Multiple Case Study of Transport Chains of Dangerous Goods in the Baltic Sea Region –

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Presented by Prof. Lauri Ojala
Turku School of Economics

SSE07, Athens, September 20-21, 2007
DaGoB Challenge & Focus

- Over 300,000,000 tons of cargo classified as Dangerous Goods transported annually in the Baltic Sea Region (BSR).

- A very small number of DG specialists at work in BSR countries; the administrative capacity is very limited.

- DaGoB diffuses good practice across authorities and firms on existing regulations and competitive procedures.

- DaGoB strengthens the competence of DG professionals and improves the efficiency and safety of DG transport.
DaGoB Scope & Partners

**BSR:**
- Authorities
- Industry
- Seaports
- Academia

**Modes:**
- Road
- Rail
- Maritime
- Ports
- Intermodal

Duration: 2006-2007
Budget: 1.4 m€

Project part-financed by the European Union (European Regional Development Fund) within the BSR INTERREG III B Neighbourhood Programme

Ojala, SSE07
DaGoB builds capacity by...

...up-to-date information on cargo flows, supply chain efficiency and risks related to DG transport in the BSR,

...enhancing co-operation between authorities involved in DG transport, and

...improving safety, reliability and efficiency of DG transport chains through best practice dissemination.
## Chemical Industry Concern: High Supply Chain Costs with DG

<table>
<thead>
<tr>
<th><strong>Industrial Sector</strong></th>
<th><strong>Typical Supply Chain Costs % Of Value-Added</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Petroleum</td>
<td>43%</td>
</tr>
<tr>
<td>Chemicals</td>
<td>37%</td>
</tr>
<tr>
<td>General retailing</td>
<td>36%</td>
</tr>
<tr>
<td>Food and beverage</td>
<td>36%</td>
</tr>
<tr>
<td>Paper</td>
<td>30%</td>
</tr>
<tr>
<td>Autos</td>
<td>28%</td>
</tr>
<tr>
<td>Building materials</td>
<td>26%</td>
</tr>
<tr>
<td>Fabricated metal products</td>
<td>18%</td>
</tr>
</tbody>
</table>

Sources: European Logistics Association; CLM research; A.T. Kearney
Industry Concerns Highlighted by Prof. Alan McKinnon in 2004

Supply Chain Excellence in the European Chemical Industry

Results of the EPCA-Cefic
Supply Chain Excellence
Think Tank Sessions

organised and sponsored by EPCA
in cooperation with Cefic
Objectives of the Case Study

To describe DG transport chains as processes in order to identify bottlenecks or problems in operations,

...by applying a uniform process framework for all cases,

...on a set of typical DG transport chains in the BSR.

*Cases highlight the most voluminous DG classes using multimodal transport; few bulk transports.*
Example of a Transport Chain

Connections to authorities in different levels

Operator 1 & 2  
*ex. haulier-forwarder*

Operator 1  
*ex. sender-haulier*

Operator 2 & 3  
*ex. forwarder-port operator-haulier*

Operator 3 & 4  
*ex. haulier-receiver*
Framework used in Single case and Cross Case Analyses

A. WHAT COMMUNICATION WITH WHOM
B. WHOM (1-n) TO INFO/CONTACT
C. WHICH DOCUMENTS FROM WHOM
D. WHO IS RESPONSIBLE
E. TIME ELAPSED

INFO PROCESS

AUTHORITY INVOLVEMENT

DOCUMENT PROCESS

LIABILITY PROCESS

TIME
## Analysed Transport Chain cases

<table>
<thead>
<tr>
<th>Case</th>
<th>Cargo type</th>
<th>DG Class</th>
<th>Route</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hydrogen</td>
<td>2.1</td>
<td>FIN -&gt; Estonia</td>
</tr>
<tr>
<td>2</td>
<td>Methane (MoU)</td>
<td>2.1</td>
<td>FIN-&gt; Sweden</td>
</tr>
<tr>
<td>3</td>
<td>Argon, Nitrogen &amp; Oxygen (ADR)</td>
<td>2.2 (5.1)</td>
<td>FIN-&gt; Russia</td>
</tr>
<tr>
<td>4</td>
<td>Cereclor</td>
<td>3 (6.1)</td>
<td>France -&gt; FIN</td>
</tr>
<tr>
<td>5</td>
<td>Paratoluen sulphonic acid</td>
<td>8</td>
<td>France -&gt; FIN</td>
</tr>
<tr>
<td>6</td>
<td>Mixed cargo (MoU)</td>
<td>..</td>
<td>FIN-&gt; Estonia</td>
</tr>
<tr>
<td>7</td>
<td>Printing ink (ADR)</td>
<td>3</td>
<td>FIN-&gt; Russia</td>
</tr>
<tr>
<td>8</td>
<td>Printing ink (MoU)</td>
<td>3</td>
<td>FIN-&gt; Ukraine</td>
</tr>
<tr>
<td>9</td>
<td>Paint &amp; Diacrylate (MoU)</td>
<td>9</td>
<td>FIN -&gt; Estonia</td>
</tr>
<tr>
<td>10</td>
<td>Paint &amp; Zinc dioxide</td>
<td>3 &amp; 9</td>
<td>FIN -&gt; Latvia</td>
</tr>
<tr>
<td>11</td>
<td>Paint, Isoph.diamine &amp; Resin (MoU)</td>
<td>3 &amp; 8 &amp; 9</td>
<td>FIN -&gt; Lithuania</td>
</tr>
<tr>
<td>12</td>
<td>Ammonia, anhydrous</td>
<td>2.3 (8)</td>
<td>Russia -&gt; FIN</td>
</tr>
<tr>
<td>13</td>
<td>Fluorosilicic acid</td>
<td>8</td>
<td>FIN -&gt; Sweden</td>
</tr>
<tr>
<td>14</td>
<td>Ammonium nitrate based fertiliser</td>
<td>9</td>
<td>FIN -&gt; Estonia</td>
</tr>
</tbody>
</table>
Memorandum of Understanding on Transport of Packaged General Goods in the Baltic Sea

