Innovation in railfreight for the customer
More Payload – Less Interfaces - Automation

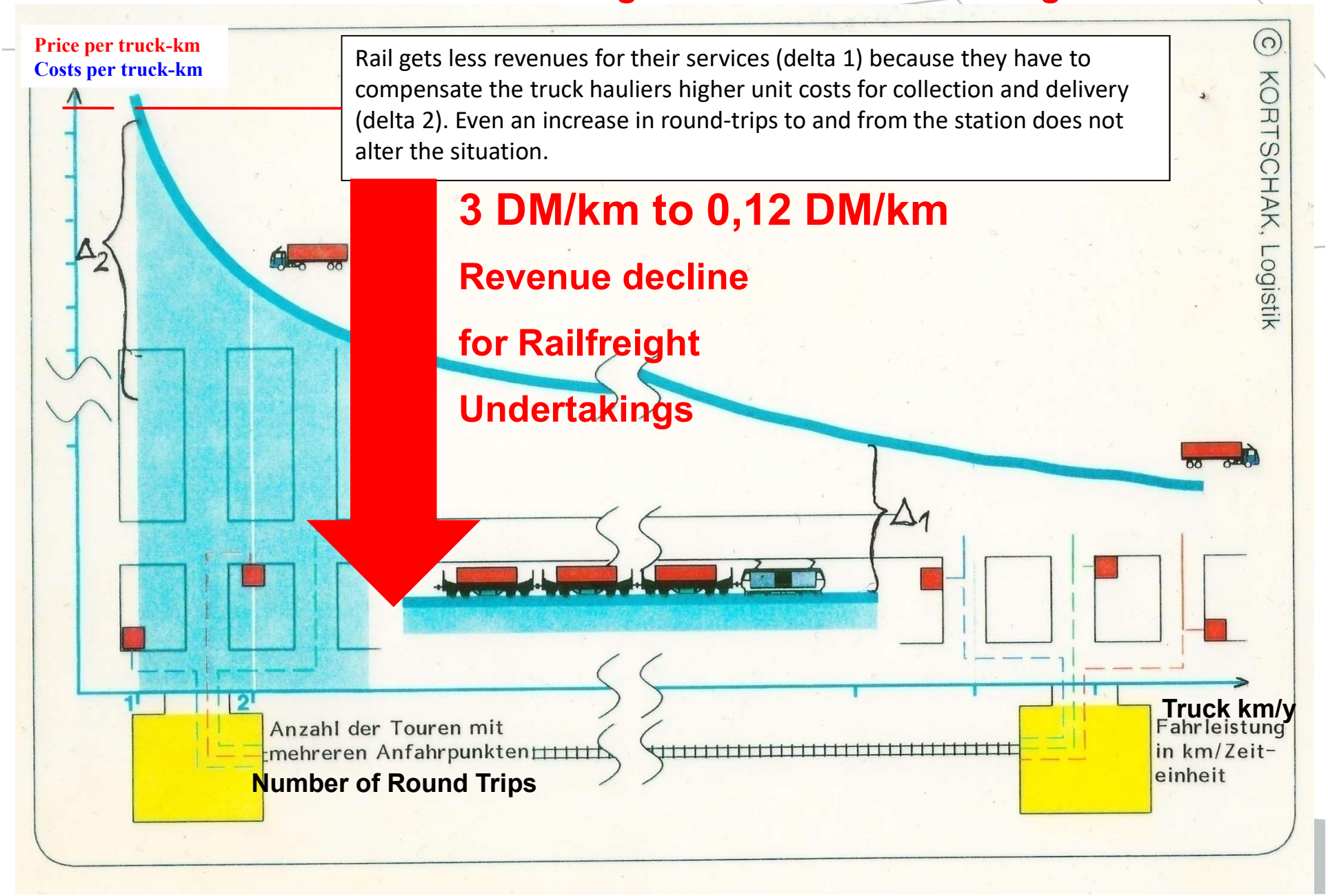
Prof. Univ.-Doz. Dr. Dr. Bernd H. KORTSCHAK

