



# Paper 176 – Challenges and Opportunities for the Waterborne Transport Infrastructure Sector to strive for sustainability – overview of activities of PIANC’s Environmental Commission

KÖTHER H.

*Chairman PIANC Environmental Commission (EnviCom)*

*Federal Ministry of Transport and digital Infrastructure (BMVI), Germany*

Email: [harald.koethe@bmvi.bund.de](mailto:harald.koethe@bmvi.bund.de)

**ABSTRACT:** To prepare and support the waterborne transport infrastructure (WTI) sector for the future, the Environmental Commission of PIANC has taken up some new activities and continues existing ones. These initiatives and activities are briefly described in this paper and they are also an offer for experts inside and outside the WTI sector to actively participate in and contribute to a sustainable development of the WTI sector.

## 1 INTRODUCTION

At the end of 2014, the steadily increasing world population (80 million/year) peaked at nearly 7,3 billion people, which came with globalization demands for more, faster and flexible mobility of people and trade. At the same time, human needs and activities constantly bring more pressure on our planet’s natural resources. The observation of a changing environment (e.g. climate change and increased variability) leads to more awareness about the meaning, values and limitations of our planet’s natural resources and challenges to find innovative, sustainable concepts and solutions for our economic activities including the waterborne transport sector. The annual global summit 2014 of the Ministers of Transport (International Transport Forum - ITF) emphasized under the theme “Transport for a changing world” these demands and challenges during its meeting in May, 21-23, 2014 in Leipzig, Germany.

The awareness that innovations in the business cycle must combine both economic and ecological considerations is increasing and has started to change our thinking on how to define and approach goals, and by extension has promulgated ‘green growth’ as a driver of economy. The ITF 2016 is going to deepen this development with the theme “Green and inclusive Transport” in May 18-20.

The Chilean-German economist in the field of international development Manfred Max-Neef stated

in 2010: “No economy is possible in the absence of ecosystem services”.

International bodies are currently underway to introduce the understanding about “ecosystem services” into our daily business and it is exciting if and how this development might lead to a new way of pricing ecological values in business calculations in future. Proactive management is essential for the waterborne transport sector toward being an attractive, highly performing and sustainable transportation mode in the future. In this sense, PIANC’s Environmental Commission (EnviCom) is continuously working with currently 31 members from 15 nations and 9 partner organizations to be a proactive partner and driver with its strategic initiatives, working groups and networking activities to implement the PIANC goals, in particular:

- promoting the development and improvement of global waterborne transport infrastructure and enhancement of its economic, environmental and social benefits
- being proactive in dealing with the impact of climate change
- promoting the philosophy of ‘Working with Nature’

To prepare and support the navigation sector for the future the EnviCom has taken up in its new action plan (2014 – 2018) the important goal to promote the concept of sustainable, integrated and resilient management of navigation and waterborne infrastructure. This goal comprises several new



topics which are already internationally in development and discussion in the water sector in various ways where guidance for the navigation and waterborne infrastructure sector is needed. Consequently EnviCom is currently pursuing new or continuing existing activities to the following topics:

- Working with Nature,
- Ecosystem Services,
- Environmental Risk Management,
- Dredging in environmental sensitive areas,
- Sustainability reporting in ports,
- Climate change adaptation,
- Carbon management,
- Resilience.

## 2 WORKING WITH NATURE

Since 2008 when PIANC published its Working with Nature (WwN) position paper with an update in 2011, the continuous development and implementation of PIANC's WwN philosophy is a main issue of EnviCom's work. The overall goal is to learn from waterborne transport infrastructure projects worldwide how the WwN philosophy or elements of it are being successfully implemented. Therefore PIANC opened a WwN database end of 2012 and invites project owner to submit their case studies and experiences to share these with the WTI community. A jury of international experts are checking these submissions for granting a PIANC "WwN certificate of recognition", "WwN candidate for certificate of recognition" or "Supporter of WwN". Information about all those projects which have received one of the categories of the WwN Certificate are publicly accessible via the PIANC WwN website (<http://www.workingwithnature.pianc.org/>). Project owners can use the WwN Certificates and WwN logo to highlight their project during implementation as well as after completion.

