European Railway Agency

# European Railway regulations & Rolling Stock

## A harmonised approach

# Content

Understanding the basics of European regulations

Interoperability

TSIs

Developments of the Conventional Rail Rolling Stock TSI. Time frame and process to the entry into force

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# A brief history...

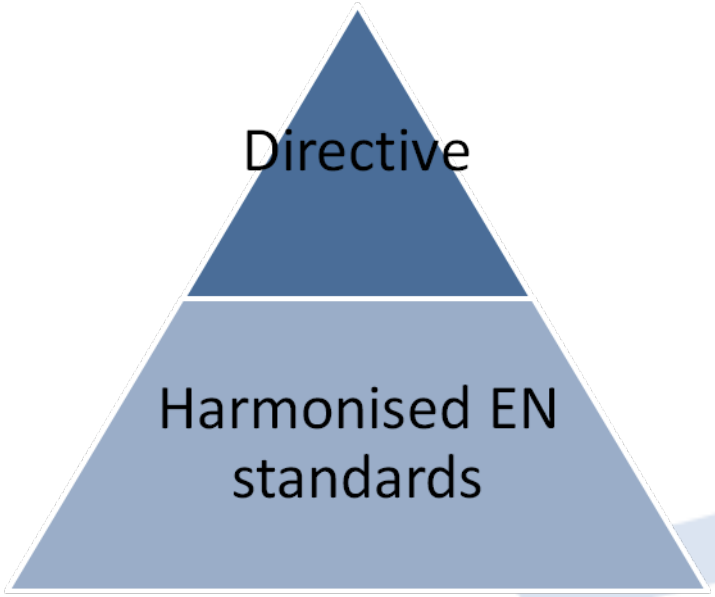
In order to fight road congestions, it was decided in the early 90's to revitalise the EU railways.

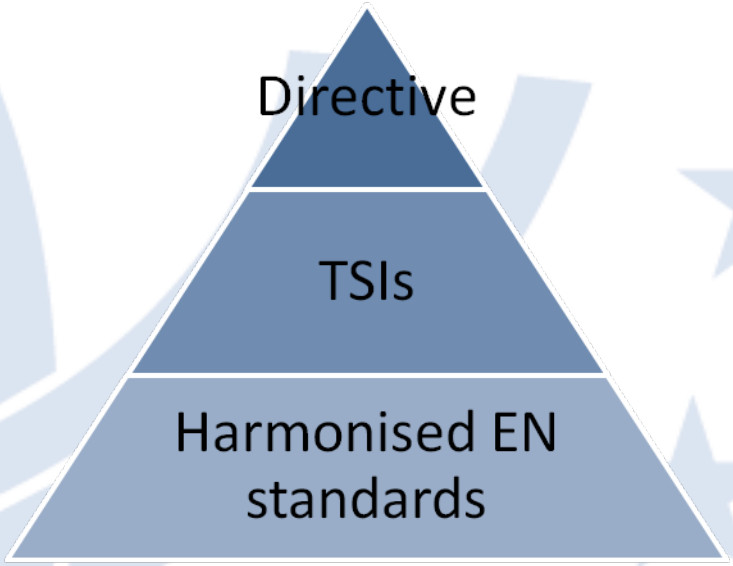
For this, it was decided to break up the monopolies of the integrated national railway companies in order to allow market forces to enter the rail system.

As a first step and in analogy with many other forms of transport it was decided to separate the owner of the infrastructure from the users of the infrastructure.

Now gradually the international rail transport market is being opened. For freight this has already happened, the international passenger traffic will follow on 1/1/2010.

# General principles for new and global approach




| Entity | Reference | Result |
|---|---|---|
| Notified Body | TSI assessment using the assessment modules | Certificate of verification |
| Applicant | Certificate of verification | EC Declaration of verification |
| National safety Authority | EC Declaration of verification | Authorisation for placing into service |

# Directive > TSI > harmonised standards

## Interoperability Directive

- Is voted in the EP (political consensus)
- Needs to be transposed into national law in all MSs
- Lays down essential requirements and calls for TSIs
- Defines acceptance process of RST in MSs

## TSIs

- Contain mandatory requirements for subsystems
- Are EU law, superseding national law
- Derogation possible after agreement with EC
- Conformity assessment by Notified Bodies
- 'EC' declaration of verification is valid throughout EU

