

Port Masterplanning: Guidelines for Existing Ports




Ron Coles - W. R. Coles and Associates,
Nashville TN

What is PIANC?

- What is PIANC?
- What does it do?
- Why should I care?
- How to get involved
- WG 158

PIANC is ... THE World Association for Waterborne Transport Infrastructure

- ...a forum where professionals around the world join forces to provide expert advice on cost-effective, reliable and sustainable infrastructures to facilitate the growth of waterborne transport.
- ... a leading partner for government and private sector in the design, development and maintenance of ports, waterways and coastal areas.
- ...a non-political and non-profit organization,
- PIANC brings together international experts on technical, economic and environmental issues pertaining to waterborne transport infrastructures.
- PIANC members include national governments and public authorities, corporations and interested individuals.
- Working Groups develop written guidance on relevant maritime topics

 [Design of Small to Mid-Scale Marine LNG Terminals Including Bunkering](#)

MarCom Working Group report 172 – 2016 ([Only available as PDF](#))

Written by: MarCom Working Group 172

 [Recommendations for the Design and Assessment of Marine Oil and Petrochemical Terminals](#)


MarCom Working Group report 153 – 2016 ([Only available as PDF](#))

Written by: MarCom Working Group 153

 [Guidelines for Cruise Terminals](#)


MarCom Working Group report 152 – 2016 ([Only available as PDF](#))

Written by: MarCom Working Group 152

 [Classification of Soils and Rocks for the Maritime Dredging Process](#)


MarCom Working Group report 144 – 2015 ([Only available as PDF](#))

Written by: MarCom Working Group 144

 [Design and Maintenance of Container Terminal Pavements](#)


MarCom Working Group report 165 – 2015 ([Only available as PDF](#))

Written by: MarCom Working Group 165

 [Guidelines for protecting berthing structures from scour caused by ships](#)

MarCom Working Group report 180 – 2015 ([Only available as PDF](#))

Written by: MarCom Working Group 180

 [Masterplans for the Development of Existing Ports](#)

MarCom Working Group report 158 – 2014 ([Only available as PDF](#))

Written by: MarCom Working Group 158

 [Design Principles for Small and Medium Marine Container Terminals](#)

MarCom Working Group report 135 – 2014 ([Only available as PDF](#))

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 [Tsunami Disasters in Ports due to the Great East Japan Earthquake](#)

MarCom Working Group report 122 – 2014 ([Only available as PDF](#))

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 [Harbour Approach Channels – Design Guidelines](#)

MarCom Working Group report 121 – 2014 ([Only available as PDF](#))

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 [Injection Dredging](#)

MarCom Working Group report 120 – 2013 ([Only available as PDF](#))

Go to
www.pianc.org
For more
information

WG 158 – Masterplans for the Development of Existing Ports

- Diverse membership in Working Group 158:
 - Steven Cork, Nigel Bodell & Peter Hunter (UK)
 - Mathias Ludicke, Iven Kramer & Oliver Schwarz (Germany)
 - Sip Meijer & Sander Dekker (The Netherlands)
 - Rafael Escutia (Spain)
 - Brad Froyland (UAE)
 - Pasquale Pizzimenti (Italy)
 - Jason Sprott (Australia)
 - Herve Houis & Andre Merrien (France)
 - Ron Coles (USA)



PIANC Report 158

Masterplans for Existing Ports

Table of Contents

- 1 General Aspects
- 2 Overview of Port Planning
- 3 Review of Existing Port Facilities and Operations
- 4 Traffic Forecasting
- 5 Engineering Aspects for Masterplanning
- 6 Terminal Planning
- 7 Environmental Issues and Green Ports
- 8 Hinterland Links
- 9 Institution Building
- 10 Project Assessment and Optimization
- 11 Preparation and Implementation of the Masterplan



