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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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

Contents

Session Summary
ICCE 2010

Date	Conference Room A	Conference Room B	Conference Room C	Conference Room D	Conference Room E
July 1	A1 Tropical Cyclone Waves A2 Wave Modeling I A3 Long Waves	B1 Estuary Dynamics I B2 Estuary Dynamics II B3 Coastal Hydrodynamics	C1 Overtopping I C2 Overtopping II C3 Overtopping III	D1 Sediment Transport I D2 Sediment Transport II D3 Sediment Transport III	E1 Tsunamis I E2 Tsunamis II E3 Numerical Modeling
July 2	A4 Wave Modeling II A5 Storm Surge I A6 Wave Modeling III A7 Storm Surge II	B4 Estuary Environment and Management B5 Estuary Morphology I B6 Coastal Protection I B7 Estuary Morphology II	C4 Wave Impacts C5 Wave-Structure Interaction I C6 Wave-Structure Interaction II C7 Wave-Structure Interaction III	D4 Sediment Transport IV D5 Beach and Dune Evolution I D6 Beach and Dune Evolution II D7 Sediment Transport Modeling	E4 Tsunami Risk E5 Tsunamis III E6 Monitoring and Measurements I E7 Sea Level Rise and Climate Change
July 3	A8 Storm Surge III A9 Wave Propagation I	B8 Coastal Protection II B9 Coastal Protection III	C8 Wave-Structure Interaction IV C9 Wave-Structure Interaction V	D8 Beach and Dune Evolution III D9 Beach and Dune Evolution IV	E8 Storm Disasters E9 Flood Risk
July 4	A10 Wave Propagation II A11 Wave Analysis I A12 Wave Analysis II A13 Wave Attenuation	B10 Coastal Protection IV B11 Beach and Coastal Evolution I B12 Beach and Coastal Evolution II B13 Beach and Coastal Evolution III	C10 Waves in Harbors C11 Wave Runup C12 Breakwater Stability C13 Breakwater Design	D10 Morphodynamics I D11 Morphodynamic Modeling I D12 Morphodynamics II D13 Wave Boundary Layers	E10 Monitoring and Measuring Devices E11 Monitoring and Measurements II E12 Nourishment Performance I E13 Nourishment Performance II
July 5	A14 Wave Breaking A15 Wind-Generated Wave A16 Wave-Current Interaction A17 Extreme Waves and Wave Groups	B14 Beach and Coastal Evolution IV B15 Surf Zone Dynamics B16 Rip Currents and Sea Level B17 Waves and Structures	C14 Loading of Structures C15 Armor Units I C16 Armor Units II C17 Submerged Structures	D14 Morphodynamic Modeling II D15 Sedimentation D16 Local Scour D17 Harbors and Channels	E14 Water Quality E15 Harbor Management E16 Coastal Management E17 Wave Energy Converters

15 Variability in Long-Wave Runup as A Function of Nearshore Bathymetric Features
Lauren M. Dunkin, Jennifer L. Irish

A4 Wave Modelling Ⅱ

Chairperson: Per Madsen

16 GPU-Accelerated SPH Model for Water Waves and Other Free Surface Flows
Robert A. Dalrymple, Alexis Hérault, Giuseppe Bilotta

17 SPH Modelling of Permeable Flow and Caisson Breakwater Movements
Benedict D. Rogers, Robert A. Dalrymple, Peter K. Stansby

18 Modelling Water Entry of A Wedge by Multiphase SPH Method
Kai Gong, Hua Liu

19 Volume-of-Fluid Model Comflow Applied in Wave Impact Studies
Ivo Wenneker, Bas Hofland

21 Numerical Simulations of Spilling Breaking Waves
Pierre Lubin, Stéphane Glockner, Olivier Kimmoun, Hubert Branger

A5 Storm Surge Ⅰ

Chairperson: Qin Chen

22 Long-Term Rise of Storminess near Poland: Possible Origin and Consequences
Grzegorz Różyński, Zbigniew Pruszak

23 Validation of Vulnerability Assessment to Storms at the Catalan Coast (NW Mediterranean) during the Last 50 Years
José A. Jiménez, Amanda Sancho, Eva Bosom, Herminia Valdemoro, Jorge Guillén, Jordi Galofré

24 Vulnerability to Coastal Flooding Induced by Tropical Cyclones
Gregorio Posada-Vanegas, Gerardo Durán-Valdez, Rodolfo Silva-Casarín, Maria Elena Maya Magaña, Jose Antonio Salinas-Prieto

25 Application of the Regional Frequency Analysis to the Estimation of Extreme Storm Surges
Pietro Bernardara, Marc Andreewsky, Michel Benoit

A6 Wave Modeling Ⅲ

Chairperson: Qingping Zou

26 Global Error Control and CPU-Time Minimization in Deterministic Wave Models Exemplified by A Fast Convolution-Type Model
Hemming A. Schäffer

