THE MEDITERRANEE RHÔNE SAÔNE WATERWAY

Author:
Charles-Elie ALLIER, Jean-Mathieu FARENC, Cédric BARIOU
CEREMA
The Mediterranee Rhône Saône waterway

- Context

- How is the waterway used?

- Some prospective

- How to improve the use of this waterway?
Context of the Méditerranée Rhône Saône waterway

- 594 km of CEMT 5 from Fos to Dijon
- No connexion to the Seine and the Rhine
- 2 Maritimes ports connected: Fos and Sete
- 2 major urban area (Marseille, Lyon)
- 30% of the French PIB close the waterway
Context

• Medlink ports
  - Maritimes ports
  - Majors fluvial ports
  - Fluvial and railway network operators
  - Transports and logistics actors

Goal:

Improving the logistics services of the members

- Promoting logistics services of the members
- Improving transport safety
- Offering numerics tools to members
How is the waterway used?

- **5.8 MT** transported in 2017 (+6% compared to 2016)
- **1.26 billions** tonnes.kilometers travelled in 2017 (-1.5% compared to 2016)
How is the waterway used?

- Two majors area: Marseille and Lyon
- 65% of the traffic transit through medlink ports members
- 20% of the traffic transit through private dock
How is the waterway used?

**Between Bourgogne/Rhône-Alps and maritimes ports**
- 57% of tonnes transported
- 87% of tonnes kilometres travelled
- GPMM = 50% of goods transported on the waterway
- Internationals traffics

**Local traffic for construction sector**
- 41% of tonnes transported
- 12.5% of tonnes kilometres travelled
- Villefranche-sur-Saône = 50% of Construction materials on the waterway
- Construction materials
How is the waterway used?

- The connexion between Fos (GPMM) and Lyon (PLEH, Feyzin, Saint Fons) is the major link of the waterway.

- Several activities use this waterway:
  - Containers
  - Oil products
  - Chemicals products

- The connexion from Bourgogne to Fos is used for the cereals.
How is it used? : Maritimes ports

• GPMM : the door of the waterway
  • 2.85 MT by waterway (3.5% of the port’s traffic)
  • Increase of containers’ traffic
  • Decrease of oil products’ traffic

• Sete
  • 315 000 tonnes waterway (7% of the port’s traffic)
  • Connexion to the Rhône with the Rhône-Sete canals (CEMT 4)
  • Waterway traffic goal : 1 MT in 2020
How is it used? : Majors Inland ports

- PLEH : the link to Fos
  - 1.4 MT by waterway
  - 12.2 MT (road, rail, waterway, pipelines)
- Majors sectors
  - Containers
  - Oil products
- 90% of the containers traffic on the Rhône transit through the PLEH

- Villefranche-sur-Saône : the port of the construction material sector
  - 1.3 MT by waterway
  - 90% of the activity is for construction material
  - More than 50% of the construction material on the Rhône transit through Villefranche-sur-Saône’s port
Some prospective for the waterway

• Attraction capacity : 40 % of the actual traffic (VNF, 2010)

• Increase for containers : + 5 % par year (GPMM, 2012)

• Others potentials sectors : recycling, reverse logistic, urban logistic

• BUT the maximum share of the flows of container sector from the GPMM catchable by the fluvial is of 10 % (GPMM, 2012) today, the modal part of the fluvial is about 3.5%

• BUT shippers are resistant to change
How to improve the use of this waterway?

• Good capacity (20 MT)

• Presenting the waterway as a logistic service

• Convincing shippers to think about waterway transport in their logistic strategies

• Adding logistics services in inland ports
LOW WATER LEVELS ON THE RHINE IN 2018 AND THEIR ECONOMIC IMPACT ON THE INLAND NAVIGATION INDUSTRY AND ON THE INDUSTRIAL SECTOR IN GERMANY

Norbert Kriedel, Administrator for statistics and market observation, CCNR
Rhine countries
84% of total inland waterway transport performance in the EU (and Switzerland)

Why Rhine navigation is crucial for European IWT

Traditional Rhine
- Navigable length: **884 km**
- Performance: **40 billion tkm/year**
- Volume: near **200 million tons/year**
- Container: > **2 million TEU/year**
The traditional Rhine and its main sections

Traditional Rhine has three main sections

- Lower Rhine (between Cologne and German-Dutch border)
- Middle Rhine (between Mannheim and Cologne)
- Upper Rhine (between Basel and Mannheim)

Middle Rhine
Most vulnerable part regarding low water periods, due to its natural characteristics
Effects of low water levels on the transport volumes
Correlation low waters and goods transport
Q1 2012 – Q3 2018

- Goods transport (mio. t, left axis)
- loading degree (in %, vessels with a draught of 2.5 m)
- loading degree (in %, vessels with a draught of 3.0 m)

- Low water leads to a reduced loading degree of inland vessels
- Reason: safe navigation has to be guaranteed
- The loading degree of larger vessels is affected more strongly than the loading degree of smaller vessels
- The overall transport volume is reduced during low waters.
Navigation on the Rhine is affected by low water levels and economic crisis years.

Source: CCNR based on data from destatis
Low water years on the Rhine 1821-2018

- 1857: 171
- 1920: 113
- 1921: 156
- 1949: 173
- 1959: 104
- 1962: 147
- 1971: 146
- 2018: 107

→ Low water periods are not a new phenomenon, but have happened quite often in the last 200 years (with a considerable strength)

Source: German Office of Hydrology
## The Rhine

### Ranking of low water years (1900-2018)

#### Ranking of low water years regarding hydraulicity

<table>
<thead>
<tr>
<th>Low water year</th>
<th>Number of days Q &lt; 783 m³/sec</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 1949</td>
<td>173</td>
</tr>
<tr>
<td>2. 1921</td>
<td>156</td>
</tr>
<tr>
<td>3. 1962</td>
<td>147</td>
</tr>
<tr>
<td>4. 1971</td>
<td>146</td>
</tr>
<tr>
<td>5. 1920</td>
<td>113</td>
</tr>
<tr>
<td>6. 2018</td>
<td>107</td>
</tr>
<tr>
<td>7. 1959</td>
<td>104</td>
</tr>
</tbody>
</table>

#### Ranking of low water years regarding economic impact

<table>
<thead>
<tr>
<th>Low water year</th>
<th>Decrease of Rhine transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 2018</td>
<td>-11.9 %</td>
</tr>
<tr>
<td>2. 1971</td>
<td>-6.2 %</td>
</tr>
<tr>
<td>3. 2003</td>
<td>-5.8 %</td>
</tr>
<tr>
<td>4. 1985</td>
<td>-5.5 %</td>
</tr>
<tr>
<td>5. 2015</td>
<td>-4.0 %</td>
</tr>
<tr>
<td>6. 1921</td>
<td>-3.5 %</td>
</tr>
<tr>
<td>7. 1962</td>
<td>-2.6 %</td>
</tr>
</tbody>
</table>

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Source: CCNR and data from Federal German Office of Hydrology
Impact of low water levels on freight rates (transport prices)
Low water periods increase transport prices, 2015-2018
(freight rates)

Impact chain on prices

Immediate consequence of low water: Reduction of possible loading degree of vessels

→ Less cargo transport per unit of vessel, loss of income for barge operator

→ Contracts foresee a compensation for this income loss

→ Price increase (stronger for larger vessels)

Source: CCNR calculation based on data from PJK International and Federal German Office of Hydrology
For the strength of the price increase, the length of the low water period is more important than the intensity.

- The **intensity** of the 2016/2017 period (drop of water levels) was stronger than in autumn 2015.
- But: the 2015 low water period was longer.
- Therefore, the price increase was stronger in 2015 than in 2016/2017.
- The 2018 period was both long and intense.

Source: CCNR calculation based on data from PJK International and Federal German Office of Hydrology
Impact of low water levels on industrial production in Germany
The Rhine

German inland waterway network

Intensively connected to several important industrial areas in Germany:

- Ruhr area with large steel industry
- Lower Rhine (Cologne) area with petrochemical industry
- Rhine-Main area with chemical industry
- Areas in Western Germany use the Rhine for container transport to and from ARA ports

Source: CCNR
German industrial production in 2018 and low water effect (Index 2015=100)

- Estimation is based on a long-term multiple regression model, using monthly values for the water level at Kaub and for industrial production in Germany.

- The occurrence of an additional day with water levels < 78 cm at Kaub has a significant negative impact on industrial production in Germany.

Loss of 5 billion Euro in the second half of 2018!

Source: Kiel Institute for the World Economy, CCNR
Conclusions and Outlook
The Rhine

Conclusions and Outlook

- The low water period and its effects on the economy in 2018, proved in a clear way the importance of Rhine navigation for the smooth functioning of modern economies, and for economic and industrial growth.

