



Terms of reference Working Group 128 InCom

Alternative Technical-Biological Bank Protection Methods for Inland Waterways

The PIANC INCOM WG 128 was established in 2009. Because of several personnel problems the group met only three times in different composition. It is planned to reactivate the working group. Because the knowledge on the design and maintenance of technical-biological bank protections increased since 2009, e.g. because there is a German Guideline available, the former TOR will be updated as follows:

1 Background

Since the mid 1980's, considerable interest has grown in the use of softer forms of bank protection to reduce costs, increase environmental benefits and more recently to demonstrate sustainable construction. In 1987 PIANC produced guidelines on the design and use of such techniques which were well-received and used to create industry standards.

In 2007, PIANC InCom WG27 reported that an increasing number of alternative bank protection measures are being implemented across the world in navigation channels, for example:

- Bio-engineering as reed planting or live willow fascine,
- Bio-technical engineering as grass composite, vegetated pocket fabric geo-textiles, rock and fibre rolls, planted coir pallets, and
- Structural engineering as timber revetments, wattle hurdles and timber piling.

However there is still limited published guidance based on actual experiences with existing alternative bank protection methods that identifies effective alternatives that can be used under specific project boundary conditions. Some of these documents were used in the WG27 report "Considerations to Reduce Environmental Impacts of Vessels" to select adequate mitigation measures. Further work has recently been undertaken by other PIANC Working Groups, namely MarCom 56 (Application of geo-textiles in waterfront protection) and CoCom 2 (Best practices for shoreline stabilization methods), to consider the use of geo-textiles in a coastal environment.

Whilst there is limited existing knowledge, there is an increasing pressure for those involved in channel design and maintenance to adopt new techniques on the assumption that these will better meet the following requirements:

- Engineering
- Ecological,
- Economic,

rather than the use of traditional engineering solutions such as riprap or sheet piling. Consequently there is a need for collecting and assessing existing experiences with alterna-

tive bank protection methods in a sense of a best practice approach to form a basis for an objective decision making tool for waterway improvement and management.

2 Objective

The objective of the new InCom Working Group is to understand, evaluate and report on the effectiveness of best practice examples of innovative (alternative) bank protection measures, as related to different impact influences and boundary conditions, to fulfil the technical purposes and additionally to improve the ecological conditions. To formulate recommendations based on results obtained from assessments of physically implemented schemes.

From the European perspective, the mandate of the Water Framework Directive and other initiatives has created a requirement for results that should be available as soon as possible. Therefore restrictions on the range and extent of the field of inquiry are necessary. To create an even more finite scope of activity by the working group, bank protection in lakes should be viewed as extraneous to the report.

Maintenance costs and details of ecological monitoring for selected alternatives must be available for a point in time at least one year after installation and must be included in the report.

Project details should include water body type (e.g., free flowing and dammed rivers, canals), climate, water level variation, flow velocity (both fast and slow), substrate of the banks, bank slope, distance to fairway, ship types and hydraulic impacts from shipping.

Information should be collected on successful and, to the fullest extent possible, on unsuccessful applications looking back over the last twenty years. It is felt that this is an appropriate timescale commensurate with the development of these techniques and will allow a full review to be undertaken to see how vegetative protection techniques have matured or not!

3 Earlier reports to be reviewed

Besides the report of INCOM WG 27, the following papers give an overview on existing guide codes:

- Performance of alternative methods of bank protection, P. F. Doyle, Canadian Journal of Civil Engineering, 1992
- Bank protection utilising geo-textiles and vegetation (PIANC, 1996),
- Waterway Bank Protection: A Guide to erosion assessment and management (Cranfield University/UK on behalf of British Waterways, 1999),
- Stability thresholds for stream restoration materials (Craig Fischenich, ERDC, USACE, 2001),
- Guide de protection des berges; Comite Zone d'intervention Prioritaire (ZIP) des Seigneuries, see <http://www.ville.repentigny.qc.ca/vie-citoyenne/environnement/guide-de-protection-des-berges.html>
- Numerous reports of the German research project on "technical-biological bank protections" including field tests, see <http://ufersicherung.baw.de/de/index.html>,
- DWA-M 519 "Technisch-biologische Ufersicherungen an großen und schiffbaren Binnengewässern (technical-biological bank protections in large and navigable inland waters)"; Guideline of the German Association for Water, Wastewater and Waste; to be published probably end 2015

These guides, however, do not clearly state how effective these bank protection techniques have proven to be in operation, they only list a few examples based on results soon after installation. Presently there is not enough information available to avoid repeating mistakes of inappropriate installation of innovative bank protection!

4 Scope

Because of the public and legal pressure to realize environmental friendly bank protections and because of the elapsed time setting up the existing WG 128, the scope of work should focus on the collection and evaluation of existing guidelines and of both positive and negative experiences with realized alternative bank protections measures, leading to a list of measures with as variable as possible local boundary conditions. This list of evaluated measures can be used in terms of a best practice approach, meaning that the planner of an alternative measure compares his local boundary conditions to the latter in the list of existing measures to decide, whether listed measures could be successful or not.

Additional to the general boundary conditions related to one listed project, specific characteristic parameters shall be added, which come e.g. from the German DWA design rules, especially concerning the influence of wave impact, bank slope or subsoil, because it turned out that only a few parameters are decisive for design. These relevant parameters can thus be used additionally to facilitate the selection process.

5 Intended product

As mentioned earlier the product is a best practice document, basing on existing design guidance and experiences. Because of the dominant influence on local boundary conditions, as e.g. the natural site conditions of plants, the intended result cannot be a straightforward design rule, but it nevertheless will support planners with very helpful information as existing design codes and the a.m. list of reference projects, together with guidance on the data needed to apply existing guidelines and the recommended best practice approach.

6 Recommended members

The members of WG 128 may be by profession civil or environmental engineers or landscape architects to mention just three professional groups working in the field of bank protections in waterways in general, especially with environmental friendly solutions. The members could come from public or private organisations, especially waterway administrations and engineering bureaus or organisations representing stakeholders in the inland waterways system. But most important is that the working group members should have own experiences with existing alternative bank protection measures as well as with the application of corresponding national design rules.

Because PIANC provides international guidelines and because local boundaries as types and properties of plants used for environmental friendly solutions may be very different from country to country and waterway to waterway, the working group members should come not only from countries lying in the temperate climate zones as in North Europe or America, they should come from other climate zones if possible too, if there are experiences available. This is especially important for possible application of the future best practice approach to Countries in Transition and concerning climate change effects.

7 Relevance for Countries in Transition

The benefits of promoting the development and use of bio-engineering techniques is considered vital in both Countries in Transition, and developing countries, in protecting against the pressures associated with increasing economic development and growth.

8 Climate Change

Climate change may affect bank protection measures in many ways, especially those using plants, because of longer periods with low water and thus poor water supply for the vegetation cover. This may force to e.g. use other plant species. For this reason it is important to involve members from countries with generally higher average temperatures into the group.