PIANC
The World Association for Waterborne Transport Infrastructure

Terms of Reference

EnviCom WG 178

PIANC-PTGCC Working Group on climate change adaptation for maritime and inland port and navigation infrastructure

1. Background

It is increasingly acknowledged that the consequences of climate change will affect both existing and new seaport and inland waterway infrastructure. Adaptation (to reduce vulnerability or increase resilience) will therefore be necessary. New designs will need to take into account the effects of climate change and some existing infrastructure may need retrofitting. Non-structural measures including modifications to management activities, maintenance regimes and other port, harbour and waterway operations are also likely to be required to facilitate the continued function of the physical infrastructure. The implications for infrastructure of an increase in the frequency of extreme events and associated adaptation options similarly need to be better understood.

Adaptation[1] requirements will vary between locations. Under a two-degree warming scenario, some maritime and inland navigation systems may require little adaptation in the short to medium term (next 10-20 years); other systems may be less well prepared. Under a four-degree warming scenario, it is likely that more significant measures will be required across most of the sector.

An increasing number of countries have developed National Adaptation Programmes of Action, in many cases including sectoral assessments. Some navigation sector organisations have also been carrying out work on the types of measures needed to adapt to the various consequences anticipated as a result of climate change, not only the more frequently discussed changes such as those associated with increased temperatures, changes in precipitation, sea level rise and increased frequency of extreme events, but also changes in fog, winds and icing. However, this work has not typically been shared widely, and there are few if any practicable catalogues of adaptation options for port and navigation infrastructure.

2. Objectives

The aims of this Working Group would be to explore the range of climate change adaptation options for maritime and inland port and navigation infrastructure; to refer to the PIANC TG3 report on climate impacts (which is assumed to be subject to updating as necessary) indicating key regional differences as far as practicable; to collate and review other existing information on climate projections; to generate a toolbox of adaptation options including non-structural (management) as well as structural measures; to evaluate the effectiveness of different adaptation options in typical or generic climate change scenarios; to understand and address challenges; and to provide a guidance framework for decision making.

1 An adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory, autonomous and planned adaptation. (IPCC, 2001).

The outcomes will be presented in a useful, well structured and practical guidance document targeted at the ports and navigation sector. The document will be suitable for use by senior managers and decision makers. It will also provide a useful overview for practitioners but it will not be a detailed technical handbook.

1. Earlier reports to be reviewed

The Working Group will agree the range of PIANC and third party reports and publications to be reviewed. As far as is practicable, the review will also cover unpublished literature, research, etc. insofar as the latter is available and relevant.

In addition, the Group will draw on the practical experience and expertise of its members (and their colleagues and contacts), and on international experience accessed through a proposed series of 3-5 facilitated regional workshops.

2. Scope

The scope of the group will extend to all aspects of maritime/estuarine and inland port and waterway infrastructure. It will cover a range of day-to-day activities such as the management, operation and maintenance of infrastructure; conservancy; dredging; pilotage; and engineering. It will also consider possible implications for the design and construction of new development projects, and will reflect on interdependencies such as hinterland connections.

It is likely that this scope of work will necessitate the creation of at least two sub-groups managed by a Steering Group. One of the sub-groups will deal with inland waterway infrastructure and the other with maritime and estuarine infrastructure (i.e. in tidal environments). Where the issues are similar – for example the principles of adaptation, the importance of preparedness, etc. – the topics will be covered jointly. Where there are differences (for example in specific maritime vs. inland climate change adaptation measures), the two groups will work in a coordinated, parallel manner.

3. Intended product

The resulting good practice document would be intended to:

i) Provide an appropriate level of background information, including definitions of adaptation concepts and processes

ii) Help the reader understand and explore the widest possible range of options available to adapt to the consequences of climate change; and to differentiate between:
   - conventional engineering options: situations in which the right answer might be building higher, stronger, wider or deeper;
   - non-structural measures: changes in management, operation or maintenance designed to facilitate the continued function of the physical infrastructure;
   - options which capitalise on the natural resilience and flexibility of nature: situations in which infrastructure resilience might be improved by enhancing nature;
   - novel options: doing things differently because the conventional solution is no longer sustainable; and

- win-win options: options which explicitly seek adaptation solutions to benefit a number of players, and which may thus provide opportunities to share costs between a number of organisations.

iii) Ensure the reader appreciates the importance of preparedness. Some navigation infrastructure may not be affected by the consequences of climate change for many years, even decades. However, it is important that the users of the guidance recognise the types of data relevant to their own situations. Designing appropriate monitoring programmes and facilitating the collation of relevant information will foster an understanding of port or waterway-specific conditions, allowing cost-effective and timely decisions to be taken on measures needed to reduce vulnerability and improve resilience.

iv) Discuss some of the challenges which could be faced, including scepticism about climate change, reluctance to invest in the collection and management of data, and a lack of capacity or resources. Suggest strategies for overcoming challenges (including resourcing constraints): raising awareness, developing ownership, mainstreaming climate change into business planning.

v) Describe a decision making framework; a tiered approach to adaptation decision making: (strategic level including integration with other interests; options appraisal; detailed assessment)

vi) Support all of the above through the collation and presentation of case studies, both of adaptation strategies and measures and, wherever possible, the application of these by a particular organisation / authority. Case studies should focus on typical examples and transferable experience.

vii) Highlight technical gaps and other needs of the sector.

The PTGCC website includes some first thoughts on adaptation options. A Working Group would further develop these types of ideas, elaborating on the range of options and the level of description, with the objective of preparing a practical technical guidance document designed to facilitate understanding of options for:

- establishing the critical infrastructure that could be impacted and that needs to be the focus of adaptation action;
- retrofitting of existing infrastructure;
- introducing modified management, operational or maintenance practices;
- identifying and dealing with situations where it is clear that existing assets or practices will be unsustainable and a change of approach / design is required;
- climate-proofing new developments;
- integrating with other sectors and interests.

4. Working Group membership

To maximise the usefulness of the publication across all sectors and in all countries, the Working Group should include members representing:

- ports, harbours, navigation and waterways (engineers, Harbour Masters, operators)

- construction and dredging companies, consultants, other advisors to the sector
- governments, policy makers, public bodies, relevant international organisations
- professional organisations, sector associations and representative bodies.

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

5. Relevance to developing countries and countries in transition

The good practice technical guidance document would 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 to developed countries not least because, whilst there is existing experience in some of these countries, levels of dissemination and sharing of information about climate change and adaptation options are often very low.

6. Climate change

The Working Group is targeted specifically at climate change issues at a regional and international level in the short-, medium, and long term.