PIANC
The World Association for
Waterborne Transport Infrastructure

Terms of References

Resilience of the Maritime and Inland Waterborne Transport System (MIWTS)

1. Background and Statement of Need

Both acute events and long-term progressive changes can significantly disrupt the international waterborne transportation system. To successfully operate with the uncertainty of these events, maritime and inland waterborne transport systems must be resilient: anticipate and plan for disruptions, resist loss in operations during disturbances and rapidly recover afterwards, and adapt to short- and long-term hazards, changing conditions and constraints. Hazards and constraints affecting the Maritime and Inland Waterborne Transport System (MIWTS) include environmental, human-induced, energy-related, and others. Environmentally, climate change, such as patterns of precipitation, changes in relative water level, and altering freeze/thaw patterns are long-term disturbances for which maritime and inland ports and harbors must plan and adapt. Short-term disturbances such as increasingly frequent and intense storms and flooding on inland waterways can cause major national and international disruptions. Other environmental hazards include invasive species, seismic disruptions and tsunamis, and hazardous spills, amongst others. Human-related hazards include population dynamics, aging infrastructure, and congestion at ports and harbors. Reliance on limited energy resources and the presence of offshore wind energy farms are constraints that can hinder port operations. Planning for mitigation to minimize disruptions and speed recovery from these and other potential hazards and constraints will serve to streamline operation of the MIWTS.

The attached paper "Background for PIANC Proposed Working Group - Resilience of the Maritime and Inland Waterborne Transport System (MIWTS)" includes an orienting summary of related PIANC reports, terminology, and how the proposed Resilience WG will leverage or compliment previous and ongoing PIANC work.

2. Objectives

The Task Group is targeted specifically at resilience of the Maritime and Inland Waterborne Transportation System, with recognition of interactions with the multi-modal transportation sector, at the regional and international level in the short-, medium, and long term. The TG will be a cross-Commission activity that will be guided by PIANC's Permanent Task Group on Climate Change.

The aims of this Task Group (TG) are to:

- Develop a working definition of resilience for the MIWTS given the features and functions of this system and develop an understanding of the relationship between resilience and other systems management concepts including sustainability, risk, and vulnerability.

- Summarize international work on maritime and inland resilience to a broad range of known hazards, including socio-economic, technological, environmental, and chemo-biological events. In addition, identify actions taken in the international community to build general, non-hazard specific resilience.
- Identify resilience indicators for the MIWTS and methods to quantify resilience.
- Provide an overarching approach to guide consideration of resilience with respect to the MIWTS
- Summarize resilience concepts and future needs in a technical report for the MIWTS.

The outcomes will be presented in a useful, well structured and practical technical report targeted at the ports and navigation sector and the PIANC community.

3. Scope

The scope of the TG will extend to all aspects of maritime, estuarine and inland port and waterway operations and infrastructure, as these interact with broader multi-modal activities. It will cover a range of day-to-day activities and long-range planning such as the management, operation and maintenance of infrastructure; dredging and placement of dredged sediments; navigation; and engineering. It will also consider possible implications for the design and construction of new development projects, and will reflect on interdependencies with the multi-modal system that accesses the MIWTS.

The TG will not be structured or funded to perform new basic research. To meet the objectives, the TG will identify and review pertinent documentation and priority PIANC and third party reports and publications. As far as is practicable, the review will also cover unpublished literature, research, tools, etc. insofar as the latter are available and relevant. In addition, the TG will draw on the practical experience and expertise of its members (and their colleagues and contacts), and through an international workshop.

4. Intended product

The intended product is a technical report (TR) that can be used for understanding resilience of the MIWTS, knowledge to date, and future needs. The TR will be produced within one year of the formation of the TG and will include:

i) Background information, including definitions of resilience and related concepts;
ii) Case study examples of best practices and how the MIWTS can achieve resiliency;
iii) Information on the integration of conventional engineering, non-structural, and operational solutions available to achieve resilience of the MIWTS;
iv) Specification of the types of information and knowledge that should be analyzed to quantify existing resilience and identify opportunities for improvement; and
v) Identification of technical gaps and other needs of the sector for future development, potentially through working groups of the PIANC technical commissions.

5. Task Group membership

To maximize the usefulness of the publication across all sectors and in all countries, the TG should include members representing:

- Ports, harbors, navigation and waterways (engineers, Harbor Masters, operators), as well as the multi-modal system;
- Construction and dredging companies, consultants, other advisors to the sector;

- Governments, policy makers, public bodies, relevant international organizations; and
- Professional organizations, sector associations and representative bodies.

This TG should also include young professionals (YP) from national sections or Commissions.

6. Relevance to developing countries and countries in transition

The guidance and documentation will be particularly relevant to developing countries and countries in transition as these countries often have least existing experience and can learn most from what has been done elsewhere. However, the publication would also be pertinent more broadly because, although there is existing experience, levels of dissemination and sharing of information about climate change and adaptation options are often very low.

7. Relevance to climate change

The Resilience WG will consider climate change and associated consequences (e.g., drought, flooding, extreme precipitation, nuisance extreme tidal conditions, extreme storms, changes to water quality, ice, thaw, sea level change, new shipping routes, etc.) as potential short- and long-term hazards and/or constraints affecting resiliency of maritime and inland waterborne transport system.