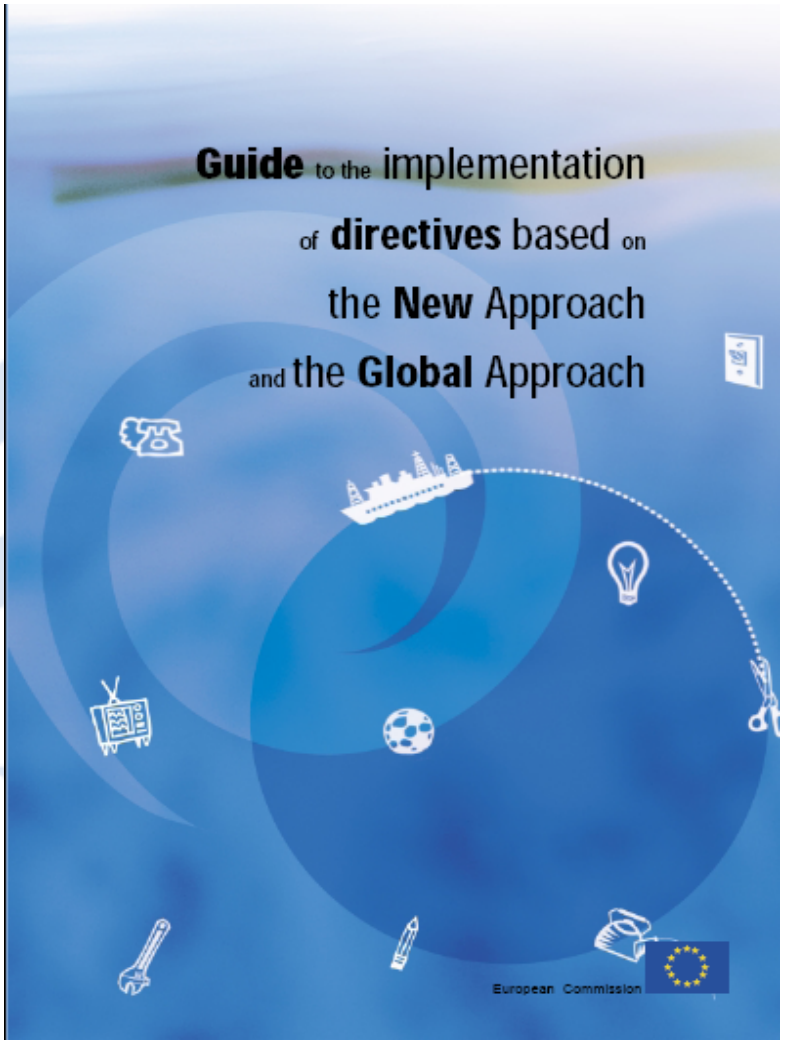
## EN Standards

- Are in the voluntary domain except when quoted in TSI
- May be developed on sector initiative or ERA's request
- May contain technical solutions
- May be harmonised, which gives presumption of conformity to Directive/TSI

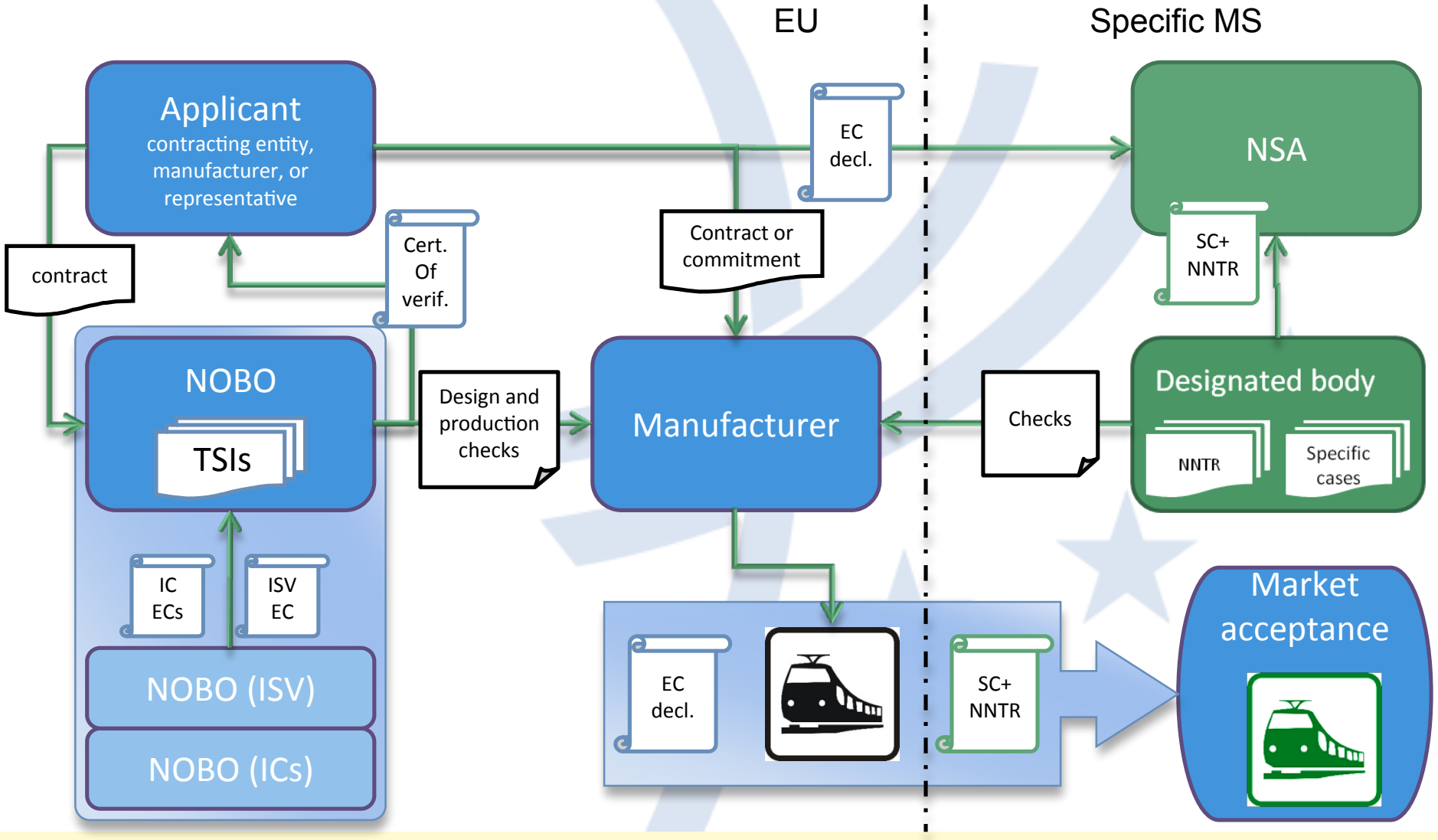
# Assessment: principle of ‘New approach’

## TSI Conformity assessment

- **Members States** are responsible for the notification of assessment bodies.
- **The notified bodies** are in charge of applying the procedures of evaluation of the conformity of subsystems and ICs
- **The notified body is responsible for the EC verification of a subsystem** this shall begin at the design stage and cover the entire manufacturing period through to the acceptance stage before the subsystem is placed in service.
- **The applicant declares** that its product is in conformity with the requirements.



