensing body
4. Investigation body
For financial reasons, they are under one umbrella. It is detached from the MoT and reports to the MoT, which is the supervisor. The MoT gives general guidance on tasks, but does not interfere with individual cases. AFER is self-financing, i.e. gets paid for its activities such as licensing, inspection and testing.

*Tasks**:***

All tasks mentioned in art. 16.2 of the RSD are assigned to the NSA.

*Resources**:***

157 People work within the Romanian Railway Safety Authority (ASFR Autoritatea de Siguranta Feroviara Romana). It cannot call in extra staff externally.

*Due process**:***

The procedures are laid down in the Minister of Transports, Constructions and Tourism's Order No. 343/19.09.2003 on the approval of the Norms for granting of safety license and certificate, in view of carrying out public and/or private railway transport services on the Romanian railways, as well as for granting of shunting operation certificate and authorisation to the economic agents carrying out only railway shunting operations, modified by Minister of Transports, Constructions and Tourism's Order No. 830/12.11.2003 and by Order of Minister of Transports, Constructions and Tourism no. 2270/09.12.2004.
It stipulates that public and/or private rail transport services on the Romanian railways may be provided only by the operators that possess rail transport license and safety certificate. In this view it contains norms for granting of railway transport license in view of carrying out public and/or private railway transport services on the Romanian railways, specifying the manner of granting and validity of the rail transport license, as well as their suspension and revocation.

Slovak Republic – NSA

Úrad pre Reguláciu Železničnej Dopravy (URZD) /
Railway Regulatory Authority.

The URZD is related to the Ministry of Transport, Posts and Telecommunications.
Railway Regulatory Authority (ÚRŽD) is an independent state administration body in the field of railroads, rail investigation body, rail safety authority, national regulator and a pricing authority in the field of national and regional railroads, acting in accordance with the Act on the Railroads.
URZD is a budgetary organization. It is through the financial relations coupled with the state budget by means of a budgetary chapter of the Ministry of Transport, Posts, and Telecommunications.
Chairman of the URZD acts as the body of appeal against the decisions of the Railway regulatory section, Safety and the state supervision on the railroads section, and State technical professional supervision and monitoring section. Chairman decides on the bases of the special committee proposal.

*Tasks**:***

All tasks mentioned in art. 16.2 of the RSD are assigned to the NSA, except:
f) national safety rules system is managed and provided by the Ministry of Transport, Posts, and Telecommunications, and:
g) final details form the ERA are needed to provide the national vehicle register.

*Resources**:***

There are 68 persons working with the URZD. So far, 10 people deal with the issues of safety (including interoperability and accident investigation). We do not foresee to employ the extra staff on temporary basis in the field of safety.

*Due process**:***

There is a system for issuing the safety certificates to the transporters; this system is gradually being completed/developed. The aim is to publish this system on the URZD web page.
By now, no safety authorizations have been applied for at the URZD.

The applicant for the safety certificate shall submit the application to the URZD. The application shall contain the following items:
1. business name, residence, legal form
2. first name, family name, address of person (persons) which are statutory body thereof
3. description (data) on internal organizational structure and organization management system
4. description (data) on safety management system of the railroad transport operation, including the assignation of duties in a case of an accident or an extraordinary event
5. designation of the railroad (or its part) which shall be operated
6. type of transport and scope of the services provided by the carrier
7. information on license (if it has been granted)

Other specified documents have to be submitted to support the application. The validity of the documents is verified based upon the URZD decision.

Slovenia – NSA

Javna agencija za železniški promet Republike Slovenije /
Public agency for rail transport of Republic of Slovenia

The Public agency for rail transport of Republic of Slovenia is an independent corporation of public law, which performs professional, technical, developmental and some administrative and monitoring tasks in the field of transport according to provisions regulated by the Railway Transport Act, Safety Railway Transport Act and Resolution of the Foundation of the Agency.

As a result of the new law, which has recently been adopted to implement the RSD, the existing Public Agency for Rail Transport will be split into two parts of appr. the same size: one for investment, within the Ministry and one for safety, capacity allocation and charging, outside and supervised by the Ministry. A part of this latter entity will be the National Safety Authority. In the new Law the Regulatory body is mentioned. The tasks of this body will be executed by the Ministry (?).

*Tasks**:***

In the current situation the Public Agency acts as NSA, covering all tasks except points f and g.
The newly formed NSA will perform all tasks of art. 16 of the RSD, except point f (monitoring etc. regulatory framework) which is not totally clear and point g (registers) because the register is not operational yet. Point g will be covered in due course.