- Low water periods are not a new phenomenon, but the vulnerability of the system « IWW – economy » has increased compared to earlier times.

- Although not part of this paper, possible adaptation measures could consist of new or modified vessel design, new shipbuilding concepts, promotion of small vessels, and also adapted logistical concepts.

Source: CCNR
THANK YOU VERY MUCH FOR YOUR ATTENTION

Mr Norbert Kriedel
n.kriedel@ccr-zkr.org
Tel: +33 3 88 52 96 43
GOOD NAVIGATION STATUS (GNS) – A SUITABLE CONCEPT FOR NAVIGATION IMPROVEMENTS ON RIVERS AND CANALS?
LESSONS LEARNED AT THE RHINE

Authors: Kai KEMPmann
         Gernot PAULi

Central Commission for the Navigation of the Rhine
Content overview

• EU Transport Policy, Corridor Management and GNS
• Lessons learned at the Rhine
• Conclusions
EU TRANSPORT POLICY
Corridor Management and GNS
EU Transport Policy TEN-T

Objective: Connecting Europe’s major Economic Regions

- Europe’s leading sea and inland ports connecting the corridors to worldwide transport flows via all transport modes
- Dense network of bi- and trimodal intermodal terminals
- River Rhine as a backbone for capacious IWW container and bulk transport
- Dense rail network over the entire corridor for efficient freight transport
EU Transport Policy TEN-T

Legal instrument

• Union guidelines for the development of the trans-European transport network (Regulation (EU) No 1315/2013) laying down the concepts for:
  • TEN-T Corridors
  • Good Navigation Status
EU Transport Policy TEN-T

Corridor management as tool

Objective: Single European transport area

Coordinated frameworks of cooperation for the prioritization of the various steps needed to realise the Corridors.

Transport infrastructure plays a key role to completing the internal market through the removal of physical barriers.

Infrastructures need to be constructed, maintained and upgraded through investments within a coherent corridor vision,
EU Transport Policy TEN-T

Good Navigation Status (GNS) as concept

Objective: Ensuring minimum waterway parameter and levels of service

European Commission aims to promote and strengthen the competitive position of inland navigation in the transport system, and to facilitate its integration into the intermodal logistics chain

GNS is a concept to improve the European waterways to be part of a sustainable transport system

- Draught not less than 2.50 m
- Minimum height under bridges not less than 5.25 m
- Availability
LESSONS LEARNED AT THE RHINE
Lessons learned at the Rhine

Mannheim Convention of 1868:

- Principle of the freedom of navigation
- Principle of the unity of the scheme
- Principle of equal treatment
- Principle of maintaining and improving the navigable waterway

- Framework for regulating navigation on the Rhine
  - Rhine vessel inspection regulations (RVIR)
  - Regulations for Rhine navigation personnel (RPN)
  - Police Regulations for the navigation of the Rhine (RPR)
  - ADN Regulation
Lessons learned at the Rhine

Corridor like management of the Rhine:

Committee for Infrastructure and Environment

- Meets twice a year
- Has fixed procedures and agreed minimum requirements
- Discusses maintenance and upgrade of waterway
- Approves projects that might effect navigation negatively
Lessons learned at the Rhine

Waterway profile of the Rhine:

- Adapted navigable channel depth
- Adapted navigable channel width
- Bridge clearance
- Availability 345 days per year
Lessons learned at the Rhine

Inland navigation transport in 2017

Transport [Mio. t]

Lower Rhine | Middle Rhine | Main | Mosel | Elbe | Danube (Germany)

CCNR based on data from destatis and German Waterway Administration
Lessons learned at the Rhine

Why is navigation on the Rhine a success, although the navigable channel depth is limited on some sections?
Lessons learned at the Rhine

Facts about the Rhine:

- Most of the Rhine sections are free-flowing
- Most times a higher navigable channel depth is available
Lessons learned at the Rhine

![Graph showing availability of navigable channel depth at the Rhine](image)
Lessons learned at the Rhine

Facts about the Rhine:

- Most of the Rhine sections are free-flowing
- Most times a higher navigable channel depth is available
- Optimized navigable channel parameters to guarantee efficient navigation and to minimize maintenance
- Up to date information on water level and forecasts
Lessons learned at the Rhine
Lessons learned at the Rhine

Facts about the Rhine:

- Most of the Rhine sections are free-flowing
- Most times a higher navigable channel depth is available
- Optimized navigable channel parameters to guarantee efficient navigation and to minimize maintenance
- Up to date information on water level and forecasts
- Supported by well developed RIS applications
Lessons learned at the Rhine

Other aspects to take into account for efficient navigation:

- Actual and foreseeable industrial developments
- Sufficient number of ports and terminals
- Well-equipped berths (communication, electricity, public transport, …)
- Efficient investment in inland waterway infrastructure development
- Waterway development policies elaborated hand in hand with industrial development policies
CONCLUSIONS
Conclusions

- Other factors than sufficient draught and headroom under bridges seem to be of higher or at least equal relevance for the success of increasing transport volume in inland navigation.

- Development of inland waterway infrastructure has to be organized and managed in a corridor approach. Going further, corridors can be combined following a network approach and its guiding principles.

- Demanding overambitious waterway requirements for free-flowing rivers year-round are neither realistic nor necessary.
Conclusions

- Realistic waterway requirements, such as on navigable channel depth, guaranteed through excellent, user-oriented maintenance, should be developed and coordinated in the corridor.

- GNS has proven to be a useful concept for individual corridors such as the Rhine. It could be developed further and applied for navigation improvements on rivers and canals worldwide.

- Common terminology for example on draught and navigable channel depth is needed to avoid misunderstanding in policy development and implementation.
Multifunctional and multimodal role of waterways: Waterborne, Land development and water resources

The case of Seine-Scheldt network

Nicolas Bour
Manager European Economic Interest Group (EEIG) Seine-Scheldt
Voies navigables de France
Vice-Chairman Inland Navigation Europe
Seine-Scheldt IWT Network

Key project of North Sea-Mediterranean corridor

Industrial accelerator for European Industries

A new interconnected gate to Europe

Multifunctional contributions of the network

Impact on European policies

Integrated Inland Waterway model

Innovation for multimodal logistics
A the heart of European transport policy

- 9 European Core network multimodal corridors to be developed by 2030
- 5 corridors connected to Seine-Scheldt
  - North-Sea Mediterranean
  - Atlantic
  - Mediterranean
  - Rhine-Alpine
  - North-Sea Baltic
- 1100 km IW and multimodal platforms network connected to 5 seaports to:
  - Shift to IWT and rail 30% of medium and long distance road transport
  - Develop multimodal logistic/industrial hubs

*European integrated multimodal stakeholders organization*
A new interconnected gate to Europe

- **Land interconnection of 5 seaports**
  - Le Havre
  - Rouen
  - Dunkerque
  - Antwerpen
  - Zeebrugge

- **1100 km continuous large gauge (Vb) IW to create a network of multimodal industrial and logistic platforms**
  - Seine River (Upstream and Downstream Paris)
  - Oise / Seine-Nord Europe Platforms
  - Dunkerque – Scheldt (Lille/Valenciennes)
  - Leie Platforms
  - Maas Platforms
  - Albert kanaal platforms

**8 bln€ over 30 years for an enlarged non congested logistic system in Europe**
Seine-Scheldt drives economic development to increase the GDP of 40 million European citizens of six Regions and 3 Metropoles:

- Normandie / Ile-de-France
- Hauts de France/ Grand Est
- Flanders / Wallonia
- Paris / Lille / Brussels

Key industrial sectors users of IWT:

- **Construction**: Materials, Civil works, Steel, Precast, ..
- **Agro-industry**: Cereals, Oil seed, Mill, Starch, Sugar, Biofuel, Protein, Agrofood, Animal food,
- **Wood**: Log, biomass, precast,...)
- **Chemical** (Battery, plastic recycling,...)
- **Recycling** (Waste, Polluted soils, deconstruction, Electric/Paper/Plastic,...)
- **Consumer Goods** (A)
- **Naval&Maritime** (Construction, Innovation)

**Co-construction with industries and territories of Seine-Scheldt development (ports, barges, logistic, industries)**
Multifunctional contributions of the network

**Socio economic and WEB analysis evaluated contributions of Seine-Scheldt to create value for 40 millions of citizens**

- **Economy**
  - Port development and foreign trade competitiveness
  - Reduced transport costs and multimodal solutions
  - Sustainable industry location along canals and river
  - Circular economy driver

- **Environmental**
  - Renewable energy development
  - River level and flood control
  - Biodiversity development
  - Reduced congestion costs
  - Reduced fossil fuel consumption and CO2 emissions

- **Social**
  - Long term sustainable job creation
  - Tourism
  - Land development

