UIC/FIATA RAIL GROUP MEETING

DEVELOPMENT IN INFRASTRUCTURE, LEGAL ENVIRONMENT AND UNIFICATION AS A FACTOR TO INCREASE THE RAIL MARKET

ENHANCING OF THE COMPETITIVENESS OF EUROPEAN RAILWAYS

FERRMED Presentation
Vienna, 23-24th April 2015
SUMMARY

- FERRMED Objectives since 2004
- Pillars of the BUSINESS COMPETITIVENESS
- Common STANDARDS for rail freight transportation
- FERRMED Standards for rail freight Great Axis in EU
- EU TEN-T new Policy 2013. Core Network Guidelines based on FERRMED Standards (not fully adopted)
  - INFRASTRUCTURES & OPERATION improvement
    - Full FERRMED Standards in the most important socio-economic corridors.
    - ERA (European Railway Agency) strengthening.
  - INVESTMENTS & SAVINGS. CBA
  - A more efficient ROLLING STOCK
    - More powerful freight LOCOMOTIVES
    - Longer and heavier freight TRAINS
    - New freight WAGONS
    - Reducing NOISE & VIBRATIONS
    - AUTOMATIC COUPLINGS for freight wagons
  - CLOSE & NEAR CHALLENGES TO SUCCEED
    - Transeurasian rail freight transportation
    - Inefficiency of the European transport system
- FERRMED PROPOSALS
FERRMED OBJECTIVES

FERRMED is promoting the implementation of common technical railway standards, the so-called "FERRMED Standards", the improvement of the connections of Ports and Airports with their respective hinterlands, the “Full FERRMED Corridors” achievement (for freight, considering only the most important part of the EU Railway Core Network) and the conception of a Great Rail Freight Axis Scandinavia-Rhine-Rhone-Western Mediterranean.

FERRMED is promoting, as well, Trans-European Forums, Conferences and Working Groups to facilitate rail freight in different activity sectors.

Another key FERRMED objectives is the optimization of the full logistics chain considering appropriate intermodality, reducing costs, increasing quality, assuring traceability and reliability, accomplishing lead times and timetables and improving management procedures in the transportation system.
R+D+4i factors are the base of the enterprise competitiveness pillars
LOGISTICS, COMPRIS A SUBSTANTIAL PROPORTION OF PRODUCT PRICES

50% of Logistics costs are outside costs, particularly transport.
PILLARS OF THE BUSINESS COMPETITIVENESS (III)

AVERAGE EXTERNAL COSTS FREIGHT 2000

€ per 1000 tkm

Road Freight: 87.8
Rail: 17.9
Aviation: 271.3
Waterborne: 22.5

- Accidents
- Air Pollution
- Up- and Downstream Processes
- Climate change low scenario
- Noise
- Nature & Landscape
- Urban Effects
- Climate change (difference low/high scenario)
COMMON STANDARDS FOR RAIL FREIGHT TRANSPORTATION IN EU CORE NETWORK

This is a key in order to get the competitiveness of the Trans European Core Network.

Interoperability is a main point, but we have to achieve this interoperability improving, as well, the rail freight capacity and the profitability of the network.

In fact, as FERRMED demostrates in the Global Study already made, the application of FERRMED Standards is the only way to reverse the decreasing share of Railway in EU land transportation and to increase its competitiveness.

For all these reasons, we strongly recommend the gradual implementation of FERRMED Standards in the EU Railway Core Network, with lead times clearly determined and with full commitment by the Member States, considering the following key items:
EU Reticular and polycentric network with great socio-economic and intermodal impact, with two parallel rail lines (double track each) in each main corridor:

- one for conventional trains at same priority rate for freight and passengers.
- another available for passengers and light freight (high speed trains).

- Trains length 1500 m. and 3600±5000 tonnes.
- Locomotive and wagon new concept.
- Availability of a network of intermodal polyvalent and flexible terminals.
- Unified labour, management and operational systems, coordinated at EU level
- Free Competition, giving all companies access to tracks in non-discriminatory way
- Favourable and homogeneous fees for the use of infrastructures.
- 30±35% of participation of rail in long distance land transportation.
- Unified coordination at EU level of homologation processes, common standards implementation and economic funds allocation in Railway Core Network.
Length of trains

- Average of usual train length in EU network: 400-450 meters
- FERRMED proposes to increase maximum authorized train length up to 1500 meters

- Such a proposal needs the whole Core Network to be modified:
  - Sidings
  - Intermodal terminals
  - Ports connections
  - Railway freight stations

- Execution step by step within the Trans-European Core Network:
  - Trains of 750 m length
  - Trains of 1000 m length
  - Trains of 1500 m length
Maximum slope

- Significant slopes:
  - Reduce train carried load because of breaking and starting reasons
  - More powerful locomotives are needed
  - Engender longer travelling times

- FERRMED proposes that the slopes do not exceed 12mm/m (exceptionally 15 mm/m between short distances of hundreds of meters only)
FERRMED STANDARDS FOR THE EU RAIL FREIGHT CORE NETWORK (4)

Width of the track UIC (1,435 mm)
Loading Gauge UIC – C
TRANSFER FROM ROAD TO RAIL BASED ON MODALOHR TECHNOLOGY (LORRY RAIL) (I)
EC DG MOVE has included in the guidelines of the EU Rail Core Network Proposal, most of FERRMED Standards, except trains of 5000 Tn weight and 1500 m length.

