

# FERRMED FREIGHT LOCOMOTIVE CONCEPT

by



Barcelona 27th May 2010



**FERRMED**

Promotion du Grand Axe Ferroviaire de marchandises  
Scandinavie-Rhin-Rhône-Méditerranée Occidentale A.S.B.L

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# INTRODUCTION

Francisco García Calvo  
Industrial Engineering  
Member of Colegio Ingenieros de Valencia  
Barcelona, 27th May 2010



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Faiveley S.A.

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Industrials de Catalunya

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## Why Ferrmed?

- Enhance European competitiveness and sustainable development by improving rail freight transport.
- We need a freight transport system that is more efficient, effective, competitive, environmentally friendly, reliable and safer than the system we have today.
- The strategic importance of rail freight transport has resurfaced due to its really larger freight carrying potential capacity and its efficiency in terms of energy use



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## Ferrmed Objectives

- To promote the creation of the Great Axis Rail Freight Scandinavia – Rhine – Rhone –Western – Mediterranean.
- To promote the implementation of the FERRMED Standards in the EU and neighboring countries rail networks.
- To improve intermodal freight transportation – railway being one of the modes – all over the EU and its neighboring countries.



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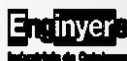
## ***Ferrmed Objectives***

- To improve ports and airports rail connections with their respective hinterlands.
- To contribute to a more sustainable overall development through the reduction of pollution and green house gas emissions.
- To stimulate European competitiveness through the continuous improvements of the global/multimodal chain of added value in the European Union and its neighboring countries.



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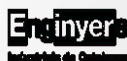
## ***Ferrmed Standards for Locomotive***

- **Interoperability** is key to improve the competitiveness of rail freight .
- FERRMED proposes a set of standards:
  - A EU reticular and polycentric network with a great socio-economic and intermodal impact .



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## ***Ferrmed Standards for Locomotive***

- The main branches of the axes should have:
  - Electrified (preferably **25.000 volts**) conventional lines with **double track**, giving priority or **exclusiveness to common freight traffic** suitable for trains with per **axle load of 22.75 ÷ 25 tones**.
  - High performances parallel lines available for exclusive or preferential use of passenger and light fast moving freight transportation properly connected with the main airports network.



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## ***Ferrmed Standards for Locomotive***

- Width of the tracks: UIC.
- UIC C loading gauge.
- Freight trains length reaching 1.500 meters with loading capacity from 3.600 to 5.000 tones.
- A maximum slope of 0.012 and limited ramps length.



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## ***Ferrmed Standards for Locomotive***

- Availability of a network of intermodal polyvalent and flexible terminals based in the harbors and main logistics nodes of the great axes.
- Usable length of siding and terminals for 1.500 m trains.
- Unified management and monitoring systems by main branches of every great axis.
- ERTMS system with “two ways working” along the tracks.



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**vossloh**

**Faiveley S.A.**

**Engineers**  
Industriale de Cotemp

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## ***Ferrmed Standards for Locomotive***

- Availability of capacity and traffic schedules for freight transportation “24 hours a day and 7 days a week”.
- Harmonization of the administrative formalities and the social legislation.
- Transport system management shared with several rail operators (free competition).



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## ***Ferrmed Standards for Locomotive***

- Favorable and homogeneous fees for the use of infrastructures, bearing in mind the socioeconomic and environmental advantages of the railway.
- Rail freight management philosophy based on the principles of the “R+D+4i” (Research, Development, innovation, identity, impact, infrastructures) in the rail freight network.



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## ***Ferrmed Standards for Locomotive***

- Reduction of the environmental impact of the freight transporting system (particularly noise, vibration and CO2 emissions).
- Locomotive and wagon concepts adapted to FERRMED Technical Standards.





## **FERRMED FREIGHT LOCOMOTIVE CONCEPT**

The aim of this Study is to define the minimum design parameters that the EU locomotives should have to fulfil the FERRMED Standards, particularly long and heavy trains.

The items analyzed are: power, pantographs, adhesion, coupling, multiple traction, brake system, interoperability, ergonomic and safety, signalling, noise, emissions and energy efficiency among others.



# STATE OF ART

Joan Locutura Moré  
Scholar of Alstom-UPC Chair  
Barcelona, 27th May 2010



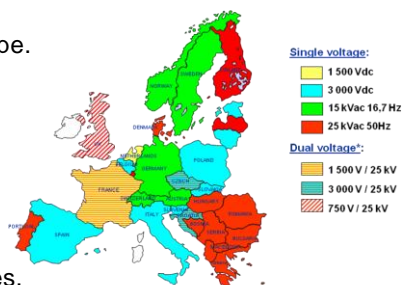
## Aspects to be answered

- How are our European networks?
- Are them compatible?
- What about other places?
- Why is not Europe as other countries?

## Different Power Supplies voltage

### Infraestructure:

- Many different voltages around Europe.
- AC/DC voltage
- Different frequencies
- FERRMED: 25kV AC



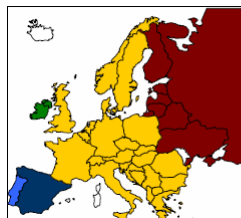
### Locomotives:

- Nowadays, they are ready for all types.
- It would be easier for manufacturers if there was only one type.
- Everybody would work only with one system, so quality will increase.

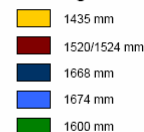
## Different Track Gauges

### Infraestructure:

- Special problem at Iberian peninsula and north East of Europe.
- Increase final time and costs of trip.
- Fermed: UIC (1435mm)



### Track Gauge



### Locomotive:

- It's not possible to change bogie in short time
- It would be need only one type of bogie for loco.

## Different Loading Gauge

### Infraestructure:

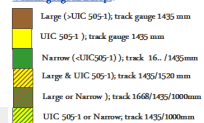
- Tunnels and bridges width and minimum distances are different from one to another country.
- It reduces maximum freight carried.
- Fermed: UIC 505 C



### Locomotives:

- Nowadays, It must be designed as the most restrictive loading gauge.

### Vehicle gauge in Europe:



## Direction of Running

### Infraestructure:

- Different direction depending on the country.
- Direction of signs depend on direction of the track.
- Ferrmed: this point is not change on infraestructure.



### Locomotive:

- Ferrmed: with European Driver's Desk, the driver is at the center of locomotive so two ways are possible.

## Different signalling systems

### Infraestructure:

- Nowadays, each country has its own signalling system.
- Ferrmeds: there's only one system called: ERTMS
- ERTMS: ATP + GSM-R



### Locomotives:

- Today, each locomotive is equipped with as many systems as countries cross.
- Ferrmed: They are equipped only with ERTMS.

# What about around the world?

## Comparison between different places

	Europe	USA	China	Australia
<b>Priority</b>	Passenger	Freight	Freight	Freight
<b>Freight transport by rail (%)</b>	14	40	50	-
<b>Power</b>	Electric	Diesel	Diesel/Electric	Diesel
<b>Axle load (T/axle)</b>	20	32	25	32
<b>Coupling</b>	Chain	Automatic	Automatic	Automatic
<b>Train length (m)</b>	450-750	2.000 or more	2500	2.000 or more

# Why is not Europe as other places?



## Political barriers:

- European Governments consider rail freight transport as a subproduct of the railways.

## Infrastructure:

- There is not dedicated freight corridors in Europe or lines where freight transport has priority over passenger transport.

## Interoperability problem between countries:

- There are different regulation but also other barriers like different voltage, radio frequency, track gauges, signaling systems, load gauges...

