Emergence and Significance of Dry Ports

VIOLETA ROSO

Chalmers University of Technology, Sweden
Division of Logistics and Transportation

Göteborg 2008-09-05
Background
The dry port concept

“A dry port is an inland intermodal terminal directly connected to a seaport by rail, where customers can leave and/or collect their standardised units as if directly to the seaport”
**The dry port concept**

- Intermodal terminal
- Situated inland
- Rail connection to a seaport
- Offers service that are available at seaports (customs clearance, maintenance of containers, storage, forwarding, etc.)
Benefits from a dry port

- Increases seaport capacity
- Increases seaport productivity
- Reduces congestion at seaports
- Reduces congestion in seaport cities
- Reduces risk for road accidents
- Reduces road maintenance cost
- Lowers environmental impact
- May serve as a depot
- Improves seaport’s access to areas outside its traditional hinterland
## Benefits for the actors of the system

<table>
<thead>
<tr>
<th></th>
<th>Distant</th>
<th>Midrange</th>
<th>Close</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Seaports</strong></td>
<td>+Less congestion</td>
<td>+Less congestion</td>
<td>+Less congestion</td>
</tr>
<tr>
<td></td>
<td>+Expanded hinterland</td>
<td>+Dedicated trains</td>
<td>+Increased capacity</td>
</tr>
<tr>
<td></td>
<td>+Interface with hinterland</td>
<td>+Depot</td>
<td>+Depot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+Interface with hinterland</td>
<td>+Direct loading ship-train</td>
</tr>
<tr>
<td><strong>Seaport cities</strong></td>
<td>+Less road congestion</td>
<td>+Less road congestion</td>
<td>+Less road congestion</td>
</tr>
<tr>
<td></td>
<td>+Land use opportunities</td>
<td>+Land use opportunities</td>
<td>+Land use opportunities</td>
</tr>
<tr>
<td><strong>Shipping lines and forwarders</strong></td>
<td>+Improved service</td>
<td>+Improved service</td>
<td>+Improved service</td>
</tr>
<tr>
<td><strong>Rail and intermodal operators</strong></td>
<td>+Economies of scale</td>
<td>+Day trains</td>
<td>+Day trains</td>
</tr>
<tr>
<td></td>
<td>+Gain market share</td>
<td>+Gain market share</td>
<td>+Gain market share</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>+Less time in congested roads and terminals</td>
</tr>
<tr>
<td><strong>Road operators</strong></td>
<td>+Less time in congested roads and terminals</td>
<td>+ Less time in congested roads and terminals</td>
<td>+Avoiding environmental zones</td>
</tr>
<tr>
<td><strong>Shippers</strong></td>
<td>+Improved seaport access</td>
<td>+Improved seaport access</td>
<td>+Improved seaport access</td>
</tr>
<tr>
<td></td>
<td>+“Environment marketing”</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Society</strong></td>
<td>+Modal shift</td>
<td>+Modal shift</td>
<td>+Lower environmental impact</td>
</tr>
<tr>
<td></td>
<td>+Less infrastructure</td>
<td>+Less infrastructure</td>
<td>+Job opportunities</td>
</tr>
<tr>
<td></td>
<td>+Lower environmental impact</td>
<td>+Lower environmental impact</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+Job opportunities</td>
<td>+Job opportunities</td>
<td></td>
</tr>
</tbody>
</table>

**Göteborg 2008-09-05**  
**Violeta Roso**, Division of Logistics and Transportation, Chalmers, Sweden
Close Dry Port

Göteborg 2008-09-05

Violeta Roso, Division of Logistics and Transportation, Chalmers, Sweden
Enfield, Sydney, Australia
Enfield

- In September 2007 Sydney Ports received planning approval to develop an Intermodal Logistics Centre at Enfield, ten years after the initial plan.
- Although the site is located in an industrial and commercial area adjacent to a dedicated freight line to the port within easy access of major roads, various obstacles hindered the realization of the plans.
- The project is initiated because road artery is quite congested and the goal was to minimize the growth of trucks on the roads.
- 85% of containers originate or are bound for a destination within 40km of the port, therefore there is no use of distant terminals.
## Enfield