Spain – NSA

Ministerio de Fomento /
Ministry of Transport and Public Works.

*Tasks**:***

The granting of safety certificates for RU's is done by ADIF, the Spanish infrastructure manager. The granting of safety authorisation for the infrastructure manager is not operational yet. Apart from this, all tasks mentioned in art. 16 of the RSD are assigned to the NSA.

Sweden – NSA

Järnvägsstyrelsen /
Swedish Rail Agency.

The Swedish Rail Agency is an independent government agency responsible for matters in accordance with the new Railway Act (2004:519) and the law on underground and street tram safety (1990:1157). The Swedish Rail Agency has taken over the responsibilities and tasks of the Swedish Railway Inspectorate concerning safety in the railway, underground and tram systems.
It performs all tasks of art. 16 and is outside of the MoT. Each year, the MoT determines the budget and gives an outline for the main tasks to be performed and the focus. It does not interfere with individual cases, but if it receives complaints from the actors in the sector, it may correct the Agency, but only in longer time-period. Any interference in a specific matter is actually forbidden by other Swedish laws and regulations. The Agency is also the regulator for competition.

*Tasks**:***

All tasks mentioned in art. 16.2 of the RSD are assigned to the NSA.

Resources:

55 people (including trams and subways).

Switzerland – NSA

The Federal Office of Transport (FOT) /
Bundesamt für Verkehr (BAV)

The FOT is subordinated to the Federal Department of Environment, Transport, Energy and Communication DETEC.

Tasks:

The FOT is responsible for the implementation of the traffic policy of Switzerland within the area of public transport. This policy has been adopted by Swiss citizens in several public votes. It is concerned with railways, funiculars, buses or ships and for goods traffic on the rail. All tasks listed in art. 16.2 of Directive 2004/49/EC are performed by the FOT. However, Switzerland has not yet transposed the 1st and 2nd railway package into Swiss law. Therefore Switzerland might not fulfill exactly Directive 2004/49/EC. In principle, the FOT is responsible for all safety relevant issues and is therefore performing basically all tasks referenced in art. 16.2 of Directive 2004/49/EC. Exception: The process of issuing safety authorizations for infrastructure managers has not started yet.

Resources:

The FOT has about 250 employees in total. The FOT Safety Authority includes the FOT Director and three FOT divisions: Supervision, Infrastructure and Safety Technology. In addition, there is a staff unit called Safety Risk Management (SRM), which reports directly to the FOT Director. In these divisions about 100 employees are dealing with safety tasks. However, one has to keep in mind that, on a rough estimation, only two thirds are dealing with systems scoped in the Directive 2004/49/EC. Approximately one third of the 100 employees are performing safety tasks for meter gauge railways, cableways, boats and busses.

Due process:

The safety certificate procedures are documented in the ‘Leitfaden Netzzugang – Netzzugangsbewilligung und Sicherheitsbescheinigung’. The procedure for the safety authorization is not yet documented.

United Kingdom – NSA

Office of Rail regulation (ORR).

The ORR performs all the tasks mentioned in art. 16.1 of the Safety Directive. It also has the role of economic regulator for the railways. Her Majesty's Railway Inspectorate (HMRI), which came into existence in the 1840's, is now part of ORR.

*Tasks**:***

All tasks mentioned in art. 16.2 of the RSD are assigned to the NSA.

Resources:

370 people (including other regulatory tasks).

*Due process**:***

The DfT has produced an extensive guidance document on the RSD. This includes details on information to be provided with applications and how they are handled.

Annex H National Investigation Bodies – fact finding

This Annex gives for each country the original name of the body that is appointed as or acts as the National Investigation Body (NIB) and its translation in English. Furthermore it gives a short description, with an emphasis on the administrative position of the body, relative to other players (but not if the NIB is the MoT). After that, information on scope, resources and due process is given in as far as available.

For an explanation on the methodology of information collection and the sources used, please refer to section 4.1.

Austria - NIB

Unfalluntersuchungstelle des Bundes (UUB) /
Federal Accident Investigation Body.

The UUB is positioned within the Bundesanstalt für Verkehr (Federal Traffic Institution), which is part of the Ministry of Transport, Innovation and Technology. Under the name 'Dach VERSA' (Verkehrssicherheitsarbeit für Österreich), also accidents concerning road traffic, aviation, shipping and cable lifts are investigated. The investigations of the UUB are independent of judicial inquiries. The UUB was established by new legislation which is in force as of 1 January 2006.