**12 bln€ NPV benefits for European public policies**
# Impacts of Seine-Scheldt network on European Public policies

## Multipolicy approach to implement benefits of a global system

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Mutualize and massify logistics flows and industrial freight</td>
</tr>
<tr>
<td>B</td>
<td>Promote investment FR/BE/EU/international along the waterway</td>
</tr>
<tr>
<td>C</td>
<td>Develop a large-gauge inland waterway network FR, FL, WA and EU</td>
</tr>
<tr>
<td>D</td>
<td>Modernize IWT fleet (energies/motors)</td>
</tr>
<tr>
<td>E</td>
<td>Locate European distribution centers in FR/FL/WA</td>
</tr>
<tr>
<td>F</td>
<td>Contribute to reducing transport impacts on climate</td>
</tr>
<tr>
<td>G</td>
<td>Develop, store and distribute renewable energies along the waterway</td>
</tr>
<tr>
<td>H</td>
<td>Reduce road congestion</td>
</tr>
<tr>
<td>I</td>
<td>Connect territorial industries to Europe and overseas</td>
</tr>
<tr>
<td>J</td>
<td>Develop multimodal solutions IWT / rail / road</td>
</tr>
<tr>
<td>K</td>
<td>Develop European and international strategic partnerships</td>
</tr>
<tr>
<td>L</td>
<td>Develop a inland ports network in FR, FL, WA and EU</td>
</tr>
<tr>
<td>M</td>
<td>Develop green flows (passengers and goods)</td>
</tr>
<tr>
<td>N</td>
<td>Create new landscapes and urban and rural connections</td>
</tr>
</tbody>
</table>

### Legend
- **Strong Impact**
- **Medium Impact**
- **Low Impact**
Integrated Inland Waterway model

✓ European Corridor integration
  ▪ Global Projects in line with EU priorities
  ▪ Strong link in Corridor nodes (Ports and Cities)
  ▪ Work plan in line with Global Project definition
  ▪ Regular EU Calls to implement the Global Projects

✓ Multimodality
  ▪ Coordination between Ports, Inland waterway and Rail
  ▪ Quality of IW and Rail infrastructure and services
  ▪ River and rail interfaces in Major cities
  ▪ Stakeholder mutualization

✓ Integrated sustainable transport system
  ▪ Link Infrastructure and Transport services
  ▪ Global logistic chain (River/Port/Last mile)
  ▪ Case of Albert Kanaal (Economic Albet Kanaal network)
  ▪ Case of CSNE Platforms, Watertruck and Multiregio project

Structure governance to reduce obstacles to the development of massified transport solutions
Amsterdam-Marseille Corridor study
A stakeholder multimodal approach for integrated logistic

✓ Solutions for industrial and logistics players to reduce long distance road transport
✓ Develop European multimodal hubs within the North Sea-Mediterranean corridor;
✓ Three sets of recommendations:
  • Multilot massification and cross-sector mutualization
  • Seine-Scheldt / Rhine-Mosel and Rhône-Saône basin recommendations (Flexibility and reliability, IW and rail performance
  • Agro/ Construction/Recycling/General goods recommendations for industrial sectors

Study available at GEIE Seine-Scheldt stand

Involvement of shippers in innovation
Innovation for multimodal logistics

- **Transforming Transportation systems**
  - Integrated logistic systems
  - Greening the multimodal transport system
  - Connected and automated multimodal services
  - Digitized and data sharing

- **Mutualized innovations for multimodality**
  - Critical size for Innovation deployment
  - Coordination between Ports, Inland waterway and Rail
  - Logistic and industrial multimodal platforms
  - Standards and reference model to be shared

- **Partnership and alliances**
  - Public private partnership
  - Cross-sector mutualized investment
  - Cross-modes inland port coordination
  - European cross-border project (Seine-Scheldt)

**Seine-Scheldt a new field of innovation**
Thank you for your attention

Questions and answers

nicolas.bour@vnf.fr
+33 3 21 68 83 63
CITY PORT RELATIONSHIP AND ITS INFLUENCE IN THE SOCIAL ENVIRONMENT

Author: Ramiro Lopez Saubidet
PUERTO BUENOS AIRES AGPSE. ARGENTINA
MODERN WORLD: SOCIAL MEDIA

THE POWER OF DIGITAL PLATFORMS

TIM WU THE ATTENTION MERCHANTS
NOWADAYS THE SOCIETY. VUCA ENVIRONMENT AND ANTHROPOCENE AGE

NOBEL PRIZE IN CHEMISTRY PAUL CRUTZEN

THE ANTHROPOCENE AGE

AMAZONIA FIRES

VUCA

COMPLEXITY
Multiple key decision factors

VOLATILITY
Rate of change

AMBIGUITY
Lack of clarity about meaning of an event

UNCERTAINTY
Unclear about the present
HORIZONTAL & VERTICAL INTEGRATION

PANORAMA IN MARITIME TRANSPORT

Maritime Industry

Horizontal integration

Vessel companies joint ventures (fleet concentration)

MEGA ships

Greater draft

Greater length

Greater need of patio

Vertical integration

Greater participation of shipping companies in terminal operation

More demand of infrastructure caused by larger peaks

Highest point of business balance. Market Concentration

Quick reaction

- Port infrastructures get STRESSED. Ricardo Sanchez
- The vessel cascading effect is affecting the ports enhancing the need to have quick solutions. Olaf Merk

Cruise industry

Larger size of ships

Greater tourist activity in the city and Atlantic Coast

Greater amount of passengers

Trend. Exclusive Attention

Possible source of financing

Beter port city integration
PORT OF BUENOS AIRES IN THE WORLD

Argentina

Puerto Buenos Aires
Its original design lasted more than a 100 years

80 years without significant infrastructure works

1904 - The design of the Puerto Buenos Aires is set
1919 - The new Dock F is built
1940 - The construction of its 5 basins is concluded
1993 - The 6 terminals were tendered and awarded
1994 - Terminals 1 and 2 are unified
1997 - Terminal 6 went bankrupt
2000 - Terminal 3 was added to 1 and 2, forming TRP
2020 - End of the three concessions
2030 - New terminal operation starts

CHANGING ACCORDING TO WORLD TRENDS

6 operators
4 operators
3 operators
1 operator
STRATEGIC PLAN
LONG TERM PROJECT
STRATEGIC SUSTAINABILITY PLAN: SUSTAINABLE PORT
LAND-USE PLAN: PUERTO NUEVO

- Port cargo area (Terminals);
- Logistic services (AGP SE);
- Accessibility (AGP SE);
- Third parties;
- Passenger Terminal – Mixed activities;
- Mixed uses borderline (AGP SE).
HINTERLAND PUERTO BUENOS AIRES

Interior Port Terminal: Córdoba, Salta
Cruise Ships: Ushuaia, Puerto Madryn.
La Corte de La Haya rechazó la demanda de Bolivia contra Chile para negociar una salida al mar por 12 votos contra tres.

A pesar de las diferencias, Macri y Evo Morales avanzan en acuerdos.

Salida al mar, Bolivia quiere incorporarse a la Hidrovía Paraná-Paraguay.

El fallo negativo en La Haya obligó al país vecino a buscar alternativas para que su comercio deje de depender de los puertos chilenos; la Argentina quiere ser un socio facilitador.
FORELAND. BOLIVIA AND PARAGUAY. BARGES TRANSSSHIPMENT

2016

8,248 TEU

JAN-APR 2017

+494% IN VOLUME

2,573 TEU

JAN-APR 2018

15,274 TEU

JAN-APR 2018

+20% IN VOLUME

51,247 TEU

JAN-APR 2018

15,274 TEU

18,341 TEU

JAN-FEB 2019*

* Abril de 2019 datos provisorios
Advantages:
- Less distance
- Does not go to Brazil
We worked with Paraguayan shipowners and port terminals. As a result, we recovered cargo coming from this country that had migrated to other ports.

We visited Bolivia and met with shipowners and cargo lines.

We worked with Bolivia to make possible transshipments to our port with third countries as their destination.
PBA removed the Customs regulation “Alerta Roja” 365/12 that made mandatory the scanning of every container, generating extra costs.

PBA abolished Resolution 1108/13 that prohibited the transshipment of barges with argentinian exportation in foreign ports.

PBA lowered 90% the Migration Fee for ships that enter or leave Puerto Buenos Aires that have as its destination any port that is more than 300 km away, and 99,2% for the rest of the ports.

PBA began to operate the berthing area of TERBASSA, generating new waiting areas for barges and providing services for its crews.

PBA reduced the General Fee for Use of Port 100% (charge for entering the port 0,075/TRN) and the fee for services and cabotage vessels (Quay fee. Charged per day 0,025/TRN).

RESULT: We recovered 70% of transshipment cargo from Paraguayan barges.
MID & SHORT TERM
WORKS & ACTIONS
CITY PORT DEVELOPMENTS AND ACTIONS. General Concepts

**STRATEGIC SUSTAINABILITY PLAN.** Development of a plan aimed at unifying the port activity with the dynamics of the city. Without losing port operation. Posing actions of Long, Medium and Short term.