27 A Fully Nonlinear Boussinesq Model for Water Wave Propagation
Hong-sheng Zhang, Hua-wei Zhou, Guang-wen Hong, Jian-min Yang

28 Green-Naghdi Modelling of Wave Transformation, Breaking and Runup, Using A High Order Finite-Volume Finite-Difference Scheme
Marion Tissier, Philippe Bonneton, Fabien Marche, Florent Chazel, David Lannes

29 Numerical Computation of Infragravity Wave Dynamics and Velocity Profiles Using A Fully Nonlinear Boussinesq Model
Rodrigo Cienfuegos, Leonardo Duarte, Leandro Suárez, Patricio Catalán

30 Valida tion of A Double-Layer Boussinesq-Type Model for Highly Nonlinear and Dispersive Waves
Florent Chazel, Michel Benoit, Alexandre Ern

31 Boussinesq Modelling of Wave Propagation, Breaking, Runup and Overtopping
Jana Orszaghova, Alistair G. L. Borthwick, Paul H. Taylor

A7 Storm Surge II
Chairperson: Nicole von Lieberman

32 Rapid Probabilistic Hurricane Surge and Damage Forecasting Using Surge Response Functions
Jennifer L. Irish, Ikpoto Udoh, Celso Ferreira, Francisco Olivera, Youn Kyung Song, Kuang-An Chang

33 The Numerical Simulation of Storm-Surge and Coastal Inundation of 2007 Typhoon Sepat
Yu-Hsien Lin, Hwung-Hweng Hwung, Ming-Chung Fang, Ray-Yeng Yang

34 Storm Surge in Seto Inland Sea with Consideration of the Impacts of Wave Breaking on Surface Currents
Han Soo Lee, Takao Yamashita, Tomoaki Komaguchi, Toyoaki Mishima

35 Uncertainty of Extreme Storm Surge Estimation by High Wind Sea Surface Drag Coefficient and Future Typhoon Change
Hiroyasu Kawai, Noriaki Hashimoto, Masaru Yamashiro, Tomohiro Yasuda

36 A Coastal Storms Intensity Scale and Induced Coastal Hazards for the NW Mediterranean
E.Tonatiuh Mendoza, José A. Jiménez, Agustin Sánchez-Arcilla, Paulo Salles Afonso de Almeida, Carlos Peña

37 A Multivariate Statistical Model for Advanced Storm Surge Analyses in the North Sea
Thomas Wahl, Jürgen Jensen, Christoph Mudersbach

A8 Storm Surge III
Chairperson: Takashi Tomita

38 Forecasting Storm Surge in Coastal Mississippi -- A Data Mining Approach
Himangshu S. Das, Hoonshin Jung, Bruce Ebersole, Ty Wamsley, Robert Whalin

39 Prediction of Storm Surge Intensity in Coastal Disaster Evaluation
Sheng Dong, Qiaoling Ji

40 Investigation of Wave Induced Storm Surge within A Large Coastal Embayment – Moreton Bay (Australia)
Philip Treloar, David Taylor, Paul Prenzler

41 An Advanced Statistical Extreme Value Model for Evaluating Storm Surge Heights Considering Systematic Records and Climate Scenarios
Christoph Mudersbach, Jürgen Jensen

42 A Real-Time Storm Surge Prediction and Visualization System
Keqi Zhang, Yuepeng Li, Jian Shen

43 Stochastic Typhoon Model and Its Application to Future Typhoon Projection
Tomohiro Yasuda, Hajime Mase, Shoji Kunitomi, Nobuhito Mori, Yuta Hayashi

A9 Wave Propagation Ⅰ

Chairperson: Guohai Dong

44 Application of A Parametric Wave Transformation Model on A Coral Reef
Shih-Feng Su, Alex Sheremet, Jane McKee Smith

45 Experimental and Numerical Studies on Wave Transformation over Artificial Reefs
Shan-Hwei Ou, Tai-Wen Hsu, Jian-Feng Lin, Jian-Wu Lai, Shih-Hsiang Lin, Chen-Chen Chang, Yuan-Jyh Lan

46 Oblique Wave Transmission through Rough Impermeable Rubble Mound Submerged Breakwaters
Valérie Vanlishout, Henk Jan Verhagen, Peter Troch

47 Using the Rasinterfoam CFD Model for Wave Transformation and Coastal Modelling
Gerald C J Morgan, Jun Zang, Deborah Greaves, Andrew Heath, Chris D Whitlow, John R Young

48 Numerical Analyses on Propagation of Nonlinear Internal Waves
Kei Yamashita, Taro Kakinuma, Keisuke Nakayama

49 Wave-Flume Experiments of Dissipating Waves on Soft Mud
Mohsen Soltanpour, Farzin Samsami

A10 Wave Propagation Ⅱ

Chairperson: Alex Sheremet

50 Experimental and Numerical Studies on Wave Propagation over Coarse Grained Sloping Beach
Jian-Wu Lai, Tai-Wen Hsu, Yuan-Jyh Lan

