UNECE COVID-19 impact Transport Statistics Activities, and Mapping Inland Water Transport Volumes

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Presentation to Working Party on Inland Water Transport. Geneva, 7-9 October 2020
Overview

• WP.6 activities in 2020: Focus on short-term data and new sources to track COVID-19 impacts
• Attempts at visualizing inland water transport volumes with existing data, to create census-style maps
Data Collation on COVID19 transport impacts

• To maintain relevance, we wanted quick data from **official sources** on a fast evolving situation. This included provisional data and experimental statistics.

• Waiting 20 months for official, annual data will not help. An emergency questionnaire would not have been popular.

• Data collated and published at [https://wiki.unece.org/display/DSOCIOT/Data+Sources+on+Coronavirus+impact+on+transport](https://wiki.unece.org/display/DSOCIOT/Data+Sources+on+Coronavirus+impact+on+transport).

• Not much inland water data available (only Belarus has monthly data), but some countries are publishing port indicators.

• Know any relevant sources for Inland water data? Tell us.
Background on Censuses

- UNECE IWW data from the common questionnaire only has national-level tonnage and tonne-kilometre figures (broken down by national, international-loaded, international-unloaded and transit volumes).

- SC3 and WP.6 have previously discussed idea of E-IWW census (similar to road+rail), to map transport volumes on the network itself.

- Appetite in countries for a new data collection exercise is low. How can we use existing data sources to achieve Census-level outputs?
Visualizing freight volumes

Modal split (TEU) on TEN-T corridor, 2016

From Statistics Netherlands
Existing Eurostat Data Are Very Detailed

150 kt of metal ores from Usti nad Laben to Prague.

98 kt of goods from Usti nad Laben to Germany. 41 kt of which was agriculture products to Hamburg; 50 kt was chemicals to other German regions.
Analysis

• 14 million data points means using Eurostat’s browser or Excel not feasible.
• Data are by NUTS2 region. Names of each region are not always familiar. Lots of data cleaning required.
• NUTS2 Shapefiles are available for download, meaning the quantities can be visualized on a map (between region centroids). This is the focus of this analysis.
Total Volumes, Origin-Destination Pairs

• Total Volumes, Origin-Destination Pairs.
• All quantities above 1KT = too much information!
• Identifies *some* River-Sea shipping flows (depending on country classification)
Total Volumes, Origin-Destination Pairs

• All total flows above 100 thousand tonnes in 2018
• Summary: most traffic is on Rhine and Danube (!). Still too busy to provide much insight.
Total Volumes, Origin-Destination Pairs

• All total flows above 2 million tonnes in 2018
Total Volumes, Origin-Destination Pairs

- All total flows above 5 million tonnes in 2018
- Danube delta, and Amsterdam/Rotterdam/Antwerp/Duisburg traffic
Next challenge: map type of goods.

- NST2007 has 16 classifications. Perhaps too detailed to be useful visually.
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GT01</td>
<td>Products of agriculture, hunting, and forestry; fish and other fishing products</td>
</tr>
<tr>
<td>GT02</td>
<td>Coal and lignite; crude petroleum and natural gas</td>
</tr>
<tr>
<td>GT03</td>
<td>Metal ores and other mining and quarrying products; peat; uranium and thorium</td>
</tr>
<tr>
<td>GT04</td>
<td>Food products, beverages and tobacco</td>
</tr>
<tr>
<td>GT05</td>
<td>Textiles and textile products; leather and leather products</td>
</tr>
<tr>
<td>GT06</td>
<td>Wood and products of wood and cork (except furniture); articles of straw and plaiting materials; pulp, paper and paper products; printed matter and.Supporting industries of paper products</td>
</tr>
<tr>
<td>GT07</td>
<td>Coke and refined petroleum products</td>
</tr>
<tr>
<td>GT08</td>
<td>Chemicals, chemical products, and man-made fibers; rubber and plastic products; nuclear fuel</td>
</tr>
<tr>
<td>GT09</td>
<td>Other non metallic mineral products</td>
</tr>
<tr>
<td>GT10</td>
<td>Basic metals; fabricated metal products, except machinery and equipment</td>
</tr>
<tr>
<td>GT11</td>
<td>Machinery and equipment n.e.c.; office machinery and computers; electrical machinery and apparatus n.e.c.; radio, television and communication equipment</td>
</tr>
<tr>
<td>GT12</td>
<td>Transport equipment</td>
</tr>
<tr>
<td>GT13</td>
<td>Furniture; other manufactured goods n.e.c.</td>
</tr>
<tr>
<td>GT14</td>
<td>Secondary raw materials; municipal wastes and other wastes</td>
</tr>
<tr>
<td>GT15</td>
<td>Mail, parcels</td>
</tr>
<tr>
<td>GT16</td>
<td>Equipment and material utilized in the transport of goods</td>
</tr>
</tbody>
</table>

### Fuel Categories

- **GT02+GT07**
- **GT01+GT04**
- **GT03+GT10+GT11**
- **GT05+GT06**
- **GT08+GT09**
- **GT12**

- Agriculture, wood and food
- Metals, metal products and machinery
- Textiles, wood and wood products
- Chemicals and Minerals
- Transport equipment
Map type of goods grouped

• All grouped good pairs >250,000 tonnes in 2018.
Mapping origin-destination lines onto the real network

• We have the Blue Book Inland Waterway Network as a Shapefile.

• But... a Shapefile is not a network. “Line features do not know what they are connected to, but network elements do.”

• Code is available for turning a Shapefile to a network with nodes and edges. Distances between any two nodes can then be calculated. NUTS2 origin/destinations can then be applied to the network by connecting them to their nearest node. This will obviously not always follow reality.
(Partial) Success
• Finally, apply the NUTS2 centroids to the network (as the crow flies).

• Next step: sum multiple origin-destination pairs for each network segment.

• Colour each segment based on most common good transported?

• Highlight segments growing most over time?
Summary

• Using available statistical data, a large amount of geospatial visualisations can be achieved for IWW analysis and producing detailed Inland Waterway maps of goods transport.

• Non-Eurostat countries: if similar regional data are available, similar analyses can be conducted.

• The analysis is conducted in R (open source) using public datasets. The code or output is available on request.

• Proof of concept a success. Further analyses are possible, depending on analytical need. Examples: types of good, type of cargo, type of vessel, changes over time, comparisons with other modes, combinations with industrial economic data etc. What does SC3 want to see?