

# Integrated beneficial sediment management in practice

**Sittoni Luca<sup>1</sup>, Burton Suedal<sup>2</sup>, Victor Magar<sup>3</sup>, Marc Huygens<sup>4</sup>**

<sup>1</sup>SIDRA, DEME-group, via Carlo Zucchi 25, 00196, Rome, Italy.

Phone: +39 335 716 3146

<sup>2</sup>US Army Corps of Engineers, ERDC, 3909 Halls Ferry Rd, Vicksburg, MS, 39180

E-mail: sittoni.luca@deme-

<sup>3</sup>Ramboll USA, 33 W Wacker Dr #2700, Chicago, IL 60606.

group.com

<sup>4</sup>DEME-group, Haven 1025, Scheldedijk 30, B-2070 Zwijndrecht, Belgium.

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**Introduction:** Sediment is a critical natural resource. Human activities interact with the natural sediment cycle, creating areas of sediment abundance, often local and limited in extension (e.g., harbor siltation), and areas of sediment scarcity, often influencing large areas (e.g., coastal erosion). Sediment scarcity is a critical concern in various regions globally, including various densely populated and high-value shorelines of Europe. This criticality is destined to increase with climate change and can benefit from integrated beneficial sediment management practices.

Integrated beneficial sediment management contributes to re-establishing natural sedimentary processes, delivering social and economic benefits, hence contributing to sustainability. In early 2023, PIANC Working Group 214 (WG214) published a guideline report on Sediment Beneficial Use (BU), focused on identifying key catalysts to promote BU and centered on sustainability principles. In parallel, various concrete pilot and commercial projects are ongoing where integrated BU is applied in practice.

This presentation connects the PIANC BU guidelines with practical lessons learned in the field.

**Methods:** The WG214 PIANC guidance recognizes that BU approaches must be tailored to site-specific conditions and to regional environmental, economic and socio-legislative frameworks. The report builds on the work of previous studies and guidance documents, and highlights important factors that should be considered when assessing BU opportunities. These include: the possibility to connect supply and demand; explore BU costs and opportunities for shared costs among beneficiaries, distributing cost burdens among stakeholders enjoying the broader range of benefits; involvement of multiple stakeholders with different objectives and levels of participation, from partners to affected communities; expand the business model for BU beyond traditional cost-benefit analyses and include ecosystem services (PIANC WG 195; 2021) and life cycle considerations; and to focus on added value to the environment and communities.

Three projects, carried out in the Scheldt estuary (Belgium), will be discussed, reflecting different BU

applications: restoring an eroding bank through Nature-based Solutions (R&D project Bankbuster); reclamation and redevelopment of a former contaminated site into a heritage park through clean-up and safe use of sediment (Sanitation project Fort Filips); retreat, developing a natural tidal area managing local sediment (Hedwige Polder).

These projects were made possible by applying the PIANC guidelines in practice, for examples: emphasizing stakeholder and community involvement, public-private partnerships, connection of supply and demand, realizing different complementary objectives to reach added value beyond clean-up, and a availability of different financial sources. Projects were made more successful through initial advocacy efforts to gain public acceptance and support of projects. Operational experience and innovative expertise of contractors and consultants were integral to successful realizations of projects.

**Results:** While BU is not new, BU has not yet achieved its full potential. Numerous projects exist that provide important lessons learned to be applied elsewhere. Especially important, these lessons provide a paradigm for sediment management solutions, complemented by different financial and governance models, which can be combined to develop optimum integrated sediment management plans at local and regional levels.

This experience basis is further available to inform legislation and policies at regional, national and international levels. This is particularly important at this historical time where different organizations (e.g., the European Union or the US Army Corps of Engineers) are working to develop legislation and practices to achieve sustainability objectives.

## References:

[1] PIANC ([www.pianc.org](http://www.pianc.org)) is the World Association for Waterborne Transport Infrastructure. Established in 1885, PIANC's mission is to provide expert guidance on design, development, and maintenance of ports, waterways, marinas and coastal areas.