AN UPDATE TO DESIGN PRINCIPLES FOR DRY BULK MARINE TERMINALS

MarCom

TERMS OF REFERENCE

1. Historical Background Definition of the problem

The WG184 document, titled 'Design Principles for Dry Bulk Marine Terminals', consists of 13 chapters and serves as a comprehensive resource for designing dry bulk terminals. It encompasses current knowledge and best practices, providing guidance on project planning and implementation for organisations involved in various phases of bulk materials handling terminals.

Given the recent developments in the industry, it is timely to update the document. The newly introduced PIANC guideline, WG235 (Oceangoing Ship Data for Port Planning and Design), supersedes certain information in WG184. Additionally, the ongoing development of WG211 (Guidelines for the design of fender systems) will replace the fender design methodology described in WG184. Furthermore, WG184 requires refinement to eliminate overlapping information presented across different chapters. The group also identified that the materials handling section should be upgraded in the revised document.

The world is aiming to become carbon neutral and phase out coal. Work is being done internationally to analyse various net zero pathways. For all of the net-zero scenarios, black coal exports will be phased out by 2060. This will have a large effect on the shipping fleet and ports. Hence, re-purposing of existing terminals should be given coverage in the document.

With PIANC MarCom's approval, WG184 will be reformed to progress the revision as WG184a.

2. Objectives

WG184a aims to refine the WG184 document and keep the document current so that the guideline continuously acts as a useful reference for designing, operating and maintaining dry bulk terminals in line with the other relevant emerging PIANC guidelines.

3. Earlier reports to be reviewed

Relevant PIANC reports on related issues are listed below.

- **PIANC MarCom WG 158:** Masterplans for the development of existing ports
- **PIANC EnviCom WG 178**: Climate Change Adaptation Planning for Ports and Inland Waterways
- **PIANC MarCom WG 184**: Design Principles for Dry Bulk Marine Terminals
- **PIANC MarCom WG 235**: Oceangoing Ship Data for Port Planning and Design
- **PIANC MarCom WG 211**: Guidelines for the design of fender systems

- **PIANC EnviCom TG3**: Waterborne Transport, Ports and Waterways: A 2023 Update of Climate Change Drivers and Impacts
- **PIANC EnviCom PTGCC Technical Note 1**: Managing Climate Change Uncertainties in Selecting, Designing and Evaluating Options for Resilient Navigation Infrastructure

4. Scope of work

The following scope is proposed.

- Remove overlap in Sections 2, 5 & 7
- Review and update materials handling (Section 6)
- General update to the document
- Develop further case studies with smaller ports / different commodities e.g.:
  - Repurposing a terminal for different commodities
  - Alumina loading terminal
  - Alumina unloading terminal
  - Copper concentrate terminal
  - Bauxite loading terminal
  - Bauxite unloading terminal
- Guidance on handling commodities required for a carbon neutral economy (e.g: copper, nickel, lithium, lead)

5. Intended product

The final product of the Working Group 184a will be a revision to the guidelines for Design Principles for Dry Bulk Marine Terminals.

6. Working Group membership

The original working group members for WG184 cover a wide range of disciplines primarily led by maritime engineering and materials handling practitioners. In addition, input was obtained from specialist parties outside of the working group members including:

- Port authorities (mooring lines)
- Environmental
- Electrical
- Control systems
- Shipping statistics

The intention is to keep the same members wherever possible. However, if previous members are unavailable, substitutes from the relevant PIANC national sections would be sought.

7. Target audience

The target audience would be the following.

- Port authorities
- Port planners
- Design consultants
- Terminal owners
- Terminal operators

- Equipment suppliers
- Mining companies
- Shipping companies

8. Relevance

8.1. Relevance to countries in transition, etc.

Many of the bulk terminals are located in countries in transition. Clear guidance on site selection, planning, design, social and environmental issues will be provided to ensure appropriate development of such terminals.

8.2. Climate Change and Adaptation

The effect of climate change and implications of transition to Net Zero Carbon will be considered (e.g. water level rise, temperature and wind effects).

8.3. Working with Nature

The WG184 document highlights 'Working with Nature' in the environmental management process section. The PEC WG 4 – 'Environmental Management Framework for Ports and Related Industries' for detailed EMF development is referred as an EMF is a way of working with nature that can be developed to integrate social, political, economic and environmental issues. It is intended to review this section of the document to ensure that it is current.

8.4. UN Sustainable Development Goals

The WG report can contribute to the achievement of UN Sustainable Development Goals including:

- Goal 8: Decent work and economic growth
- Goal 9: Industry, Innovation and Infrastructure
- Goal 13: Climate action
- Goal 14: Life below water

9. References

A list of further references is provided below.

- 1978 UNCTAD – Port development: a handbook for planning in developing countries
- 1985 Frankel (World Bank) – Bulk Shipping and Terminal Logistics
- 2014 Thoresen – Port designer's handbook