Scope[XXVIII]:

Accidents and incidents are investigated by the NIB when their cause is not clear or when it is expected that insights can be gained with respect to prevention of accidents. An accident is defined as a collision, derailment, or any event that has led to a fatality, severe injury or serious damage to rolling stock, infrastructure or the environment, and has affected railway safety.

Resources:

The NIB-railway has at the moment 9 persons and can ask for temporary experts, if needed.

Due process[XXIX]:

There is a regulation ("Meldeverordnung") which accidents and incidents have to be reported. The principles and procedures for an investigation are fixed by law, covering such issues as impartiality, secrecy, involvement of experts, investigator's competences, documentation, reporting (including the opportunity for those involved to comment on a draft) and recommendations.

[XXVIII] Text compiled by the authors on the basis of Austian legislation
[XXIX] Idem dito.

Belgium – NIB

Federale Overheidsdienst van Mobiliteit en Vervoer /
Service public fédéral Mobilité et Transports /
Federal Public Service Mobility and Transport.

An investigation body is created by transposition of the European directive on security in the railways and this body is integrated within the FPS Mobility and Transport. This new organisation works functionally independent from every other institution of the FPS Mobility and Transport or of the railway sector.

Scope:

Only the serious railway accidents and those accidents which under slightly different circumstances could have led to a serious accident are investigated by the NIB. This is in fact the minimum requirement of the directive. The body investigates only railways accidents.

Resources:

It is composed of two investigators (for the moment only one investigator is really on charge) and can, if necessary, make appeal on external experts.

Due process:

The investigation body has not documented its procedures, because it has just started its activities. The aim is to elaborate clear procedures, in as far as possible.

Bulgaria – NIB

No information available.

Czech Republic – NIB

Drazni Inspekce /
Rail Safety Inspection Office.

The Rail Safety Inspection Office is an independent state body which investigates rail accidents and incidents and performs state supervision of the whole Czech rail system.
Note: both NSA and NIB carry out state supervision on operations.

Scope:

NIB investigates all categories required by the safety directive and most of accidents at the level crossing. It must investigate accidents of which the consequences are at least 1 fatality or 5 injured or damage more then 5 million CZK. It can investigate (and it often does) other accidents, for example on request of RUS or repeated events or when it is caused by a systematic mistake in the safety system. The NIB also can (not must) investigate accidents at tramways and funicular railways.
The Czech Railways as an infrastructure manager has a department responsible for investigation of accidents. They investigate all more serious accidents (but not for example a derailment of a wagon during shunting without any consequences). There is discussion, if it is necessary to double the investigation process in the case that an investigation by the NIB is not required by law.

Resources:

The staff is approximately 64.

Denmark – NIB

Havarimyndighed for luftfart og bane /
Accident Board for Aviation and Railways.

This is an agency within the Danish Ministry of Transport and Energy. It is independent from the Safety Authority. It is a multi-modal investigation body: rail and aviation.

Resources:

4 investigators

Estonia – NIB

The Emergency Management Department was established in 2003. Since 31 March of 2004 it is established as a structural unit of the Ministry of Economic Affairs and Communications for organisation of the investigation of railway accidents or railway incidents (investigation unit). There was engaged in investigation of railway accidents one executive officer at the Emergency Management Department. The executive officer performs the function of investigator-in-charge and he is obliged to perform all tasks of NIB.

The Emergency Management Department is an integral department of The Ministry of Economic Affairs and Communications. Head of the Emergency Management Department is subordinated to the chancellor of Ministry. Employees of the Emergency Management Department are civil servants and work for the Ministry. The Investigation unit shall be independent in its investigation-related decisions. Tasks of Emergency Management Department are divided in separate directions:

1. risks analysis;
2. crisis management or regulating;
3. air accident investigation;
4. railway accident investigation.

Scope:

Since 2004 has the NIB investigated level crossing accidents, derailments and other accidents. There have not happened any serious accidents in Estonia (SD Article 3). The NIB may investigate all accidents, incidents and other occurrences.

Resources:

The investigation unit (NIB) has the right to engage experts in the investigation and submit proposals to the Minister of Economic Affairs and Communications for establishment of investigation commissions. Institutions associated with the investigation are required, within the limits of their competence, to provide the necessary assistance to the investigation unit, members of investigation commission, or experts.

Due process:

Procedures for carrying out investigations are generally documented in Railways Act of Estonia.