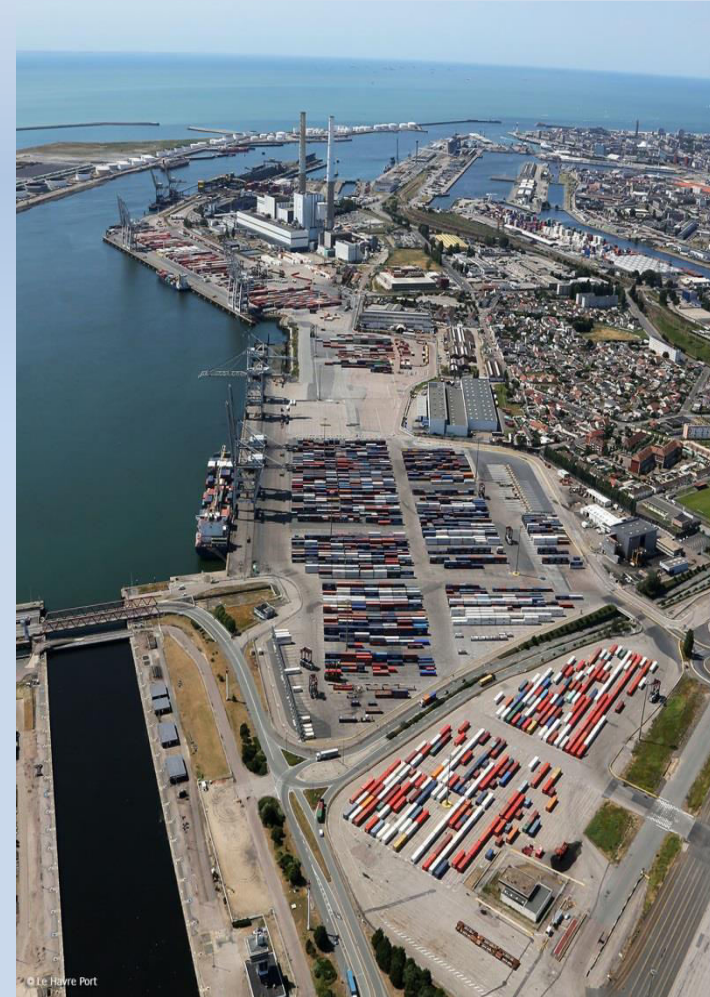
With Our Time Today

- Overview
 - What is a port masterplan?
 - Challenges for existing ports
 - Overview of port planning
 - Case Study Examples
 - Closing and Contact Info



What is a port masterplan?

- A port masterplan establishes policies and guidelines to direct the future development of a port.
- The main purposes of a port masterplan are to:
 - Clarify the port's strategic plans for the medium and long term
 - Assist local/regional planning and transport network providers in preparing their own development strategies
 - Inform port users, employees, and local communities how they can expect the port to develop over the coming years



Timeframes for Masterplanning

Port planning can cover different issues and encompass different periods of time:

Period of time	Infrastructure
20-30 years	Master Plan Long Term Development
5-10 years	Strategic Plan Investment Planning Medium Term Development
1-5 years	Project Planning Business Planning Port Zoning



The Masterplan

The Masterplan describes how a port must grow and adapt in accordance with the evolution of future demand, changes in transport technologies and other factors.

- Masterplanning is long-term planning, ideally over 25 to 30+ years.
- The Masterplan defines requirements for port expansion as well as its integration into the environment and the off-site transport network.
- *Short- or medium-term planning can lead to solutions that limit alternative development options, and therefore needs long term context.*



Guiding principles

- Port layout recommendations should be **definitive** enough to provide guidance, **yet flexible** enough to incorporate future changes into the forecasted scenarios.
- Masterplanning should **allow some future proofing** of the critical parameters that otherwise could produce the (early) obsolescence of infrastructure:
 - Water depths at the quay wall
 - Landside operational and storage areas
 - Hinterland connections
- The port must be able to **develop in phases**. Development in phases enables the progressive adaptation of the port extensions to meet future demands.

Challenges for existing ports

Many ports are encountering difficulties in achieving their main objective as a port—to efficiently meet service demand.

There are several possible reasons for this:

- Rapid traffic growth can overload port capacity.
- Increasing vessel sizes may limit scheduled calls or reduce efficiency.
- Management structure/systems or outdated handling equipment may lead to inefficient operations.
- Existing port layout and site may limit options for growth and expansion.
- Inland transportation connections may be congested.

Preparation of a port masterplan

Issues to be addressed:

- Review of existing port facilities and operations
- Traffic forecasting—to help define future requirements
- Terminal planning and KPIs—to cater for future growth
- Hinterland links—to ensure effective operation of the port
- Project evaluation and optimization—to determine the best way forward
- Environment and “green ports”
- Finance and phased implementation

US Inland Waterways System



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Nashville TN





Typical Barge Dimensions
195'x 35' or **60m x 11m**
1750 imp tons or 1800 metric tons

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Nashville TN



- Modern River lock is 1200 x 110 ft (366m x 34m)
- Older are 600 x 110 ft (183m x 34m)

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Nashville TN

COMPARE ...

