Technological Developments and their Challenges for Public Port Authorities

A Harbour Master’s Perspective

Capt. Andreas Mai
- Harbour Master Bremerhaven/Bremen -
1996 - 2009

- Containerization / computerization
- Introduction of electronic communication
- Reform of port administrations
- Increased environmental demands
- Competition in port services
- Y2K
1996 - 2009

- Increased efficiency in processes
- Increased awareness of port communities for societal demands
- Increased regulatory activity on EU level
- Economic / financial downturn
1996 – 2008 Ship sizes

1996   300m x 32m
1996   318m x 43m
1997   347m x 43m
2005  367m x 43m
2006   398m x 56m
398 m * 56 m * 75 m
8000 TEU - Ship
2002 - ?? Maritime Security

• US Megaport Initiative
• Screening / Scanning
• EU Customs Code
• World Customs Organization Framework of Standards
Future

– EU - Blue Book on Integrated Maritime Policy
– Global warming
– Emission reduction
– Uncertainties in the shipping market
# Panama Canal Expansion

## Comparison between Panamax and Post-Panamax Container Vessels

<table>
<thead>
<tr>
<th></th>
<th>Panamax</th>
<th>Post-Panamax</th>
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<tbody>
<tr>
<td><strong>Capacity:</strong></td>
<td></td>
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<tr>
<td>Containers (TEUs)</td>
<td>4,500</td>
<td>12,000</td>
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<tr>
<td><strong>Dimensions:</strong></td>
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<tr>
<td>Beam</td>
<td>32m (106')</td>
<td>49m (160')</td>
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<tr>
<td>Length</td>
<td>294m (965')</td>
<td>366m (1,200')</td>
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<tr>
<td>Draft</td>
<td>12m (39.5')</td>
<td>15m (50')</td>
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</table>

Length of Panamax Vessel: 294m

Length of Post-Panamax Vessel: 366m

Panamax Draft: 12m

Post-Panamax Draft: 15m

Panamax Beam: 32m

Post-Panamax Beam: 49m
Panama Canal Expansion

• Dimension new lock chambers:
  - 427 m (1,400’) long (366 m)
  - 55 m (180’) wide (49 m)
  - 18.3 m (60’) deep. (15 m)
Forecast on maritime traffic until 2030

The graph shows the forecast on maritime traffic in Mio Tonnen from 2002 to 2030. The lines represent different scenarios:

- **Ist-Umschlag**
- **HWWI Basis**
- **HWWI niedrig**
- **Planco Gesamt**

Each scenario is marked with a different symbol and color to distinguish between them.
Maersk Carbon Footprint Calculator

Global warming is recognised as one of the greatest environmental challenges of this century. Carbon emissions, the main contributor, are increasingly the centre of attention. Maersk Line can estimate your carbon footprint from door-to-door transportation services worldwide.

The tool developed by Maersk Line and Maersk Logistics maps CO₂ emissions for all legs in your global supply chain, from the pick-up at the factory until the delivery to the point of sale, including ocean transport, airfreight, trucking, rail, barge, port operations, and warehousing. In addition, the tool allows you to differentiate between dry cargo and refrigerated cargo.

The tool can provide you with:

- High-level global carbon footprint from transportation, provided in total emissions, per 40 foot container or per cubic metre of cargo moved
- The carbon footprint for various components in a door-to-door perspective
- The carbon footprint for all legs and modes of transportation throughout the supply chain

The carbon footprint can be valuable for a variety of purposes, including environmental reporting and identification of “carbon hotspots” in your transportation supply chain.
Megacity Challenges

- Megacities prioritize economic competitiveness and employment
- The environment matters, but may be sacrificed for growth
- Transport overtakes all other infrastructure concerns
- Better governance is a vital step towards better cities
- Holistic solutions are desired but difficult to achieve
- Technology will help deliver transparency and efficiency
- The private sector has a role to play in increasing efficiency

Source: www.siemens.de/megacities
The Port Authority

• Definition:
  – ???

• Tasks:
  – managerial / operational
  – legal / safety / security
Port Authority (legal) / Harbour Master

– Neutral institution in a highly competitive environment
– Information centre for planning of processes
– Central point of reference for matters concerning ships‘ visits
Influences on Port Management

- Local Authorities
- Government
- Competition
- Ownership
- Owner (Ship)
- Cargo
- Interest-groups (Environmental)
- Unions
- International Rules
- National Rules

Port Management

Seaports Innovation, HH, Oct. 2009
© Andreas Mai
Co- operation in a port
# Harbour Masters’ Roles /Tasks

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### Physical Roles

- Harbour Master (legal/safety PA)
- Port Authority (transnational PA)
- National Authority (incl. PSS)
- Other regional and local auth.
- VTS Center (if not under the HM)
- Coast Guard or Navy
- Private party

### Port Auth.

- Port Auth. (private)
- Port Auth. (public)
- Port Auth. (national)
- Port Auth. (regional)
- Port Auth. (private)
- Port Auth. (public)
- Port Auth. (national)
- Port Auth. (regional)
Berth / Traffic Planning
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Hansestadt Bremisches Hafenamt

Position on terminal
AIS
Digital Divide
Radioactive Material
Negligent Securing of Cargo..
…and consequences
Incidents
Challenges

• Digital divide
• Ports are seen as an entity – they are not
• EMSA – centralization (SSN)
• E-maritime initiative
E- Maritime

ICT Standards

– In order to promote the development and utilisation of safe digital navigation, improved communication between ship and shore-based administrations, the EU27 (..) should actively work for the establishment of global standards. A sub-objective is to work for the establishment of a European standard.”[1]

E- Maritime

COM (2009)8, Jan. 21, 2009:

Looking ahead to 2018, the capacities of the EU’s maritime transport system should be strengthened by putting in place an integrated information management system to enable the identification, monitoring, tracking and reporting of all vessels at sea and on inland waterways to and from European ports and in transit through or in close proximity to EU waters.
Adequate **ICT inspection and monitoring tools**, also related to surveillance, should be developed. Technical management of the fleet, including remote control of engine performance, structural strengths and the overall state of operation of vessels should be facilitated by means of advanced telecommunication systems. To this end, a reference framework should be established to enable the deployment of ‘e-Maritime’ services at European and global levels. Such e-services should also encompass public administrations, port communities and shipping companies.
Solutions

• development of
  – global minimum standards
  – reliable decision support tools
• intensifying training
• process thinking
• increasing the societal acceptance
• maintaining decentralized decision structures
## Decision support - PORT ECDIS ??

Comparison  
HPA Basis Port ENC - BSH ENC

### Fixed marks / navigational aids

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### Quay wall corner

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Port ECDIS – accuracy and functional test

Onboard ENC (inaccurate)  Port ENC (precise)
Decision Support Tools

- Simulation
- Training
- Process Mapping
Thank you for your attention!