# “EC” verification process for rolling stock



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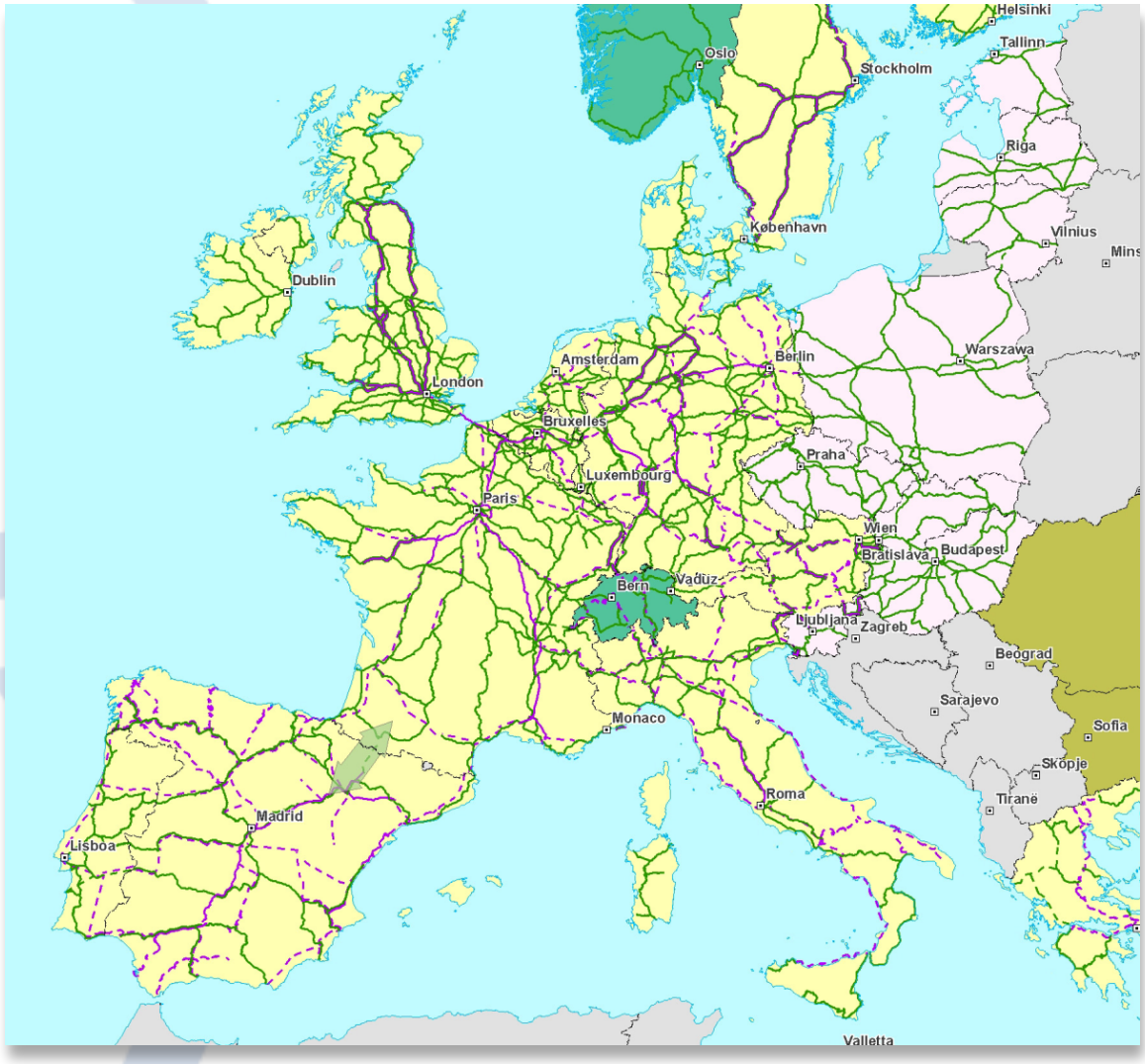
# Interoperability definition and TEN map

**'INTEROPERABILITY'**

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.

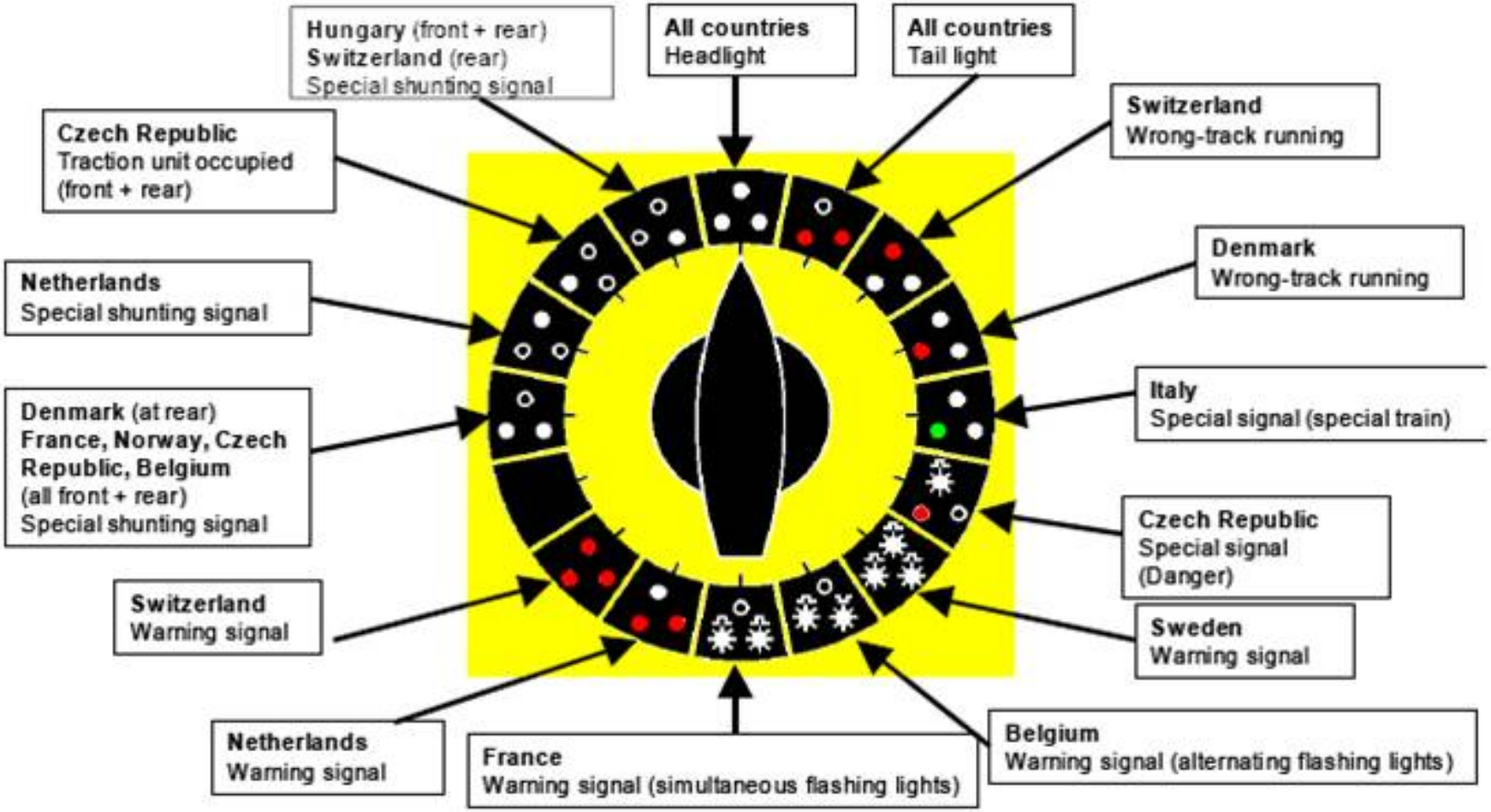
This ability **depends on all the regulatory, technical and operational conditions** which must be met in order to satisfy the essential requirements;



