Management decision process of beneficial reuse of marine sediments in civil engineering applications
Faycal El Fgaier, Arjan Wijdeveld, Bruno Lemière, An Janssen, Sinead Tangney, Samira Brakni, Zoubeir Lafhaj

To cite this version:
Faycal El Fgaier, Arjan Wijdeveld, Bruno Lemière, An Janssen, Sinead Tangney, et al.. Management decision process of beneficial reuse of marine sediments in civil engineering applications. SedNet Conference 2015, Sep 2015, Krakow, Poland. 2015. <hal-01185074>

HAL Id: hal-01185074
https://hal-brgm.archives-ouvertes.fr/hal-01185074
Submitted on 19 Aug 2015

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.
Management decision process of beneficial reuse of marine sediments in civil engineering applications

EL FGAIER Faycal1, WIJDEVELD Arjan2, LEMIÈRE Bruno3, JANSSEN An4, TANGNEY Sinead5, BRAKNI Samira6, LAFHAJ Zoubeir1

1École Centrale de Lille, 59651 Villeneuve d'Ascq, France
2Delft University of Technology, 2628 CN Delft, Netherlands
3BRGM, 4506 Orléans, France
4BBRI, 1000 Brussels, Belgium
5Cork Institute of Technology, Cork, Ireland
6CD2E, 62750 Loos en Gohelle, France

Introduction: The management of dredged sediments is an increasing issue for harbours and local authorities. Consequently, contaminated sediments are the subject of intense technology development, such as beneficial reuse or in situ treatment. However, current decision analysis approaches, such as comparative risk assessment, benefit-cost analysis, and life cycle assessment, do not offer a comprehensive approach for incorporating the varied types of information and multiple stakeholder and public views [1]. In this context, the EU Interreg-funded CEAMaS project promote the beneficial re-use of marine sediments in civil engineering applications, in a sustainable, economic and socially acceptable manner. The objective of this paper is to support management alternatives for dredged marine sediments based in two main criteria: The first one is compliance to legislation related to sediment management, which differs in each country. The second criteria are the physical, mechanical and chemical properties of dredged marine sediments, which define the possible civil engineering applications and other reuse options according to national legal frameworks and standards. It allows also the selection of a treatment process (if needed) and to determine other reuse operational options.

Methods: The methodology of this study is based on the development of a database on the legislations related to sediment management in CEAMaS project partner countries (Ireland, France, Belgium and the Netherlands), and on the mechanical, physical and chemical requirements of various civil engineering applications (such as infrastructure, coastal protection works or as a building material,...). An experimental work is then carried out at the laboratory scale. Dredged marine sediments from different locations are characterised, according to various national standards and common characterisation methods for sludge properties.

Results and discussion: The first samples show contaminant values in excess of national standards but not necessarily for the same contaminants for all countries. They show a large range of mineral and engineering properties, reflecting their sedimentological and geographic origin. This leads them towards different possible applications. Based on the database and laboratory works, a tool is being developed for the application to different dredged marine sediments. This tool is based mainly on regulatory and technical aspects for the management alternatives of sediments, by connecting sediment’s composition and characteristics with reuse application requirements and sludge treatment procedures. In the CEAMaS project, the economic feasibility and the social aspects are also considered for re-use options of marine sediments in civil engineering applications. A Multicriteria Decision Analysis framework will be developed for guiding individual decisionmakers to choose the best reuse option of sediments, depending on the criteria of interest.

Acknowledgement: This project was supported by the European Regional Development Funding through INTERREG IV B.

References: