Introduction: Presentation of results achieved using INVOQUE®T, a unique mineral- based performance-dewatering system.

Within the marine and civil engineering sectors, excavated and extracted materials may include fine materials, drilling muds and other hard-to-dewater materials that need to be selectively separated for economic disposal and/or reuse.

INVOQUE®T is an innovative, high-performance system and an exceptional fit for dewatering hard-to-treat and fine sediments in a variety of industrial settings, across a wide pH, salinity and particle size range, contributing to improved economic, environmental and sustainability benefits for users.

The METHA II plant at Hamburg Port Authority AöR (HPA), has qualified a zero CMR, zero SHVC, environmentally-friendly conditioning solution for harbour silt dewatering for the first time. The results from various large-scale experiments, performed in conjunction with CUTC Institut GmbH, Clausthal-Zellerfeld, showed several advantages compared to other treatment concepts, which can improve both technical operations and the circularity of the recovered resources.

Methods:
(2015) Preliminary experiments with a mobile test system to optimise the dosage, and planning in preparation for a large-scale experiment.
(2016) Large-scale experiment using a 3-component mineral-based process:
→ Omyased / Promoter + Starch KCG 750

Results:
In a large-scale experiment conducted in the METHA II plant during spring 2016 around 1,000 t of dewatered harbour silt was generated over a period of around 2 weeks, using a mineral-based, acrylamide-free flocculation process for conditioning and thickening. After thickening, a membrane chamber filter press (MCFP) was used for dewatering, achieving the following results:
- Good pre-thickening of the harbour silt
- 15 - 20% higher solids
- Approx. 20% higher shear strength

A number of improvements were noted in relation to the operation of the MCFP:
- Batch throughput up to 25% higher
- Shorter cycle time
- Longer cleaning intervals of the filter cloths
- Increased plant availability
- Low staffing requirements at the plant

Discussion:
Based on improvements in the physical properties of the soil (e.g. residual humidity, coefficient of permeability (cf value) for the sealing materials (<5.0 x 10^-10 m/s)), the INVOQUET® technology allows the fine material to be re-used, increasing the circularity of the material and reducing the need for land-build disposal. Options and various applications for the reuse of the material needs to be assessed and discussed with operators.