



# **ICCE 2010**

**Shanghai, China**

**June 30 - July 5, 2010**

**32<sup>nd</sup> International Conference on Coastal Engineering**

**Book of Abstracts**

# **Book of Abstracts**

**The 32<sup>nd</sup> International Conference on  
Coastal Engineering (ICCE 2010)**

June 30 --- July 5, 2010

Shanghai, China

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**32<sup>nd</sup> International Conference on Coastal Engineering  
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## Foreword

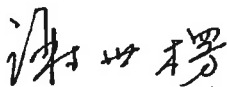
The 32<sup>nd</sup> International Conference on Coastal Engineering (ICCE 2010), which will be convened on June 30 to July 5, 2010, in Shanghai, is the first of its kind ever held in the mainland of China. Delegates from 46 countries will gather in this great event.

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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## EXPERIMENTAL RESEARCH ON PORE PRESSURE ATTENUATION IN RUBBLE MOUND BREAKWATERS

Dieter Vanneste, Peter Troch

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### INTRODUCTION

When studying the structural response of rubble mound breakwaters to wave loading, the knowledge on pore pressures and related wave attenuation inside the porous structure is important as the pore pressures affect most responses. Moreover, the pore pressure attenuation in the core provides valuable information for the scaling of small scale hydraulic models.

### PORE PRESSURE MEASUREMENTS

In this research, the pore pressure attenuation is analysed by performing pore pressure measurements at several locations within the body of a conventional breakwater, modelled at scale 1:30 in the wave flume of Ghent University (30x1.0x1.2m). The scale model tests have been designed to compare the pore pressure distribution and wave-structure interaction with numerical simulations of the same test setup. To model the porous flow resistance, the Forchheimer equation is used, which requires the knowledge of the shape factors corresponding to the porous material with specific properties, ie. porosity, mean diameter, grading, shape class. A review was carried out of the different factors which have been experimentally determined in permeameter flow tests by various researchers. Care is taken that the flow conditions, determined by a specific range of the Reynolds number, correspond to the flow conditions occurring in the permeameter tests.

### RESULTS

The pressure drop through the armour and filter layer is represented by the dimensionless reference pressure, ie. the ratio between the dynamic pressure height oscillation  $p_{0,s}/\rho g$ , measured at the interface between filter layer and core, and the incident wave height  $H_s$ . The reference pressures from large-scale model tests in GWK (Oumeraci and Partensky, 1990) showed a weak dependence on the wave steepness  $s_p$  and distance ( $y$ ) of the pressure sensor under SWL, see Fig. 1a. For practical use, Burcharth et al. (1999) proposed a constant value for the reference pressure equal to 0.55, assuming a constant value along the interface between filter layer and core. Close to the SWL ( $y/H_s < 1$ ), the pressures are affected by turbulence and the proposed practical value is not valid. The present tests (Fig. 1b) show a stronger correlation between the reference pressures and the wave steepness. In particular, the wave period appears to have a dominating influence on the reference pressure, rather than the wave height. If tests of equal wave steepness but different wave period are compared, a relatively large difference between reference pressures is observed, with the lowest reference pressures corresponding to the smallest wave period.

From Fig. 1b it is observed that the reference pressure exceeds the proposed value of 0.55, especially in the case of small values of wave steepness ( $s_p < 0.03$ ). A reference pressure larger than unity suggests that the reference pressure is highly influenced by wave run-up. A first preliminary comparison with results from numerical simulations using the same test setup confirms this hypothesis and suggests that scale effects play a significant role. The dissimilarity regarding air entrainment (turbulent flow dissipation) and the amplitude of viscous forces affects the energy dissipation through the armour and filter layer, leading to a significant difference in reference pressure for the different scale models.

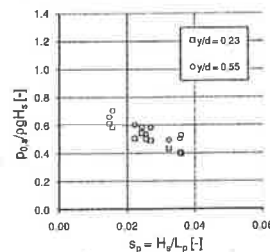


Fig. 1a : GWK data

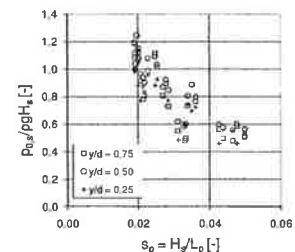


Fig. 1b : present tests

The dynamic pressure height oscillation in the core decreases exponentially along the direction of wave propagation. The empirical formula for the damping coefficient (Burcharth et al., 1999) was validated using the present tests. However, from the tests it was observed that the damping factor shows a weak correlation with the incident wave height  $H_s$ . A linear regression analysis without  $H_s$  in the dimensionless predictor results in a better fitting of the damping coefficient. A reanalysis of the GWK data (Oumeraci et al., 1990) confirmed the obtained value of the regression coefficient. More details of the presented results will be provided in the paper.

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