Connecting the Hinterland

Smart integration of rail into supply chains

Agenda

- Background HPC
- Developments in Global Transport
- Port-Rail Connectivity
- Improving Process Efficiency
- Intermodal Network Concepts

Background HPC

Our Focus

- Ports
  - Container terminals
  - Bulk terminals
  - Cruise ship terminals
- Intermodal facilities
  - Rail terminals
  - Inland ports
- Logistics facilities

Our Clients

- Private terminal operators, port authorities & public institutions
- Governments
- Logistics service providers
- Banks and private investors
- International organisations, such as World Bank, UN

Background HPC

Our Concept – Holistic Approach From Operator's Perspective

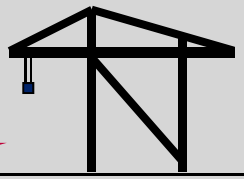
→ Interdisciplinary Approach → Permanent Methodological Enhancement

Maritime Customers

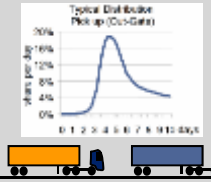
Carriers
Shipping lines
Agents

Volumes
Availability
Handling time
Service level
EDI

Intra-Terminal World Dimension



Operations



Continuous Adaptation to Dynamic Challenges

Enable

Efficiency
Profit
KPI

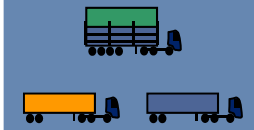
Require

Resources

Equipment | Staff | IT

Landside Customers

Shippers
3PLs
Forwarders



Volumes
Gate hours
Service level
EDI
Customs

Agenda

Background HPC

Developments in Global Transport

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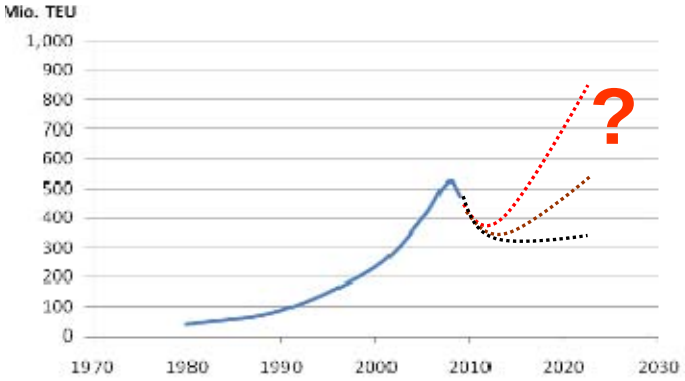
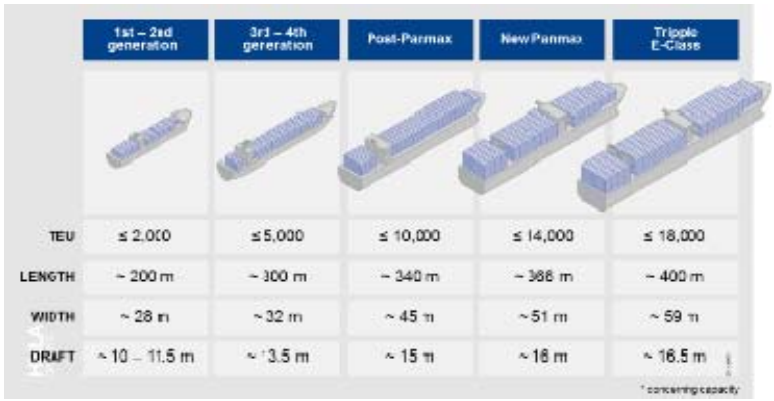
Developments in Global Transport