# Interoperability

## Today facing a technical patchwork:

- 5 types of electrification
- 21 signaling system
- 5 track gauges
- 5 classes of axles load
- 6 line gauges
- national operational rules


Hungary (front + rear)
Switzerland (rear)
Special shunting signal
All countries
Headlight
All countries
Tail light
Switzerland
Wrong-track running
Czech Republic
Traction unit occupied
(front + rear)
Denmark
Wrong-track running
Netherlands
Special shunting signal
Italy
Special signal (special train)
Denmark (at rear)
France, Norway, Czech Republic, Belgium
(all front + rear)
Special shunting signal
Czech Republic
Special signal
(Danger)
Switzerland
Warning signal
Sweden
Warning signal
Netherlands
Warning signal
France
Warning signal (simultaneous flashing lights)
Belgium
Warning signal (alternating flashing lights)

# Conditions to create interoperability

To create technical compatibility between lines and vehicles by harmonising the requirements.

Clear definition of responsibilities of the different actors (IM, RU, NSA, MS).

Harmonisation of operational rules, necessary to achieve interoperability.

To be careful not to jeopardise the economic viability of the rail system.

A regulator which defines the rules of the game.

# TSIs principles with regard to rolling stock

All new rolling stock for operation on TEN lines need to be TSI compliant, since TSIs are law.

- Derogations to the application of TSIs are managed between the Member State and the European Commission.

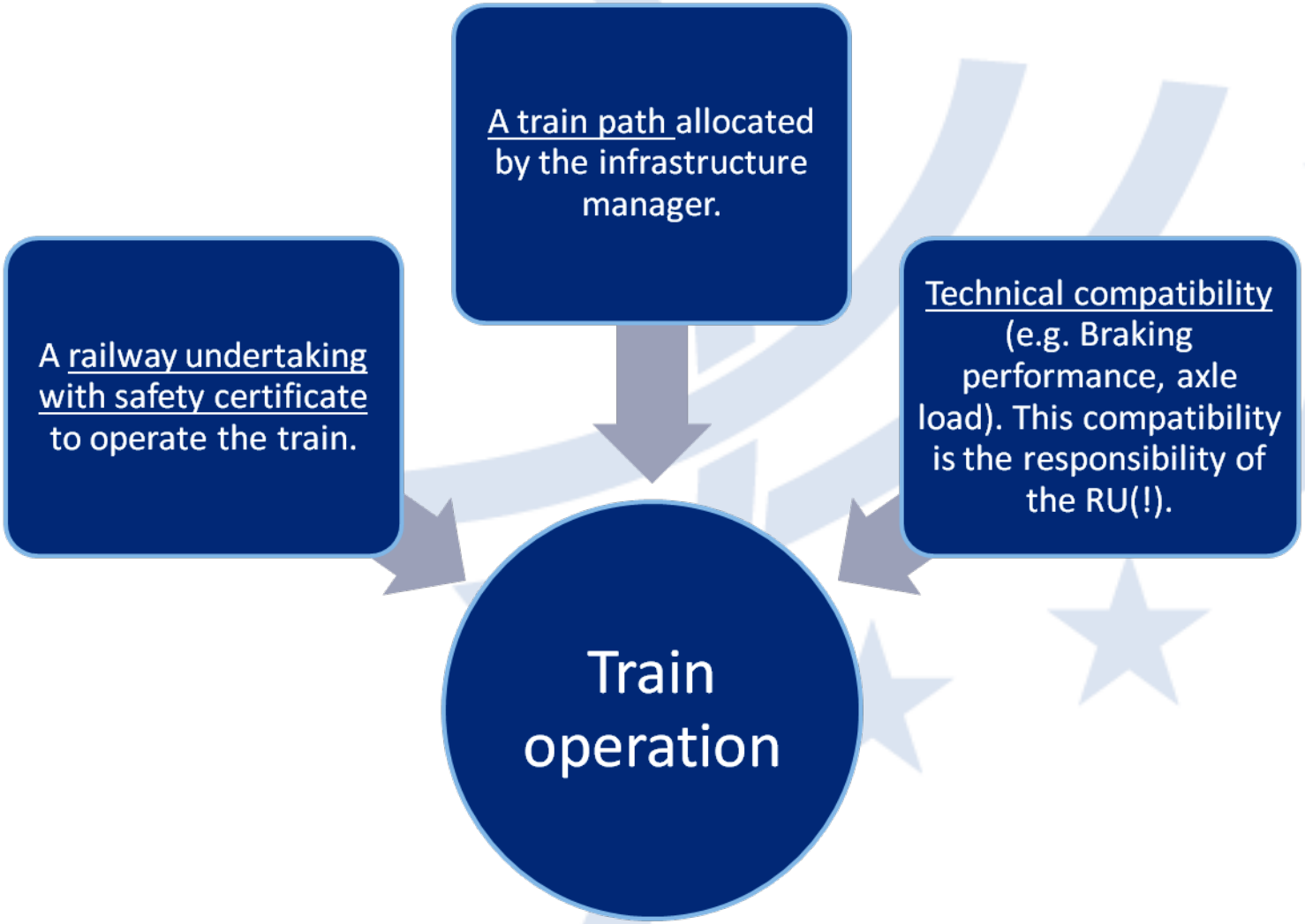
TSI assessment is done by notified bodies, and shall not be repeated by national safety authorities (NSA).