EU Strategy for Danube Region (EUSDR), with support of UNECE

The Danube Region Transport Day 2024

Ljubljana December 3,2024

The Problem: Revenues for Rail freight fell well below the long distance truck



Innovation for the customer

The problem: lack of Revenues for IM‘s & RU‘s:

The solution:

Payload/train ⬆ Interfaces ⬇ Automation

1. Higher Payload per Train -> add more payload per m train length

Innovation for the customer

WIRTSCHAFTS UNIVERSITÄT WIEN

Higher Payload per m train length

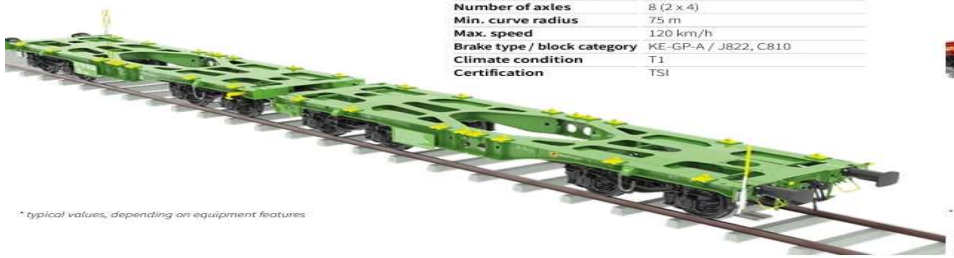
2x30 ft InnoWaggon

The 2x30 ft InnoWaggon is the shortest member of the InnoWaggon family. Compared to longer wagons, it has a higher load per meter so that, depending on requirements, shorter trains or higher payload are possible with the same train length.

This makes the wagon suitable for all types of goods with a very high specific weight, such as those required for the supply of raw materials in the metal industry. The 2x30 ft InnoWaggon is also a top choice for transporting finished metal products.

Technical data 2x30 ft InnoWaggon*

Classification	Sggmmrrs
Classification code	4658
Track class	A, B1, B2, C2, C3, C4, D2, D3, D4
Tare weight	28.4 t (2 x 14.2 t)
Max. payload	151.6 t
Max. axle load	22.5 t
Max. meter load	8.00 t/m
Max. container pins	32
Floor height	
above rail level	1,155 mm
Loading length	2 x 10,310 mm
Length over buffer	22,500 mm
Width	2,874 mm
Track gauge	1,435 mm
Dist. between bogie pins	6,500 mm
Bogie wheel base	1,800 mm
Wheelset diameter	920 mm
Number of axles	8 (2 x 4)
Min. curve radius	75 m
Max. speed	120 km/h
Brake type / block category	KE-GP-A / J822, C810
Climate condition	T1
Certification	TSI



** typical values, depending on equipment features*

2x40 ft InnoWaggon

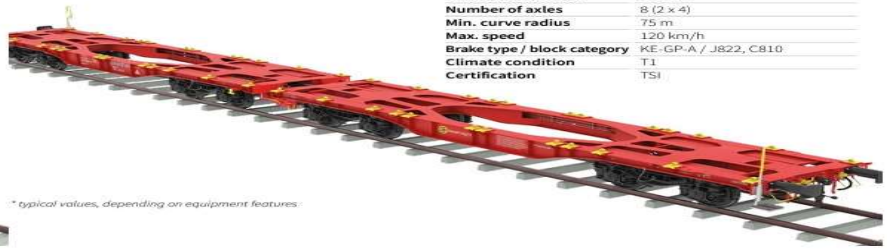
The 2x40 ft InnoWaggon was the first member of the InnoWaggon family and is the perfect combination of payload and loading length for many types of cargo.

The wagon is best suited for goods with high mass, such as building materials, ores, limestone or even grains.

The 2x40 ft InnoWaggon is also available as a Finno version for the 1,524 mm broad gauge commonly used in Eastern Europe.

