



## PIANC MarCom WG 212

# Criteria for Acceptable Movement of Ships at Berths (Update of MarCom WG24)

## Terms of Reference

### 1 Background

The report of PIANC MarCom WG24, *Criteria for Movements of Moored Ships at Berths – a Practical Guide*, was published in 1994 and the criteria published in that report now need updating.

A ship moored in a harbour or at a marine terminal requires safe mooring conditions, with ship movements and fender and mooring line forces all within safe limits. Efficient cargo loading and unloading operations require ship movements to be within acceptable limits, and passengers and crew need movements to be within comfortable limits.

### 2 Objectives

The objectives of the proposed Working Group (WG) are to gather existing technical information on criteria for safe and efficient limits for movements of moored ships, including the effects of such movements on operations of cargo handling equipment, and to develop practical criteria for use as guidelines by port authorities and designers.

Governing criteria could include:

1. ship movements (surge, sway, heave, pitch, roll, yaw), velocities, accelerations and frequencies, and statistical data including both mean values and extremes;
2. their effects on productivity and downtime for different types of loading and unloading operations;
3. limiting conditions for loading and unloading operations;
4. limiting conditions for operational safety and comfort on board the moored vessel;
5. limiting conditions beyond which the ship cannot remain safely moored.

Criteria for acceptable conditions can vary widely at different ports, and the WG should consider the range of conditions that can be acceptable, particularly where these are subjective rather than being governed by specific physical constraints such as mooring line strengths.

### 3 Existing documents to be reviewed

Current knowledge, criteria, guidelines and standards published by other organisations such as representative international and national bodies, and also classification societies, relating to berthing and mooring of oil tankers, gas carriers, bulk carriers, container ships, RoRo ships, naval vessels, and other vessels, needs to be reviewed.

Relevant existing PIANC WG reports and relevant PIANC reports currently in production should also be studied, including

- PIANC MarCom WG24 Criteria for Movements of Moored Ships in Harbours, 1995
- PIANC WG33 Guidelines for the Design of Fender Systems, 2003
- PIANC WG121 Harbour Approach Channels Design Guidelines, 2014
- PIANC WG115 Criteria for (Un)loading of Container Ships, 2012
- PIANC WG116 Safety Aspects Affecting the Berthing Operations of Tankers to Oil and Gas Terminals, 2012
- PIANC WG153 Recommendations for the Design and Assessment of Marine Oil and Petrochemical Terminals, 2016

#### **4 Scope**

The WG report should develop criteria for acceptable limits for movements of ships at berths, covering an agreed range of cargo handling operations and ship types and sizes.

Movements of vessels should be considered with regard to the safety and comfort of the crew and passengers. Smaller vessels such as tugs and fishing vessels and should also be considered. Mitigation of ship movements, for example by improved mooring configurations and methods (and the use of mooring analysis software and modelling) may also be considered by the WG, but mooring design is outside the scope of this WG.

Ship-to-ship mooring, buoyed moorings, and recreational craft are outside the scope of this WG. Mooring line forces and forces on fenders have been covered by other PIANC WG reports and these topics are expected to be generally outside the scope of this WG.

The report may refer to relevant national and international standards but it is not intended to be a catalogue of existing requirements.

#### **5 Intended product**

The WG report should provide recommendations and guidelines for the criteria for acceptable limits for movements of ships at berths, covering the agreed range of cargo handling operations and ship types and sizes, in operational and non-operational conditions, for use by port authorities and designers.

#### **6 Working Group membership**

Membership of the WG should include representatives from stakeholders and target users such as designers (engineers and naval architects), harbour authorities, and organisations representing commercial navigation (including fishing), and classification societies. The range of expertise should cover at least practical design and operational knowledge in terms of ships and cargo handling equipment and operations.

#### **7 Relevance to Countries in Transition**

The report will be of value in protecting the interests of countries in transition, and will assist decision makers such as harbour authorities in the planning and design of port facilities, including in some cases whether there is a need to provide protective works such as breakwaters.

#### **8 Climate Change**

Although the criteria developed by the WG will not be affected by climate change, the report should draw attention to the probability that climate change will affect conditions at berths and hence the amount of movement of ships at berths.