

Dredged Materials in DiKE Construction

Implementation in the South Baltic Region using Geosynthetics and Soil Improvement

Editorial

This is the fifth newsletter of the DredgDikes project. The year of 2013 has been very busy with field testing and dissemination activities. The project has been prolonged by one year until the end of 2014. Also, the planning and procurement for the pilot dike construction has been finalised and a construction company has been contracted. The planning for both project conferences in Spring 2014 is well on the way and a considerable number of interesting contributions could be gathered to make these events an important discussion and information panel for questions associated with dredged materials in dike construction and beyond. Detailed information about all activities can be found on the project web site www.dredgdikes.eu.

Two DredgDikes Conferences to be held in spring 2014

South Baltic Conference on Dredged Materials in DiKE Construction

In *Rostock* the conference with strong focus on dredged materials to be used in geotechnical applications, particularly dike constructions, will be held *10-11 April 2014* in the Yachthafen Residenz Hohe Düne, directly at the seaside and very close the Rostock test dike facility. The call for papers closed in October and 25 contributions were selected to be presented at the conference. The second bulletin with all necessary information on the conference, the venue, registration, travel and accommodation can be found on the project website. *Registration is now open*. An online registration tool is available on the website www.dredgdikesconf.auf.uni-rostock.de.

South Baltic Conference on New Technologies and Recent Developments in Flood Protection

In *Gdansk* the conference with a wider focus on modern flood protection technologies, including the use of dredged materials and CCP composite materials in dike constructions, will be held *5-6 June 2014* at Gdansk University of Technology. In the first bulletin including the call for papers all necessary information can be found. The *call for papers has been prolonged until 15 January 2014*.

Both conferences are designed to inform researchers, planners, authorities and state agencies, companies and the public about the findings of the DredgDikes project as well as associated research and development projects. Therefore, there will be *simultaneous translation* on both conferences to give the local people the possibility to follow the presentations, which will be held in English.



Field Experiments at the Rostock Test Dike Show Positive Results

Between April and September 2013 a large number of field experiments have been performed at the Rostock test dike. The series of experiments was started with several fillings of the polders to analyse the seepage behaviour of the different dike cross-sections. Each polder has been filled three times for this investigation so far. Data evaluation is presently performed and the first results will be presented on the project conferences 2014.



Fig. 1: Filling test at German research dike - spring 2013

During September overflowing experiments have been performed on seven slopes of different dike sections. For the experiments a flexible flume system of three parallel flumes with a width of 60 cm each was installed on the slopes. The maximum loading per flume was: $Q_{\max} = 230 \text{ l/(s*m)}$, $H_{\max} = 8 \text{ cm}$, $\tau_{\max} = 250 \text{ N/m}^2$ and $v_{\max} = 3,6 \text{ m/s}$. The data is being analysed in the frame of a Master's thesis which will be available in March 2013.

New Aspects: Geotechnical Characterisation of the Rostock Dredged Materials

During the first investigation period in 2011 problems in determining the geotechnical parameters with standard methods occurred. Therefore, a new set of tests was performed with new and adapted analysis methods, particularly regarding the plasticity (Atterberg), compaction parameters and water permeability. Also, investigations on the oedometer parameters, the composition of the organic structure and a mineralogical analysis are currently on the way.

The small scaling of some laboratory tests and the inhomogeneities of the original dredged materials was problematic in the first set of investigations. Therefore the materials were now homogenized both with a garden tilling machine and a paddle mixer, to receive a fine-crumbled, homogeneous material for further laboratory analysis.

Initially, the water permeability had been determined using a standard saturation method at approximately 50 kPa saturation pressure which lead to compression of some samples when applying the pressure steps too quickly and when too large steps were chosen. Thus a slow saturation procedure with pressure control (so-called B-test) was applied in a second test series to receive more reliable results.

Proctor test results (optimal water content and compaction) were determined using different drying modes which are all allowed by German and international standards. Considerable differences between the results were noticed.

During the construction of the research dike the degree of compaction was controlled regarding different installation technologies. The results are now available and will be published shortly.

More information about the geotechnical characterisation of the Rostock dredged materials will be available in the download section of the project website shortly.



Experiments at the Gdansk Test Dike Show Good Performance of Soil-Ash Composites

The summer and autumn of 2013 were very busy on the Polish test dike. Two scenarios of flood wave have been simulated in three repetitions, totaling in six experiments. The first scenario simulated a one-week flood wave with about 48-hours culmination in three repetitions. The second experiment was devoted to investigate a long, flat flood wave during a period of two weeks.



Fig. 2: Filling test at Polish research dike - summer 2013

Fortunately, due to the use of the soil-ash composite, no problems were encountered regarding damages caused by rodents or other animals. All data obtained from the experiments are used to calibrate an unsaturated numerical model of the dike. Also, environmental control was performed during the last experiments: samples of water flowing through the dike body were taken to verify the heavy metal content and organic pollutions in the seepage water; the samples are being processed in the laboratory now.

The Construction of the Pilot Dike Started in December 2013

The construction of the pilot dike construction at the Körkwitzer Bach near Ribnitz-Damgarten, 30 km North-East of Rostock, finally started in December 2013. The construction is planned to be finished by the end of February 2014, depending on the weather conditions. The pilot dike will be instrumented with wires for electronic deformation analysis (during the construction time) as well as tensiometers and



Fig. 3: Constructing the dike core on a woven reinforcement geotextile

piezometers for seepage analysis (post construction). The data will be transferred via GSM to the database at Rostock University.

After completion of the pilot dike construction a monitoring plan will be developed which will be followed for at least 5 years. The issues to be addressed are flood and seepage correlations, turf development on the dike surface, damage monitoring with respect to cracking, voles and other animals, and deformation analysis.



DredgDikes Links to Three Other INTERREG Projects

The DredgDikes project actively seeks to link to other INTERREG projects working on the use of dredged materials. Therefore, two presentations were given on the Setarms (Sustainable Environmental Treatment and Reuse of Marine Sediment) conference in April 2013 where many contacts could be made with Western European research groups and stakeholders dealing with similar problems.

There have been several links to the SMOCS project (Sustainable Management of Contaminated Sediments) already. SMOCS was a project funded in the Baltic Sea Region Programme until the End of 2012 with partners from Sweden, Finland, Poland, Lithuania and Germany. In SMOCS a guideline was developed from which DredgDikes could already benefit. Recent contacts to SMOCS and Setarms include discussions on conferences as well as the involvement of Göran Holm and Dr. Mohamed Boutouil in the scientific committee of the DredgDikes conference in Rostock.

On the World Dredging Congress WODCON XX in June 2013 a close connection was started to the PRISMA pro-

ject (Promoting Integrated Sediment Management) with partners from France, Belgium, Netherlands and the UK. This led to a visit of the PRISMA partners in Rostock and Gdansk to see the research dike constructions and discuss interesting issues of both projects, and just recently a delegation from Gdansk participated in a project meeting and site visit in the Norfolk and Suffolk Broads, which was organised by the Broads Authority, one of the PRISMA partners. All three projects submitted contributions to the DredgDikes conferences.

5th DredgDikes Steering Group Meeting and Workshop in Rostock

On December 17 and 18 the fifth steering group meeting and workshop was organised in the Penta Hotel in Rostock. More than 20 participants from DredgDikes partners and associated organisations actively contributed to the discussions. Two group workshops were organised to discuss the results of this year's experiments, further test scheduling for 2014 and the drafts of chapters for the best practice guideline.



Imprint

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