Situation

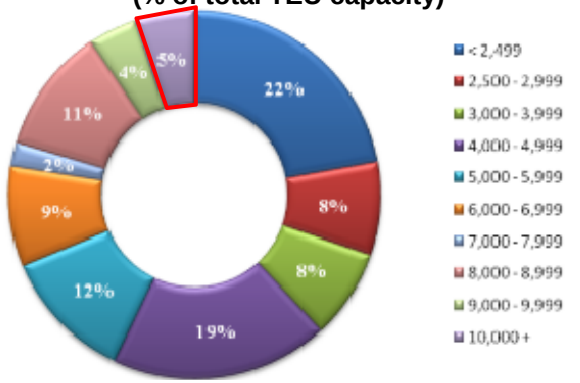
Global Container Transport Growth



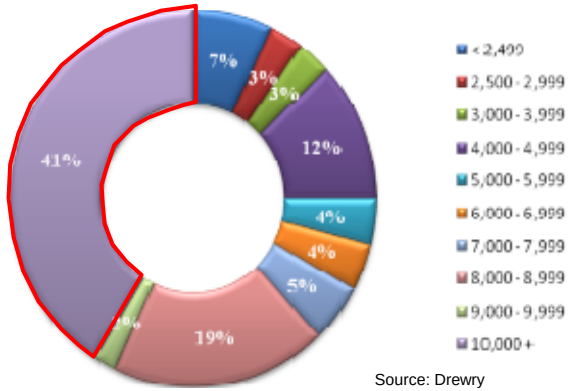
Evolution of Containerships 1966-2014



Vessel Size Growth, Fleet Segmentation
(% of total TEU capacity)



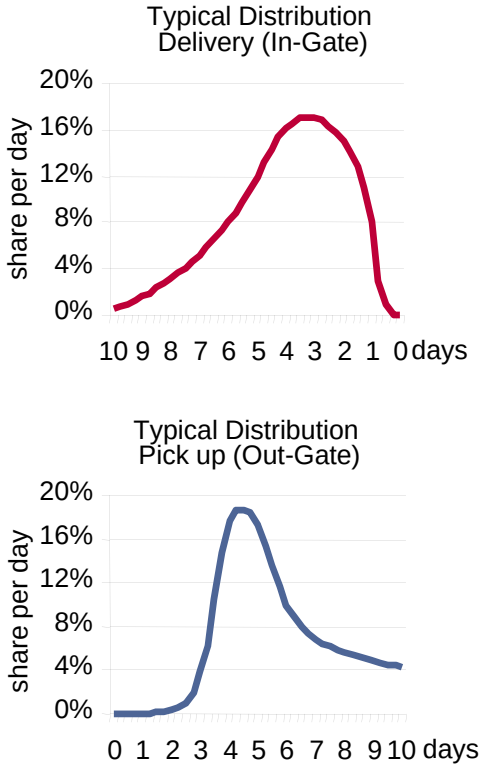
Order Book Segmentation
(% of TEU order capacity)



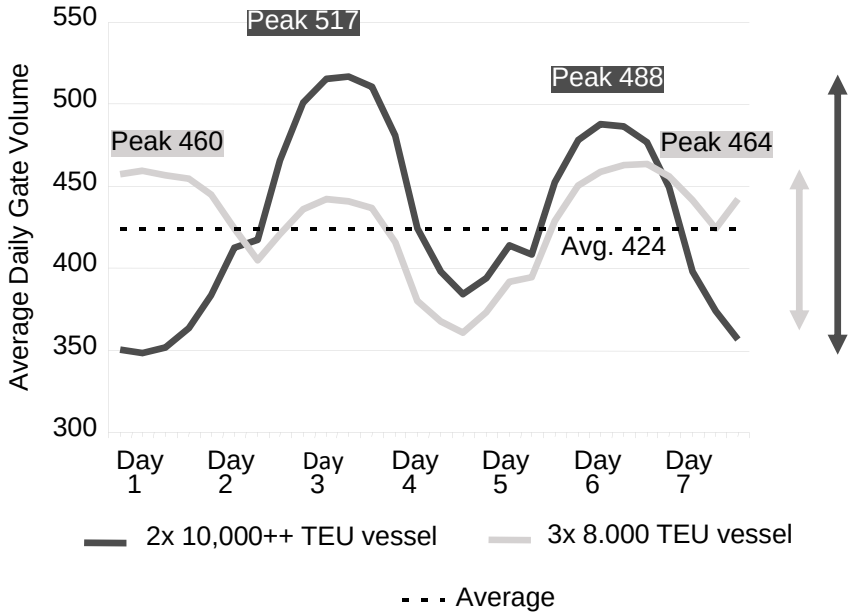
Source: Drewry

Developments in Global Transport

Challenges



Change of call pattern from tri-weekly 8,000 (4,000 moves) to bi-weekly 10,000 (6,000 moves) TEU vessels