Technical data 2x40 ft InnoWaggon*

Classification	Sggrrs
Classification code	4854
Track class	A, B1, B2, C2, C3, C4, D2, D3, D4
Tare weight	29.7 t (2 x 14.85 t)
Max. payload	150.3 t
Max. axle load	22.5 t
Max. meter load	6.76 t/m
Max. container pins	48
Floor height	
above rail level	1,155 mm
Loading length	2 x 12,370 mm
Length over buffer	26,620 mm (long stroke buffer: 26,710 mm)
Width	2,878 mm
Track gauge	1,435 mm (Finno: 1,524 mm)
Dist. between bogie pins	8,070 mm
Bogie wheel base	1,800 mm
Wheelset diameter	920 mm
Number of axles	8 (2 x 4)
Min. curve radius	75 m
Max. speed	120 km/h
Brake type / block category	KE-GP-A / J822, C810
Climate condition	T1
Certification	TSI



** typical values, depending on equipment features*

2x45 ft InnoWaggon

The 2x45 ft InnoWaggon is the longest member of the InnoWaggon family and has a greater loading length compared to the shorter wagons, combined with an equally high payload.

The longer loading surface compared to other wagons and the resulting higher loading volume enables the efficient transportation of goods with a high volume at a lower specific weight or very long goods.

The 2x45 ft InnoWaggon is also available as an Ibero version for the Iberian broad gauge.

Technical data 2x45 ft InnoWaggon*

Classification	Sggmrrs
Classification code	4657
Track class	A, B1, B2, C2, C3, C4, D2, D3, D4
Tare weight	29.9 t (2 x 14.95 t)
Max. payload	150.1 t
Max. axle load	22.5 t
Max. meter load	6.09 t/m
Max. container pins	32
Floor height	
above rail level	1,155 mm
Loading length	2 x 13,820 mm
Length over buffer	29,520 mm (long stroke buffer: 29,610 mm)
Width	2,890 mm
Track gauge	1,435 mm (Ibero: 1,668 mm)
Dist. between bogie pins	9,520 mm
Bogie wheel base	1,800 mm
Wheelset diameter	920 mm
Number of axles	8 (2 x 4)
Min. curve radius	75 m
Max. speed	120 km/h
Brake type / block category	KE-GP-A / J822, C810
Climate condition	T1
Certification	TSI

** typical values, depending on equipment features*

80 ft InnoWaggon

The 80 ft InnoWaggon is the newest member of the InnoWaggon family. In contrast to the other InnoWaggon types, it is only a single-piece wagon. The wagon, which is also weight-optimized, is the ideal base for light (finished) products, very long products and for transporting intermodal or standard ISO containers. The wagon has around 7 percent less tare weight than comparable 80 ft wagons.

The one-piece 80 ft InnoWaggon is also available as an Ibero version for the Iberian broad gauge.

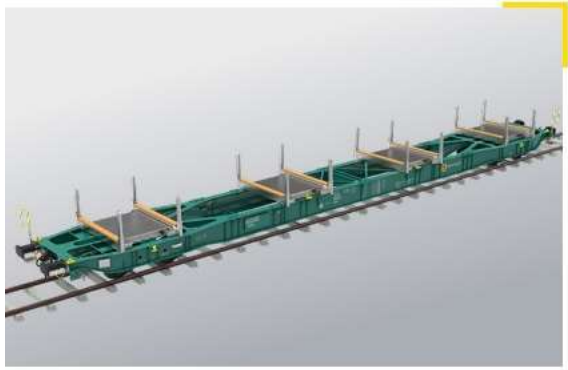
Technical data 80 ft InnoWaggon*

Classification	Sggns
Classification code	4561
Track class	A, B1, B2, C2, C3, C4, D2, D3, D4
Tare weight	19.7 t
Max. payload	70.3 t
Max. axle load	22.5 t
Max. meter load	3,50 t/m
Max. container pins	36
Floor height	
above rail level	1,155 mm
Loading length	24,470 mm
Length over buffer	25,710 mm
Width	3,068 mm
Track gauge	1,435 mm (Ibero: 1,668 mm)
Dist. between bogie pins	19,070 mm
Bogie wheel base	1,800 mm
Wheelset diameter	920 mm
Number of axles	4
Min. curve radius	75 m (Ibero: 120 m)
Max. speed	120 km/h
Brake type / block category	KE-GP-A / J822, C810
Climate condition	T1 / T3
Certification	TSI

