

www.dredgdikes.eu

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Dredged Materials in Dike Construction

Implementation in the South Baltic Region using Geosynthetics and Soil Improvement

Editorial

This is the first newsletter of the DredgDikes project. DredgDikes stands for the application of dredged materials in dike construction including the use of geosynthetics and soil improvement technologies. DredgDikes is a South Baltic Cross-border Co-operation project, funded by the EU. Coordinated by the chair of Geotechnics and Coastal Engineering at the University of Rostock, Germany, it incorporates five eligible partners from Germany and Poland, namely the Technical University of Gdansk, the water and soil association "Untere Warnow – Küste", the Hanseatic City of Rostock and the Steinbeis Innovation gGmbH, as well as 15 associated organisations from Poland, Lithuania, Germany and Latvia. Within 40 months large scale test dikes will be built and analysed, a pilot dike construction will be built and a guideline on the application of dredged materials in dike construction will be produced and distributed throughout the South Baltic region. Detailed information about all activities may be found on the project website www.dredgdikes.eu.



Project Kick-off

The DredgDikes kick-off workshop took place at the University of Rostock, 13-14 January 2011. The 25 participants from both partners and associated organisations were introduced and the general outline of the project was presented. Different workshops about the DredgDikes project and financial management ensured an immediate project start for all partners. Vigorous discussions between all participants during the breaks showed the importance of the project for all participants. The first official monitoring and steering group meetings were held during the kick-off workshop, introducing and fixing the responsibilities of the different supervisory bodies. The tasks for the first half of 2011 were agreed, which contained the setup of management and communication structures, the planning of the test dikes and a variety of laboratory investigations.

2nd Steering Group Meeting

The 2nd steering group meeting was held at Gdansk Technical University, 6-7 November 2011. The partners' activities so far were presented and discussed and a general work plan for the first half of 2012 was established. The next meeting of both the steering group and the monitoring group was scheduled to be held in Rostock in April 2012.





The German Test Dike

The German test dike will be realised on the spoil field "Radelsee" in Markgrafenheide near Rostock. The spoil field is operated by the city of Rostock (project partner 4). There are plenty of different dredged materials on ripening fields to be used in the dike construction and there is enough water in close proximity to realise seepage and overflowing experiments. The planning of the test dike was finished in May 2011 to meet the procurement requirements for a construction start in August 2011. To determine the characteristics of the different dredged materials to be used in the construction over 250 laboratory tests have been performed at Rostock University. The subgrade was investigated also. To ensure a successful turf development on the dike surface, seeding tests were performed by partner 5, using a standard dike seeding mixture with some legume seeds added, which showed very good results.



After a successful procurement the construction works for the Rostock test dike was planned to be 8 August 2011. Due to very heavy rainfalls in Rostock during this summer (more than 300 % of the average rainfall in this period) both the subgrade and the dredged materials were too wet to start building. After two weeks of mostly dry and warm weather the construction works finally started on 22 August. The construction site was prepared, the measurement container placed, a meteorlogical station installed, and three of the four planned cross-dams to separate the construction into three polders could be built (see picture). After another two weeks of construction the weather became very unstable again and there was no stable weather in sight. For a number of reasons, especially because both the subgrade and the dredged materials were still too wet to build a high quality research dike, the construction has been postponed to spring 2012. The dams constructed so far are now under investigation.

In 2012 the test dike will be instrumented with moiture sensors, tensiometers, seepage collectors, piezometers and an extensive data logging system to record moisture penetration and seepage for a period of at least 7 years. The first seepage tests are planned to be performed in the second half of 2012 after a sufficient development of the vegetation cover.



BredgDikes

The Polish Test Dike

Afull scale section of a dike with a dredged non-cohesive soil-coal ash compound body is planned to be investigated in Poland. The 4-meter wide test segment of the 24-meter long dike will be separated by sheet pile walls to obtain 2D plane conditions for seepage and overtopping with a controlled water level. The cross section of the test dike is shown in figure 1. Both slopes have inclination of 1:2 and the dike is 3.0 m high with a 3.0 m wide crest. To focus the attention on the seepage witin the dike, its bottom will be isolated from the permeable ground by 0,5 m thick clay liner. A high-water level of 2.5 m is planned to be maintained until the steady flow within the dike body is achieved. The instrumentation designed to control the development of percolation through the dike body consists of 4 piezometers and 24 moisture sensors. Additionally, sampling and laboratory testing of the physical and mechanical parameters of the applied sand-ash mixture are planned to be carried out during the test.



Currently, the details of the dike body structure are investigated. First, the proportions of the dredged sands, fly and fluidal ashes are studied in the laboratory to obtain the mixture with optimal properties for the dike. This is mainly focused on the seepage and mechanical properties of the mixture. Second, the technological aspects of the earth works during the construction of the dike are considered to make the designed structure feasible and easy to build.

The test site will be located in Wiślinka/Trzcińsko on the bank of Vistula River ca. 20 km away from the City of Gdańsk. The construction works are planned to start in the spring of 2012.

The ground under the test dike was extensively explored with the use of CPTU penetrometer. Under a shallow sandy crust, some fine grained soft deposits interbedded by sandy layers are probed. Due to good drainage conditions the consolidation of the soft deposits under additional loading is quite fast and it occurs almost entirely during the earth works. Additionally, appeared settlement are uniform what constitues a stable ground conditions.





The Pilot Dike

The pilot dike will be built at the stream "Körkwitzer Bach" near Ribnitz-Damgarten, 30 km North-East of Rostock. Approximately 450 m of an already planned dike reconstruction will be used to apply the new solutions investigated in the project. The planning for the pilot dike was officially started in October 2011. While the project partners all contribute to the setup of the pilot dike, a planning company will prepare the official planning documents for procurement and building permission. The planning has been scheduled in such a way that it will be possible to start the construction in Autumn 2012. The Water and Soil Association "Untere Warnow - Küste" is responsible for the realisation of the pilot investment.



Communication and Dissemination Activities

A variety of communication and dissemination activities have already been performed. Several press articles have been released both in regional press and professional journals. The first journal articles have been prepared describing the general setup of the project and the first outcomes of laboratory work. The project will be present at the South Baltic Programme Annual Conference in Schwerin, 28-29 November 2011. During the 12th Baltic Sea Geotechnical Conference in Rostock in May 2012 the project will be presented by means of a presentation and paper, as well as possible excursions to the German project sites. In September 2012 the 7th Dredged Materials Seminar (the German biennial conference on dredged materials organised by project partner P5 - Department of Applied Landscape Planning), will take place in Rostock, where the project will also be presented. An official conference excursion will be organised to the Rostock test dike. New project flyers and giveaways have been produced and the first promotion visits within the programme area have been planned to extend the network for the topic of dredged materials in dike construction.

Imprint

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