The European Freight Rail Experience with Innovation

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## Contents

- Challenges facing European Freight Rail  
  - 3
- European Freight Rail Innovation: Interoperability  
  - 8
- European Freight Rail Innovation: Logistics  
  - 12
- Summary  
  - 20
Challenges facing European Freight Rail
Globalisation and modern demographic development has led to the need to:

- move bigger quantities over further distances on busier railways
- move goods/components that require logistical support and not stockpiling

Environmental issues - sustainability and noise pollution; social responsibility; security issues and technological innovation have all changed the landscape

Road Vs. Rail = 8 process steps Vs. 12 process steps
The EU encourages Rail Freight

- Modal share of rail freight has been consistent around about 18%
- The European Commission wants to increase rail share by 2030 to 25% (286 billion train km’s)
- The 2011 European Commission White Paper stated the goal that:
  - by 2030, 30% of road freight should shift to other modes of transport such as rail or waterborne transport
  - by 2050 50% of road freight should shift to other modes
- To achieve this the rail freight industry must see improvements in reliability, punctuality, predictability of turnaround and safety
- Efficient use of capacity needs to be maximised
Coal saw growth since 2010 but only due to economic recovery and price reduction as the US switched to shale gas

2014/15 forecast for both coal and metal freight to fall to 2010/11 levels

Intermodal growth despite economic downturn
A 1% reduction in the costs of fuel/energy, people and assets & overheads could more than **double** annual profits.

**Typical UK freight company cost of sales breakdown**

<table>
<thead>
<tr>
<th>Fuel/Energy Costs</th>
<th>People</th>
<th>Assets &amp; Overhead</th>
<th>Access</th>
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<tbody>
<tr>
<td>0%</td>
<td>30%</td>
<td>60%</td>
<td>90%</td>
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European Freight Rail Innovation: Interoperability
Interoperability across Europe

- Supported by the EU’s executive body - the European Commission
- Establishment of nine initial rail corridors traversing Europe
- Corridors governed by a pan-European Executive Board
- Freight Rail companies developed a core of common infrastructure requirements across the countries
- Increased harmonization of operating rules, train planning and vehicle authorisation
Three ‘Railway Packages’ adopted by EU since 2001 to reinforce the competitiveness of rail. Provisions introduced include:

- Open access to all European railway undertakings for international and national freight services
- Definition of conditions for companies seeking licenses to operate freight rail services across Europe
- Increased transparency of the processes governing access charges and capacity allocation
- Setting of requirements for safety certification of railway undertakings
- Establishment of a European Railway Agency
- Mechanism for harmonising safety standards and requirements
Uniform Infrastructure

- Uniform railway signalling across EU to improve interoperability – ERTMS
- Uniform set of maintenance rules for rolling stock
- Facilitate wagons with a high load capacity
- Kinematic Gauge standardization wherever possible:
  - Increased use of GC Kinematic Gauge (4,650mm high by 3,150 wide)
- Longer trains – up to 1,500m and associated infrastructure requirements
European Freight Rail Innovation: Logistics
Remote Condition Monitoring

- On-board remote condition monitoring and data from On-Train Monitoring Recorder if available
- Incorporated into new wagon design and retro-fitted where possible
- Enables rectification before train failure

<table>
<thead>
<tr>
<th>Alarm Severity 1</th>
<th>Traction Motor 1</th>
<th>Traction Motor 5</th>
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<tr>
<td>66324 15:17</td>
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<td>66011 15:31</td>
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<td>Fuel Level</td>
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<table>
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<table>
<thead>
<tr>
<th>Alarm Severity 3</th>
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<th>A Exam Overdue</th>
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<td>66005 14:12</td>
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<td>66324 15:17</td>
<td></td>
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</tr>
<tr>
<td>66014 15:31</td>
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</table>
Mobile consisting

- Mobile/hand-held, ‘cloud’ based applications for:
  - Depot and ground staff
  - Drivers and shunters
  - Network Rail/Infrastructure Staff
- Each person can log that their part in the process of preparing the train’s consist is completed
- Driver and depot controllers also log their readiness
- Reduction in train preparation time
- Removes need for paper processes and file storage in ‘portakabins’
Connectivity

- Cloud based application taking feeds from the timetable, GPS and the mobile consist readiness data
- Gives everybody early visibility of train arrival and ‘train ready to depart’ times
- Data also used for ‘Driver Advisory’ system which can enable live train path amendment

<table>
<thead>
<tr>
<th>Departures</th>
<th>Time</th>
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<td>Glasgow</td>
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<td>On Time</td>
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<tr>
<td>Leeds</td>
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<td>Pending</td>
</tr>
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<td>Tilbury</td>
<td>15:31</td>
<td>Pending</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Arrivals</th>
<th>Time</th>
<th>Status</th>
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<tbody>
<tr>
<td>Wakefield</td>
<td>14:12</td>
<td>Pending</td>
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<td>Tilbury</td>
<td>15:17</td>
<td>Delayed</td>
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<tr>
<td>Manchester</td>
<td>15:31</td>
<td>Pending</td>
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The Roller Container Transport System

- Containers equipped with steel roller wheels
- Moved between rail and lorry utilizing specially equipped rail cars and lorries with lever arm mechanisms
- Ideal for transporting items such as waste products or construction material to/from remote villages where rail is a better option than lorries travelling on winding roads
- Known as the ACTS system (Abrollcontainer Transport System) it is seen in Switzerland, Germany, Austria and the Netherlands

Rolling Highways

- Lorries are transported on rail cars with low decks and specialized bogie assemblies
- Drivers can rest in connected passenger cars
- Commonly seen in the mountainous regions in Switzerland, Austria, France and Italy
- Avoids traffic jams in narrow, winding roads whilst drivers can have compulsory rest time
- A further innovation - the Modalhor railroad car has standard bogies and a pivoting deck to enable easier loading and unloading

**CargoBeamer**

- Lorries leave their semi-trailers on specially designed sliding pallets
- When the train arrives the pallets slide sideways onto the train
- As one pallet slides onto the train, another pallet slides off the train
- Trains loaded and unloaded in just 15 minutes, 10% of the time taken using a crane
- No need for lorry and train to wait for each other
- No cranes used - can be used with overhead electrification
- The system is being developed in Germany with support from the EU

*Picture Source: CargoBeamer*
Summary
Only the beginning

- The rail freight industry in Europe needs to modernize and innovate in order to continue to compete with road haulage
- Network Rail has been focussing on enabling the move from ‘rail freight’ to ‘integrated logistics’
- Within the wider EU there has been a wider focus on innovations that help with the interoperability, and efficiency and reliability of rolling stock and freight handling
- Rail operators and governments will continue to drive and support innovation in order to meet challenging targets for rail’s modal share of freight
Thank you