The MoU allows transport of packaged DG on Ro-Ro ships as ADR (Road) or RID (Rail) cargo under special provisions on low wave height routes.
Detailed descriptions in DaGoB Publications 1:2007

Case 9 (less than truck load)

<table>
<thead>
<tr>
<th>Cargo flow</th>
<th>Average total distance 125 km</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Consignor's production unit in Vantaa (FI)</td>
<td>30 km</td>
</tr>
<tr>
<td>(2) Road transport (FI)</td>
<td>Vantaa (FI)–Helsinki (FI)</td>
</tr>
<tr>
<td>(3) Port of Helsinki (FI)</td>
<td>Loading the vessel</td>
</tr>
<tr>
<td>(4) Sea transport (FI–EE)</td>
<td>90 km</td>
</tr>
<tr>
<td>(5) Port of Tallinn (EE)</td>
<td>Unloading the vessel</td>
</tr>
<tr>
<td>(6) Road transport (EE)</td>
<td>Tallinn (EE)–Tallinn (EE)</td>
</tr>
<tr>
<td>(7) Consignee</td>
<td>Consignor's subsidiary in Tallinn (EE)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Info process</th>
<th>Key authority involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Order to the consignor</td>
<td>Consignor</td>
</tr>
<tr>
<td>(2) Info to the carrier (FI)</td>
<td>Logistics provider (FI)</td>
</tr>
<tr>
<td>(3) booking of the shipping space</td>
<td>Port of Helsinki</td>
</tr>
<tr>
<td>(4) info to the carrier B (EE)</td>
<td>Port of Tallinn</td>
</tr>
<tr>
<td>Document process</td>
<td>(1) ICN + MDGF to the carrier</td>
</tr>
<tr>
<td></td>
<td>(2) Advance Notice of DG (24 h before the cargo's arrival at the port) + CMR waybill</td>
</tr>
<tr>
<td></td>
<td>(3) CMR waybill, ICN + EIC from the driver (FI) to the shipping company</td>
</tr>
<tr>
<td></td>
<td>(4) CMR waybill + ICN + EIC to the driver (EE)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Liability process</th>
<th>Average transit time total</th>
<th>Frequency several times/week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delivery terms DDU Tallinn (EE)</td>
<td>Consignor's liability: the whole transport chain, excl. unloading (EE)</td>
<td>36 h needed before the transport</td>
</tr>
<tr>
<td>Consignor's production unit in Vantaa (FI)</td>
<td>Loading at the consignor's production unit in Vantaa (FI)</td>
<td>1 h</td>
</tr>
<tr>
<td>Road transport Vantaa (FI)–Helsinki (FI)</td>
<td>Waiting + loading in the port of Helsinki (FI)</td>
<td>1–2 h</td>
</tr>
<tr>
<td>Sea transport Helsinki (FI)–Tallinn (EE)</td>
<td>Unloading in Tallinn (EE)</td>
<td>4–16 h</td>
</tr>
</tbody>
</table>

ICN = International Consignment Note
MDGF = Multimodal Dangerous Goods Form
EIC = Emergency Instruction Card

Ex. Case 9

Project part-financed by the European Union (European Regional Development Fund) within the BSR INTERREG III B Neighbourhood Programme
Cross-case analysis (A, B & C)

A. Communication process
   - Lack of common language causes some problems
   - Information from ferry company whether it is possible to carry DG onboard comes very late
   - In long-term relationships the communication is fluent

B. Authority involvement
   - Some problems with the multimodal transportations, when interpreting different regulations

C. Document process
   - Document practice seems to be well-established and stable
Cross-case analysis (D, E & other)

D. Liability process
- Each of the transport chain partners appeared to be well aware of the issues involved

E. Total transport time
- Time for DG does not seem to differ from that of non-DG; in fact, on Russian-Finnish land-border DG passes faster
- Lack of temperature regulated containers can sometimes cause delays

Other findings
- DG companies do not want to give “too much” information to the public
Conclusions

- Differences in regulations across modes exist.

- DG transports call for an effective control system of operations, up-to-date equipment, well-trained personnel and an approved quality system.

- Especially in the summer, the number of passengers on ro-ro / ro-pax ferries limits the amount of DG cargo.

- No major problems occurred in the DG transport chains analysed in this study comprising 14 cases of well-known trading partners and logistics providers.

- Better coordination of safety authorities is needed.
Suggestions for further actions

- Decision-makers should be actively supplied with accurate information on DG transport.
- Maritime & port IT systems not well enough connected.
- Regulations adapted to BSR conditions when possible.
- MoU works well in the BSR; to be applied elsewhere??
- The human factor can be affected by up-to-date training, knowledge and the use of modern equipment.
- Work to improve safety of DG transport needs to continue with emphasis on preventive measures.
Thank you!

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