



# NSWPorts

## Planning for Automation of Container Terminals

PIANC APAC 2022  
Carsten Varming | 6 September 2022

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1

## Content

1. Terms of Reference
2. Working Group Composition
3. Report Development
4. Related PIANC Publications
5. Report Content
6. Report Findings
7. Summary and Conclusions
8. PIANC plans with WG208



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2



2

## Terms of Reference

- The WG report should provide guidance to owners, operators and designers of container terminals worldwide, in order to provide safer, environmentally and cost-effective operation of the terminals
- February 2018 PIANC MarCom seeks expressions from participants to WG208
- December 2018 kick-off meeting for WG208 held in Brussels
- Most new larger terminals are developed as semi or fully automated terminals



3

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3

## Working Group Composition

- 25 members from:
  - USA
  - Canada
  - UK
  - Holland
  - Spain
  - Australia
  - Japan
  - Germany
- 8 corresponding members from major suppliers and operators
- Reviews by world leading operators and developers



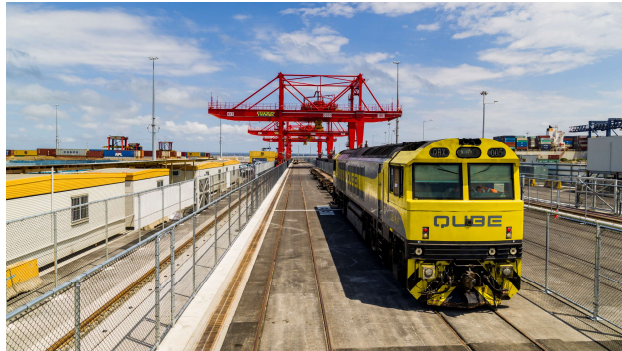
4

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4

## Working Group Composition

1. Major international consultancies
2. Specialist consulting companies
3. Port owners
4. Port Operators
5. Research Institutes



5

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5

## Report Development

- Kick-off meeting – face to face – set table of content – assign chapter leads and chapter participants
- Ongoing Webex engagement by chapter teams
- Monthly WG Webex
- Face to Face meetings in Long Beach and Brussels
- Draft submission of report to PIANC in September 2020
- Comprehensive engagement with industry before publication



6

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6

## Related PIANC Publications

PIANC Report No.103	Life Cycle Management of Port Structures	2008
PIANC Report No.115	Criteria for (un)loading of Container Ships	2012
PIANC Report No.135	Design Principles for Small and Medium Marine Container Terminals	2014
PIANC Report No.136	Sustainable Maritime Navigation	2013
PIANC Report No.143	Environmental effects of Navigation and Infra projects	2014
PIANC Report No.150	Sustainable Ports	2014
PIANC Report No.158	Masterplans for the development of existing ports	2014
PIANC Report No.159	Renewables and Energy Efficiency for Maritime Ports	2019
PIANC Report No.165	Design and Maintenance of Container Terminal Pavements	2015
PIANC Report No.178	Climate Change Adaptation Planning for Ports and Inland Waterways	2020
PIANC Report No.185	Ports on Greenfield Sites - Site selection and Master planning	2019
PIANC Report No.188	Carbon Management for Port and Navigation Infrastructure	2019
PIANC Report No.193	Resilience of the Maritime and Inland Waterborne Transport System	2020
PIANC Report No. 204	Awareness Paper on Cybersecurity	2019

7



7

## Report Content

- Chapter 1 – General Aspects
- Chapter 2 – Definition and Description
- Chapter 3 – Developing a Business Case for Automation
- Chapter 4 – Planning for automation – Detailed analysis of process
- Chapter 5 – Integration, consolidation and interaction
- Chapter 6 – Engineering, implementation and operation
- Chapter 7 - Conclusions
- Not a step by step guide on how to develop an automated container terminal.
- Aim is to provide the reader with an understanding of the processes involved in developing an automated terminal and what key decisions will need to be made at key junctions in the development process.