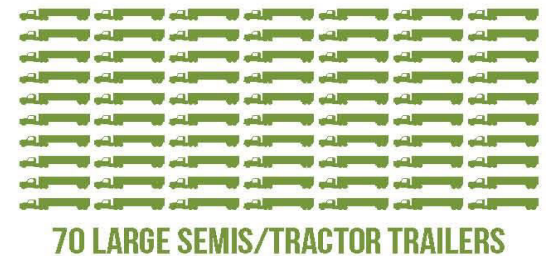
Source: Iowa Department of Transportation | 800 Lincoln Way | Ames, IA | www.iowadot.gov

CARGO CAPACITY

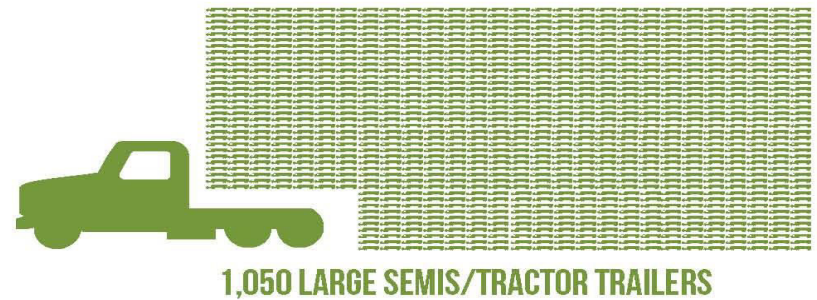


EQUIVALENT UNITS

ONE BARGE



ONE 15-BARGE TOW AND TOW BOAT



EQUIVALENT LENGTHS

ONE 15-BARGE TOW
0.25 MILE

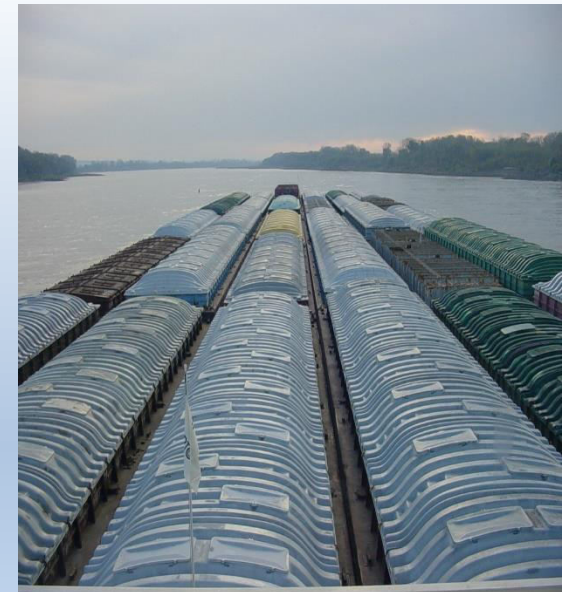
TWO 108-CAR TRAINS
2.6 MILES

1,050 LARGE SEMIS/TRACTOR TRAILERS
13.9 MILES (BUMPER TO BUMPER)

Barge Tows on the Mississippi River



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Nashville TN



**Marine
Highways
Connect the
Heartland of
the USA to
global
markets**

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Ports are multi-modal hubs of commerce



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Future Intermodal
Industrial Park Expansion
(800 acres)

Route 7 Interchange Construction

Ohio Route 7

Future Industrial Site

Polar Minerals

Future Multi-Modal
Industrial Site

Future Containers or
Bulk Materials

Probex

OLF

Rail Staging Area

Future Dock

Future Bridge Crane
Operations area

Ashland

Future Overhead
Bridge Crane

Ohio River



Steel, minerals and other cargoes support local and regional jobs



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Aeres IX Rocket Components for NASA



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Owensboro, Kentucky

300 acre (125 hectare) port complex on the Ohio River in Western Kentucky



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The use of aluminum in car/truck bodies in the USA:

- **.09 million m tons in 2012**
- **18 million tons in 2025 (projected)**
- **Globally – 158 million tons!**

The volume of imported aluminum (T-bars, sows, etc.) will likely increase



Strategic investments are needed to capture increased aluminum trade

What do these ports have in common?

Planning resulted in success!

They were **prepared** when opportunity presented itself

Logical plan for phased development, making best use of resources

Creation of sites for industries (jobs and tax base) to lessen risk for the developer, and to attract industries which need water transportation

Yellow Creek – steel (large fabricated items, auto related), silicon

CCPA – energy and minerals, plastics additives

Tulsa – oil field and power plant equipment, ag

ORA – ag, aluminum (auto for future), LMX, NYMX, IT systems

Management structure, marketing and business systems as well as physical improvements

Plan for Success!

- **Port Master Planning – a key to success for all ports**
- **Logical path for future – provides direction, focus, and priorities – with plan for phased development**
- **Important Communications Tool**
- To obtain the book: ***“WG 158 - Masterplans for the Development of Existing Ports”*** , or participate in a Working Group, contact **www.pianc.org**
- Ron Coles, W. R. Coles and Associates, **www.wrcoles.com**, **ron@wrcoles.com**