→ **Day-to-day volatility increased by 80%**

→ **Total peak increased by 11%**

→ **Vessel size growth creates new challenges for intermodal railway facilities in ports and on intermodal networks!**

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- **Port-Rail Connectivity**
- Improving Process Efficiency
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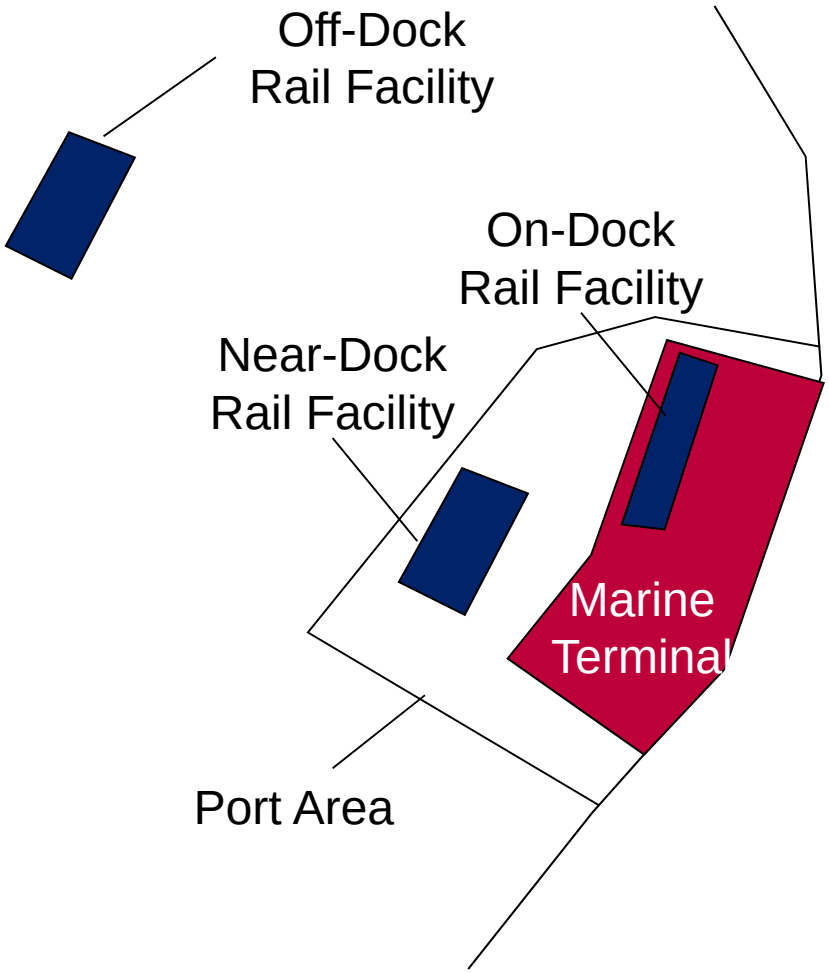
Port-Rail Connectivity

Overview



On-Dock:

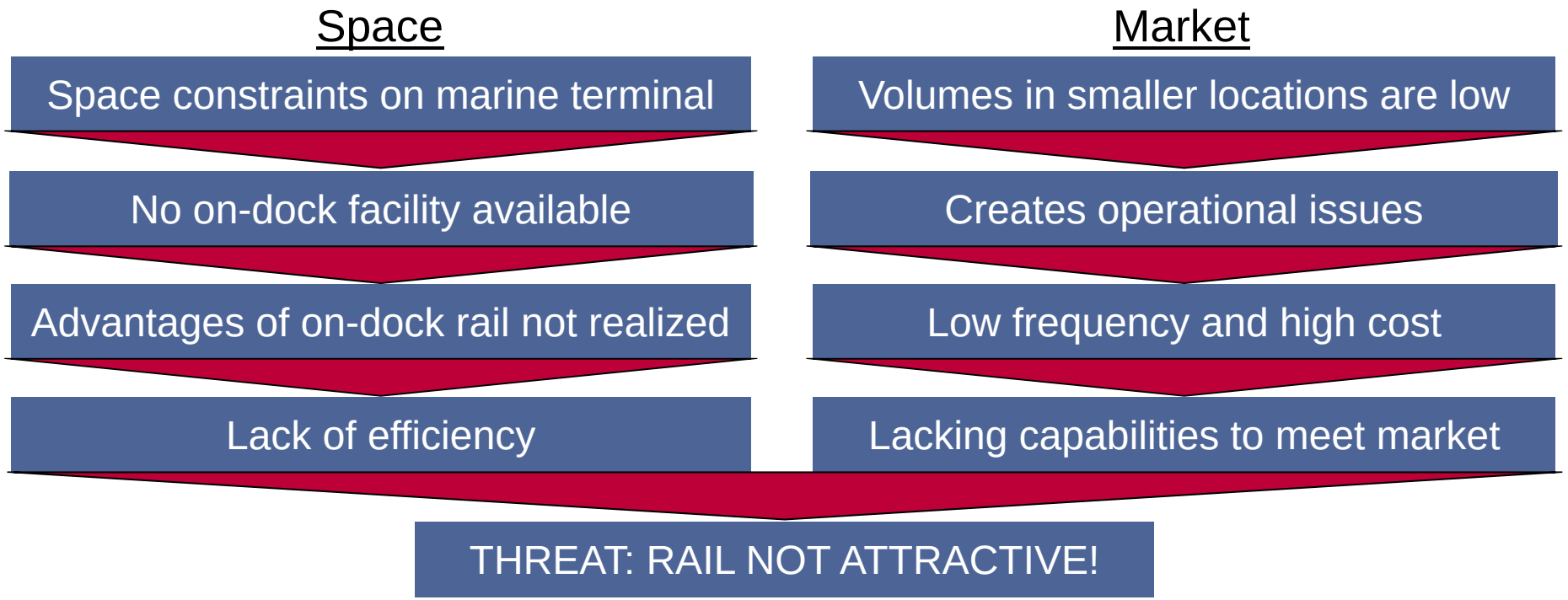
- No traffic issues on public streets
- If well planned, no double/triple-handling of boxes required
- Density might not be sufficient for direct trains

Near-Dock/Off-Dock:

- Congestion on public streets
- Typically requires double/triple-handling
- Density can be created (from multiple marine terminals)

Port-Rail Connectivity

Exemplary Challenges



How to overcome the downsides of a near-dock/off-dock facility?
→ Coordinated approach required to improve efficiency!

How to consolidate small volumes?
→ Improve intermodal network capabilities!

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Improving Process Efficiency

International Best Practice of a Near-Dock Facility

Problem 1: Box handling

Box handled multiple times (i.a. shuffle moves) → increased operating cost

Solution 1: Coordinated procedures for container exchange

E.g. pool of trucking companies to dray a pool of containers → shuffle moves and operating cost can be reduced significantly

Problem 2: Congestion

Traffic situation causes delays and non-reliable service

Solution 2: Dedicated truck road for container exchange

Reliable container exchange is possible by avoiding congestion

→ **Coordinated approach can help to improve efficiency**
→ **But: requires infrastructural capacity to achieve reliability**
→ **And: information exchange must be built in the planning processes**