FERRMED insists in the implementation of such kind of trains in some of the most important socio-economic corridors. They allow to increase net loading weight between 75% and 100%, to reduce operational costs by 25% and to improve lines capacity by more than 50%.

FERRMED Standards application is the only way to reverse the decreasing participation of railway in EU land transportation.
An EU leading organism and regulatory body is required in order to coordinate the economic funds allocation for the Rail Core Network development, common standards implementation and giving all companies access to tracks in a non discriminatory way.

In that sense, **to strengthen the role of European Railway Agency** and clear definition of the coordination with Infrastructure Managers is a key.
We understand as FULL FERRMED CORRIDORS the ones of which FERRMED Standards are fully implemented.
FULL FERRMED CORRIDORS (I)

ACTIONS TO BE DEVELOPED

• Bottlenecks solving
• UIC-C loading gauge
• 1.500 m. trains length and 5.000 ton weight
• ERTMS implementation
• International track width in Eastern Iberian Peninsula
• Intermodal Terminals adaptation
• Removal of 10% of the existing freight wagons according to FERRMED conception
INVESTMENT AND SAVINGS

By extrapolating the results of the Global Study made by FERRMED the required investments, in order to develop the aforementioned Actions, is approximately **58 billion Euro** in 18 years (3,2 billion Euro/year in overall EU).

The **savings** (transfer from road to rail, lead time reduction and environmental) from 2016 to 2045 are **350 billion Euro** and the Economic Internal Rate of Return **12%**.
INVESTMENTS BUSINESS ORIENTED

Main topic:
Balanced Socio-economic and Territorial Cohesion investments
AN EFFICIENT ROLLING STOCK

- Adequate locomotives for long and heavy freight trains
- Payload increased
- A larger loading gauge
- Lighter wagons with lighter materials
- Automatic couplings
- The application of technology for the reduction of noise and vibrations
- Common vehicle (locomotives and wagons) homologation-certification at EU level
FULL FERRMED CORRIDORS (VIII)

**Required freight locomotive**

**MAIN CHARACTERISTICS**

<table>
<thead>
<tr>
<th>FERRMED FREIGHT LOCOMOTIVES CHARACTERISTICS</th>
<th></th>
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<tbody>
<tr>
<td><strong>Power of the locomotive</strong></td>
<td>3.500 kN - 5.000 kN</td>
</tr>
<tr>
<td><strong>Axle load</strong></td>
<td>22.5 t/axle—25 t/axle</td>
</tr>
<tr>
<td><strong>Maximum speed</strong></td>
<td>120 km/h</td>
</tr>
<tr>
<td><strong>Type of traction</strong></td>
<td>Diesel locomotive or Electrical multi-tension locomotive</td>
</tr>
<tr>
<td><strong>Multiple traction</strong></td>
<td>Yes, distributed traction (not only locomotives on train’s head)</td>
</tr>
<tr>
<td><strong>Coupling</strong></td>
<td>Automatic, with capability to connect current UIC screw couplers and Russian couplers</td>
</tr>
<tr>
<td><strong>Safety and Signaling system</strong></td>
<td>ERTMS</td>
</tr>
<tr>
<td><strong>Train control system</strong></td>
<td>ETCS</td>
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</tbody>
</table>
### FERRMED Trains Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
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<tbody>
<tr>
<td>Length</td>
<td>1.500m</td>
</tr>
<tr>
<td>Track gauge</td>
<td>1435 mm</td>
</tr>
<tr>
<td>Loading gauge</td>
<td>UIC C</td>
</tr>
<tr>
<td>Gross Weight = Load</td>
<td>3.600 t – 5.000t</td>
</tr>
<tr>
<td>Number of motorized axles</td>
<td>12 axles</td>
</tr>
<tr>
<td>Number of locomotives</td>
<td>More than one: 2 Co-Co or 3 Bo-Bo</td>
</tr>
<tr>
<td>Starting tractive effort of the train</td>
<td>600 kN – 800 kN</td>
</tr>
<tr>
<td>Power of the train</td>
<td>7.000 kW – 10.000 kW</td>
</tr>
</tbody>
</table>
Required freight wagons

MAIN CHARACTERISTICS

Platform concept (several wagon types can be demanded/detachable superstructures)

Three basic designs:
Design A1: Long wagon → mainly for intermodal/volume-cargo (25m of loading length)
Design A2: Short wagon → for bulk and break-bulk commodities
Design B: Flat wagon for trailer Transport

Key parameters: Axle load 22.5 ÷ 25 tons; Loading gauge: UIC-GC; Speed: 100 ÷ 120 km/h.; Central beam; Automatic central couplers; Electric power Supply/ IT equipment; compact brakes

Main advantages:
A1: More capacity when loaded with containers. Better adapted to 40’ containers. 50% more capacity when loaded with C-Swap bodies
B: handles 100% of European semi-trailer fleet
The noise is attributable both vehicle and track.

Rolling noise is produced by the vibration of the wheels, rails and sleepers. This vibration is induced by the combined “roughness” of the wheel and rail surfaces. Balast and sleepers is a very important issue, because a well done installation on balast and sleepers can absorb around 50% of the sound that is incident to them.

One more issue is the weight of the boogies considering the different brake systems.

Boogies with compact brakes, reduce noise, offer space and weight advantages as well as less installation and maintenance work.

See in next figure the three kind of brake systems (Tread, disc and compact)
The boogie main brake systems

Tread brake

Disc brake

Compact brake

SOURCE: Wascosa
Another source of noise are the couplings and bumpers.

To introduce FERRMED freight wagon concept with:

- Central beam for efforts transmission
- Automatic couplings
- Boogies with compact and composite brakes

will reduce weight and noise. In principle, with the same weight per axle, **two additional tonnes could be carried and long and heavy trains could be possible.**

Then, FERRMED asks for a **retrofitting plan at EU level to adapt the existing wagons** (at least in couplings and brakes).

One additional key plan is to introduce new FERRMED concept wagons, at least in Full FERRMED corridors.
Automatic couplings have an important cost saving potential (about 20\%\% 25\%\%, calculated on total cost of marshalling manpower and average rate of derailments/recovery). They allow the possibility to carry long and heavy trains.

Automatic couplings are compatible with the actual and old fashioned coupling used in EU freight wagon. That is really important because at transition period, both systems can be used.
TRANS-EURASIAN RAIL NETWORK
(Eurasian East – West Vector)
TRANS-EURASIAN RAIL FREIGHT TRANSPORTATION

The increasing rail freight traffic between China, CIS countries and the EU, is fully unbalanced regarding the length and weight of the trains. One Russian train can carry 4 or 5 times more weight than a common EU freight train. That represents from EU side important logistics and transportation costs that have to be avoided.

Infrastructure, operation and rolling stock adaptation and fitting for long and heavy trains (in EU) is required in order to increase the competitiveness of China-EU rail connection through Transsiberian link.
INNEFFICIENCY OF THE EUROPEAN TRANSPORT SYSTEM

Logistics costs in EU are, on average, close to 22% of the cost of manufactured products, according to European Logistics Association. 50% of these costs are external transportation.

The results derived from the Study of World Economic Forum 2009 show that:

• 24% of freight vehicles in the EU run empty
• The loading of the rest is, on average, of 57% in terms of weight
• The overall efficiency is only 43%
• There is an estimated recoverable loss for the EU of 160 billion Euro/year

Reducing these costs, balancing the inherent flows, is a key issue in EU, in order to achieve EU White Paper on transport targets.
To reinforce the role of the European Railway Agency (ERA):

• Authority for issuing European vehicle authorization and Single Safety Certification
• Leading organism regarding the management, monitoring and tracking systems at EU level
• Bring together corridors coordinators (trains paths are linked to a network comprising several corridors)
• Pre-arranged trains paths and reserved capacity for international journeys
To deploy a new Strategic Logistics Plan at EU level in order to make land transport system more efficient and sustainable, conveniently balancing both flows and share between rail, road and barge. To accomplish this goal, “Open Data” (both public and private Open Data), duly selected from Big Data, regarding transportation from one place to another of all kind of goods and by all sort of means, is a key.

This means the homogenization of all kind of technical standards and certification procedures across the EU, overcoming fragmentation, considering also intelligent detection and monitoring solutions in the transportation system and single window for all reporting requirements, regardless of the mode of transport.
FERRMED PROPOSALS (and III)

The **Smart Applications** have to take into account R+D+4i factors of excellence and to be **developed from the corresponding Open Data**. In that sense, the tracing of trains, wagons, trucks, barges, etc, has to be perfectly known, as well as the origin and the destination of all of them.

FERRMED wants **to go forward from the previous Freight Transport Logistics Action Plan started in 2007**, asking the EC to look at the achievements made in the last 4 years identifying challenges and opportunities **to determine a New Strategic Logistics Plan**.

This Plan has to consider an ambitious long term vision, but with **specific targets at short and medium terms** in order to enhance land transportation system in the coming 4 years.
However beautiful the strategy, you should occasionally look at the results.

Winston Churchill

THANK YOU VERY MUCH FOR YOUR ATTENTION!