The investigation unit, investigation commissions and experts have the right to access the location of the railway traffic accident or railway incident, the rail vehicles associated with the accident or incident, railway infrastructure, traffic control equipment, and signalisation equipment. The investigation unit, investigation commissions and experts shall also have the right to question all persons who have information important from the viewpoint of the investigation and to access independently or in co-operation with and institution conducting criminal investigation all information and documents to the case.

Finland – NIB

Onnettomuustutkintakeskus /
Centralen för undersökningar av olyckor /
Accident Investigation Board of Finland

The Accident Investigation Board is a permanent and an independent multimodal accident investigation body. The body consists of at least two permanent investigators (in each branch mentioned above) able to perform the function of investigator in charge in the event of an accident or incident.
The Accident Investigation Board of Finland is located within the Ministry of Justice and investigates all major accidents regardless of their nature as well as all aviation, maritime and rail accidents and their incidents. The allocations granted for the operation of the Accident Investigation Board of Finland and its investigation of accidents and incidents are included in the state budget under its main division of the Ministry of Justice.

Scope:

Rail accident investigation is conducted in following cases:

- Accident in train traffic;
- Hazardous situation in train traffic;
- Accident in shunting work in railways, if a person is deceased or seriously injured;
- Accident in shunting work in railways, if it is related to transportation of dangerous goods;
- Underground or tram accident, if several persons have been deceased or seriously injured or there is other special safety related reason for the investigation.

Accidents on level crossings are not investigated by Accident Investigation Board, except fatal accidents and the accidents in which a train has derailed or a passenger or a train crew member is deceased or injured seriously.

Resources:

Fixed staff of AIB is 11 persons (Director, administrative director, 7 investigators and 2 assistants).
AIB can in temporary bases hire extra investigators and experts to the investigations, AIB has budget for:

- the permanent body and staff,
- the investigations, this is estimated appropriation (flexible).

Due process:

AIB has Quality manual, Operation manual and Rail accident investigator's handbook. The Railway Act of Finland is available.

France – NIB

Bureau d'Enquêtes sur les Accidents de Transport Terrestre (BEA-TT) /
Land Transport Accident Investigation Bureau.

The BEA-TT is related to the Ministry of Infrastructure, Transport and Tourism. The BEA-TT deals with railway transport, urban guided transportation systems (underground, tramcars), cable haulage systems, road transport (notably heavy goods vehicles and public transport by coach and bus) as well as navigable waterways. In the event of transport accidents, a two-fold investigation approach is required: a judiciary inquiry to identify liabilities and, if necessary, determine compensations for the victims, and a technical investigation to prevent similar occurrences. A technical investigation is necessarily separate from a legal inquiry. Based on experience, it became apparent that a legal status was required for such technical investigations, in order to guarantee to all investigators access to sites, recordings and information covered by non-disclosure of pre-trial information or professional confidentiality. The Act of 3 January 2002 has supplied the legal basis for all technical investigations. It provides for such investigations to be carried out by permanent specialised bodies and for these bodies to have the right of access to all elements useful to an investigation, even those covered by non-disclosure of pre-trial information, and medical or professional confidentiality. The Act also reaffirms the principles of both investigators' independence and publishing of the final report. However, the decision to launch a technical investigation comes from the Minister for Transport. The Decree of 26 January 2004, published pursuant to this Act, officially founded the BEA-TT. From the beginning, it was granted financial means to discharge its missions and ensure its independence.

Scope:

In France the decision of an investigation is decided by the Minister of transportation, on his own or on proposal from the head of BEA-TT. The head of BEATT has a delegation from the Minister.

Resources:

In 2004, BEA-TT was authorised a staff of 10 people. It is written down in BEATT status that it can hire short term experts, independent or from any organisation. These experts are paid on the Ministry of transportation’s budget, without a determined part being set.

Due process:

The NIB follows recommendations from ERA on the investigation report template but has no procedures for carrying out investigations. However, decree 2004-85 of 26 January 2004 (see also par. 2.1.3.3) holds provisions with respect to such issues as information duties, organisation, competences, international co-operation, opening an investigation, staff, publication and follow-up of recommendations.

Germany – NIB

Bundersministerium für Verkehr, Bau und Stadtentwicklung /
Ministry of Transport, Construction and Urban development.

This Ministry can on a case by case basis delegate all investigation activities to the Eisenbahn-BundesAmt (EBA - Federal Railway Authority). Within the EBA, there is a staff unit for accident investigation.