** typical values, depending on equipment features*

Innovation for the customer

Higher Payload per m train length



SteelPallet

Length: 10 ft

Loading length: max. 24.4 m

Max. payload per wagon: 67 t

Loaded goods:
steel slabs, blooms, pipes

Unloading:
unloading crane or forklift

Standard ISO Container
(intermodal)

Container length: 20 ft / 40 ft

Max. payload of the wagon without container: 70 t

Standard Reefer Container
(intermodal)

Container length: 20 ft / 40 ft

Max. payload of the wagon without container: 68 t

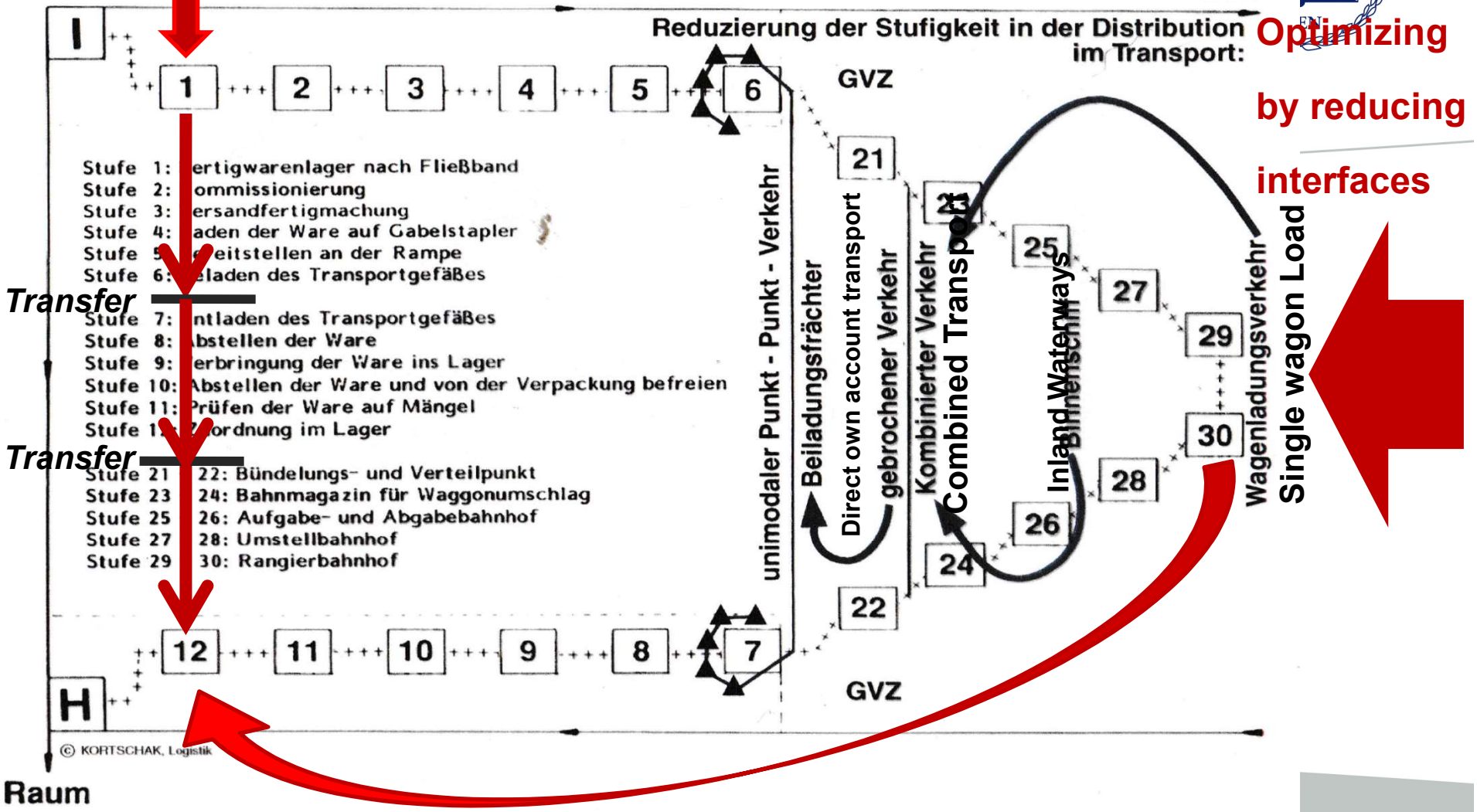
Besonderheit:
GensetTainer for reefer energy supply integrated in the wagon frame