This development peaked in the grant of the 1<sup>st</sup> PIANC WwN Award on the 33<sup>rd</sup> PIANC World Congress in San Francisco, California, June 1-5, 2014. Three winning projects were selected by the WwN jury from seven international waterborne transport infrastructure projects which have been awarded a WwN Certificate of Recognition in the course of the year 2013. During the Congress, the project managers of these three projects presented their projects in a special session and finally the winner was announced at the Closing Ceremony of the Congress. The 1<sup>st</sup> prize winner was the project 'New Tidal Area Kreeksand, Elbe River' from Germany. The 2<sup>nd</sup> winning project was '3 m Navigation Channel Middle Mississippi River, and

the 3<sup>rd</sup> winning project was 'Flood Spillway Rees, Rhine River' from Germany. With the conclusion of the juried selection for the 1<sup>st</sup> WwN award, PIANC is looking forward to receiving additional projects to be submitted for the WwN Certificates of Recognition. As PIANC is working up to the 2<sup>nd</sup> WwN Award all projects newly acknowledged for a Certificate will automatically be candidates for the 2<sup>nd</sup> WwN Award.

With all these new experiences the PIANC WwN rules & regulations were updated and functions in the database improved to receive more interesting projects for WwN certificates and the next WwN award on the 34<sup>th</sup> PIANC World Congress 2018 in Panama.

Furthermore members of EnviCom are presenting the benefits of applying the WwN philosophy to WTI projects on international events.

In February 2015 PIANC started the new Working Group 176: "A guide for Applying Working with Nature to Navigation Infrastructure Projects" to provide technical information regarding the Working with Nature approach for navigation infrastructure projects by drawing from existing approaches and best practices worldwide. The report will give orientation about the difference and relationship between various so-called "with nature" – initiatives.

## 3 ECOSYSTEM SERVICES

Nowadays estimating the economic benefits of an investment in infrastructure is common and well known business. Unfortunately the same is not true for estimating environmental impacts and benefits. These are not economically defined and usually not included. In practice, by not valuing nature economically, its worth becomes in effect zero in the economic calculations for infrastructure investment planning.

With the increasing awareness of the ongoing loss of nature and natural resources by human activities, it is evident that nature and its services for human welfare and living quality are insufficiently considered in the economic calculations for infrastructure investment planning.

Against this background the concept of Ecosystems Services (ES) was launched – starting from the background of preserving the world's biodiversity – by the 'Millennium Assessment Report' in 2005. It was advanced and pushed forward in the international TEEB Study, 'The Economics of Ecology and Biodiversity' since 2010. Today ES are part of environmental guidelines, especially on the European level.

This ES concept has the potential to become an internationally accepted and unifying basis for a



cross-sectoral instrument that bridges economic and environmental sectors by integrating the values of nature – the ecological, socio-economical and potentially financial – and its “deliverables” (i.e., services) for human welfare and living quality.

ES offer a sector-bridging tool for mediating environmental values and benefits balancing environmental, social and economic issues when planning and realizing WTI projects. New (business) opportunities are identified, explored and generated. The societal acceptance of WTI projects as undertakings having multiple societal benefits is boosted.

But how will the ES concept further affect our approach to WTI? What is it really about, how should we deal with it and how can the WTI sector benefit from it? Therefore PIANC held a seminar on May 7, 2015 in Koblenz, Germany with international experts in the field of ecosystem services to first get more orientation on this complex topic (see <http://www.pianc.org/events.php>). Based on the outcome of the seminar the next step is to publish a PIANC orientation paper on ES for the WTI sector until end of 2015 which presents the current understanding of the Ecosystems Services concept (ES-concept) and gives recommendations, underlining the added value of integrating ES in deployment, planning, and designing WTI projects and/or maintenance.