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance from the port</td>
<td>18 km</td>
</tr>
<tr>
<td>Surface area</td>
<td>60 ha</td>
</tr>
<tr>
<td>Traffic</td>
<td>300,000 TEU</td>
</tr>
<tr>
<td>Rail frequency</td>
<td>daily shuttle</td>
</tr>
<tr>
<td>Loading rail tracks</td>
<td>920 m</td>
</tr>
<tr>
<td>Lifting equipment</td>
<td>3 gantry cranes, 3 container forklifts, 2 reach stackers</td>
</tr>
<tr>
<td>Warehouse</td>
<td>60,000 m²</td>
</tr>
<tr>
<td>Container storage area</td>
<td>yes</td>
</tr>
<tr>
<td>Customer service</td>
<td>Separate forwarding service</td>
</tr>
</tbody>
</table>
Impediments

Regulations
- There are no direct subsidies for rail from the government.
- Government’s suggestion - impose so called “infrastructure charge” of 30A$ for both road and rail; and then rail would be refunded, revenue from the charge would be intended for financing rail infrastructure.
- One reason for week involvement of the government in support of rail might be in very strong road lobby that impedes any actions towards increased use of rail and by that intermodal transport.

Environment
- The Enfield project was delayed due to bureaucracy and politics; fear from increased traffic through the area.
- In 2007 it was approved to build the intermodal terminal with smaller operating capacity, 300,000 instead of 500,000 TEU a year, traffic in and around the terminal is limited by regulations and will be monitored.
Impediments

Land use
- The closer the potential site for an intermodal terminal is to metropolitan area the higher the price as well as demands regarding the environmental impacts.
- Functionality of the seaport depends on its inland access which in this case depends greatly on close intermodal terminal situated within metropolitan area but the residents want parks not transport facilities.

Infrastructure
- Existing passenger and freight shared rail network is getting more constrained by passengers, and passenger transport has priority.
- On shared rail freight is not allowed between 6-9am and 3-7pm, and there are very few free slots for eventual new rail operators.
- Seaport terminals as well as city roads are congested by trucks; but improvements of intermodal network with dedicated freight lines would require considerable investments.
Distant Dry Port

Göteborg 2008-09-05

Violette Roso, Division of Logistics and Transportation, Chalmers, Sweden
Isaka Dry Port, Tanzania
Midrange Dry Port

Göteborg 2008-09-05

Violeta Roso, Division of Logistics and Transportation, Chalmers, Sweden
Virginia Inland Port, Virginia, USA
Environmental evaluation

Reference situation - without the dry port

Scenario – with the dry port

Göteborg 2008-09-05

Violeta Roso, Division of Logistics and Transportation, Chalmers, Sweden
Results of the simulation regarding queues at the terminals

a) Without DP: 23 trucks – 85min average waiting time
b) With DP: 5 trucks – 13min average waiting time
Results of the simulation regarding CO₂ emission

Simulation for 35 trucks:

- The calculated CO₂ emissions are approximately 25% lower in the model with the dry port

- Road-kilometres reduced: approximately 2000 road-km a day
The Dry Port Concept

Origin | Sea transport | Port interface | Inland transport | Inland terminal interface | To door delivery | Destination

Origin-destination route with a conventional inland terminal as a part of the network

Transport network

Origin | Sea transport | Port | Inland transport | Dry port | To door delivery | Destination

Origin-destination route with a dry port as a part of the network

Göteborg 2008-09-05

Violeta Roso, Division of Logistics and Transportation, Chalmers, Sweden
Conclusion

A dry port must fit into a complex system where the necessary supporting infrastructure (roads, railways) is in place, maintenance is assured, and the regulatory and institutional systems are properly designed to optimize the involvement of both the public and the private sector.”

Vandervoort and Morgan (1999)