DESIGN OF FLEXIBLE LOADING & UNLOADING FACILITIES FOR IW NATURAL RIVERS

PROPOSED TECHNICAL WORKING GROUP

TERMS OF REFERENCE

1. Historical Background

The design guidelines for ports, harbours and related loading & unloading facilities for inland navigation are typically focusing on regulated rivers where water discharge is controlled (reservoir operations) mainly by locks and dams. In this situation, the river morphology, the water levels, and therefore the river flow conditions are quite predictable and stable.

If the design of ship loading & unloading facilities like quays, jetties, or even large ports infrastructures, is well covered by the existing literature, these publications usually do not deal with the design, operation, logistics and maintenance of loading & unloading facilities under natural free-flow conditions, mainly subject to evolutionary processes (meandering), large water level variations (from flood to ebb) and river dynamics (erosion and sedimentation, inducing changes in the main navigation channel). For such cases, today, flexible and economic solutions must be identified.

2. Objectives of the WG

The main goal of the working group is to develop a set of guidelines and recommendations concerning the design practices and principles for highly diversified ship loading & unloading facilities at Inland waterway free-flow rivers where evolutionary processes are expected.

The scope of the report will focus on the planning (where?), design, operation and related logistics (how?) and maintenance of new facilities as well as the refurbishing or rehabilitation or decommissioning of existing facilities.

A key objective is to identify flexible and economic ship loading & unloading facilities, which should be easily removed and re-allocated in function of the river dynamics and changes (water level, navigation channel, …).

In addition, a set of recommendations aimed for reducing the uncertainty in the design due to the lack of knowledge of river morpho dynamics will be provided.

This document should be considered as an additional guidance to existing publications on free-flow rivers management and particularly to the "Sustainable management of the navigability of natural rivers" (WG236).

3. Earlier reports to be reviewed

Although there are many PIANC reports that deal with terminal design aspects (liquid and solid bulks, containers, RORO, ROPAX, fishing ports, and others), all of them are generally intended

for ports and harbors at the shore and have no direct reference to application for inland waterways and, in any case, for free-flow rivers.

4. Scope of work

These guidelines and recommendations should be applicable to various kind of ship/vessel loading or unloading facilities from pontoons, quays, mooring points or jetties up to **very small port facilities** that are located at:

- **Natural Free-Flow Rivers**: Undeveloped or quasi-natural rivers with natural hydrology, and unconfined morphology
- **Trained Rivers**: Open River systems with natural hydrology, but laterally fixed in place by river training works aiming to prevent natural morphological evolution.

Design of large facilities in regulated river flow areas, as sea and inland ports, will not be considered in this WG.

5. Intended product

All results will be described in a published PIANC report that provides guidance on the planning, design & operation, and maintenance of new facilities as well as the revamping/rehabilitation or decommissioning of existing facilities.

6. Working Group membership

In addition to the owners and operators of such terminals, the Working Group members should represent parties involved such as consulting planners, engineers and hydrologists, suppliers and contractors, organizations like IAPH and public or private managers of inland waterways, and public authorities. Members with a research background should also be welcomed.

7. Target audience

The WG should advise owners, designers, and operators of these facilities and related infrastructures worldwide, to provide a safe, sustainable, efficient, and cost-effective design and operation.

8. Relevance

8.1. Relevance to countries in transition, etc.

The guideline will also aid countries in transition since in these countries waterways are often Free-Flow rivers. The development of their natural inland waterways infrastructures in compliance with these recommendations will result in improved safety, sustainability, and environmental protection, taking advantage of the collective knowledge of the industrial countries and major global stakeholders.

8.2. Climate Change and Adaptation

The report will address climate change and issues in the context of how to plan and design when evolutionary processes at rivers, that are quite unpredictable under the present and future climate change conditions, are expected.
Particular attention will be given to resilience of potential consequences of climate change, the challenges addressed in WG178 report "*Climate Change Adaptation Planning for Ports and Inland Waterways*", and the suggestions and recommendations raised by the Permanent Task Group on Climate Change (PTGCC).

8.3. Working with Nature

Even though the WG deals with infrastructure of natural free flow rivers, the report will also address WnN philosophy aiming to work with natural processes and promoting the conservation of existing wet habitats (as natural rivers) as part of these infrastructure projects.

8.4. UN Sustainable Development Goals

This proposed report is intended to directly contribute to the following SDG's:

- Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation,
- Goal 11: Make cities and human settlements inclusive, safe, resilient, and sustainable,
- Goal 13: Take urgent action to combat climate change and its impact.

9. References

Beyond of those refer above, the following reports will be considered by the Working Group:

- WG141: Design Guidelines for Inland Waterway Dimensions.
- WG178 report "*Climate Change Adaptation Planning for Ports and Inland Waterways*",
- WG201: Framework for an Inland Waterway Classification in South America,
- WG 236: Sustainable management of the navigability of natural rivers
- WG 249: Adaptation of IW for Climate Change Impacts

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