#### 4 ENVIRONMENTAL RISK MANAGEMENT

Previous EnviCom Working Groups have developed procedures addressing various aspects of environmental risk assessment of dredging and dredged material disposal related to navigation and port infrastructure, providing a scientific basis for making decisions based on environmental risk assessment data. These reports did not address methodologies for informing risk management. A new effort is therefore proposed to fill this gap by developing a practical guide derived from existing methods and approaches for informing decision makers managing environmental risk associated with navigation infrastructure projects. In February 2015 PIANC therefore kicked off the new Working Group 175 “A Practical Guide to Environmental Risk Management for Navigation Infrastructure Projects” to produce a report providing technical information to decision makers regarding the risk management process for navigation and infrastructure projects by drawing from existing approaches and best practices worldwide. The report will integrate current knowledge and will build upon the Working Group 10 report “Environmental Risk Assessment of Dredging at Disposal Operations” and the Working Group 143 report “Initial Assessment of Environmental Effects of Navigation and

Infrastructure Projects”, showing decision makers how to transition from risk assessment to risk management. The report will present a practical and structured management process developed to guide identifying, evaluating, selecting, and implementing actions for reducing environmental risks. The process developed will be compatible with the “Working with Nature” Philosophy, taking into account existing methods for managing environmental risks while providing an open, deliberative, and transparent decision-making process.

#### 5 DREDGING IN ENVIRONMENTAL SENSITIVE AREAS

In 2003 EnviCom presented the report “Ecological and engineering guidelines for wetlands restoration”. In the following years the need become more and more urgent to provide guidance for dredging operations in environmentally protected, sensitive areas. Consequently EnviCom initiated this and presented in 2010 the report “Environmental Aspects of Dredging and Port Construction around Coral Reefs” which was a joint publication with UNEP (UN Environmental Program). To amend the comprehensive EnviCom dredging guidance for sensitive Working Group 157 “Environmental Aspects of Dredging and Port Construction ” around coastal plant habitats was set up in 2012 and is expected to be published in early 2016. Furthermore in 2014 Working Group 170 “Dredging Operations and Port Construction around Marine Turtles and Mammals has taken up its work.

All the produced PIANC dredging knowledge is successively provided to the IMO and its Scientific Group of the London Convention (LC) and has contributed e.g. to the revision and update of the “LC Guidelines for the Assessment of Dredged Material” which was adopted in October 2013.

#### 6 SUSTAINABILITY REPORTING IN PORTS

Following the green port philosophy the International Association of Ports and Harbors (IAPH) and PIANC agreed to set up a new joint working group on “Sustainability reporting for ports” to give more guidance to this upcoming topic. This Working Group started its work in October 2014. Reporting about relevant corporate social responsibility issues forms an essential basis for the license to operate for a port, the basis for development and operations of ports. Several ports already publish a sustainability report or have it integrated in their yearly report in various ways. Despite the different approaches, reports in general are based on the guidelines for sustainability reporting provided by the Global Reporting Initiative



(GRI). This activity builds upon the PIANC/IAPH-report of Working Group 150 “A practical guide for a sustainable seaport (Green Port)”, published in May 2014, and the report of EnviCom Task Group 2 “Towards a Sustainable Waterborne Transportation Industry” which was published in September 2011.

## 7 CLIMATE CHANGE

As significant changes in climate and their impacts are visible globally and are expected to become more pronounced in the coming decades, partly as a result of increased concentrations of greenhouse gases (GHG) in the atmosphere EnviCom initiated the set up of the PIANC Permanent Task Group on Climate Change (PTG CC) in 2009. The main goal for the new cross-commission PTG CC being led by EnviCom is to build on the report “Waterborne Transport, Ports and Waterways: A Review of Climate Change Drivers, Impacts, Responses” of EnviCom Task Group (TG) 3 published in 2008 and to inform PIANC on how navigation may be affected by climate change and where and how adaptation and mitigation actions need to be taken so that the necessary actions and investment can be done in a proactive way. Through participation and coordination with the outside world, the PTG CC is developing to become a global focal point for the waterborne transport sector on climate change issues and responses. The PTG CC provides a common and basic platform for all PIANC commissions to build up their work plans regarding climate change and to contribute to supporting waterborne transport as a sustainable mode of transportation.