**ARTICULATION SPACE** between the Port and the City. Bringing the citizen to enjoy the coastal sector. Refunctionalization of disused port infrastructure. Social valorization of the port area. Paradigm change of the port image.

**BRIDGES OF INTEGRATION:** Communication between port authorities and citizenship. Use of Networks. Community participation. Sustainable Cultural transformation.
PORT/COMMUNITY INTEGRATION

CORPOREAL SIGNAGE

LIGHTNING

COLORED CONCRETE CUBES

BASIN F: COASTAL PROMENADE AND ACCESS PORTAL
PORT/COMMUNITY INTEGRATION. New Signage

IDENTIFICATION SIGNS

INTERIOR SIGNAGE

URBAN SIGNAGE
PORT/COMMUNITY INTEGRATION

DÁRSENA NORTE

FRAGATA LIBERTAD. NAVY FRIGATE
PORT/COMMUNITY INTEGRATION

DIQUE 0: PUBLIC SQUARES
PORT/COMMUNITY INTEGRATION. Cruise terminal & mixed uses development
PORT/COMMUNITY INTEGRATION

GENDER INTEGRATION
BIKE LANES
PORT TRAINING CENTER
RUNNING
SUSTAINABILITY REPORT 2017

- First Communication On Progress (COP) of the United Nations Global Compact.
- First Sustainability Report made according to GRI standards.
- GRI Content Index referencing the Principles of the Global Compact and the Sustainable Development Goals (SDG).
RAMIRO LOPEZ SAUBIDET
Gerente Coordinador de Gestión Operativa
Administración General de Puertos S.E.

rlopezsaubidet@puertobuenosaires.gob.ar
ramirolopezsaubidet@gmail.com

Av. Ingeniero Huergo 431
(C1107AOE) CABA, Argentina
Cel.: (+54 9 11) 4081-8926

www.argentina.gob.ar/transporte/puerto-buenos-aires
@puertobsas
@Ramiro1000LS
NATIONAL PORT STRATEGIES: how will the new French national strategy benefit from PIANC and from a European benchmark?

Author: Geoffroy CAUDE- permanent member of the French High Council for Environment and Sustainable Development- Ministry for an ecological and caring transition.
Summary of the presentation

Introduction

1- Quick overview of the French port system

2- The main strategic issues to be considered in a new national port strategy

3- PIANC recommendations on port planning

4- European national port strategy experience:
   4-1 Germany
   4-2 Spain
   4-3 Italy

5- Main results of this bench-mark

Conclusion: new work for PIANC
1- Quick overview of the French port system
1- Quick overview of the French port system
2- The main strategic issues to be considered in a new national port strategy

Four pillars in the 2013 French national strategy:

- Allow the traffic growth and enhance port cooperation
- Qualitative logistics pillar: competitiveness, massification, easing the port operations, market share increase
- Industrial pillar to favor newcomers
- Landlord management in a sustainable way

7 Large maritime ports with new strategic plans covering the 2014-2018 period
COP 21 agreement to reduce greenhouse gases emissions adopted in 2015/2016
3- PIANC recommendations on port planning

The five principal objectives of a port masterplan are to:

- Communicate the ‘vision’ for the port to the wide range of stakeholders
- Develop the port in accordance with international and national legislation and guidelines
- Integrate economic, engineering, environmental and safety considerations in the overall plan
- Promote the orderly long-term development and growth of the port by establishing functional areas for port facilities and operations
- Allow the port to respond to changing technology, cargo trends, regulations and legislation and port

<table>
<thead>
<tr>
<th>Period of time</th>
<th>Infrastructure</th>
<th>Operations</th>
<th>Business</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5 years</td>
<td>Investment Plan Port Zoning</td>
<td>Management Plan Port Zoning</td>
<td>Business Plan</td>
</tr>
<tr>
<td>5-10 years</td>
<td>Investment Plan Strategic Plan</td>
<td>Strategic Plan Masterplan</td>
<td>Business Plan</td>
</tr>
<tr>
<td>20-30 years</td>
<td>Masterplan Masterplan</td>
<td>Masterplan</td>
<td>Business Plan</td>
</tr>
</tbody>
</table>

Table 2.1: Different planning concepts in port sector
3- PIANC recommendations on port planning
3- PIANC recommendations on port planning
4- European national port strategy experience :
4-1 the German experience

1- Maintenance and development of port and transport infrastructures

2- Increase in international and European competition

3- New European initiatives toward ports

4- Necessity to develop adapted facilities for wind farm energies

5- Technology developments in automation and numerical

6- Environment and climate change

7- Infrastructures for alternative fuels and alternatives energies

8- Safety and security related to ICT

9- Demography
4- European national port strategy experience:
4-1 the German experience

Investment for the next parliamentary term:

- 5 G€ for the transport with 1,8 G€ in 2018 and 2019

- 3,1G€ between 2016 and 2018 from the investments for the future program

- complementary resources due to financing through the users (extension in two periods of time of the lorry taxes)
4- European national port strategy experience
4-2 The Spanish experience
4- European national port strategy experience
4-3 The Spanish experience

An equilibrium between State and autonomies

28 ports (46)

Board of 15 members

5 years strategic plan approved by the chairman of the port and by the chairman of Puertos del Estado

National strategy between 2012 and 2024

National strategic framework: the first in 1998 and the existing one in a renewal phase starting in October 2018
4- European national port strategy experience:
4-3 The Italian experience

<table>
<thead>
<tr>
<th>UNA VISION PER IL SETTORE PORTUALE E LOGISTICO ITALIANO</th>
<th>Obiettivo 1</th>
<th>Simplificazione e snellimento</th>
</tr>
</thead>
<tbody>
<tr>
<td>Il sistema portuale e logistico:</td>
<td>Obiettivo 2</td>
<td>Concorrenza, trasparenza e upgrading dei servizi</td>
</tr>
<tr>
<td>Per la ripresa economica del Paese</td>
<td>Obiettivo 3</td>
<td>Miglioramento accessibilità e collegamenti marittimi e terrestri</td>
</tr>
<tr>
<td>Come strumento attivo di politica Euro-Mediterranea</td>
<td>Obiettivo 4</td>
<td>Integrazione del Sistema Logistico</td>
</tr>
<tr>
<td>Per lo sviluppo e la coesione del Mezzogiorno</td>
<td>Obiettivo 5</td>
<td>Miglioramento delle prestazioni infrastrutturali</td>
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<tr>
<td>Per la promozione della sostenibilità</td>
<td>Obiettivo 6</td>
<td>Innovazione</td>
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<td>Obiettivo 7</td>
<td>Sostenibilità</td>
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<td></td>
<td>Obiettivo 8</td>
<td>Certezza e programmanbilità delle risorse finanziarie</td>
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<td>Obiettivo 9</td>
<td>Coordinamento Nazionale, condivisione e confronto partenariale</td>
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<td>Obiettivo 10</td>
<td>Attualizzazione della governance del Sistema Mare</td>
</tr>
<tr>
<td></td>
<td>Azione 1</td>
<td>Misure per la Simplificazione e la velocizzazione delle procedure, dei controlli e degli interventi sul Porti di interesse nazionale</td>
</tr>
<tr>
<td></td>
<td>Azione 2</td>
<td>Misure per l’efficientamento dei servizi portuali e l’aumento della competitività degli operatori</td>
</tr>
<tr>
<td></td>
<td>Azione 3</td>
<td>Misure per migliorare i servizi di trasporto ed aumentare l’accessibilità dei porti via mare e via terra</td>
</tr>
<tr>
<td></td>
<td>Azione 4</td>
<td>Misure per incentivare l’integrazione delle catene logistiche e delle attività manifatturiere e logistichhe</td>
</tr>
<tr>
<td></td>
<td>Azione 5</td>
<td>Misure per il potenziamento infrastrutturale dei porti e dei loro collegamenti terrestri</td>
</tr>
<tr>
<td></td>
<td>Azione 6</td>
<td>Misure per incentivare la ricerca, lo sviluppo e l’innovazione tecnologica nella portualità italiana</td>
</tr>
<tr>
<td></td>
<td>Azione 7</td>
<td>Misure per l’efficienzamento energetico e la sostenibilità ambientale dei porti</td>
</tr>
<tr>
<td></td>
<td>Azione 8</td>
<td>Misure per il finanziamento della gestione e degli investimenti dei Sistemi Portuali</td>
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<tr>
<td></td>
<td>Azione 9</td>
<td>Coordinamento, programazione e promozione nazionale del Sistema Mare</td>
</tr>
<tr>
<td></td>
<td>Azione 10</td>
<td>Misure per adeguare la Governance dei Porti alla mission della Portualità Italiana</td>
</tr>
</tbody>
</table>
4- European national port strategy experience:
4-3 The Italian experience
5- Main results of this benchmark

- The national French ports strategy should be enlarged to regional ports
- The ports should be connected with their respective hinterlands with a national platform of rail freight stakeholders including port stakeholders
- This hinterland should priorily be connected by the main penetration axes: river Seine; Rhone-Saone connection, North connection
- National port strategy should integrate the low carbon emission strategy, the energy transition strategy, the numerical transition strategy, the environmentla protection, biodove’risty and limitation of land use
5- Main results of this benchmark

The French national strategy ongoing process includes 7 working groups:

WG 1: competitiveness and commercial attractiveness
WG 2: ecological transition
WG 3: numerical transition
WG 4: infrasructures and logistics
WG 5: governance
WG 6: employment and training
WG 7: research and development, innovation
Conclusion: new work for PIANC

1- Narrow link between port strategy, land planning and urban planning which could enhance the opportunity to work with IACP
2- Link with the limitation of land use by ports
3- Link between the climate change adaptation strategies and the national port strategies
4- Revisit the resilience of port structures after the special publication of the IPCC recently released on Ocean and Cryosphere under the umbrella of WPSP
5- Start of a working group on national port strategies?