The only additional checks that NSAs are allowed make are towards safe integration, compatibility and open points.

- And specific cases (if they exist in the TSIs).

TSI compliant rolling stock will than receive an 'Authorisation for placing into service' from the NSA in an individual EU Member State.

# Operating authorised rolling stock



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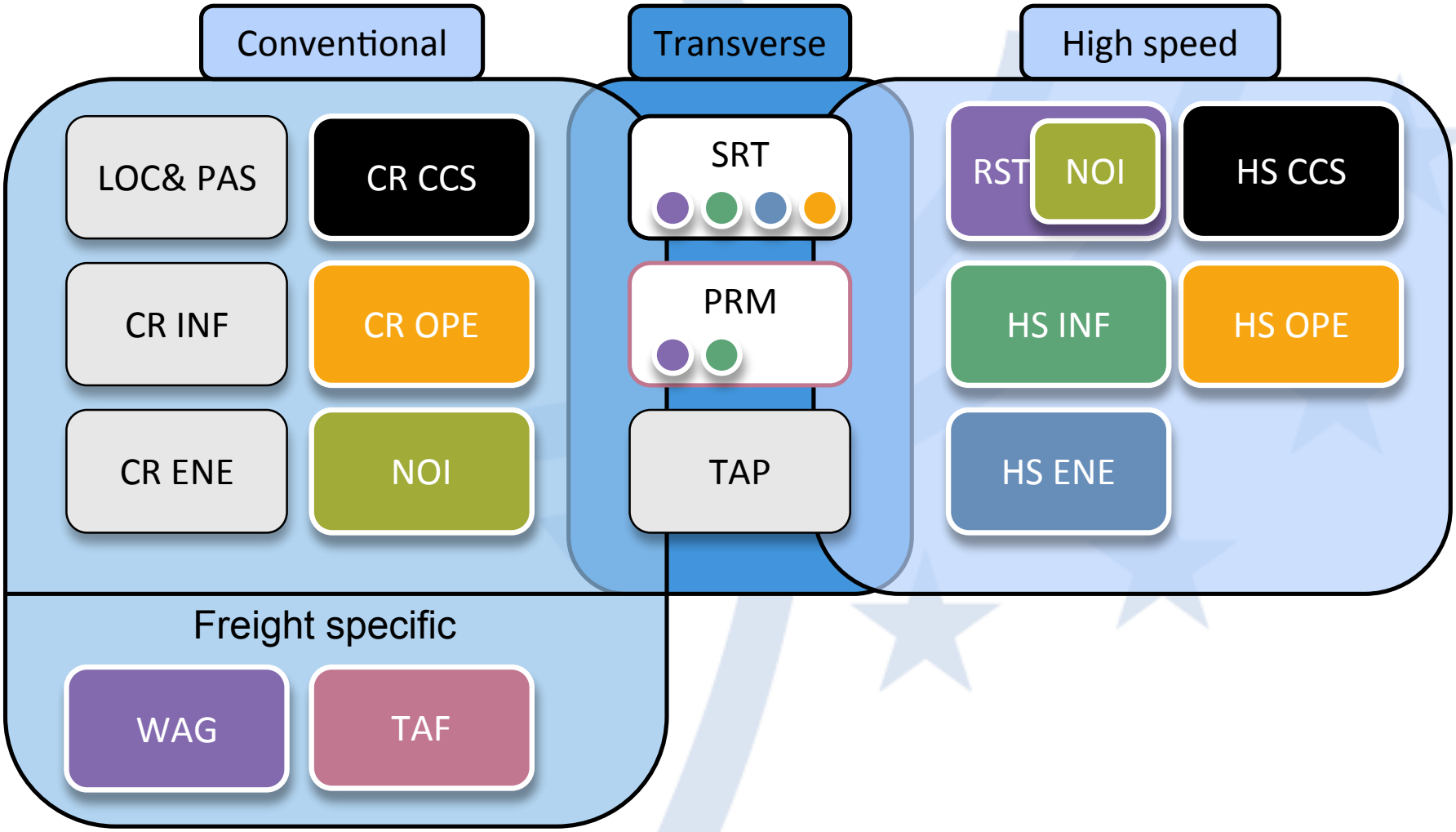
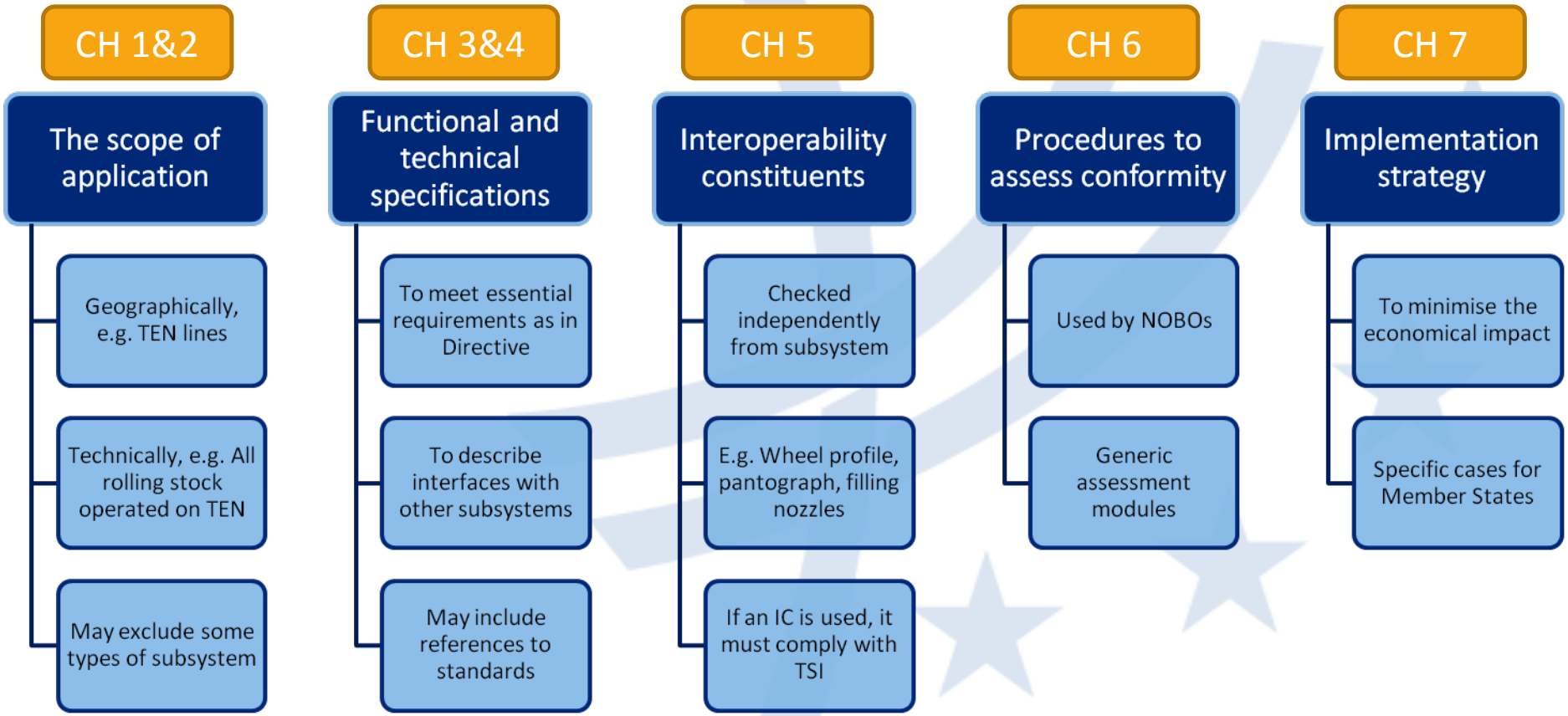
# TSIs available or under development



