Sustainable Management of Contaminated Sediments, SMOCS

Göran Holm[1], Wolfgang Ahlf[2], Bo Svedberg[3], Kristina Lundberg[3]

[1] Swedish Geotechnical Institute, Linköping, Sweden
[2] Hamburg University of Technology (TUHH), Hamburg, Germany
[3] Luleå Technical University (LTU), Luleå, Sweden

Phone: +46 13 20 18 61
E-mail: goran.holm@swedgeo.se

Introduction:
Sediments in Baltic ports, coastal areas, estuaries etc. are often highly contaminated due to human activities. Land reclamation for new residential areas and dredging in ports and fairways imply management of these contaminated sediments. The volume to be dredged in the coming years in e.g. the coastal areas around the Baltic Sea is estimated to several million m^3 including contaminated sediments.

Remediation of contaminated sediments in Baltic ports is usually performed by dredging and deposition in contained land deposits. The increased demand for deposit areas and construction of new quays, coupled to the need for reduced use of natural resources, such as gravel, for such construction highlights a demand for sustainable solutions. Methods for the management of these sediments in a sustainable way need to be clarified and highlighted in order to harmonize the methods and action to be taken all around the Baltic Sea. Stabilization/solidification of moderately contaminated sediments, resulting in beneficial harbor constructions, may be a sustainable alternative.

Within the recently completed EUREKA project STABCON (Stabilization / Solidification Of Contaminated Sediments) sediment specific stabilization/solidification techniques with different binders and additives have been tested, both in laboratory and in the field. Results from the tests show significant reduction in environmentally available (leachable) contaminants over time, as well as excellent engineering properties (i.e. high compressive strength, very low permeability). These results have also been verified in field tests. Furthermore performed environmental system analysis on a project level indicates that stabilization and solidification method is favorable in terms of climate impact, resource use and use of energy. All in all the STABCON project indicates that stabilization/solidification of moderately contaminated sediments can be beneficial as a method for constructing quays and areas for container storage in ports.

Fig. 1: Dredging activities in Hamina Harbour, Finland (Terramare, 2009).

A further development, in which additional decision levels are addressed, has started within the Baltic Sea Region Program via the newly approved SMOCS project (Sustainable Management Of Contaminated Sediments in the Baltic sea). The overall aim is to present a guideline comprising a framework methodology for sustainable handling of dredged sediments that may work both on a national and Baltic Sea Region level. The works will include studies of the current situation, assessments and decision tools, as well as studies on treatment technologies where the most promising ones will be verified in pilot studies in ports around the Baltic Sea.

Results:
The project SMOCS will be described in this poster, including a description of the large scale tests that will be performed in Port of Gävle and Port of Kokkola and at other sites around the Baltic Sea. A special focus will be set on the stabilization and solidification technology and the findings from environmental and geotechnical laboratory tests. This focus is proposed as the technology enables beneficial use of the contaminated sediments for infrastructural purposes in ports and other facilities. Furthermore the poster will describe the performed assessments of the different management options using a sustainability approach.