C4R

Capacity for Rail

Project overview

2nd Dissemination Workshop – Brussels, 3rd November 2016

SEVENTH FRAMEWORK PROGRAMME

The transport challenge of 2030/2050

C4R
Capacity for Rail

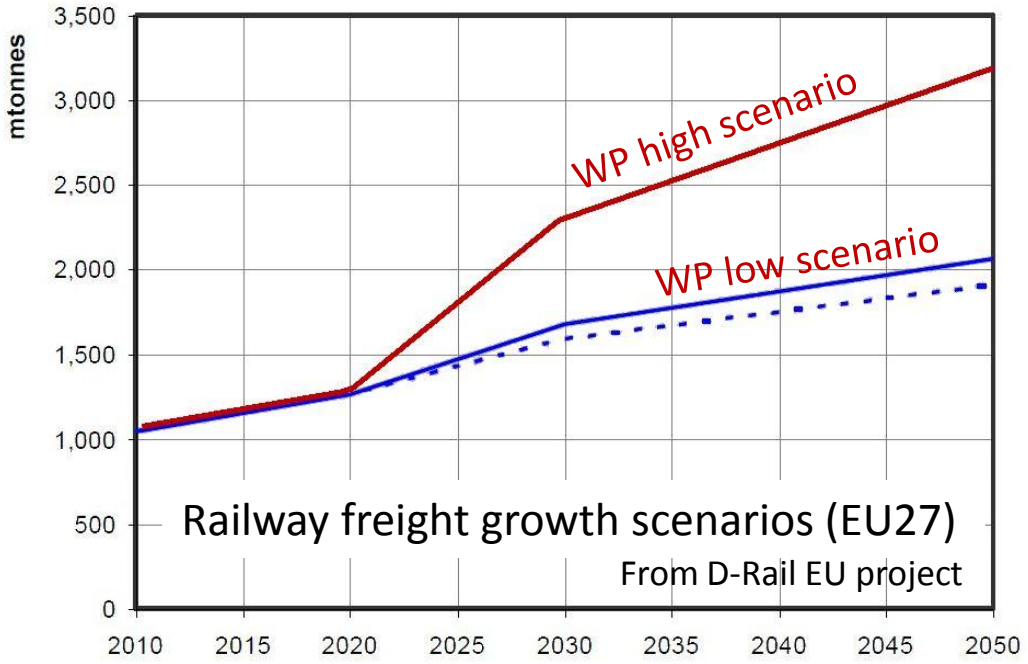
- **Challenging demand**

Demand for railway transport is rising, driven by several factors:

  - Urbanisation
  - Environmental concerns
  - Energy costs
  - Road congestion

- **Concentration of traffic**

  - On already busy corridors
  - Freight routing from a limited number of large sea ports
  - to already congested urban areas



EU White Paper target ⇨ 50% of road freight over 300 km to be shifted to other modes by 2050

Making the rail the mode of choice

Capacity for Rail

- **Increase the attractiveness of railways by making it:**

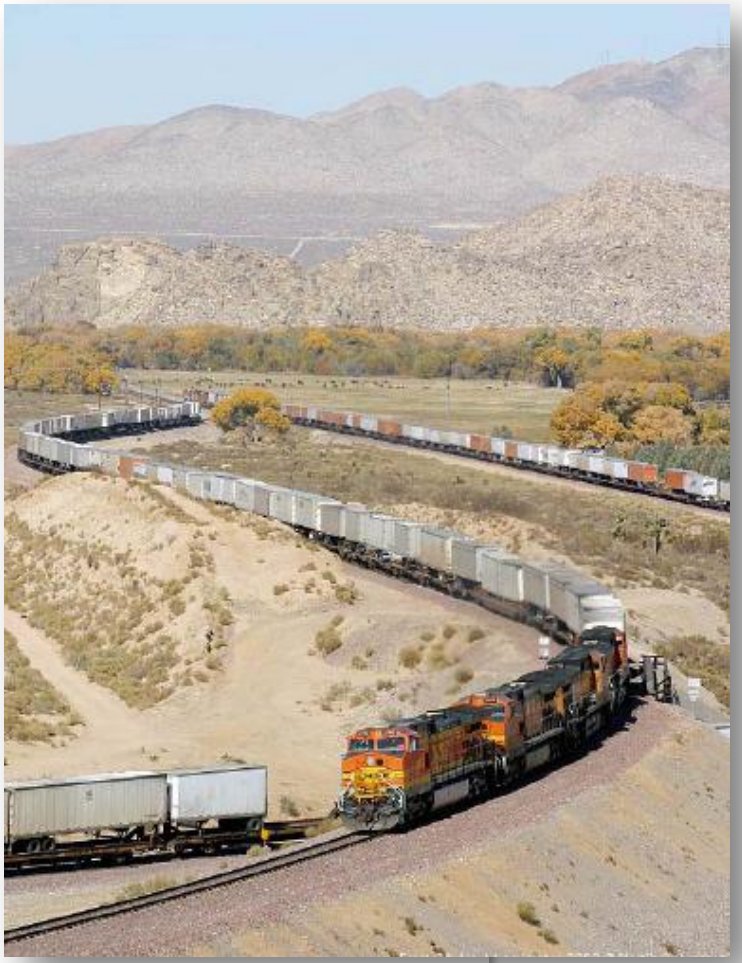
Resilient

Adaptable

Automated

Affordable

→ High Capacity



Squeezing extra capacity out of existing needs to be done without impacting the quality of the rail offer

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Resilience: *challenges and levers*

- Resilience to daily malfunctions

  - **Capacity management** has to cope with trains which are not on time, with technical defects, with HR dropouts, etc.
  - % of on-schedule trains indicator allowing up to 10’ delay to be considered “on-time” spoils the capacity in nodes, where the accuracy is essential -> temptation to build time schedules with safety margins of extra time.

Automation: automatic re-scheduling and decision helping ; real time information to drivers, automatic driving.

Reliability of vehicles

Resilience: *challenges and levers*

Capacity for Rail

- Resilience to the expected increase of climate events

  Average temperatures, extreme temperatures, heavy rains, snow, floods, landslides

- Resilience to the expected increase of duty

  Higher axle loads, speeds, cumulated tonnage, accelerations and breaking efforts…

Infrastructure: Design of earthworks, Switches & Crossing, innovative slabs, rails

Advanced monitoring and alerts

Incident management plans

Reliability of vehicles

Adaptability: *challenges and levers*

- Market needs flexibility and extensibility
- Necessity for shippers to be able to order a train path at very short notice.
- Adaptation to daily, weekly, yearly or seasonal variations

Automatic timetabling: forecast models based on real time information on operation, giving ability to allocate or re-allocate remaining capacity with short notice

Improved real time **data collection** and **exchange of information**.

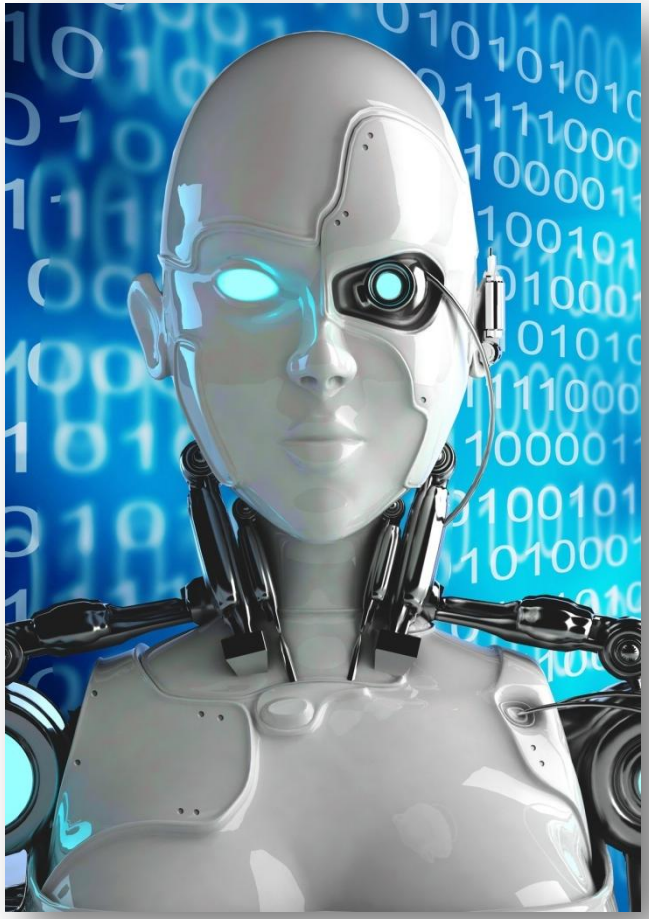
Adaptation of wagon design to customer's upcoming needs

Affordability: *challenges and levers*

Capacity for Rail

- Capacity needs to be created at low cost, or users and shippers will not go on the most expensive lines
- **Procurement cost:** cheap design solutions and building process, modularity
- **Operational costs:** low maintenance needs and high maintainability
- **Environmental friendliness**: maintain the rail advantages and improve its noise performance.
- **Social affordability** : maintain the expected high level of safety

Automation: *challenges and levers*



- **Release human resources** for high value activities
- Use of algorithms and information technology to **streamline the processes**.
- increased **throughput**; improved **robustness** of processes

Automated timetabling: development algorithms for optimised resolution of bottlenecks

Help for decision making

Assistance to the driver

Automated infrastructure self monitoring

High-Capacity: *challenges and levers*

Capacity for Rail

- Virtually **no constraints** on operations
- Can **accommodate customer's demand** at any time
- Tolerates interventions with **minimal impact**

Carrying capacity of trains/slot: longer trains, improved loading space, heavier payload.

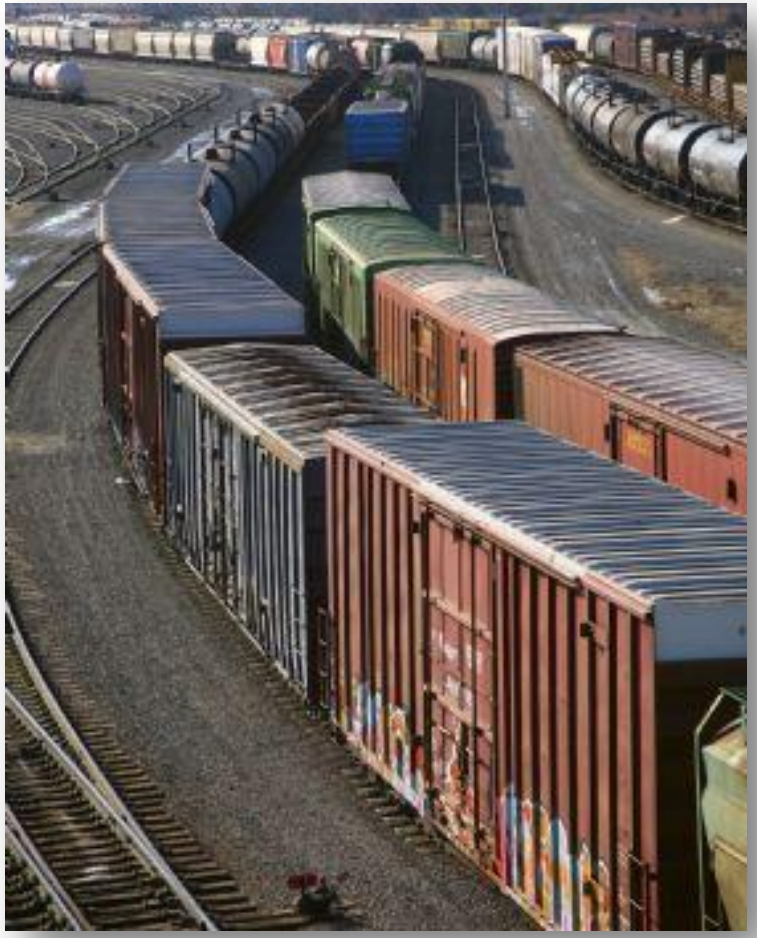
Optimised design and freight operations at transshipment terminals

Reduction of capacity consumers for infra: quicker installation, less maintenance needs, quicker maintenance, non-intrusive monitoring, train-borne solutions

Objectives of C4R

The overall objective of CAPACITY4RAIL is **to set up a vision and bring the railway system towards a resilient, affordable, adaptable, automated and high-capacity railway for 2030/2050,** through major step changes in:

- infrastructure design, construction and maintenance (including advanced monitoring)
- freight operations, with a particular focus on transshipment and improved performance of rolling stock.
- operations management, automation
- incident recovery through real-time data management



Project structure breakdown

C4R
Capacity for Rail

2050
2030
2020

SP5

Migra-tion

State of art

⇩

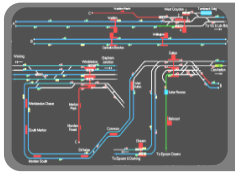
Vision

⇩

Roadmap

SP1 - Infrastructure

SP2 – New concepts for efficient freight



SP3 - Operation for enhanced capacity

SP4 - Advanced monitoring

Recommendations, roadmap

Scenarios for smooth migration from now to 2050

Assessment of the full sustainability of the developed solutions

Demonstration

SP6 – Dissemination and management

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The C4R consortium

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Facts and Figures

Total Budget: €15 million
(€9.9 M€ EU funded)

Duration: 48 months

Project Start Date: 01/10/2013

Project End Date: 30/09/2017

Partners: 46

Grant agreement n° 605650