Agenda

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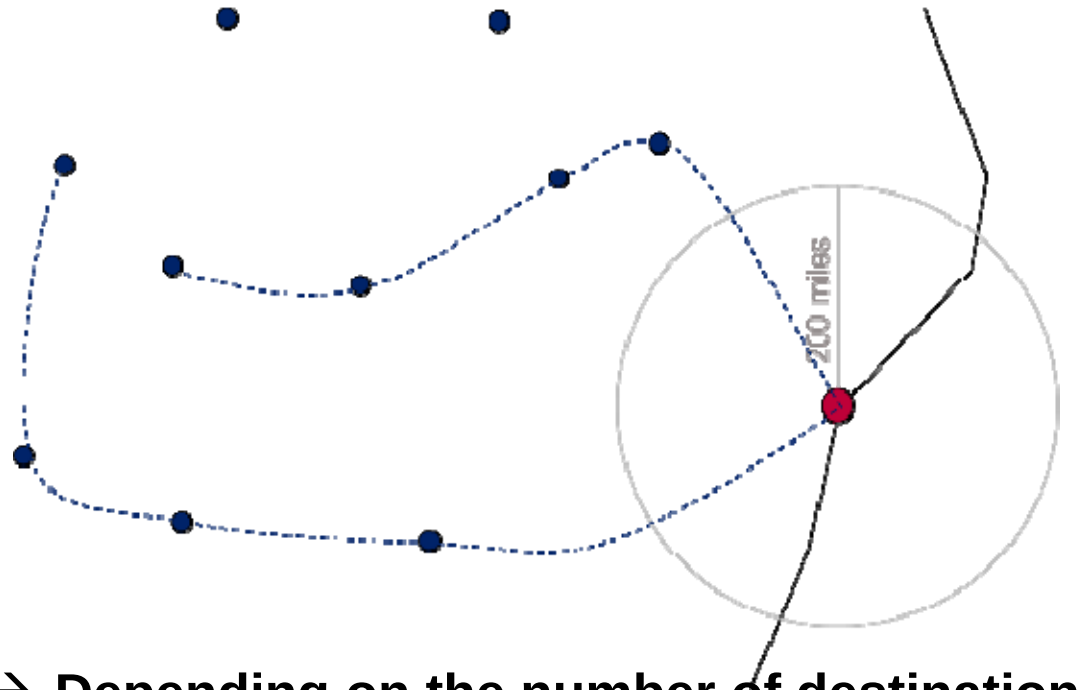
Improving Process Efficiency

Intermodal Network Concepts

Intermodal Network Concepts

"Milk run" Train



Effects:

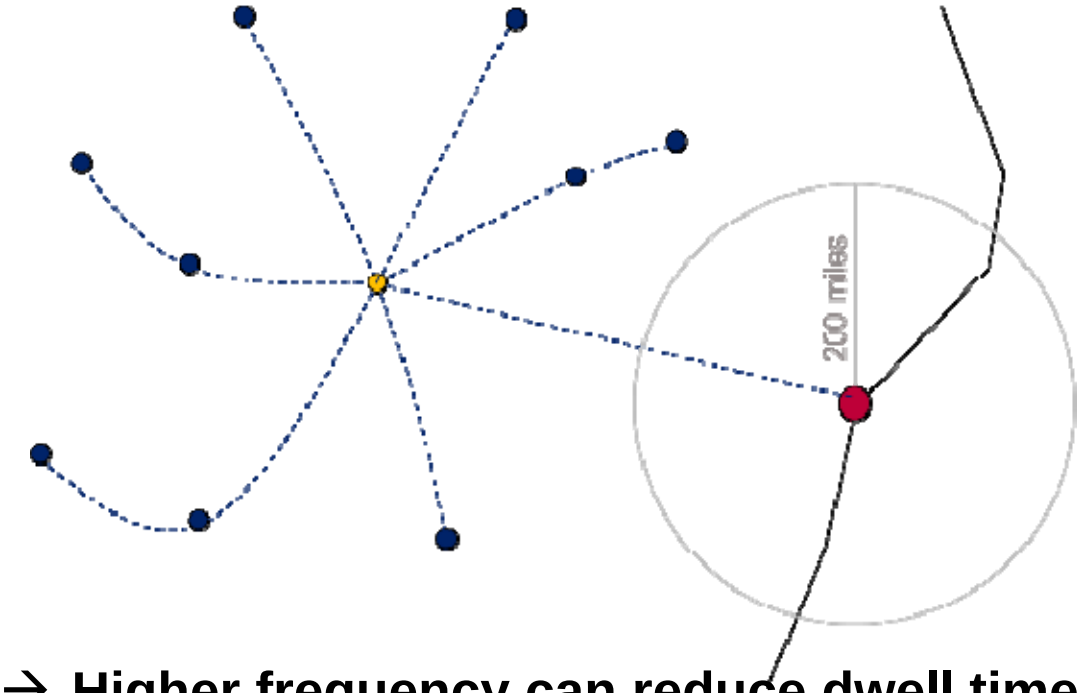
- Long train travel times
- Requires high sorting efforts in the port for import trains
- Some origins/destinations might not be served
- Possibly issues with reliability of schedule

→ **Depending on the number of destinations, train building for import containers can be very challenging and time consuming**

→ **Some markets are not served due to lack of volume**

Intermodal Network Concepts

Hub Network



Effects:

- Higher frequency possible due to volume consolidation
- Sorting efforts for import trains can be reduced
- More origins/destinations can be served
- Less schedule deviations expected

→ **Higher frequency can reduce dwell time in port**

→ **Train building can be performed more efficiently, leads to higher capacity**

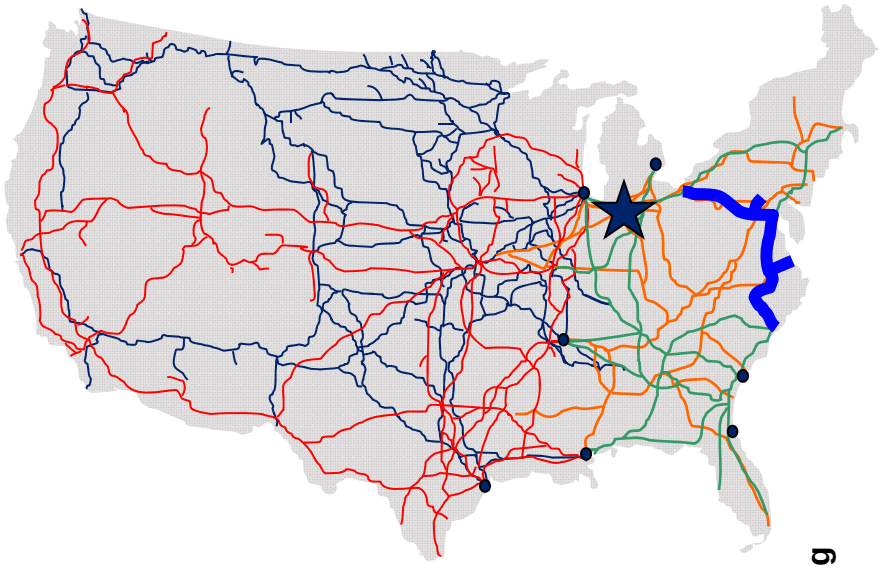
Intermodal Network Concepts

Existing Terminal Networks

→ **Existing terminals are not designed to serve as hubs!**

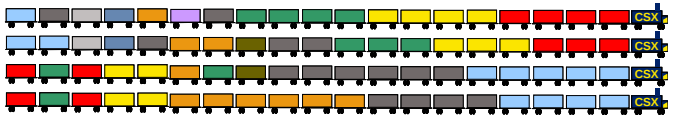
Intermodal Network Concepts

Example: CSX NWOH – A True Intermodal Hub

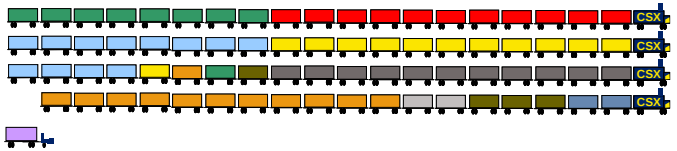


Objectives

- connect east/west
- toupee/fillet operations
- make use of economies of scale in distribution of domestic and maritime volumes
- serve local economy of northern Ohio