Scope:

The Ministry investigates serious accidents as defined in art. 3(l) of the RSD and other incidents that could have led to serious accidents. EBA investigates other incidents, and can carry out investigation activitiies for serious accidents when charged by the Ministry.

Resources:

5 accident investigators and specialists who can be called in to support the investigation.

Greece – NIB

Federal Railway Authority.

The Federal Railway Authority is related to the Hellenic Ministry of Transport and Communication.
An investigation board is going to be established. It will be a permanent and independent body.

Resources:

3 permanent board members. The board will be able to train investigators. An office will be established for secretarial support.

Hungary – NIB

Közlekedésbiztonsági Szervezet (KBSZ) /
Transportation Safety Bureau (TSB).

This body employs at least one investigator who is able to perform the function of investigator in charge in the event of an accident or incident. KBSZ was founded on 01.01. 2006. This is an independent multimodal organisation.

KBSZ is a part of the Ministry of Economy and Transport, but it is an independent and separated organisation. Under the Hungarian law, KBSZ cannot be instructed in the investigation by the Transport Ministry or Minister and other organization. KBSZ provides and publishes final reports on the investigations. NSA – Nemzeti Közlekedési Hatóság/National Transportation Authority – is also a part of the Ministry of Economy and Transport.

Scope:

Under the Hungarian law, KBSZ has to investigate accidents and serious incidents and can investigate any other occurrence if it is needed in its concern. KBSZ is responsible for the investigation of aviation, railway and marine accidents and serious incident.
KBSZ has 3 departments for the investigation:
- aviation department;
- railway department;
- maritime department.

Resources:

The KBSZ has 13 investigators for rail, both technical and organisational. It is permitted to involve external specialist if that is needed.

Due process:

KBSZ has investigation manuals for all modes of transport. These manuals follow the international requirement.

Ireland – NIB

Coimisiún Sábháilteachta Iarnróid (CSI) /
Railway Safety Commission (RSC).

The principal functions of the CSI are to:

- Foster and encourage railway safety.
- Enforce this Act and any other legislation relating to railway safety.
- Investigate and report on railway incidents.

The RSC will include a Railway Incident Investigation Unit, which will be functionally independent of the Commission. The Unit may, as part of its investigation of a railway accident, investigate the role and decisions of the Commission, as safety regulator, leading up to the incident. The Chief Investigator will be selected by the Public Appointments Service and appointed by the Minister. The Chief Investigator will in turn appoint all staff of the Investigation Unit.

Scope:

Serious accidents must be investigated. Investigations by Railway Undertakings of other accidents or incidents with high potential are being tracked.

Resources:

Currently we have one member of staff, i.e., Chief Investigator, appointed on 1st April 2006. The NIB may call upon an Inspector or another suitably qualified person to undertake an investigation.

Due process:

The development of the documentation of the RSC is work-in-progress.

Italy – NIB

Railway Safety Commission.

The Railway Safety Commission is related to the Ministry of Infrastructure and Transport.

Scope:

An investigation is undertaken when there are fatalities, serious damage or significant public interest.

Resources:

The Commission is drawn from a list of professional engineers, universities, RU's and the IM.

Due process:

Until the NIB is established, the Ministry of Transport has issued guidelines based on the RSD for rail incident enquiries.

Latvia – NIB

Aircraft Accident and Incident Investigation Bureau Republic of Latvia (AAIIB).

The State Railway Technical Inspectorate (SRTI) has carried out investigations so far.
In December 2006, it was decided to add a branch for railway accident investigation to the organisation now called AAIIB.

SRTI does investigation of train and shunting operation accidents, which are serious, on the request of National Investigation Body (NIB)). Participation in investigation of serious accidents that have occurred on railways is done on the request of NIB. Occurrences of violations are under of responsibility of SRTI. Inspectorate investigates these minor accidents.

Scope:

The Aircraft Accident and Incidents Investigation Bureau (AAIIB) have rights to:

- investigate serious train and shunting operation accidents (if the consequences of accidents are beyond 2,000,000 EUR) ;
- take decisions to investigate another accidents which could have been inimical influence to safety movements, society, etc and could lead to serious accidents, including technical failures in the structural subsystems. These accidents could be train derailments, train collisions, accidents on level crossings, rolling stock fire, etc.

Resources:

Within AAIB, two investigators for the railways are nominated. AAIIB can call in extra staff (teaching staff from Railway Institute and other railway experts) for expertises, according to the Cabinet Regulation No 393 adopted 27.03.2007.