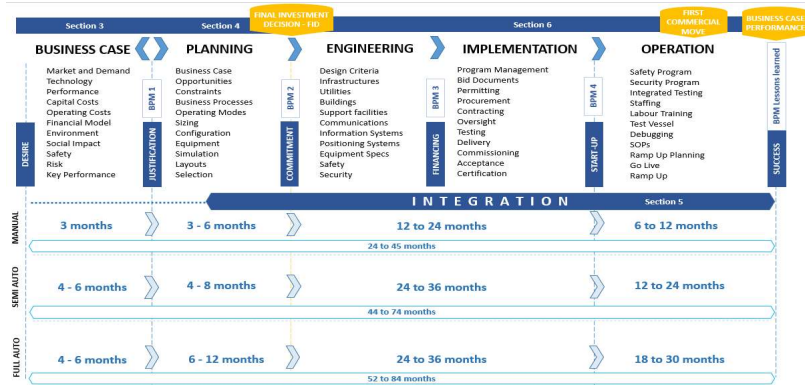
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8

## Report Findings

*“The first rule of any technology used in a business is that automation applied to an efficient operation will magnify the efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency.” —Bill Gates*

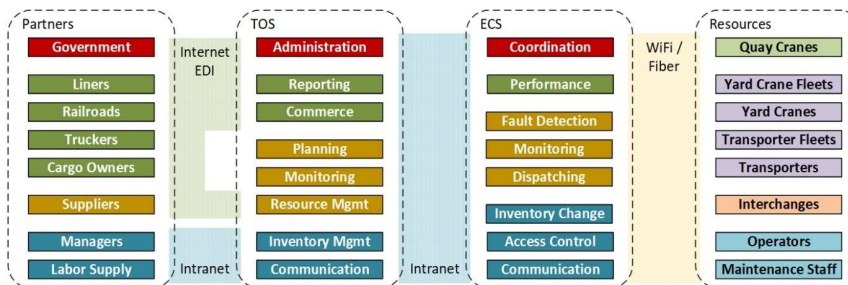


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9

## Report Findings - Continued

- **Fully Automated Terminal:** A terminal in which storage/retrieval in the yard AND horizontal transport are both conducted using automated container handling equipment.
- **Semi-Automated Terminal:** A terminal in which only storage and retrieval in the yard are conducted using automated container handling equipment.

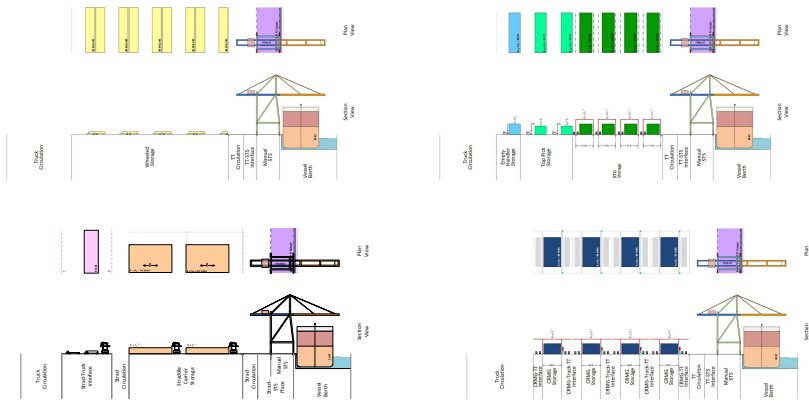


10

10

## Report Findings - Continued

### Manual Operation

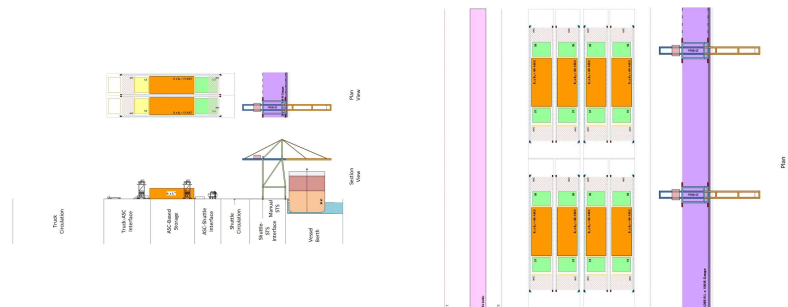


11

11

## Report Findings - Continued

### Semi Automatic Operation



12

12



## Report Findings - Continued

- The five main goals of Terminal Planning are:

- Capacity
- Productivity
- Balance
- Flexibility
- Phasing



- Core team members should be:

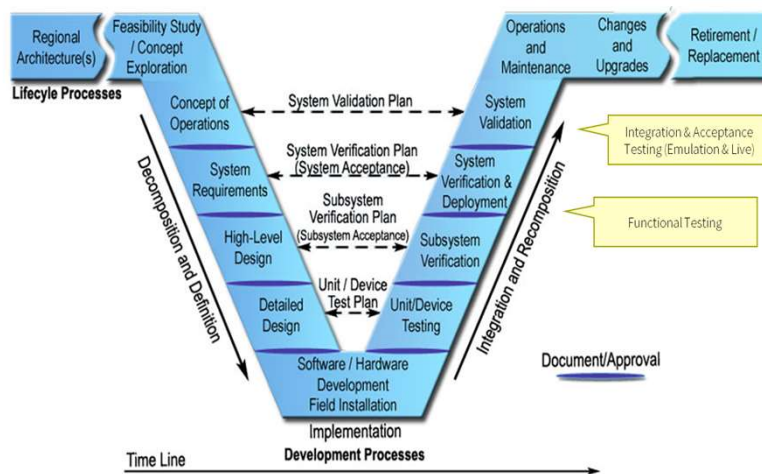
- Management
- Operations
- Equipment
- Infrastructure Engineering – Civil, Electrical, Buildings
- Finance
- TOS, IT Systems and Cyber security
- Labor Relationships
- Local regulation, standards and requirements

15

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15

## Report Findings - Continued



16

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16



## Report Findings - Continued

- To meet the planned productivity and capacity for an automated terminal it is critical that key elements of operations has been properly considered:
  - Maintenance Access to automated areas
  - Recovery of stranded equipment
  - Data transfer and networks
  - Cyber security
  - Equipment refuelling and maintenance transfer facility
  - Skills of workforce and operators



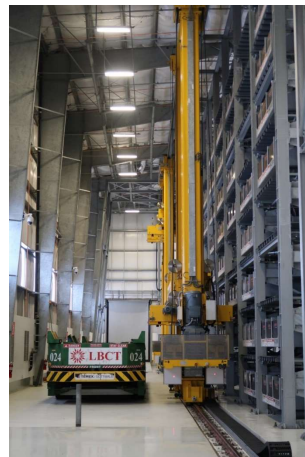
17

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17

## Report Summary and Conclusions

- Automation of a container terminal is a very complex process that need careful consideration and a structured approach to succeed
- Engage experienced and skilled professionals who have done this before – best chance of success
- This report is NOT a step by step guide as this is not possible due to the extremely high number of variables



18

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18

## PIANC Plans with WG208

- Due to the speed at which automation of container terminals evolves
- Due to the interest across the industry in automation of brown and greenfield terminals
- PIANC plans to maintain WG208 to review the report every couple of years



19

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19

## Thank you

### FOR FURTHER INFORMATION

Please contact:

Carsten Varming  
Port Development Manager  
Carsten.Varming@nswports.com.au

NSW Ports Pty Ltd  
as trustee for  
NSW Ports Property Hold Trust  
ABN 25 674 171 329

NSW Ports Operations Hold Co  
Pty Ltd as trustee for  
NSW Ports Operations Hold Trust  
ABN 28 792 171 144

Port Botany Operations  
Pty Ltd as trustee for  
Port Botany Unit Trust  
ABN 25 855 834 182

Port Kembla Operations  
Pty Ltd as trustee for  
Port Kembla Unit Trust  
ABN 50 132 250 580

NSW Ports Finance Co  
Pty Ltd  
ABN 83 161 943 497

20