# What do TSIs include?



# TSI categories – RST compatibility

| INF | ENE | CCS | SRT |
|---|---|---|---|
| Gauge: GA, GB, GC. | Catenary system.<br>•AC 25kV (target)<br>•AC 15kV 16.7Hz<br>•DC 1.5kV and 3kV | Class A: ERTMS | Fire safety category A/B in relation to tunnel length |
| Axle load: 20t, 22.5t, 25t. | | Class B: Corresponding systems required | |
| Line speed:<br>100, 120, 140, 160, 200 km/h | | | |
| Train length:<br>250, 300, 400, 500, 600, 750m | | | |

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# Scope of the LOC&PAS TSI

## Scope:

- All trains likely to travel on all or part of the conventional lines of the TEN.
- the maximum operational speed of these trains is not specified.

## Excluded:

- Rolling stock designed to operate primarily on urban tramway or light rail networks.
- Shunters which are not intended to operate on the open lines of the TEN.
- Freight wagons (covered by the CR WAG TSI)

# Draft CR LOC&PAS TSI – contents /1

| | |
|---|---|
| **Structure and mechanical parts** | • No mandatory type of coupler<br>• Passive safety in line with EN 15227 |
| **Track interaction and gauging** | • Gauges GA, GB and GC permitted<br>• Running dynamics according to EN 14363<br>• Definition of characteristics of wheels and wheelsets |
| **Braking** | • No minimum braking performance defined (operational issue)<br>• Braking performance to be defined in a harmonised way<br>• Safety level attributed to the emergency brake |
| **Passenger related items** | • Toilets not mandatory, bioreactors allowed<br>• Door/traction interlock mandatory<br>• Ventilation: CO2 level specified |