Due process:

Procedures for carrying out investigations are prescribed in the Cabinet Regulation No 393 adopted 27.03.2007 (according to the Safety directive's requirements).

The steps in the procedures are as follows:

- Information of accident;
- Summary of railway staff and other witnesses of testimonies;
- Information of the safety management system and safety documentation;
- Man-machine- organisation interface;
- Previous occurrences of a similar character;
- Analysis and conclusions;
- Recommendations.

Lithuania – NIB

State Railway Inspectorate.
The State Railway Inspectorate is related to the Ministry of Transport and Communications.

Luxembourg – NIB

Ministère des Transports /
Ministry of Transport.

The investigation body, created in 2003, is multi-modal; rail, air and marine. It works under the umbrella of the MoT, but its members are not employed by this Ministry.

Resources:

The members of the investigation body can fulfil the task of investigator or external investigators can be charged.

Netherlands – NIB

Onderzoeksraad voor Veiligheid (OVV) /
Dutch Safety Board.

The OVV is a statutorily established autonomous agency. The OVV was established in 2005. Prior to 2005, the response to disasters and serious accidents depended on the public sector in which they occurred. The Dutch Transport Safety Board was concerned with investigating transport accidents. The OVV consists of the Board (permanent and special board members) and a professional Bureau. The OVV decides on launching investigations and is responsible for the investigation process and the subsequent reports.

Scope:

The OVV conducts investigations into the possible causes of disasters, serious accidents and other incidents in all policy sectors.

Resources:

3 rail investigators.

Norway – NIB

Havari Kommisjonen /
Accident Investigation Board Norway.

The Norwegian Accident Investigation Board is a government-funded investigation board. It is independent from the MoT and directs its recommendations through the MoT to the IMs, RUs, and the NSA. For example: the NIB could recommend that the IM should introduce a speed restriction, but the NSA will be the authority to decide if this recommendation from the NIB shall be mandatory. There are no problems known with respect to organising accident investigation and interpreting the criteria of the Directive on the need for investigation. The purpose of the investigations is not to apportion blame and liability.
Combining accident investigation for rail with other modes of transport in one organisation is efficient and helps cross-fertilisation to a certain degree, e.g. staff from different units may in some cases be deployed for a rail accident investigation.

Scope:

The Board's task is to investigate accidents and incidents within the aviation, railway and road sectors (including underground railways and tramways).

Resources:

1 part time and 4 full time investigators.

Poland – NIB

Urzad Transportu Kolejowego (UTK) /
Railway Transport Office.

UTK is the National Safety Authority. It performs all the tasks mentioned in art. 16.2 of the Safety Directive. It is independent from all other players in the railway sector. Before UTK came into existence, inspection tasks were performed by the Main Inspection for Railways (in Polish: Głowny Inspektorat Kolejnictwa - GIK) closely connected with the Ministry of Transport (MoT). Most of UTK's employees used to work there.
For the moment UTK is also entitled to perform the function of investigator-in-charge, referred to in art. 21.1 of the RSD. This effectively means that UTK is the permanent body for investigation of accidents and incidents, referred to in that same article.
This is however a temporary state, as changes in railway act have already been voted by parliament in view of RSD in 2006. As a result of those changes a new body "State Railway Accidents Investigation Committee" (in Polish: Panstwowa Komisja Badania Wypadków Kolejowych) will be established to deal with railway accidents and incidents investigations. This State Committee did not start work, as the required transport Minister decrees are not yet finalised. They are at the latest stage of the legal procedure so the State Railway Accidents Investigation Committee should be working in two-three months. Note: this information was given in March 2007.

Resources:

Nowadays when an investigation needs to be done, experts can be recruited at liberty, i.e. from all organisations where railway expertise is available, except those that are in some way involved in the accident or incident to be investigated. Experts can also be recruited from abroad.

Due process:

Detailed rules for the State Railway Accidents Investigation Committee are under preparation.

Portugal – NIB

Gabinete de Investigaçao de Segurança e de Acidentes Ferroviários (GISAF) /
Investigation body of railway safety and accidents.

The legislation establishing this body is expected soon (note: this information was given in May 2007). It will deal with railway accidents, incidents and other safety related events. It will be an independent entity within the Ministry of Transport. So far, accident investigation was a task of the *Instituto Nacional do Transporte Ferroviário (INTF)*, the Portuguese rail regulator.