Innovation for the customer

1. **Higher Payload per Train -> add more payload per m train length**
2. **Reducing costly time consuming interfaces for transfer**

INNOFREIGHT Solutions:

- Maximum Payload per m train length
- Direct Movement Warehouse to Warehouse



Optimizing by reducing interfaces

From 1 to 12 by immediate *transfer* without buffer = INNOFREIGHT

Innovation for the customer

Tragöß Collection by electric truck to Terminal

Terminal – industrial site by rail

Industrial site: rail to store by one move

https://www.innofreight.com/videogalerie/#foobox-1/28/jqh4mUU81ns

Tragöß Collection by electric truck to Terminal

Terminal – industrial site by rail

Industrial site: rail to store by one turn around

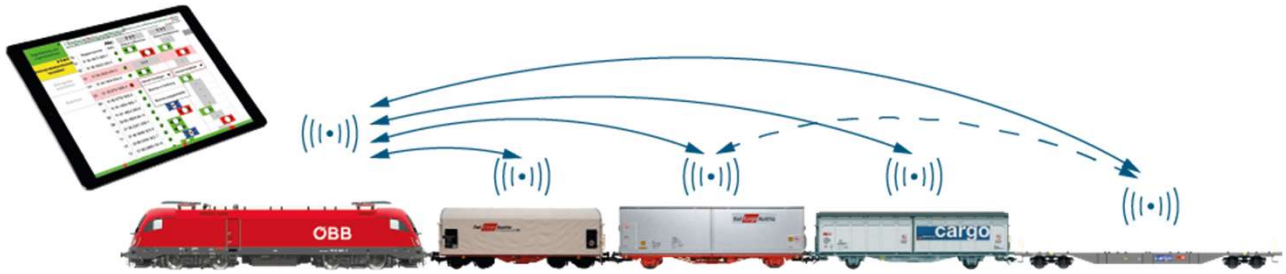
Total length of journey 120 km ! (not more than 700 km)

Innovation for the customer

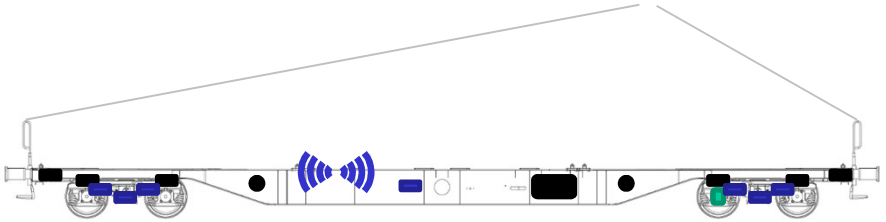
1. **Higher Payload per Train -> add more payload per m trainlength**
2. **Reducing costly time consuming interfaces for transfer**
3. **Automation**

Innovation for the customer

Intelligent Freight Train – Real-Time Monitoring during Train Operation



Real-time monitoring



- Brake status of last waggon
- End of train status
- Derailment diagnosis
- Hot axle box warning
- Automatic/remote controlled park brake
- Automatic/remote controlled de-coupling
- Diagnosis of faulty braking wagons during operation
- Safety relevant measurement of trestle/hitch
- Base for future requirements

Developed in cooperation with

SBB CFF FFS Cargo · Rail Cargo Group Member of ÖBB · MERCITALIA RAIL GRUPPO FERROVIE DELLO STATO ITALIANE

source: PJM

Automation

WaggonTracker System =

Monitoring and safety relevant automation in one platform.

WaggonTracker: The cutting-edge technology provides a wide range of monitoring features and automated processes

Monitoring

- Vehicle performance
- Positional data: Current country, next down, next country, last move, running direction etc.
- Historic data
- Geofencing
- Management of wheelset-performance
- Derailment diagnosis
- Temperature of axle bearing
- Impact detection
- Identification of wheel flats
- Load situation (overload, asyemetric load, load of wheel sets)
- Signals / acoustic alert while loading the vehicle
- Impact detection (according to EN 12663, vertical impact monitoring)
- Monitoring of the barking-break position
- Identification of wheel flats
- Protection against incorrect or improper use (overload, reporting of incorrect usage etc.)
- Acceleration
- Moisture and temperature
- Door monitoring including alert (anti-theft protection, camera)

Automated processes

- Automated load monitoring system
- Automatic brake tests

Product design

- Autonomous power-supply, due to a hub generator
- Autonomous data-transfer via in-train-communication
- Patented technology
- Easy to install, even on old freight wagons
- Robust, long-lasting and maintenance-free

source: PIM

Take Away

Fixed assets need better utilisation in business

Higher Payload per meter train length is one key

Reducing time consuming interfaces in train preparation and transfer is another key

Automation of costly and time consuming operations is a further key

More details:

htttps://binderholz.com

https://innofreight.com

https://pjm.co.at

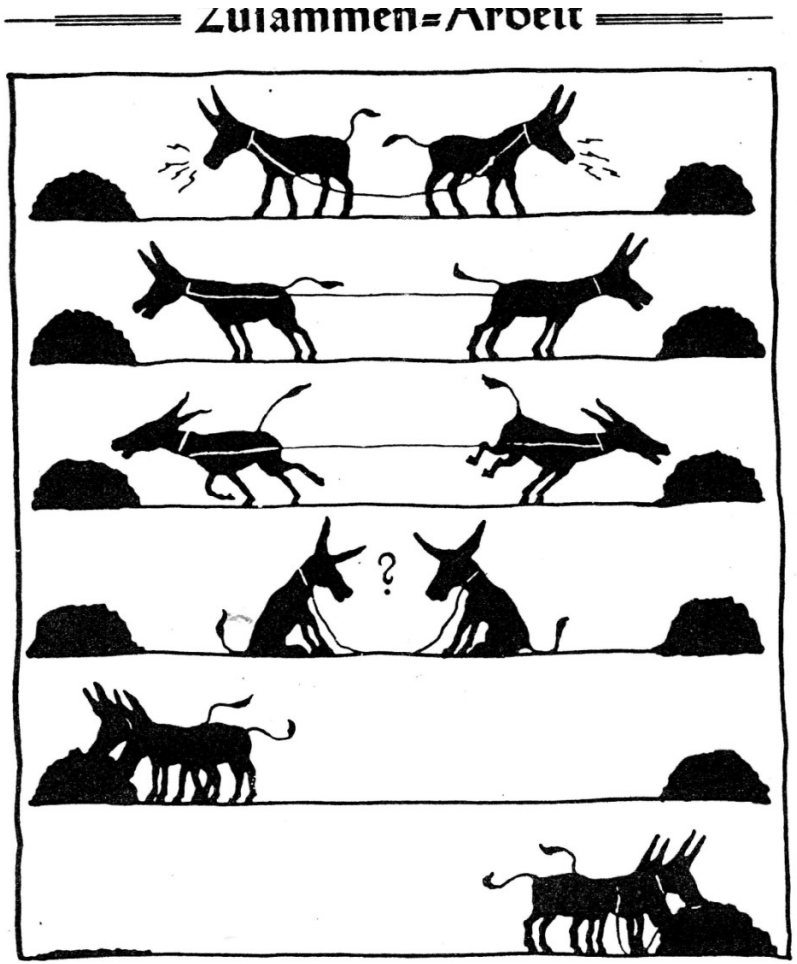
Kortschak, Bernd: Innovationen bei der Deutschen Bahn AG, in: Burr, W./Stephan, M. (eds.): Technologie, Strategie und Organisation, Wiesbaden 2017, pp. 127-152

Take Away

With the cooperation on time windows

for reconstruction and development you may start now:

Good cooperation



The CCC – Strategy:

1. **Commitment**
2. **Competence**
3. **Coordination**

Source Radovic 2019

Prof. Dr. Dr. Bernd H. Kortschak
Lecturer for Business and Logistics
Vienna University of Economics and Business
bernd.kortschak@wu.ac.at
+43(664)3074244 (cell phone)