

# Utilisation of Dredged Sludge – Equipments and Execution Step by Step: Turku Case

Laboratory Tests and Quality Control  
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# Preliminary Investigations / Sampling

- Sediment sampling for stabilisation investigations
- Sampling should cover the whole dredging area ⇒ Determination of variation of sediments from different areas:
  - stabilisation properties
  - sediment type (grain size etc.)
  - water content
  - organic matter content
  - content of contaminants
- Thickness of sample layer should be the same as the planned thickness of dredging

# Preliminary Investigations / Determination of Binder Recipes

- Determination of binder recipe is always site specific
- Object is to find a proper binder or binder admixture, which
  - can solidify the material to meet the technical requirements for the harbour field constructions
  - can immobilise contaminants from sediment
  - is cost effective
- Thorough research of the binder recipes and utilisation of industrial by-products as binder components can bring about significant savings
- Different binders are for example: cements, lime products, fly ashes, blast furnace slags

# Preliminary Investigations / Determination of Binder Recipes

- Important technical parameters are:
  - 1-axial compression strength of stabilised sediment:
    - Comparison of different binders by comparing compression strength results
    - Effect of the amount of binder on strength
    - Long term strength development (for example 28 d, 90 d, 180 d)
    - Effect of water content of sediment on strength
  - Water permeability of stabilised sediment
- Environmental investigations are:
  - Analysis of contaminants of sediment
  - Determination of leaching of contaminants by modified diffusion test

# Quality Control during Stabilisation / Technical Investigations

- Field tests:
  - Water content of the dredged sediment  $\Rightarrow$  to adjust the amount of binders needed to get desired strength to stabilised material
  - Measuring of binder amount of mixed sludge by Niton XRF – analyser
  - Determination of mixing efficiency of the stabilisation equipment (= homogeneity of the mixed mass) by measuring Ca-content of samples by Niton XRF-analyser
- Laboratory tests:
  - Measuring of binder amount of mixed sludge by titration
  - 1-axial compression strength
  - Water permeability

# Quality Control during Stabilisation / Environmental Investigations

- The environmental investigations depend on the commands in environmental permit. Investigations can be as follows:
  - Analysis of contaminants of the dredged sediment
  - Analysis of TBT content of water samples from end placement basin during and after stabilisation
  - Analysis of TBT content of sediment taken from the water area close to the end placement basin before, during and after stabilisation
  - Leaching tests on the stabilised mass taken from end placement basin
  - Determination of visibility depth of the water in the end placement basin before and during stabilisation

# Long Term Quality Control Investigations

- Determination of technical parameters from stabilised structure such as:
  - Compression strength
  - Water permeability

## Further Information



- [www.terramare.fi](http://www.terramare.fi) EU-LIFE
- Life Environment project STABLE is funded by Life financial instrument of the European Community