Due process:

INTF, which is the predecessor of GISAF, the new investigation body to be created, has procedures that cover the following stages:

- selection of occurrences and opening the investigation, including setting up the Technical Investigation Committee;
- collection of information and analysis, including interaction with involved parties;
- reporting, including opportunity for involved parties to give their opinion;
- monitoring follow-up of recommendations.

Romania – NIB

Organismul de Investigare Feroviar Roman (OIFR) /
Romanian Railway Investigation Body.

It is part of Autoritatea Ferroviara Romana (AFER), the Rumanian Railway Authority (see Annex G).
OIFR has 2 departments: 1 for accident investigation and 1 for technical faults investigation.
In 2007, 2 accidents have been already investigated.

Scope:

The Romanian Railway Investigating Body (OIFR) is carrying out investigations of serious accidents on the railway system, the objective of which is improvement of railway safety and the prevention of accidents; in addition to serious accidents, the Romanian Railway Investigating Body may investigate those accidents and incidents which under slightly different conditions might have led to serious accidents, including technical failures of the structural subsystems or of interoperability constituents of the trans- European high-speed or conventional rail systems.

Resources:

It has a total fixed staff of 8. No extra staff can be called in.

Due process:

This is under way.

Slovak Republic – NIB

Úrad pre Reguláciu Železničnej Dopravy (URZD)/
Railway Regulatory Authority.

The URZD is related to the Ministry of Transport, Posts and Telecommunications.
This body employs at least one investigator who is able to perform the function of investigator in charge in the event of an accident or incident. Besides, the relevant system documentation is being prepared at the present.
This is the "Investigation unit" in the "Safety and the state supervision on the railways, special track and cable ways department, railway accident investigation". This department forms a part of the "Safety and the state supervision on the railroads section".

Scope:

According to the valid legislation, the NIB investigates the causes and circumstances of the railway accidents in collisions of rail vehicles or rail vehicle derailments resulting in:

- the death of one or more persons;
- serious injury of five or more persons;
- material damage over 2,000,000 EUR;
- other accidents based on the URZD decision.

Resources:

Two persons are employed within the investigation unit at this moment. The NIB may ask railroad operators (infrastructure managers), railroad transport operators (carriers) for cooperation, and may ask other bodies for relevant documents, analysis, and expertise. In order to investigate given accident, the URZD appoints the investigation committee. The main investigator is appointed by the MDPT SR.

The finance resources are managed in accordance with the allocated resources for the URZD. In special cases, the costs will be negotiated with the Ministry of Transport, Posts, and Telecommunications on individual bases.

Due process:

Procedures for carrying out investigations are being prepared. The procedures contents in brief:

- Introduction
- Definitions
- Aims of the investigation body
- Competence
- Legal reference
- Information system
- Specific investigation procedure
- Documentation

Slovenia – NIB

Investigation of accidents and incidents is until now done within the Railways. Now that the legal foundation has been laid, the establishment of an independent Accident Investigation Body is expected before 1 August 2007. This body will be the only one to investigate railway accidents and incidents. It is not concerned with other modes of Transport. The NIB is going to be an independent unit within Ministry of Transport. Financial means will be provided by the State Budget.

Spain – NIB

Ministerio de Fomento /
Ministry of Development

This Ministry is also responsible for Transport and Public Works.
Current Spanish law requires a commission of 3 bodies: RU, IM and Ministry of Development.
The IB is not yet completely independent. It is functionally independent, but staff belongs to the Ministry of Development. A new law will provide independence.

Resources:

2 persons, assisted by 8 persons from an independent (?) group.

Sweden – NIB

Statens Haverikommission (SHK) /
Swedish Accident Investigation Board.

The SHK is a state authority reporting to the Ministry of Defence. The SHK was established in 1978.

Rail accident investigation used to be a task for the Inspection (SRA, which was formed in 1998 with the separation of the Swedish State Railways into two different companies, one for infrastructure and one for railway undertaking). Now the investigation is done either by the SRA, for smaller accidents, or by the SHK for larger accidents. In practice, the SHK does the investigation for all of the accidents already, but for the smaller ones the precise demand has not yet been formally transferred. Sometimes the SHK asks the SRA to do an investigation because they have no capacity themselves. This will change at the 1st July 2007 when the Investigation of accidents law is changed due to the amendment of the Railway law. From that date only SHK will perform accident investigations.