51 Practical Application of A Jacket Type Breakwater with A Water Cahmber to the Fishing Port
Takayuki Nakamura, Thoru Kouno

52 A Numerical Model for Wave Propagation over Muddy Slope
Xiaojing Niu, Xiping Yu

53 Wave Transformation and Wave-Driven Circulation on Natural Reefs under Extreme Hurricane Conditions
Ismael Mariño-Tapia, Rodolfo Silva-Casarín, Cecilia Enriquez-Ortiz, Edgar Mendoza-Baldwin, Edgar Escalante Mancera, Francisco Ruiz-Rentería

54 Experimental Research on Coefficient of Wave Transmission through Immersed Vertical Barrier of Open-Type Breakwater
Liehong Ju, Peng Li, Jihua Yang

A11 Wave Analysis Ⅰ

Chairperson: Andre van der Westhuysen

55 New Conundrums in Extreme Wave Climate Analysis
Fernando J. Mendez, Inigo J. Losada, Roberto Minguez, Melisa Menendez, Borja G. Reguero, Cristina Izaguirre, Paula Camus

56 Statistical Equivalence of Wave Systems from Hindcast and Observations
Layla Loffredo, Clive Anderson, Jaak Monbaliu

57 Evaluation of Wave Climate Schematization Methodologies for Morphological Models over Engineering Time-Scales
Benedet, L., Dobrochinski, J, Klein, A.H.F., Walstra, D.J.R., Bonanata, R.

58 Spatial Variations of Ocean Surface Waves Measured by Terrasar-X and Nautical X-Band Marine Radar
Susanne Lehner, Xiao-Ming Li, Andrey Pleskachevsky, Miguel Bruck

A12 Wave Analysis II

Chairperson: Xiping Yu

59 Incorporation of Weibull Distribution in *L*-Moments Method for Regional Frequency Analysis of Peaks-over-Threshold Wave Heights
Yoshimi Goda, Masanobu Kudaka, Hiroyasu Kawai

60 Wave Height Distributions in Shallow Waters
Stephan Mai, Jens Wilhelmi, Ulrich Barjenbruch

61 Improved Determination of Directional Wave Spectrum for Swell Waves Using X-Band Radar Imaging
Jeseon Yoo, Dong-Young Lee, Ki-Chun Jun, Jong-Ju Yoon

62 Separation of Low-Frequency Waves by An Analytical Method
Yuxiang Ma, Guohai Dong, Xiaozhou Ma

63 Verification of A Modified Bayesian Method for Estimating Directional Wave Spectra from HF Radar
LUKIJANTO, Noriaki HASHIMOTO, Masaru YAMASHIRO

64 Applying Bivariate HHT to Horizontal Velocities of Multi-Directional Waves
Theo G. R. Moura, Claudio F. Neves, José Claudio F. Telles

A13 Wave Attenuation

Chairperson: James Houston

65 The Effectiveness of Mangroves in Attenuating Cyclone-Induced Waves
Siddharth Narayan, Tomohiro Suzuki, Marcel J.F. Stive, Henk Jan Verhagen, W.N.J. Ursem, Roshanka Ranasinghe

66 Effects of Coastal Vegetation Species and Ground Slope on Storm Surge Disaster Mitigation
Shamal Chandra Das, Kosuke Iimura, Norio Tanaka

68 Experimental Research on Pore Pressure Attenuation in Rubble Mound Breakwaters
Dieter Vanneste, Peter Troch

69 Attenuation of Waves by Surface Turbulence
Jose Beya, William Peirson, Michael Banner

70 Response of Posidonia Oceanica Plants to Wave Motion in Shallow-Waters - Preliminary Experimental Results
Luca Cavallaro, Carlo Lo Re, Giovanni Paratore, Antonino Viviano, Enrico Foti

Paper No. 68

EXPERIMENTAL RESEARCH ON PORE PRESSURE ATTENUATION IN RUBBLE MOUND BREAKWATERS

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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 Partenscky, 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.

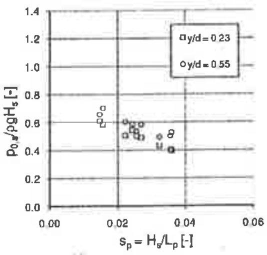

Fig. 1a : GWK data

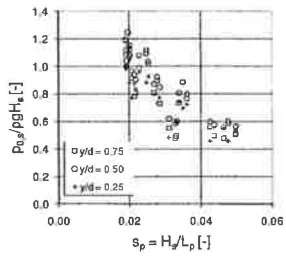

Fig. 1b : present tests

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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