Much work is already being undertaken by other organizations on maritime navigation mitigation. The role of the PTG CC in this respect will therefore be to monitor such activities, to disseminate information and to contribute to ongoing work where appropriate. Insofar as climate change adaptation for the maritime sector is concerned, there is a role for the PTG CC in collating and coordinating currently disparate information, identifying gaps, and contributing to further knowledge and guidance in this area.

Against this background the PTG CC provides information on their website <http://www.pianc.org/climatechange.php> and has initiated some important new activities which are shortly presented below. All these activities contribute to an expertise of PIANC to represent the sector on important global events (e.g. OECD/International Transport Forum; UNFCCC - United Nations Framework Convention on Climate Change).

### 7.1 Adaptation

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, harbor 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. Therefore PIANC started the new Working Group 178 “Climate change adaptation for maritime and inland port and navigation infrastructure” in February 2015. The aims of this Working Group is to explore the range of climate change adaptation options for maritime and inland port and navigation infrastructure; 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.

### 7.2 Resilience

Hazards, changing conditions and constraints affecting WTI systems 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 waterways, 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 from these and other potential hazards and constraints will serve to streamline operation of WTI. Enhancing the resilience of WTI involves anticipating changes in conditions, proactively planning, and implementing adaptation actions. Against this background the PTGCC is currently preparing a paper to pave the way how PIANC can support the development and application of resilience concepts and engineering analysis applied to WTI.

### 7.3 Carbon Management

There is growing interest in managing the "carbon footprint" of industrial activities to respond to climate change. Effective carbon management involves steps to reduce and offset emissions and sequester carbon. Identifying opportunities for carbon management requires a greater understanding of the carbon sources and sinks relevant for waterborne transport. Consequently there is a need on investigating the carbon footprint of navigation infrastructure development, operations and maintenance, and identifies best practices for management of the sector's carbon footprint.

PIANC, through the work of its Permanent Task Group on Climate Change, is currently setting up the new Working Group 188 on "Carbon Management for Port and Navigation Infrastructure" to collect currently available international experiences and to develop guidance for carbon management for WTI projects. The guide developed by this Working Group will be applicable to inland, marine and recreational waterway and port infrastructure projects.

PIANC therefore seeks to produce a report providing technical information to decision makers regarding carbon management for navigation and infrastructure projects by drawing from existing approaches and best practices worldwide. Therefore the report will integrate the current knowledge and will build upon existing the PIANC reports and ongoing activities on climate change.

## 8 Outlook

A common definition of sustainability is that human actions and conduct that meet society's present needs without compromising the ability of future generations to meet their own needs while maintaining the natural resource base and environmental quality on which life depends. The WTI is being called on to play its part in the drive to make human activities sustainable. The topics and activities initiated by the EnviCom and described in

this paper are contributions to support the WTI sector on its way to strive for sustainability. It is obvious that these topics are important components and interlinked on the way to approach new projects with a new way of thinking. New ways are challenging but they offer also new opportunities.

The environmental benefits of waterborne transportation are in general known, but are all current trends really sustainable? PIANC WG 150 report clearly points out: Today, the idea of sustainability is generally accepted to cover much more than strictly environmental issues. It has become clear that a new growth paradigm is needed that can promote economic development to better meet its needs, while at the same time, ensure climatic and environmental sustainability. This next step is the drive towards Green Growth. While economic activities and environmental protection are conventionally perceived as two separate domains adversely affecting each other, green growth calls for a conceptual shift to recognize that both can be achieved complementarily. Transport is an important theme related to green growth. Transport has a substantial impact on the environment and much public investment is related to transport infrastructure. Greening of transport and transport infrastructure therefore will be one of the key drivers for development in the next decades.

Waterborne transportation is an essential part to drive towards transportation sustainability but there is much to be done and the opportunities are not fully discovered and exploited. WTI professionals are positioned and invited to take an active role in this development with PIANC's initiatives. Do not hesitate to contact the EnviCom and visit the respective thematic PIANC websites.