For any question contact: geoffroy.caude@developpement.durable.gouv.fr
DEVELOPMENT OF THE PORT OF BARRANQUERAS AND ITS ROLE IN THE PARAGUAY – PARANA WATERWAY

Author: Eng. Ariel José Savarese
Empyria STM/ Port of Barranqueras
Paraguay – Paraná Waterway (PPW)

- Natural inland waterway in South America
- Countries: Argentina, Paraguay, Uruguay, Brasil and Bolivia (MERCOSUR)
- Second largest sudamerican waterway - length: 3400 km
- Freight transportation multiplied by 25 in the last 20 years
Port of Barranqueras

- Province of Chaco, Argentina - 1200 km. north from City of Buenos Aires
- Geographical center of the MERCOSUR
- Marginal area in terms of investment and development
- Port Authority dependent on provincial Government
- First operation dating back 1906
Port of Barranqueras – Facilities

- Regional railway and routes connections (Multimodal Port)
- 50,000 m² of yards for containers and general cargo
- Silos with a dynamic capacity of 25,000 tons of grain
- 10,000 m² of covered space for cargo consolidation
- Reinforced concrete quay - 800 metres long with three sections to dock
Port of Barranqueras – Equipment

- **Liebherr** Reachstakers

- 2,5 tons forklifts for cargo consolidation

- 2 **Liebherr** stationary cranes (40 tons)

- 2 **Ganz/VKE** móvil cranes (27 tn/12,5)

- On-Site phytosanitary control and customs offices
Port of Barranqueras - Operation

![Map of South America showing the Parana-Paraguay Waterway and the Port of Barranqueras.](image-url)
Reactivation and Reconversion Plan

- “Port of Barranqueras Reactivation and Recorversion Plan” devised by Port Authority

- Developed during 2015/2016 by Port Authority technicians, with the support of an external advisor

- Objective: to transform the Port into a logistic center for the interconnection between the PPW and the provinces of Northern Argentina
Reactivation and Recorversion Plan

• Concentration on six axis
  
  Simple and direct planning

  Take advantage of the multimodal resources to change the business model

  Stress on comercial vision and professionalizing the Port Authority

  Incentivate the participation of private capital

  Use the existing infraestructure

  Involve all the actors, respecting their idiosyncrasy
### Tools used

<table>
<thead>
<tr>
<th>Management</th>
<th><strong>S.W.O.T. analysis</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>Statistical standardization</td>
</tr>
<tr>
<td>Management</td>
<td>Pareto analysis (for maintenance of the equipment)</td>
</tr>
<tr>
<td>Management</td>
<td>Union categorization and stress on workers stability</td>
</tr>
<tr>
<td>Management</td>
<td>Supply Chain management</td>
</tr>
<tr>
<td>Management</td>
<td>Digital transformation</td>
</tr>
<tr>
<td>Management</td>
<td>Analysis of workflows</td>
</tr>
<tr>
<td>Management</td>
<td>Implementation of work protocols</td>
</tr>
</tbody>
</table>
Tools used

- Understanding the local idiosyncrasy and bureaucracy was crucial.
- In order to achieve that, we applied this "ad hoc" tools

<table>
<thead>
<tr>
<th>Fecha reunión:</th>
<th>Temática</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Area</strong></td>
<td><strong>Participación</strong></td>
</tr>
<tr>
<td>Dirección</td>
<td>Excelente</td>
</tr>
<tr>
<td>MKT</td>
<td>Excelente</td>
</tr>
<tr>
<td>Operación</td>
<td>Excelente</td>
</tr>
<tr>
<td>Administración</td>
<td>Muy bueno</td>
</tr>
<tr>
<td>Legal</td>
<td></td>
</tr>
<tr>
<td>Otros</td>
<td></td>
</tr>
<tr>
<td>Obs.</td>
<td></td>
</tr>
</tbody>
</table>

1. Local Partnership

2. Bureaucracy
Tools used

3. Employees’ training and skills

4. Mixture of short-term with long-term objectives
Context

- The implementation is taking place in a context of budget constraints with devaluation of the national currency and high inflation.
Results

• Income of the Port Authority grew 7 times at nominals terms and 3.7 times in real terms

• Cargo throughput increased 15 times

• Record of truck entry in 2018
Conclusion

• Technical perspective is a necessary but not sufficient condition to pull off a plan successfully.

• Vital importance of the correct handling of management tools as well as the comprehension of the local idiosyncrasy and bureaucracy

• The failure of previous reform plans on the Port of Barranqueras (and other ports as well) were due to the underrating of this two items.

• Nowadays the Port Authority is working on the second part of the Plan
Thank you for your attention
ASSESSING THE ROBUSTNESS OF DUTCH INLAND PORTS

P. Taneja, M. Dekker, C. van Dorsser and T. Vellinga
Delft University of Technology, The Netherlands
Content

1. Inland ports- role and functions
2. Problem definition & objective
3. Assessing the robustness of an inland port
4. Case study
5. Conclusions & recommendations
Inland Waterway Transport (IWT)

Important role in Dutch transport system
• waterways
• infrastructure sea ports, inland ports, locks etc.

Sea Ports
• node in global supply chains
• hub for various transport modes

Inland Ports
• connect global flows of goods & local spaces of consumption / production
Inland Ports

A well-functioning inland port is important for:

- competitive IWT
- competitive position of deep-sea ports
- efficient supply chains
- modal shift to environmentally-friendly IWT (CC/GHG)

Inland Ports: Many challenges

- Multiplying environmental impacts
- Insufficient capacity to prevent bottlenecks along transnational corridors
- Proximity to urban areas: lack of space for expansion
- Changing demands/ new functions
Inland port main functions/ activities

Source: Internet

Transfer of cargo  Storage of cargo  Industrial production

Demand for major functions is likely to change over time
Is the port robust?

- Can the port be adapted (in a cost-effective manner) to fulfil its functions under changing future conditions?
  - Will the current activities be threatened in the future?
  - Are there sufficient opportunities in the future?
  - Can the port adapt to seize these opportunities (flexibility)?

- Objective: Method for assessing the robustness of a port so that the port can develop short & long term strategies
Planning robust ports

Creating a strategic and long-term view requires us to draw on tools, techniques, and methodologies from other fields.

- **SWOT** (Strengths-Weaknesses-Opportunities-Threats) analysis
- Anticipating change from **Futures Field**
- Dealing with uncertainty from **Field of Policymaking**
Anticipating the Future: Strategic Foresight

**Figure: Futures Pyramid** (Van Dorsser, Walker, Taneja, & Machau, 2018)
## Approaches for dealing with uncertainty

<table>
<thead>
<tr>
<th>Uncertainty</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Future</td>
<td>A clear enough future</td>
<td>Alternate futures (with probabilities)</td>
<td>A multiplicity of plausible futures</td>
<td>An unknown future</td>
</tr>
</tbody>
</table>
| Type of action| **Optimal**
   Forecast the future and choose an ‘optimal’ policy for that future | **Risk-based**
   Use probabilities to optimize action in accordance with the risk attitude of the policymaker | **Static robust**
   Identify plausible futures, and find a strategy that works acceptably across most of them | **Adaptability**
   Adapt over time as conditions change and learning takes place |

*Source: Adapted from Agusdinata (2008) and Walker, Marchau, and Swanson (2010)*
Modified SWOT analysis

Internal analysis → Examine port characteristics → sufficient flexibility and adaptability to seize new opportunities by investing in new activities/services → Strengths and weaknesses

Analysis of external environment → Strategic Foresight → Smaller set of plausible developments → Threats and opportunities

Can the new services/activities be established by employing or adapting existing infrastructure & facilities?

If yes, the port is considered robust
Modified SWOT analysis: Schematization

Adaptable for new functions?

Anticipating the future
Strategic Foresight Method
Case study: Port of Wageningen

- located on northern bank of the Nederrijn
- 5 terminals
  - 2 agro-bulk
  - 1 concrete plant
  - 1 dry bulk for sand/gravel
  - 1 liquid bulk
- accessible by IWT, less by road, no train connection
- Reasonable hinterland; nearest inland ports at 25 km
Internal Analysis: Port characteristics

- Port basins and terminals
- Accessibility
- Hinterland size
- Existing functions/activities
- Throughput volumes
- Operational indicators

Flexibility
Space for expansion – quay wall, terminal area
Activities

- Public quays for breakbulk, neo bulk and special cargo; no storage
## Statistics

<table>
<thead>
<tr>
<th>Port activity</th>
<th>Area</th>
<th>Quay length</th>
<th>Throughput volumes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container terminal</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dry bulk terminal</td>
<td>10,500 m²</td>
<td>130 m</td>
<td>200,000 tonnage</td>
</tr>
<tr>
<td>Liquid bulk terminal</td>
<td>15,400 m²</td>
<td>110 m</td>
<td>150,000 tonnage</td>
</tr>
<tr>
<td>Terminal for remaining cargo</td>
<td>2,300 m²</td>
<td>230 m</td>
<td>Unknown (but small volumes)</td>
</tr>
<tr>
<td>Agro-bulk producer</td>
<td>15,625 m²</td>
<td>230 m</td>
<td>650,000 tonnage</td>
</tr>
<tr>
<td>Construction mat. producer</td>
<td>15,000 m²</td>
<td>100 m</td>
<td>200,000 tonnage</td>
</tr>
<tr>
<td>Energy producer</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Recycling company</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Remaining industrial producer</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>58,825 m²</td>
<td>800 m</td>
<td>1,200,000 tonnage</td>
</tr>
</tbody>
</table>
Flexibility to seize new opportunities

Free area

No port activities
## Internal Analysis: SWOT

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Waterway CEMT-class Va</strong>&lt;br&gt;large inland vessels</td>
<td>Poor accessibility road &amp; rail</td>
</tr>
<tr>
<td><strong>Good inland navigation accessibility</strong>&lt;br&gt;channel 850 x 45-80 x 5.5; port basin 4.0 m</td>
<td>Limited diversity in port activities: containers, energy production, recycling activities</td>
</tr>
<tr>
<td><strong>Large hinterland area</strong>&lt;br&gt;few ports, many companies</td>
<td>Dependent on agro-bulk transfer /storage&lt;br&gt;50% throughput volumegruniekRijnvallei</td>
</tr>
<tr>
<td><strong>Area available for expanding port activities</strong></td>
<td>Small throughput volumes</td>
</tr>
<tr>
<td><strong>Mainly port-related activities in the inland port</strong></td>
<td>Small terminal areas</td>
</tr>
<tr>
<td></td>
<td>Restricted operational time&lt;br&gt;sunday, noise</td>
</tr>
</tbody>
</table>
## Analysis of external environment: future trends

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Relocation of low-value industrial processes</td>
</tr>
<tr>
<td>2</td>
<td>Specialisation of the remaining industries</td>
</tr>
<tr>
<td>3</td>
<td>Replacement of small inland vessels for larger inland vessels</td>
</tr>
<tr>
<td>4</td>
<td>Gradual stagnation in product demand</td>
</tr>
<tr>
<td>5</td>
<td><strong>Energy transition</strong> to reduce emissions</td>
</tr>
<tr>
<td>6</td>
<td>Transition to <strong>sustainable and recycled resources</strong></td>
</tr>
<tr>
<td>7</td>
<td>Increasing number of construction activities</td>
</tr>
<tr>
<td>8</td>
<td>Increasing demand for food and feeder from the Netherlands</td>
</tr>
<tr>
<td>9</td>
<td><strong>Climate change</strong> and the related changes in hydraulic conditions</td>
</tr>
<tr>
<td>10</td>
<td>Digitization <strong>big data</strong> sharing</td>
</tr>
<tr>
<td>11</td>
<td><strong>Synchro-modality</strong></td>
</tr>
<tr>
<td>12</td>
<td><strong>Autonomous shipping</strong></td>
</tr>
<tr>
<td>13</td>
<td><strong>Smart port infrastructure and port equipment</strong></td>
</tr>
<tr>
<td>14</td>
<td><strong>3D-printing</strong></td>
</tr>
</tbody>
</table>
## Analysis of external environment: SWOT

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agro-bulk production and storage hub</td>
<td>Decrease in liquid bulk activities</td>
</tr>
<tr>
<td>Dry bulk transfer and storage: produce/handle more sand, gravel construction (anticipated increase until 2050)</td>
<td></td>
</tr>
<tr>
<td>Container transfer and storage</td>
<td></td>
</tr>
<tr>
<td>Introduce renewable energy production: adapt liquid bulk terminal to sustainable fuel terminal</td>
<td></td>
</tr>
<tr>
<td>Recycling activities</td>
<td></td>
</tr>
</tbody>
</table>
Case Study

- Port of Wageningen is robust
  - Sufficient opportunities to replace the threatened port activities with new activities existing terminal infrastructure

- Proposed method provides an initial insight into the robustness an inland port
- Develop strategies for short- and long-term
Conclusions and recommendations

Overall objective: Modal shift to environmentally-friendly IWT in a supply chain

A well-functioning inland port helps achieve this

Further research:
Get quantitative data, include financial impact in analysis
Apply the method for various time scales, monitor the environment and analyze impact for ports
ASSESSING THE ROBUSTNESS OF DUTCH INLAND PORTS

QUESTIONS?
WATERBORNE CITY-LOGISTICS: BRINGING TOGETHER INLAND SHIPPING, LOGISTICS EDUCATION AND URBAN DEVELOPMENT

Author: Dr. Lars Stemmler
bremenports GmbH & Co. KG
Waterborne city logistics: Bringing together inland shipping, logistics education and urban development

„Modal shift is mindshift“

Dr. Lars Stemmler
International Projects

Lyon, 2rd Oct. 2019
Modal shift is mindshift!

#IWTS 2.0 - facilitating modal shift in inland navigation

How to bring more goods onto inland waterways?

(1) #IWTS 2.0 – Interreg-funded project to facilitate IWT
(2) Urban waterway logistics and training
(3) Adding „coolness-factors: cargobikes and digitisation
Project objectives – facilitating modal shift

Make better use of existing waterways:
+ by adapting them towards a sufficient standard size vessels.
+ by developing innovative sustainable small barge concepts.
+ Contribute towards modernizing IWT education, training with a focus on navigation on smaller waterways.
The Project – Key facts

#IWTS 2.0 is an Interreg VB North Sea Region project.

+ 10 Partners
+ **Total budget**: € 3.5 mio
+ **Duration**: Aug 2017-Jun 2021
+ [https://northsearegion.eu/iwts20/](https://northsearegion.eu/iwts20/)
+ **The scene**: Friesland Campina, a factory producing milk-powder, are exploring a modal shift.

+ **The potential**: 80 trucks per day

+ **The facilitator**: IWT simulation to identify potential bottlenecks in the waterway system.
Targeting students and young professionals

Bringing inland navigation into their daily lives

- **The scene**: Summer evening, cool drinks, hot logistics.
- **The potential**: Give it a trial
- **The facilitators**:
  - “Innovation Lab” - Creative Challenge with local university
  - “Innovation Inventory” – Online learning material on IWT
Putting IWTS on one’s mental radar screen

What competencies require logisticians to consider IWT?