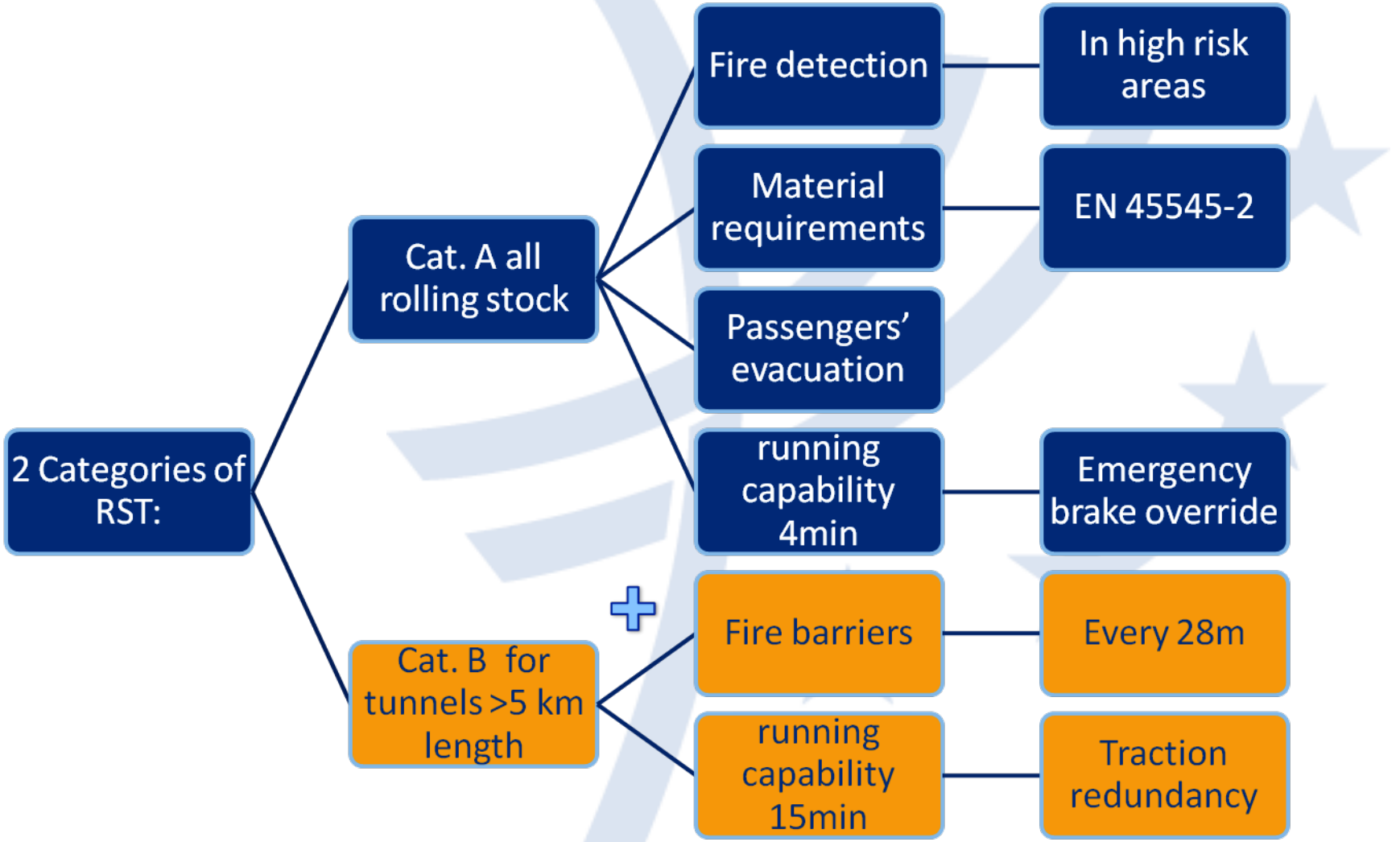
# Draft CR LOC&PAS TSI – contents /2

| | |
|---|---|
| Environmental conditions and aerodynamic effects | • Climatic zones identified<br>• Aerodynamic effect requirements for Vmax>160km/h |
| External lights & visible and audible warning devices | • 2 headlights + 3 markers and 2 red tail lights<br>• Horn with harmonised requirements |
| Traction and electrical equipment | • 25Kv AC is target system, other systems allowed<br>• Two pantograph heads allowed: 1600mm and 1950mm wide |
| Driver's cab and driver-machine interface | • Visibility in accordance with UIC 651<br>• Working conditions not covered by the TSI |

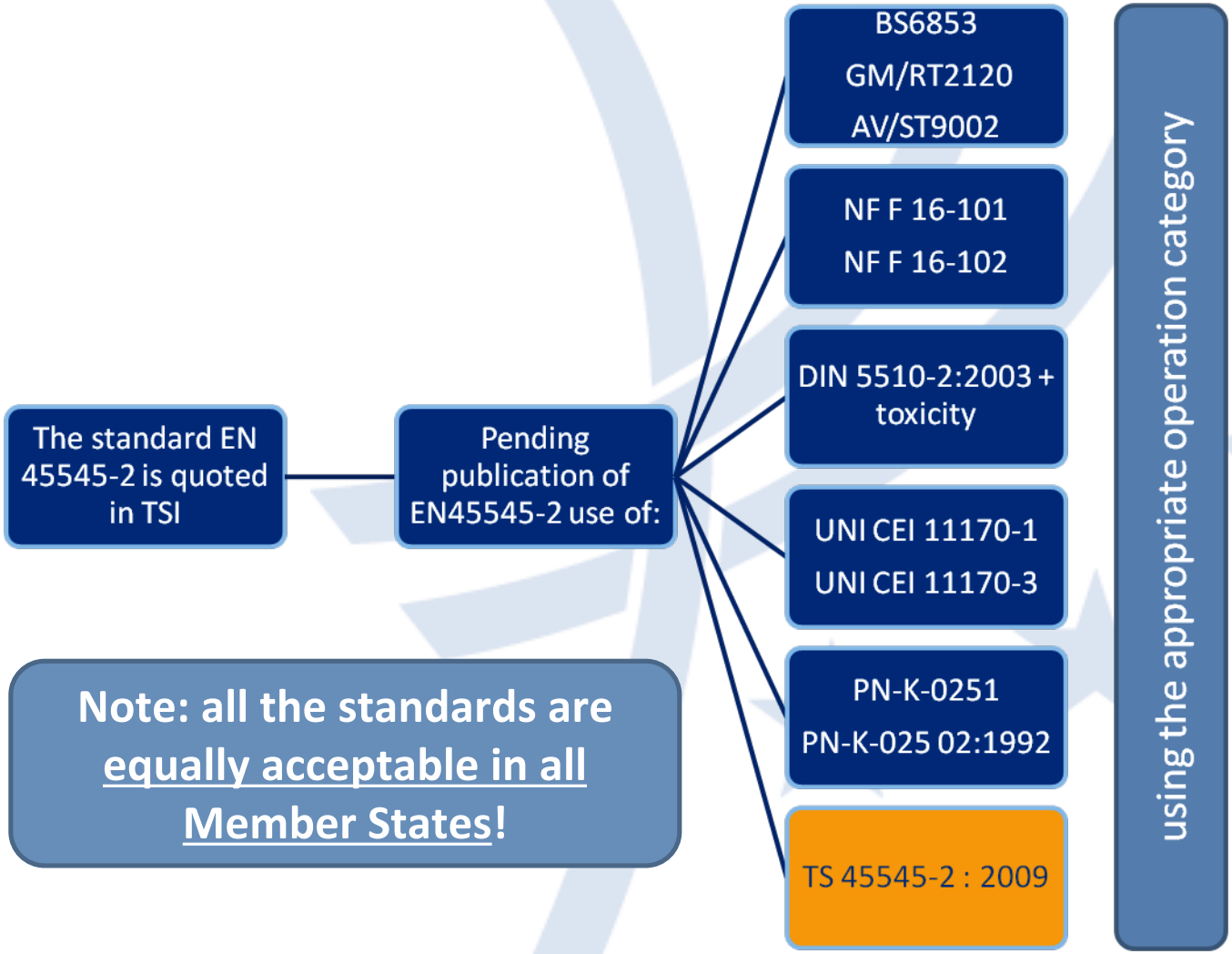
# Draft CR LOC&PAS TSI – contents /3

| | |
|---|---|
| **Fire safety and evacuation** | • Category A or B<br>• For category B trains, fire barriers may be substituted by other means with equal safety |
| **Servicing** | • Toilet discharge interface for retention systems<br>• Water refilling and refuelling interfaces<br>• Auxiliary power supply during stabling |
| **Documentation for operation and maintenance** | • General documentation of the unit<br>• Maintenance files<br>• Operating and rescue related documentation |

