Institute for Railway Engineering and Transport Economy

New Chances through New Technologies (!?)

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„Trinity of Transport“

Transport Policy
(laws, rules, recommendations, etc.)

Transport Technology
(roads, vehicles, IT, etc.)

Transport Economy
(operations, undertakings, services etc.)

Change in one field causes alterations in the others

Impact to changes is non-satisfaction with an established practice
Scheme of present operation in combined rail freight transportation

- Long distance run > transfer station
- Change of loco > dieselloco > shunting into terminal
- Unloading with portalcrane
  - onto lorries
  - onto waggons when stationary
- shunting with diesel > stabling > shunting with diesel
- loading with portalcrane
- shunting with dieselloco > transfer station
- > electric loco > long distance run under catenary

„When the GOOD LORD invented Railways, the DEVIL came – and invented shunting!“
Basic question:

• Can goods be manipulated
  - simpler ?
  - thus quicker?
  - thus with higher performances?
  - thus with less cost?

and

• can freight-trains run with speeds of 120 km/h or more?
This is **NOT** a question of improving **DETAILS**, but calls for considerations for the **ENTIRE** system „combined freight transport“

and thus must deal with **manipulation** of freight and long-distance-movement
Thus: twin-model of thoughts

Innovative Freight Terminal
- arrival at loading track with long-distance loco under catenary
- loco remains on train
- manipulation of goods with „fast“ loading equipment
- departure with long-distance loco under catenary
- thus strict time-table for these „line-trains“

Line Train System
- trains run on predetermined routes in a time-table even overdays
- goods jump on and off
- trains with given lengths
- trains consist of loaded and unloaded cars in a non-determined sequence
- maximum length = capacity
- braking problems to be solved by controls
cost comparison based on present transport needs

- total cost of scheduled-train-system about 15 % LESS
- even with non-optimal conditions (like unbalanced transport flows)
- cost advantage of scheduled-train-system grows with the load factor
high-performance terminals

- high transfer capacity FROM and TO scheduled trains
- for instance by side-loading machines etc. under grounded catenary
high-performance terminals

- separation of transport flows by intermediate storing capacities (f.i. high floor stores)
- shortest stopover-times for scheduled trains
- NO shunting
- compact installations for integration into cities
- short road approaches
- little space requirement (extensions to be kept in mind)
- interconnected-information-flow
high-performance terminals
- high performance inner logistics (f.i. driverless manipulation)

Bild 15: Lkw-Umlademaschine

Bild 9: System Hochleistungsterminal (HoT), schematische Darstellung
Line-train-System

- scheduled-trains are superior even in smaller, less occupied networks
- freight transportation overday would need
  - cars with higher speed capacity (\(V > 120 \text{ km/h}\))
  - cyclic timetable for freight transport
- would allow the following transport times
  - Hamburg – Köln 6h
  - Hamburg – München 9h
  - Hamburg – Wien 13h (today 1 1/2 days!)
- circle routes possible to connect „fitting“ terminals
- centralised transport logistics permits short-term disposition
- high performance terminals of a new type
Conclusion 1

- rail freight today suffers a technological standstill
- performance limits became visible
- many detailed developments have been
  - started
  - realised
  - tested
  - but have not gripped ground in daily practice

Examples:

- Low Noise Train LNT
- derailment detector
- braking systems
- higher speeds
- tracing of loads etc

- a concise strategy for innovation does NOT exist
- multiple groups voice differing priorities
Conclusion 2

- combined rail freight transport CAN be developed to considerably higher tonnages

- the development of combined transport should not become stuck in the jungle of short-sighted advantage-hunting

- innovation at large scale requires
  - dirigism or
  - common understanding and joint efforts
Literature:

- diploma works at the Institute for Railways Engineering and Transport Economy, Technical University Graz
Thank you for your attention…