+ Creating awareness of IWT
+ Reflecting truck-focused status-quo
+ Ability to organise appropriate transport chains

→ Get out of personal comfort-zone
Merging existing ideas with emotions

Awareness, sustainability, urbanity and digitisation

- Awareness of existing ideas in IWT
- Addressing sustainability along the transport chain
- Advocating emotions: Urban and digital
Hafenstraße 49
28217 Bremen
Germany

Dr. Lars Stemmler
International Projects
+ 49 (0) 421 3090 1234
lars.stemmler@bremenports.de

Lyon, 2nd Oct. 2019
FROM BULKS TO PACKAGED GENERAL CARGO: THE WORTHY ADAPTATION OF INLAND WATERWAY TRANSPORT TO CONTEMPORARY CITY NEEDS

Authors:
Marie Douet, Researcher (ESPRIM)
Didier Baudry, Senior Inland Waterway Transportation Officer
Cerema
CEREMA:
Centre for Studies and Expertise about Risks, Environment, Mobility and Planning

— French major public institution developing and capitalising on public expertise

— Cerema supports governmental services and local authorities in developing, implementing and assessing sustainable development policies

— 2706 full-time equivalents (about 200 researchers)

31 août 2018
Presentation outline

- Introduction
- 1. Contemporary city needs
- 2. How to catch general cargoes as well as bulk cargoes
- 3. An integrated (bi-modal) service requires a single planner
- Conclusion
Introduction

- Urban metabolism has been of great concern to politicians for centuries
- With sustainable development concerns, politicians nowadays outline virtues of inland waterway transportation. Their aim is to massify cargo flows into the irrigated cities’ hearts.
- In spite of many obstacles, a few market players mobilize resources for this purpose
- We consider cargo flows between warehouses located in peripheral urban areas and urban quais in the related city hearts.
1. The contemporary city needs

— 1.1 To secure freight flows and waste flows

— 1.2 To control detrimental externalities

— 1.3 To maximize use of waterways
1.1 To secure freight and waste flows

**Raw materials**: large shipments, Business to Business.
Examples: aggregates for concrete, oil products for home heating and cars.

**Waste flows and related flows**: large shipments, B to B.
Example: clinker issued from waste incineration plants.
Large bulk or containerised shipments.

**Manufactured products**: medium shipments, B to B
(industries, factories, wholesale and retail business).

**Manufactured products**: small shipments, parcels, B to C
(deliveries to parcel locker stations, to pick-up locations, home deliveries)

**Manufactured products**: parcels, D to C (direct to consumer)?
1.2 To control detrimental externalities

- Road congestion, Urban space occupancy, Noise,
- Greenhouse gas
- Ecosystem Health Social costs
- Other air pollutants
- Fuel consumption Energy consumption

Reduction in the number of vehicles on the road

- Waterborne shipments for urban customers

Negative externalities

Corrective measures
1.3 To maximize use of waterways

— Inland waterway transportation may contribute to mitigate road congestion and air pollution.

— In some river cities:
  – inland waterways are non-congested
  – idle quais are still available for economic activities
  – and it is high time to save them from the real-estate developer greed.

— The institutional environment promotes modal shift and urges firms to green their business practices.
2. How to catch general cargo as well as bulk cargo

— 2.1 Can barges carry general cargo freight?
   - (other than that is stuffed in ocean containers)

— 2.2 What technical resources should be used?
2.1 General cargo as a market segment for inland waterway transportation

**Bulks**
- Raw materials: large shipments, Business to Business.
  - Examples: aggregates for concrete, oil products for home heating and cars.

**Bulks and containers**
- Waste flows and related flows: large shipments, B to B.
  - Example: clinker issued from waste incineration plants.
  - Large bulk or containerised shipments.

**Containers pallets, parcels, bags, drums**
- Manufactured products: medium shipments, B to B
  - (industries, factories, wholesale and retail business).
- Manufactured products: small shipments, parcels, B to C
  - (deliveries to parcel locker stations, to pick-up locations, home deliveries)
- Manufactured products: parcels, D to C?
## 2.1 General cargo: freight transport capacities

<table>
<thead>
<tr>
<th>Services</th>
<th>Unit number (pallet, container, swap bodies,..)</th>
<th>Capacity</th>
<th>Tonnage</th>
<th>Handling</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point P (construction industry)</td>
<td>About 275 pallets</td>
<td>400 m³</td>
<td>1 470 tonnes</td>
<td>On board crane</td>
<td>CEREMA</td>
</tr>
<tr>
<td>Blue Line Logistics (construction industry, palettised big bags)</td>
<td>198 palettes on a level</td>
<td>2 levels</td>
<td>300 tons</td>
<td>On board crane</td>
<td>CEREMA</td>
</tr>
<tr>
<td>Vert chez vous (per day) service no longer offered</td>
<td>2 000 to 3 000 parcels</td>
<td>144 m³</td>
<td>14 tons</td>
<td>On board crane</td>
<td>Voies Navigables de France</td>
</tr>
<tr>
<td>Franprix (per day)</td>
<td>28 swap bodies, later 48 swap bodies</td>
<td>450 pallets /day</td>
<td>480 tons</td>
<td>Reachstacker</td>
<td>CEREMA</td>
</tr>
<tr>
<td>Fludis (September 2019)</td>
<td>3 000 parcels</td>
<td>700 m²</td>
<td>Not available</td>
<td>On board crane</td>
<td><a href="http://www.ammeconoligique.eu">www.ammeconoligique.eu</a></td>
</tr>
</tbody>
</table>

### Benchmarks

| Barge Freycinet: 38.5m*5.05m; 350 tons | 14 trucks (equivalent to) about 3 200 parcels | 400 m³ | 350 tons | CNBA, Cabinet Lebéfaude |
| Size of a parcel **example**       |                                              | 0.125 m³ | 0.100 ton (1) | The authors |

(1): according to MTES data, Soes, Parcel delivery companies survey, average weight for conventional parcel service deliveries
2.2 What technical resources should be used?

- 2.2.1 Technical adaptation of a former barge
- 2.2.2 Building of dedicated barges
- 2.2.3 Suitable handling equipment.
2.2.1 Technical adaptation of a former barge for:

- Loading swap bodies (Franprix), trucks (Distri-Seine)
- Taking advantage of a waterborne warehouse for preparing orders during the journey (ex Vert chez Vous)
- Loading pallets and parcels under safe conditions (Point P).
- Loading cargo-cycles or small green road vehicles for the last mile (ex Vert chez Vous).
Technical adaptation of a former barge: for swap bodies, Franprix,
Technical adaptation of a former barge: pallets for construction industry: Point P

Source: Batiweb
2.2.2 Building of dedicated barges?

- Blue Line Logistics example, catamaran for construction industry: Zulu 1 et Zulu 2, Zulu 3, Zulu 4 (other catamarans due to be delivered)
- Fludis example: waterborne warehouse
- Green Deliriver example, loading ramps

- Keeping in mind that the urban quai narrowness offer no stockage area
Building of dedicated barges: Blue Line Logistics, pallets for construction industry
Building of dedicated barges: Fludis, a warehouse-barge

Solution de transport du dernier/premier kilomètre
Logistique urbaine innovante et massifiée pour l’entrée/sortie de ville

1.7 m³
0.250 ton

www.portdufutur.fr
Building of dedicated barges: Distri-Seine, trucks on board
Building of dedicated barges:
Deliriver, a barge with loading ramps and semi-autonomous modules

2.2.3 Suitable handling equipment

- Handling with quay equipment:
  - Reachstacker (Franprix),
  - Mobile cranes
  - Mobile cranes for construction industry: pooling of resources is to be considered

- On board handling equipment:
  - Zulu, Point P: cargoes for construction industry
  - Green Switch Meridian (project): swap bodies (20 m³)
  - Barges fitted with loading ramps
2.2.3 Quay equipment

Reachstacker, Franprix,  
*Source: Haropa Ports de Paris*

Paris, construction industry, *Forum-chantiers.com*

Paris, Port Victor, construction industry,  
*Paristoric.com*
2.2.3 On board handling equipment: cranes for pallets (construction industry)

Blue Line Logistics, Zulu catamaran
2.2.3 Barges fitted with loading ramps: roll-on roll-off loading

Length: 79 metres

Length: 41, 90 metres
3. An integrated (bi-modal) service requires a single planner

— 3.1 Emergence of a demanding organisation for such a bi-modal association

— 3.2 Key points for a seamless door to door service
3.1 Emergence of a demanding organisation for such a bi-modal association
3. 2 Key points for a seamless service

— 3.2.1 Berth availability in city centres

— 3.2.2 Who manages the whole (bi-modal) chain to the ultimate consignee and who markets the whole service?
3.2.1 Berth availability in city centres: Paris (situation, 2012)
3.2.1 Berth availability in city centres: Paris (focus, 2018)

Source: Projet d’aménagement et de développement durable, Plan local d’urbanisme approuvé par délibération du Conseil de Paris en date du 2, 3, 4, et 5 juillet 2018, page 6
3.2.1 Berth availability in city centres: Lyon

Source: VNF, Schéma portuaire lyonnais et ses zones d’influence, avril 2016, page 72
3.2.2 Who manages and who markets the whole (bi-modal) chain to the ultimate consignee?