Block Swapping
Container Swapping



→ **Combined Switching/ Intermodal Lift “Transrailment” Terminal!**

Intermodal Network Concepts

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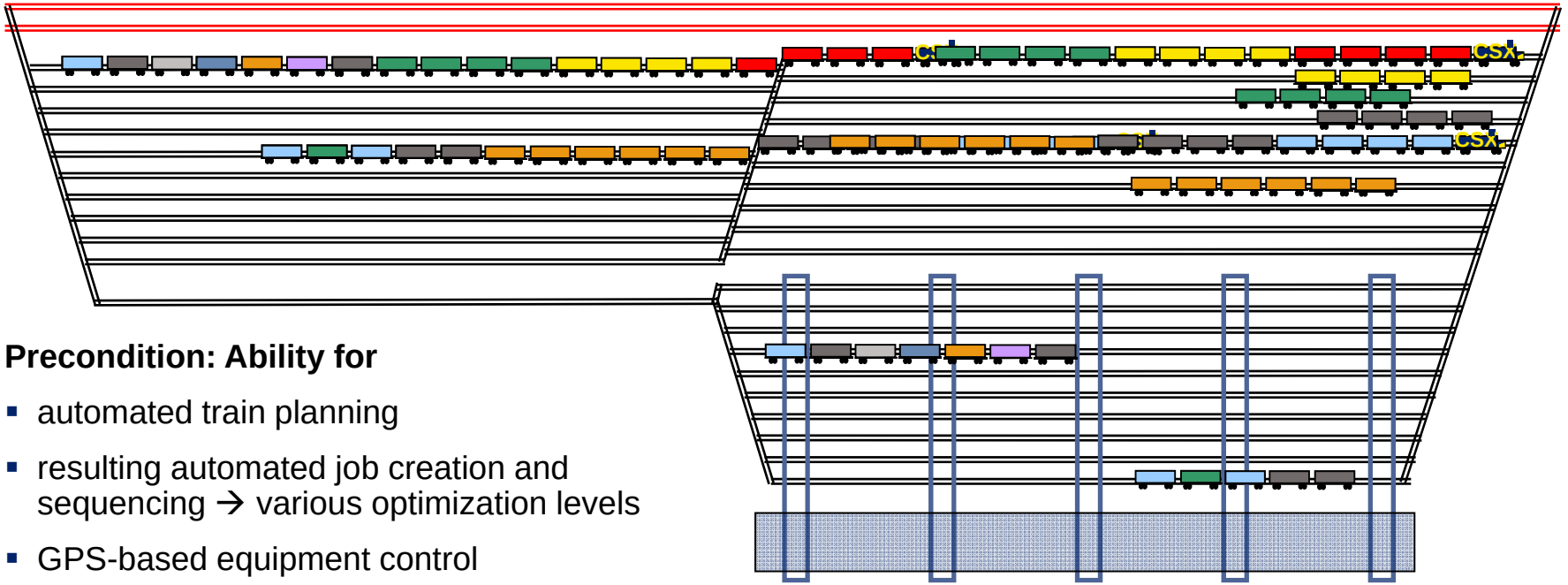
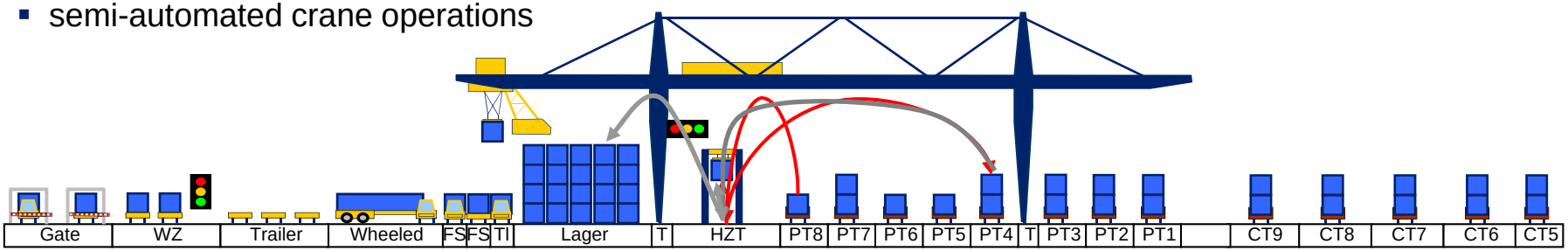


Precondition: Ability for

- automated train planning
- resulting automated job creation and sequencing → various optimization levels
- GPS-based equipment control
- semi-automated crane operations



Intermodal Network Concepts

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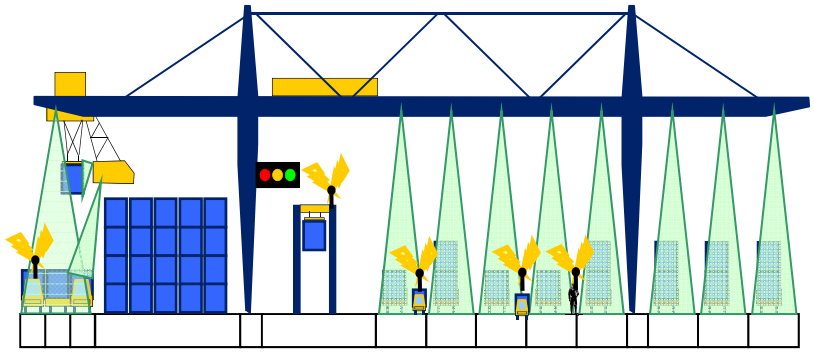


- **Automated railcar recognition in approach to terminal, in ladder and in entrance to process tracks**
- **Automated container recognition**
- **Railcar tracking in entire facility**
- **Automated train-set position calibration**

- **Automated collision/overrun with load control between cranes, SCs, grunts, M&R crews and moving trains**
- **Auto-gates and system based truck-to-crane order calls**

→ Tailored Planning Process including Simulation and Process Optimization Ensured Feasibility of Hub Functionality and finally Operations Success!