Scope:

Initially, SHK investigated only accidents involving civil and military aircraft. Since 1990, all types of serious accidents are investigated, whether they occurred ashore, at sea or in the air. The seriousness of the accident determines whether the SHK will investigate. However, there are specific situations in which the law dictates that an investigation is always carried out. The SHK is obliged to investigate transport accidents and can also investigate other accidents.

Resources:

The SHK employs 16 chief investigators and must often engage external experts for assistance. They have a fixed staff for all of the duties of the board of about 20 and can call in additional experts from a list of around 100. For rail there is one full time and one part time investigator.

Switzerland – NIB

Investigation Bureau for Railway, Funicular and Boat Accidents (IRFBA).

IRFBA is an independent body subordinated to the General Secretariat of the Federal Department of Environment, Transport, Energy and Communication DETEC. The IRFBA started its activities as National Investigation Body in the year 2000.

Scope:

The IRFBA examines all accidents with personal injuries or larger damage to property (more than Euro 60'000), heavy incidents as well as threatened and executed acts of sabotage with railways, funiculars, tramways and ships.

Resources:

The IRFBA consists of four persons. If necessary, eight standing external experts can be called in. The budget of IRFBA allows to have external independent expert judgements, services of test centers etc.

Due process:

The IRFBA has documented its procedures for carrying out investigations. Relevant events are to be announced immediately to the REGA alarm office. REGA is the Swiss airborne rescue service. Due to the first telephone clarifications the IRFBA decides whether an investigation is introduced, an appropriate investigation executed and a final report provided.

The task of IRFBA is to find out the cause(s) of an accident or incident. It does not deal with the penal aspects of an accident or incident. When necessary, the IRFBA issues safety recommendations to the FOT Safety Authority. On the basis of these recommendations, the FOT Safety Authority will either take appropriate action or will provide the IRFBA with its reasons for not taking action.

United Kingdom – NIB

Rail Accident Investigation Branch (RAIB).

Within the Department for Transport, there is a Directorate for investigation of transport accidents. The RAIB is part of this Directorate and reports directly to the Secretary of State for Transport. The RAIB was established by the Railways and Transport Safety Act 2003. The RAIB is independent of the railway industry, safety regulators and prosecution bodies. The powers of the RAIB and its Inspectors - and the framework for reporting and investigating accidents - are set out in the Railways and Transport Safety Act 2003 and the Railways (Accident Investigation and Reporting) Regulations 2005. The RAIB forms part of the Department for Transport, but is functionally independent: the Chief Inspector reports on accident investigations directly to the Secretary of State. The RAIB receives annual funding to meet the costs of its investigation work in the form of a grant-in-aid from Parliament, through the Department for Transport.

Resources:

The RAIB employs 24 inspectors (12 working based team, 6 derby based team) plus administrative staff.

Due process:

The are Memoranda of Understanding with all the main safety authorities, police, procurator fiscal of Scotland. The DfT has produced an extensive guidance document on the RSD.

Annex I Interface management and requirements structure

A structure that might be helpful in tackling interface issues in a pro-active and comprehensive manner is the following:
1. define a limited number of base types for infrastructure;
2. define a limited number of base types for rolling stock;
3. choose a limited number of logical infrastructure / train combinations.
These would be inspired largely by those types of infrastructure and rolling stock already existing, combined with a view on new developments.

For each of these combinations the requirements for infrastructure, rolling stock and operations (including train composition) have to be defined such that the proper (i.e. effective, safe, healthy and environmentally correct) functioning of the combination is ensured. Ideally, one should be able to use these requirements separately to develop infrastructure and rolling stock projects and then have a guarantee of fit. The key is that when rolling stock meets the requirements belonging to a given combination of type X rolling stock and type Y infrastructure, and infrastructure meets the requirements belonging to that same combination, than the proper functioning of that rolling stock on that infrastructure under operational procedures defined for that same combination is guaranteed on forehand and accepted.

Although it is acknowledged that the real world cannot be squeezed entirely into this theoretical model, it can be helpful in structuring the problem and solutions. In terms of requirements it would mean that for each base type of infrastructure, there are general requirements and additional (hopefully limited) requirements for that infrastructure to work together with a particular type of rolling stock, and conversely.

Next to serving as a structure to help define the future desired state, the structure might proof useful in defining the status quo and implementation paths. Such a system would make the basic choices ‘for which trains will my infrastructure be OK to travel on’ and ‘on which infrastructures will my rolling stock be able to travel’ transparent and manageable in terms of which requirements to meet. Of course such a system cannot be developed easily to cover all possible situations. It would have to start from a solid scope as a basis and then grow, responding to practical needs.