<table>
<thead>
<tr>
<th>Chain components</th>
<th>Resources to be coordinated/managed</th>
<th>Comments</th>
<th>Involved players</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goods loading in peripherical warehouses</td>
<td>Trucks</td>
<td>Handling conditions</td>
<td>Road haulier</td>
</tr>
<tr>
<td>Road haulage</td>
<td>Trucks</td>
<td>Road traffic conditions</td>
<td>Road haulier</td>
</tr>
<tr>
<td>Inland waterway carrier</td>
<td>Waterway</td>
<td>Sailing conditions, floods,</td>
<td>Carrier</td>
</tr>
<tr>
<td></td>
<td>Locks</td>
<td>Operating hours, tolls</td>
<td>Voies Navigables de France</td>
</tr>
<tr>
<td></td>
<td>Self propelled boats or barges and pusher crafts, associated crews</td>
<td>Toward green engines</td>
<td>Carrier</td>
</tr>
<tr>
<td></td>
<td>Quays</td>
<td>Availability, regular maintenance</td>
<td>Inland port authority</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quay accessibility</td>
<td>Municipality</td>
</tr>
<tr>
<td>Handling</td>
<td>On board crane or ro-ro or (port) reachstacker</td>
<td>Sensitive impacts on operating costs</td>
<td>Carrier or handling society, Port authorities</td>
</tr>
<tr>
<td>Deliveries to scattered customers</td>
<td>Cycles</td>
<td>Delivery rounds</td>
<td>Road hauliers or others municipality</td>
</tr>
<tr>
<td></td>
<td>Trucks</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>In the future: drones ?</td>
<td>Not yet in the agenda</td>
</tr>
</tbody>
</table>
Conclusion

- The inland waterway carrier is currently evolving from the position of a bulk carrier to the position of a parcel delivery (liner) carrier.
- As the inland waterway carrier now deals with small shipments, he finally imitates ocean carriers adopting (barge) dedicated containers and swap bodies.
- However, other solutions are explored: sailing warehouse for example.
- Road hauliers, waterway carriers and handling companies are relevant for managing the whole chain especially those who also have the legal status of:
  - freight forwarders and/or
  - waterway shipbrokers.
SOURCING THE CITY BY INLAND WATERWAY TRANSPORTATION, UNDER WHICH CONDITIONS?

Author: Résillot L., Roulier L., Sudre M., Suslova A., Tretout L.
Ecole Nationale des Ponts et Chaussées
Cost driven analysis

Road transportation vs Inland waterway transportation

Data
- Institutional sources
- Interviews with actors

Parameters
describing the supply chain
Modelization

Data and parameters
- Location of the warehouse and ports
- Volume (daily quantity of goods transported)
Modelization

Supply chain parameters
- Road transportation costs
- Type of vehicles
- Number of round trips per vehicle
Modelization

Warehouse

Intermodal platform

Urban port

Client

Road transportation

Intermodal transportation
Method: The market area theory (Niérat, 1996)
Market area for the Intermodal supply chain
Market area for the intermodal supply chain
Market area for the intermodal supply chain
Market area for the intermodal supply chain

- Variable costs of road transportation
- Fixed costs of road transportation
- Pre-haulage fixed costs

Warehouse

Urban port
Market area for the intermodal supply chain

- Fixed costs of road transportation
- Variable costs of road transportation
- Cost of fluvial transportation and manutention
- Pre-haulage fixed costs

Warehouse → Urban port
Market area for the intermodal supply chain

Warehouse

Urban port

- Variable costs of road transportation
- Fixed costs of urban delivery by road
- Cost of fluvial transportation and maintenance
- Pre-haulage fixed costs
Market area for the intermodal supply chain

- Variable costs of urban delivery
- Variable costs of road transportation
- Fixed costs of urban delivery by road
- Cost of fluvial transportation and manutention
- Pre-haulage fixed costs

Warehouse

Urban port
Market area for the intermodal supply chain

- Variable costs of urban delivery
- Variable costs of road transportation
- Fixed costs of urban delivery by road
- Cost of fluvial transportation and manutention
- Pre-haulage fixed costs

Warehouse → Urban port → Clients
Market area for the intermodal supply chain

- Fixed costs of road transportation
- Variable costs of road transportation
- Variable costs of urban delivery
- Fixed costs of urban delivery by road
- Cost of fluvial transportation and maintenance
- Pre-haulage fixed costs

Warehouse -> Urban port -> Clients
Market area in two dimensions
Existence of a market area: constraint on fixed costs
Standard scenario

Volume: 40 containers

Road

Vehicles: 19 t
1 round trip per vehicle

Intermodal

Barge (capacity 48 containers)
Pick-up: 44 t (2 vehicles)
Delivery: 12 t
3 round trips per vehicle

- Warehouse
- Intermodal platform
- Urban port
Influence of the volume
Standard scenario

Variable volume

Road
- Vehicles: 19 t
- 1 round trip per vehicle

Intermodal
- Barge (capacity 48 containers)
- Pick-up: 44 t (2 vehicles)
- Delivery: 12 t
- 3 round trips per vehicle
Road / river costs depending on the volume
Unshared barge

The threshold volume is 34 containers, which represents a load ratio of 71%
Franprix scenario

Road
Vehicles: 19 t
1 round trip per vehicle

Intermodal
Barge: 4100€
Pick-up: 44 t (2 vehicles)
Delivery: 19t
3,4 round trips per vehicle
Volume size and profitability

Daily cost (€)

- Road cost
- Intermodal cost

Volume (number of containers)
Boat cost proportional to the volume

**Shared barge** (full)

The threshold at which the river becomes profitable is lower: 25% or 12 containers.
Distribution of costs depending on the volume

**Shared barge**
Cost per container: 236€

**Unshared barge**
Cost per container: 206€
Parameters influencing competitiveness

- **Ports and warehouse locations**
  - Warehouse location
  - Intermodal platform location
  - Urban port location

- **Number of round trips per vehicle**
  - Road solution
  - Intermodal delivery

- **Type of vehicle**
  - 19t
  - 12 t
  - 8t
Influence of the location of the urban port
Standard scenario
Volume: 40 containers

Road
Vehicles: 19 t
1 roundtrip per vehicle

Intermodal
Barge (capacity 48 containers)
Pick-up: 44 t (2 vehicles)
Delivery: 12 t
3 roundtrips per vehicle
Influence of the urban port location

- 5 km East of the city center
- 5 km West of the city center
- at the city center
Competitiveness of the river as a function of the urban port location
Urban port location: a strategic question

Ratio of average costs to deliver the city:

\[
\frac{\text{River cost}}{\text{Road cost}} = 1.01
\]

River less competitive in average: the city is never entirely covered

Urban port far from the intermodal platform

Urban port close to the intermodal platform
Urban port location: a strategic question

Ratio of average costs to deliver the city:

\[
\frac{\text{River cost}}{\text{Road cost}} = 0.98
\]

River more competitive: locating the urban port closer to the platform allows to cover the entire city

Urban port far from the intermodal platform

Urban port close to the intermodal platform
Influence of the number of round trips per vehicle
Standard scenario

Volume: 40 containers

Road

Vehicles: 19 t
1 round trip per vehicle

Intermodal

Barge (capacity 48 containers)
Pick-up: 44 t (2 vehicles)
Delivery: 12 t
3 round trips per vehicle
Influence of the number of round trips
Economic constraint

River market area economically competitive compared to the road solution for a given number of round trips per vehicle
Number of round trips - Economic constraint

Economic competitiveness areas compared to road solutions as a function of the number of round trips per vehicle

- Increase of the number of round trips per vehicle
- Less vehicles necessary
- Decrease of fixed costs
- Decrease of the total cost of the river solution
- Increase of the market area compared to the road solution (1 round trip per vehicle per day)
Number of round trips - Economic constraint
Economic competitiveness areas as a function of the number of round trips per vehicle

Comparison of the costs to deliver the city

River cost / Road cost

River solution more competitive

Standard scenario

Number of round trips per vehicle in the city

2.76
**BUT** increase of the number of round trips $\rightarrow$ shorter time length of a round trip (time constraint: 7h of work per day) $\rightarrow$ shorter available area in a round trip zone (space constraint)

Number of round trips
Number of round trips - Time constraint

- Economic constraint - Economic competitiveness area compared to the road solution
- Time constraint - Available area in x round trips
Final market area - Taking into account both constraints
2.8 round trips per vehicle

3 round trips per vehicle

3.2 round trips per vehicle
Time constraint

Available areas as a function of the number of round trips per vehicle

- Blue: 2.8 round trips per vehicle
- Grey: 3 round trips per vehicle
- Yellow: 3.2 round trips per vehicle

Graph showing maximum available distance as a function of number of round trips per vehicle.
Conclusions
### RESULTS

- There is a critical threshold for demand that can be lowered by the use of a **shared service**.
- **Reducing the number of trucks** compared to a road solution is a major criterion.
- The **cost of the boat is not proeminent**, in relation to the costs of pick up and delivery.
  → The model gives **variation trend**
  → The code is **adaptable**

### IMPROVEMENT TRAIL

- High sensitivity to parameters
- **Threshold values**:
  → Approximative costs (parisian context, boat prices)
  → Dependence on the standard scenario
- **Complexity of the supply chain**:
  → location of clients
  → Congestion
- **Environmental costs**: a lead for a greater competitivness