

A minimal characterization identification approach for pre-selecting dam fine sediments reuse options

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Introduction: During the last decade, the dredged sediments management became a major concern for all ports and waterways authorities and hydroelectric plant and dam operators more recently. While more and more regulations are imposed, usual practices of disposal at sea or deposits on land are liable to be challenged, reviewed or called into question. Depending on the hazardous nature and the rate of contamination of sediments, authorities may refuse to release them in rivers or water-ecosystems.

Concerning sediment management on land, the determination of some sediment characteristics is essential for achieving an efficient secondary raw material. So far, there is no well defined methodology for the characterization of the sediments adapted to a convenient land management. Since several sediment beneficial reuse techniques are available, considering separately each option of reuse would lead to redundant, excessive and finally, costly characterizations.

Methods: A more robust and adequate sediment characterization approach is proposed by offering pre-selection of beneficial reuses to facilitate the manager's decision with regards to sediment land management. Sediments characterization is based on a number of reduced parameters in accordance with the technical specifications of potential beneficial reuses. Five beneficial uses are selected from: (i) agricultural and horticultural uses, (ii) addition to the raw material to produce Portland cement clinker, (iii) substitution of fine aggregates and cement for mortar and concrete, (iv) sub road layer materials, and (v) ceramic materials.

These options have been chosen taking into account the following points:

- Minimization of fine sediments volumes to be disposed of, while maximizing reuses.
- Ability to valorize large volumes of fine sediments,
- Implementation can be achieved at a low cost,
- Proximity of hydroelectric plants and dams,
- Respect of legislation,
- Applicable as reference to other beneficial reuses.

Considering these five options, a list of the main parameters is performed through a large bibliography (standards, technical guides and scientific papers), or experiments run out in the private and public labs and

from experts. This identification approach will provide the basis for identifying the key input parameters for each beneficial reuse *i.e.* necessary and sufficient required parameters to implement a beneficial reuse (Fig. 1).

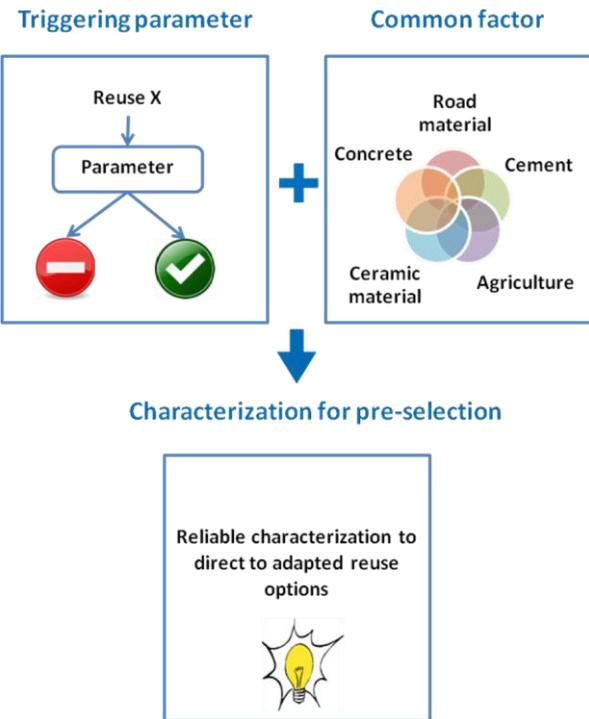


Fig. 1: Conceptual illustration of identification approach for pre-selecting use options.

Results: In this way, a minimal characterization on fine sediments may help to pre-select one or more beneficial reuses. Thus, a decision-making tool will be conceived to direct fine sediments towards the best adapted beneficial reuses as shown on the following scheme.