

**WALENBERG**  
Rail Assessment

## Rolling stock approval process

Presentation to SEETO Working  
Group by Frank Walenberg  
Skopje 9 November 2010

FW/WRA028-001 v002 SEETO/ 9-11-2010 1

**WALENBERG**  
Rail Assessment

## Overview

- Need for the approval process
- RST approval process in the past
- Interoperability: the Interoperability Directive
- Safety: the Safety Directive
- Relationship between Interoperability and Safety
- Processes and Application

FW/WRA028-001 v002 SEETO/ 9-11-2010 2

**WALENBERG**  
Rail Assessment

## Need for the approval process

Two main reasons:

- Formal reasons based on the legal requirement to receive an authorisation to operate a railway vehicle on a railway network
- Contractual reasons to verify that the contractual requirements from the customer are met by the supplier

In this context only the first reason will be investigated

FW/WRA028-001 v002 SEETO/ 9-11-2010 3

**WALENBERG**  
Rail Assessment

## Rolling Stock approval process in the past

- Characterised by integrated railways
- National railway responsible for all aspects: specification, testing, verification and homologation/immatriation
- Based on voluntary application of international standards and requirements: UIC leaflets, IEC/ISO/DIN standards
- Based on international treaties: COTIF/RIC/RIV for the international part, voluntary application for the strictly national part

FW/WRA028-001 v002 SEETO/ 9-11-2010 4

**WALENBERG**  
Rail Assessment

## Rolling Stock approval process in the past

- Incompatible infrastructure characteristics e.g. track gauge, loading gauge, supply voltage or signalling system limited the free movement of vehicles
- The approach has resulted in limited interoperability.
- International exchange of freight wagons and passenger coaches
- No or very limited exchange of locomotives and trainsets

FW/WRA028-001 v002 SEETO/ 9-11-2010 5

**WALENBERG**  
Rail Assessment

## Rolling Stock approval process in the past

- Technological development has removed some barriers: multi-current locomotives, automatic gauge changing axles, integration of different signalling systems, ....
- Nevertheless the technological development alone is insufficient to achieve interoperability
- Further efforts to achieve interoperability were needed and this started with the Interoperability Directive of 1996: 96/48/EC

FW/WRA028-001 v002 SEETO/ 9-11-2010 6

Rolling Stock approval process in the past

**WALENBERG Rail Assessment**



Multiple signalling systems .....

FW/WRA028-001 v002 SEETO/ 9-11-2010 7

Rolling Stock approval process in the past

**WALENBERG Rail Assessment**



Multiple wayside signalling and reverse STM solutions .....

FW/WRA028-001 v002 SEETO/ 9-11-2010 8

Rolling Stock approval process in the past

**WALENBERG Rail Assessment**



Multiple track gauges .....

FW/WRA028-001 v002 SEETO/ 9-11-2010 9

Rolling Stock approval process in the past

**WALENBERG Rail Assessment**



Adaptive train

FW/WRA028-001 v002 SEETO/ 9-11-2010 10

Rolling Stock approval process in the past

**WALENBERG Rail Assessment**



Train with automatic track gauge adaption

FW/WRA028-001 v002 SEETO/ 9-11-2010 11

Rolling Stock approval process in the past

**WALENBERG Rail Assessment**



Combination of multiple track gauge and multiple signalling systems .....

FW/WRA028-001 v002 SEETO/ 9-11-2010 12

## Interoperability

WALENBERG  
Rail Assessment

European transportation policy:

- 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

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

➤ Interoperability is one tool to achieve this. Other tools for opening the market and achieving the goals of the European transportation policy are not considered in this context.

FW/WRA028-001 v002 SEETO/9-11-2010 13

## Interoperability

WALENBERG  
Rail Assessment

Goals of interoperability:

- Open the market for railway products
- Open the market for railway operations

Defined in the Interoperability Directives:

- 96/48/EC (High Speed)
- 2001/16/EC (Conventional Rail)
- 2004/50/EC (Harmonisation of High Speed and Conventional Rail)

➤ 2008/57/EC: Current High Speed + Conventional Rail Interoperability Directive

FW/WRA028-001 v002 SEETO/9-11-2010 14

## Interoperability

WALENBERG  
Rail Assessment

Definition of interoperability:  
2008/57/EC art 2.b

*'interoperability' means the ability of a rail system to allow the safe and uninterrupted movement of trains which accomplish the required levels of performance for these lines. This ability depends on all the regulatory, technical and operational conditions which must be met in order to satisfy the essential requirements;*

FW/WRA028-001 v002 SEETO/9-11-2010 15

## Interoperability

WALENBERG  
Rail Assessment

### Essential Requirements

- Safety
- Reliability and availability
- Technical Compatibility
- Environment
- Health

➤ Interoperability Directives contain specific Essential Requirements, but this does not replace the application of other Directives, that also contain Essential Requirements (e.g. Machinery, EMC etc.)

