How to improve competitiveness of rail freight?

Increase economies of scale
  → To improve productivity / reduce costs per output-unit
  → improving cost competitiveness of rail freight

• Introduce new production systems
  → To respond to new market demands / enter into new market-segments
  → improving quality competitiveness of rail freight
Situation today

- Separate wagon fleets for trainload, wagonload and intermodal
  - trainload: specialized wagons
  - wagonload: multipurpose wagons
  - intermodal: dedicated fleet for intermodal traffic
- Existing norms and standards not necessarily adequate to respond to future market demands due to changing competitive environment
- Most efficient wagons today are "exceptions from the standards"
- Careful review of vehicle as well as related infrastructure standards will be necessary

Outlines of a new freight wagon concept

- Platform Concept
  - to achieve economies of scale in production and maintenance
  - several wagon types can be derived
  - detachable superstructures
- Three basic designs
  - Design A1: Long wagon → mainly for intermodal / volume-cargo
  - Design A2: Short wagon → for bulk and break-bulk commodities
  - Design B: Flat wagon for trailer transport
- Approach
  - combine innovative, but proven solutions for sub-systems rather than developing ‘revolutionary’ new solutions with high technical risks
Examples of flexible superstructures

Key parameters

- Axle-loads: 25 tons (optionally more)
- Loading gauge: UIC GC, extended gauge on selected corridors
- Train length: 750 m (1,000 m) or 2 * 750 m = 1,500 m
- Design speed: Generally 100 km/h at 25 t axle-load, optionally more at reduced axle-load (120/140/160 km/h)
Benefits of higher axle-loads

•... for **heavy cargo** (e.g. ore, steel, paper, liquid cargo):
  • Increased payload per train-length (ton/meter)
  • Heavy Cargo Wagon

•... for **volume cargo** (e.g. finished and semi-finished products, typical intermodal cargo):
  • Decreased number of axles per train-length (axles/meter)
  • Wagon design A (Long wagon)

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Design A1 – long wagon (80’)

Today – loading length ca. 19 m

- 20’
- 20’
- 20’

- 7.15-7.82 m

Future – loading length ca. 25 m

- 20’
- 20’
- 20’
- 20’

- 7.15-7.82 m

• 33% more capacity when loaded with containers
• better adapted to 40’-containers (~75% of maritime containers)
• 50% more capacity when loaded with C-swap bodies
• frame slightly heavier due to longer span, but bigger distance between bogies → tare weight per meter less than today’s wagons
• tare weight ca. 23-24 ton
Averaged European Unit Distribution Equivalent to 100 TEU (No. Units)

- 5%: ISO 40’
- 7%: ISO 20’
- 11%: ISO 45’
- 13%: SB 7.15m
- 18%: SB 7.45m
- 21%: SB 7.82m
- 5%: SB 13.7m
- 3%: Semitrailer

Longer wagons mean:
- more flexible loading patterns for a wide range of loading unit lengths
- higher wagon utilization
- lower transport costs

North-American Standard 80’-wagon

Australian class CQMY 80’-wagon
### Denomination

<table>
<thead>
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<th>LMPW – Long Multi-Purpose Wagon</th>
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<tr>
<td><strong>Denomination</strong></td>
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<tr>
<td><strong>Type of goods</strong></td>
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<td><strong>Length over buffers/couplers</strong></td>
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<td><strong>Loading length</strong></td>
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<td><strong>Distance between bogie centers</strong></td>
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<td><strong>Floor height</strong></td>
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<td><strong>Electric power supply</strong></td>
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<td><strong>Other</strong></td>
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</tbody>
</table>

### Design B: Flat wagon for semi-trailers

- **Today** – pocket wagon
- **Future** – trailer on flat wagon

**Excludes >95% of European semi-trailer fleet!**

**Handles 100% of European semi-trailer fleet**
Approach for European TOFC-solution

Combination of:

• Slightly decreased floor height – 800 mm
• Slightly increased loading gauge – 4.800 mm (on relevant corridors)

→ Sharing the responsibility for implementation between wagon design and infrastructure development
Other key features

- Automatic central couplers
  - allows removal of side buffers and simpler/lighter frame design (medium-term)
  - screw-coupler-compatible central coupler to reduce implementation barriers
- Electric power supply
  - for railway-internal applications (IT)
  - for customer applications (e.g. reefer containers/trailers, operation of sliding doors, …)
  - energy-supply stationary and during transport

Comparison:
Number of Loading Units per 100 m
Comparison: Number of loading units per axle

Nr of LU per axle

Comparison: Maximum payload per loading unit

Maximum payload per LU (with regard to axle-load !)
Conclusions

The FERRMED Wagon Concept:
• allows to make optimised use of the FERRMED Standards for the rail network
• is flexible and addresses a wide range of market segments (trainload + wagonload + intermodal; volume cargo + high-density cargo + different types of intermodal loading units)
• improves economies of scale in rail transport
• optional features open up for introduction of new operation methods and customer-benefits
• is in line with trends in wagon design on global level

Thank You for Your attention!