ICCE 2010

Shanghai, China

June 30 - July 5, 2010

32nd International Conference on Coastal Engineering

Book of Abstracts

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The 32nd International Conference on Coastal Engineering (ICCE 2010)

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32nd International Conference on Coastal Engineering
June 30 --- July 5, 2010, Shanghai, China

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Foreword

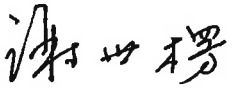
The 32nd International Conference on Coastal Engineering (ICCE 2010), which will be convened on June 30 to July 5, 2010, in Shanghai, is the first of its kind ever held in the mainland of China. Delegates from 46 countries will gather in this great event.

A total of 725 papers were submitted. After review jointly by Technical Paper Review Committee (TPRC), Coastal Engineering Research Council (CERC) and the Local Organizing Committee (LOC) of ICCE 2010, the abstracts-in-depth of 436 papers and 55 posters have been selected for inclusion in this Book of Abstracts.

With the rapid development of science and technology in recent years, much progress has been made in the basic theory, computational methodology and data processing approaches in coastal engineering studies; the understanding of various physical phenomena in coasts and seas has been deepened; and the relationship among various disciplines has become much closer. The accepted papers and posters cover the science and technology relating to planning, design, management and construction for coastal protection, estuary training and port engineering, including topics on wave; swash, nearshore currents and long waves; coastal management, risk and environmental restoration; sediment transport and morphology; and coastal structure. Interdisciplinary topics, covering more than three sub-disciplines, number quite a few, leading to the understanding that scientists of today and in the future need a more comprehensive and integrated ability to handle various problems. This conference will surely help to broaden the vision of coastal researchers and engineers, trigger new approaches and concepts, and promote the development of coastal engineering studies, which is the very goal of ICCE conferences.

We wish to express our sincere thanks to the organizer and hosting institutions of ICCE 2010 for their hard work to ensure the success of the conference; thanks also to the sponsoring and supporting institutions and exhibitors for their strong support of and active participation in the conference. We believe that delegates from all over the world will enjoy their participation in ICCE 2010 both academically and culturally.

May ICCE 2010 be a great success!



Xie Shileng
Chairman, LOC
ICCE 2010

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Paper No. 243

GEOTECHNICAL DESIGN OF A BREAKWATER IN OSTEND (BELGIUM) ON VERY SOFT SOIL

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INTRODUCTION

Ostend, a city situated in the middle of the Belgian coastline, plays an important role in the Southern North Sea, although its relatively small harbour. To make the port accessible for ships of 200m, the harbour entrance will be reoriented and 2 new breakwaters are constructed on both sides of the access channel. These works started in 2007 (Verhaeghe et al, 2009)

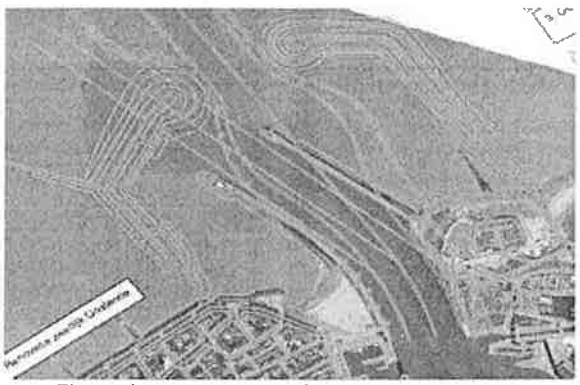

Figure 1 - reorientation of the harbour entrance

At the location where the western breakwater will be built, dredging works had been carried out in the past to maintain the old access channel and meanwhile to win "clean" sand for e.g. building purposes These works were carried out with suction dredgers, creating a pit in the sea bottom. Due to natural sedimentation, these holes got filled up with soft sediments in the subsequent years, causing a very heterogeneous soft soil of 8 to 10m thick at the location of the western breakwater.

The presence of this soft layer imposes stringent requirements on the construction phases. A long consolidation time between different construction phases is wanted, but this is in contrast with the urgent need for an improved harbor access. The actual design steps will be described here.

GEOTECHNICAL DESIGN

To tackle the problem two alternatives are considered: dredging the soft soil and replace it by sand, or building on existing layers taking into account long consolidation periods. The latter alternative is chosen, and a full study was carried out.

In a first step, a detailed study of the slope stability analysis in fully consolidated situation was performed. In a second step, the possibility to build the breakwater section in 3 phases was studied. For each phase a detailed analysis of the consolidation process was performed. To avoid unacceptable long consolidation periods, it was opted for using a strong geotextile working as reinforcement of the cross-section. The geotextile is placed underneath the core of the breakwater.

Calculations of the necessary characteristics (tensile strength, strain, ...) of this geotextile are performed with 2 software codes: Geo-Slope and Plaxis, for both temporary construction phases and the final geometry.

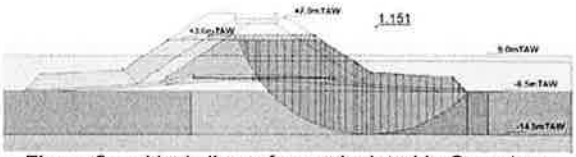

Figure 2 - critical slip surface calculated in Geo-slope.

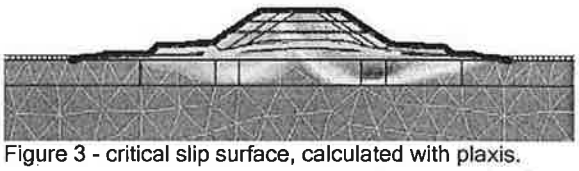

Figure 3 - critical slip surface, calculated with plaxis.

OUTCOME

In the presentation, the phased construction and the relying consolidation analysis will be described in detail. It can be concluded that the combination of Geo-Slope and Plaxis was a good choice for a best-estimate of the deformations in the dam and the tensile forces in the geotextile. The final design resulted in the use of a geotextile with a nominal tensile strength of 1600kN (Stabilenka, polyester) to deal with the soft layer underneath the breakwater.

The settlements under the breakwater are expected to be about 1.00m.

REFERENCES

Verhaeghe, H., Van Damme, L., Goemaere, J., De Rouck, J., Van Alboom, W., (2009): Construction of two new breakwaters at Ostend leading to an improved harbour access, abstract submitted for ICCE2010.