FW/WRA028-001 v002 SEETO/9-11-2010 16

## Interoperability

WALENBERG  
Rail Assessment

### Levels of European Regulations

Mandatory (=law):

- Interoperability Directive
- Technical Specifications for Interoperability (TSI)

Voluntary:

- European Harmonised Standards (EN Norms)

Each level gives more details

FW/WRA028-001 v002 SEETO/9-11-2010 17

## Interoperability

WALENBERG  
Rail Assessment

### Directives:

- Highest level of EU legislation
- Specify general and generic requirements:
  - Definitions
  - Processes and procedures (also rolling stock approval and authorisation!)
  - Further legislation and requirement documents
  - How to deal with exceptions and derogations
  - ...
- Directives refer to Technical Specifications of Interoperability (TSI) as second level of EU legislation

FW/WRA028-001 v002 SEETO/9-11-2010 18

**WALENBERG**  
Rail Assessment

## Interoperability

Technical Specifications for Interoperability are arranged by subsystem or apply at system level:

- Structural Subsystems (High Speed and Conventional Rail)
- Functional Subsystems
- Transversal TSIs

FW/WRA028-001 v002 SEETO/ 9-11-2010 19

**WALENBERG**  
Rail Assessment

## Interoperability

### TSI for Structural Subsystems

- Infrastructure (INS or INF)=> Published for High Speed, awaiting publishing for Conventional Rail
- Control/Command & Signalling Track Side (CCS-TR proposed separation)=> Published combined for High speed and Conventional Rail
- Control/Command & Signalling On Board (CCS-OB proposed separation)=> Published combined for High Speed and Conventional rail
- Energy (ENE) => Published for High Speed, awaiting publishing for Conventional Rail
- Rolling Stock (RST)
  - Rolling Stock=> High Speed published
  - Freight Wagons (WAG)=> Conventional Rail Published
  - Locomotives and Passenger Coaches (LOC&PAS)=> Conventional Rail accepted, in process of publishing
  - Noise (NOI)=> Conventional Rail published

FW/WRA028-001 v002 SEETO/ 9-11-2010 20

**WALENBERG**  
Rail Assessment

## Interoperability

### TSI for Functional Subsystems

- Traffic Operation and Management (OPE)=> Published for High Speed and Conventional Rail
- Maintenance (MAI)=>published for High Speed, replaced
- Telematics Applications for Passengers (TAP)=> in decision making process)
- Telematics Applications for Freight (TAF)=> Published

FW/WRA028-001 v002 SEETO/ 9-11-2010 21

**WALENBERG**  
Rail Assessment

## Interoperability

### Technical Specifications for Interoperability at system level:

- Transversal TSIs:
  - Persons of reduced Mobility (PRM)=> published for combined High Speed and Conventional Rail
  - Safety in Railway Tunnels (SRT)=>published for combined High Speed and Conventional Rail

FW/WRA028-001 v002 SEETO/ 9-11-2010 22

**WALENBERG**  
Rail Assessment

## Interoperability

### Technical Specifications for Interoperability:

- Requirement documents with a standardised structure of chapters:
  1. Introduction
  2. Subsystem definition/scope
  3. Essential Requirements
  4. Characterisation of the subsystem
  5. Interoperability Constituents
  6. Assessment of Conformity and/or suitability for use
  7. Implementation of the TSI

FW/WRA028-001 v002 SEETO/ 9-11-2010 23

**WALENBERG**  
Rail Assessment

## Interoperability

### Harmonised EN-Standards

- Where TSIs refer to EN standards directly, these become mandatory
- Normally TSIs do not need to refer to harmonised EN-standards in order to make them voluntarily applicable
- Use of harmonised EN-standards leads to the principle of presumption of conformity
- ERA publishes guidance with the list of applicable standards: <http://www.era.europa.eu/Core-Activities/Interoperability/Pages/STND.aspx>

FW/WRA028-001 v002 SEETO/ 9-11-2010 24

**WALENBERG**  
Rail Assessment

## Interoperability

### Completeness of TSIs

- The TSIs are not necessarily complete:
  - The scope is limited (technically, geographically and in time)
  - A TSI may have some "open points"
  - There are specific cases where requirements (Basic Parameters) in certain Member States differ from the TSI
  - There can be derogations
- Member States have to Notify their National Rules that are different from the TSI requirements
- Member States must designate the body/bodies (DeBo) that can perform the verification and certification for their Notified National Rules

FW/WRA028-001 v002 SEETO/ 9-11-2010 25

**WALENBERG**  
Rail Assessment

## Interoperability

### Interoperability Certification

- Certification by Notified Body (NoBo)
  - Interoperability Constituent
  - Subsystem
- NoBo uses modules (procedure) as described in the TSI
- Manufacturer of Interoperability Constituent draws up the Declaration of Conformity
- Applicant of the Subsystem (Manufacturer, Railway Undertaking, Infrastructure Manager, Vehicle Leasing Company, Vehicle Owner or Keeper) draws up Declaration of Verification.

FW/WRA028-001 v002 SEETO/ 9-11-2010 26

**WALENBERG**  
Rail Assessment

## Interoperability

### Interoperability Certification

- In some cases (e.g. ERTMS/ETCS) the Independent Safety Assessment according to EN RAMS standards forms part of the certification process, but is performed by an Independent Safety Assessor. NoBo can be ISA.
- Certificate of Conformity by NoBo and Declaration of Verification are necessary, but not sufficient for requesting the authorisation to put a subsystem into operation (e.g. vehicle approval). Member States need to investigate compatibility with the infrastructure and safe integration (art. 15 of 2008/57/EC).

FW/WRA028-001 v002 SEETO/ 9-11-2010 27

**WALENBERG**  
Rail Assessment

## Interoperability

### National Certification

- Additional National Certification is necessary where there are open points in the TSI, specific cases, derogations and therefore Notified National Rules.
- The National Certification is performed by a Designated Body (DeBo). This can be (but must not be) a Notified Body or Independent Assessor

FW/WRA028-001 v002 SEETO/ 9-11-2010 28

**WALENBERG**  
Rail Assessment

## Interoperability

### Interoperability Certification

FW/WRA028-001 v002 SEETO/ 9-11-2010 29

**WALENBERG**  
Rail Assessment

## Interoperability

### Interoperability Certification

FW/WRA028-001 v002 SEETO/ 9-11-2010 30

Example of vehicle certification and integration of ERTMS/ETCS On Board Unit

**WALENBERG**  
Rail Assessment

## Interoperability

Application of the Interoperability Directive and TSIs:

- Generally applicable for all new subsystems within the geographical and technical scope

But .....

- Only for the phases of development, design and construction/implementation of the subsystems, up to the moment of the putting into operation.
- In some cases of upgrading and renewal, if the Member State decides that the TSIs are applied (or partly applied)

And ...

- To cover other life cycle phases the Safety Directive must be considered.

FW/WRA028-001 v002 SEETO/ 9-11-2010 31

**WALENBERG**  
Rail Assessment

## Safety

### Background of the Safety Directive

- Historically, the Safety Directive came after the Interoperability Directive. The Safety Directive is a complement to the interoperability Directive. Together these cover all phases of the life cycle of the railway system.
- Technically and logically the Safety Directive is more general and creates a broad framework for safety within which the Interoperability Directive has a logical place for certain aspects and for certain parts of the life cycle.

FW/WRA028-001 v002 SEETO/ 9-11-2010 32

**WALENBERG**  
Rail Assessment

## Safety

### Relation between the Interoperability Directive and the Safety Directive

Picture from Commission document 08/57 DV29 of 23-09-2010

FW/WRA028-001 v002 SEETO/ 9-11-2010 33

**WALENBERG**  
Rail Assessment

## Safety

### Application of the Safety Directive

- For the “normal” operational lifetime the Safety Directive is applicable
- The Scope of the Safety Directive is wider than only the interoperable subsystems, it is aiming at the complete integrated railway system including its supporting functions
- The safety Directives covers both interoperable and non-interoperable subsystems

FW/WRA028-001 v002 SEETO/ 9-11-2010 34

**WALENBERG**  
Rail Assessment

## Safety

### The Safety Directive:

- Specifies general and generic requirements:
  - Definitions
  - Safety Management and Safety Management Systems
  - Common Safety Targets (CST) / Common Safety Indicators (SCI)/ Common Safety Methods (CSM)
  - National Safety Rules
  - Safety Certification and Safety Authorization
  - **Placing in Service of Rolling Stock**
  - Safety Authority
  - Accident and Incident Investigation Body

FW/WRA028-001 v002 SEETO/ 9-11-2010 35

**WALENBERG**  
Rail Assessment

## Safety

### CST/CSI/CSM under the Safety Directive

- CST=Common Safety Targets: the required level of safety
- CSI=Common Safety Indicators: the characteristics that describe the achieved level of safety
- CSM=Common Safety Methods: the methods describing how safety levels, achievement of safety targets and compliance with safety requirements are assessed

➤ CSM for risk evaluation and assessment (352/2009) has to be applied for rolling stock approval