Intermodal Network Concepts

Example: Hamburg – Metrans and Polzug

Description of System

- Long distance private operator rail transport to Eastern Europe and Southern Germany
- Founded by terminal operator as part of horizontal integration strategy
- Full trains operate between port and inland terminals
- Various dedicated rail terminals aand hub terminals in Poznan, Ceska Trebova and Prague
- Regular connection/service to Bremerhaven, Hamburg and Rotterdam

Driver / Initiator

- Improvement of hinterland connectivity and transport duration between port and market.
- Part of horizontal integration strategy

Traffic Impact

- Approx. 25% of Hamburg port volumes – some 2.3m TEU - are transported by rail
- Around 1.2m truck visits are avoided

Capacity Factors

- Lack of information sharing from cargo owners/forwarders limits the potential to move containers quickly to inland facilities. Dwell time for rail is not shorter than for trucks.

Efficiency Factors

- Additional moves on seaport and inland terminal – long travel distance saves significant trucking fees
- Railway connection faster to market than trucking

Emission Reduction

- Electrically powered rail transport is assumed to result in 48.1g CO_2 per tkm, a 70% reduction over trucks.

Summary

Benefits from well-integrated rail network:

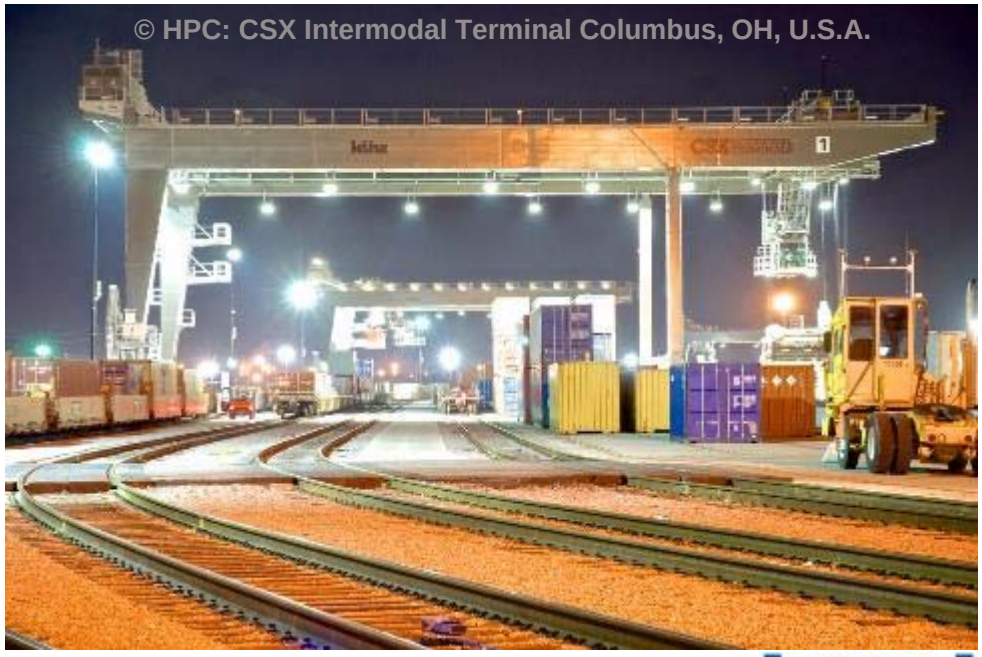
- Reduced road congestion
- Emission reduction
- Rail connection faster to market than trucking
- Substantial trucking fees can be saved

Requirements:

- Network and facilities need to be designed to support
- Coordination and information sharing is key to successful implementation

HPC Hamburg Port Consulting GmbH

Contact Details



With courtesy of CSX Intermodal Terminals Inc.

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