# Fire safety requirements in the draft TSI



# Material fire safety requirements



# Fire safety related changes in the draft vs current TSIs

Amends existing TSIs in order to allow for alternatives to rigid fire barriers (not allowed today)

Allows the use of the TS 45545-2 in case the EN would not have been published


Has evacuation requirements harmonised with EN 45545

Applies to all rolling stock running on TEN lines

# Crash worthiness and the draft LOC&PAS TSI

**The TSI will require to reduce the severity of collisions, by:**

- limiting deceleration
- maintaining survival space and structural integrity of the occupied areas
- reducing the risk of overriding
- reducing the risk of derailment
- limiting the consequences of hitting a track obstruction.

**In analogy with EN 15227, four collision scenarios are defined:**

- Scenario 1: A front end impact between two identical units;
- Scenario 2: A front end impact with a freight wagon;
- Scenario 3: An impact of the unit with a large road vehicle on a level crossing;
- Scenario 4: An impact of the unit into a low obstacle (e.g. car on a level crossing, animal, rock etc.)

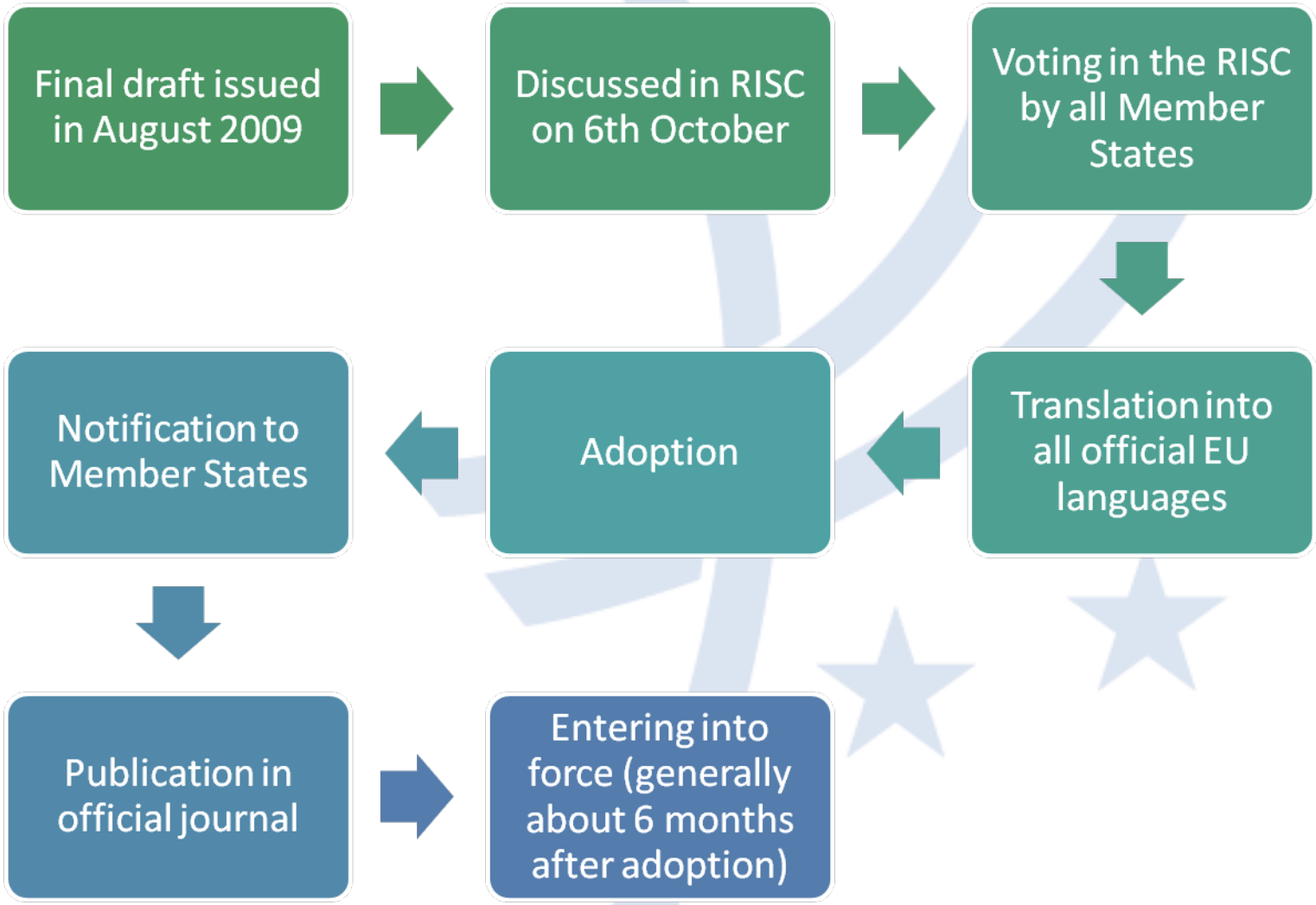
# Crash worthiness and the draft LOC&PAS TSI

ERA performed a cost benefit analysis to the mandatory application of EN 15227. The cost impact is neutral and therefore a harmonised approach is chosen by making EN 15227 mandatory.

The application of requirements related to scenarios 1 and 2 to heavy haul locomotives equipped with SA-3 couplers is an open point.


The assessment of conformity of locomotives with central cabs with the requirements related to scenario 3 is an open point.

# Process for CR LOC&PAS TSI



# Thank you for your attention