FW/WRA028-001 v002 SEETO/ 9-11-2010 36

**WALENBERG**  
Rail Assessment

## Safety

CSM for risk evaluation and assessment (352/2009)

- Defines the risk evaluation process that has to be applied for any significant change
- Describes the different steps in the process
- Describes the risk analysis methods:
  - Codes of practice
  - Similar reference systems
  - Explicit risk estimation
- Requires an assessment on the application of the risk evaluation by an Independent Assessor

FW/WRA028-001 v002 SEETO/ 9-11-2010 37

**WALENBERG**  
Rail Assessment

## Safety

Method from Commission Regulation 352/2009 on CSM  
The Appendix "Risk management process and independent assessment" gives the schedule for the approach. The process consists of the following steps:

- System definition
- Hazard identification
- Hazard classification
- Risk determination
- Risk evaluation
- Determination of safety requirements
- Demonstration of compliance with safety requirements
- Hazard management
- Independent assessment

FW/WRA028-001 v002 SEETO/ 9-11-2010 38

**WALENBERG**  
Rail Assessment

## Safety

### Relation between the Interoperability Directive and the Safety Directive

**Roles and Responsibilities for Subsystem Authorisation**

Picture from ERA document 08/57 – DV29 31-03-2010

FW/WRA028-001 v002 SEETO/ 9-11-2010 39

**WALENBERG**  
Rail Assessment

## Processes and Application

### Global process approach

Picture taken from EC Report: Rail Interoperability & Safety, Transposition of legislation and progress on the field of October 2007

FW/WRA028-001 v002 SEETO/ 9-11-2010 40

**WALENBERG**  
Rail Assessment

## Processes and Application

### Vehicle Authorisation: part of process B

- All organisational requirements from the Railway Directives must be met: NSA, RU, IM, NIB, Regulator etc. (Process A)
- Infrastructure requirements are specified and met
- National Rules are Notified

➤ Vehicle Authorisation is based on the application of all Directive requirements by the parties in Process B

FW/WRA028-001 v002 SEETO/ 9-11-2010 41

**WALENBERG**  
Rail Assessment

## Processes and Application

### Vehicle Authorisation steps

- Constituents EC Certification (and ISA if required)
- Subsystems EC Certification (and ISA if required)
- National Verification and Certification
- Subsystem Integration
- Vehicle first Authorisation
- Further National Verifications (specific cases and open points)
- Further vehicle authorisations

FW/WRA028-001 v002 SEETO/ 9-11-2010 42

**WALENBERG**  
Rail Assessment

## Processes and Application

### Vehicle Authorisation steps

- The Safety Directive gives a general procedure for rolling stock which is not fully covered by TSIs.
- The Interoperability Directive gives detailed procedures and distinguishes between:
  - TSI conform vehicles
  - Non-TSI conform vehicles
  - Vehicles which conform to an already authorised type (in other Member States)

➤ Further development of Cross Acceptance will improve the processes. ERA and EC are working on this.

FW/WRA028-001 v002 SEETO/ 9-11-2010 43

**WALENBERG**  
Rail Assessment

## Processes and Application

### Final points of attention

- The Vehicle Numbering system
- The National Vehicle Registers
- The European Register of Authorised Vehicles
- Maintenance of Vehicles and Entity in Charge of Maintenance

FW/WRA028-001 v002 SEETO/ 9-11-2010 44

**WALENBERG**  
Rail Assessment

## Processes and Application

### Guidance

- Guidance is/will be given by EC:
  - Guide for the application of the Interoperability Directive
  - Guides for the application of specific TSI
  - Guide for the application of relevant EN-standards
  - Guidance in the application and interpretation of the Interoperability Directive with document DV29

FW/WRA028-001 v002 SEETO/ 9-11-2010 45

**WALENBERG**  
Rail Assessment

## Processes and Application

### Useful addresses:

- EC Interoperability and Safety web site:  
[http://ec.europa.eu/transport/rail/interoperability/interoperability\\_safety\\_en.htm](http://ec.europa.eu/transport/rail/interoperability/interoperability_safety_en.htm)
- ERA web Site:  
<http://www.era.europa.eu/Core-11Activities/Pages/home.aspx>

FW/WRA028-001 v002 SEETO/ 9-11-2010 46

**WALENBERG**  
Rail Assessment

## Questions?

Thank you for your attention

For questions you can also contact:

Frank Walenberg  
Walenberg Rail Assessment  
[frank@walenberg-rail.eu](mailto:frank@walenberg-rail.eu)  
[www.walenberg-rail.eu](http://www.walenberg-rail.eu)

FW/WRA028-001 v002 SEETO/ 9-11-2010 47