

**18th Australasian Coastal and
Ocean Engineering Conference 2007
and the 11th Australasian Port and
Harbour Conference 2007**

(COASTS AND PORTS 2007)

**Melbourne, Australia
18-20 July 2007**

ISBN: 978-1-62276-428-0

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2007) by Engineers Australia
All rights reserved.

Printed by Curran Associates, Inc. (2012)

For permission requests, please contact Engineers Australia
at the address below.

Engineers Australia
Engineering House
11 National Circuit
Barton ACT 2600

Phone: +61 2 6270 6555
Fax: (02) 6273 1488

memberservices@engineersaustralia.org.au

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

KEYNOTE

Coasts and Ports	1
<i>Eric Van Den Eede</i>	

PORT PLANNING

Creating Tomorrows Opportunities Today	26
<i>Scott Keane, Murray Burling, John Schepis</i>	
Port of Hastings Land Use and Transport Strategy - Long Term Planning Challenges	32
<i>Lara Poloni, Ralph Kenyon</i>	
New Berths for Port Kembla Inner Harbour	33
<i>Michael Coull, Tonilee Andrews</i>	

NUMERICAL MODELING (PURE)

An Intermediate-field Model for Ocean Outfalls - A First Step	37
<i>Hong Wei Guo, Tony Webb</i>	
Wave Transformation Over Submerged Breakwaters/Reefs	43
<i>Mojtaba Tajziehchi, Ronald J. Cox</i>	
The Application of Artificial Neural Network Water Level Forecasts to Galveston Bay, Texas	49
<i>A. W. Garcia, J. P. Rhee</i>	

ENVIRONMENTAL MODELLING & STUDIES

Innovative Environmental Monitoring and Management Strategies: Port of Hay Point Capital Dredging Project	54
<i>Simona Trimarchi</i>	
Marine Renewable Energy Research in New Zealand: A Multi-scale Perspective of Resources and Impacts	67
<i>Craig Steven, Murray Smith, Richard Gorman, Stephane Popinet, Roy Walters</i>	
Appraisal of a One-dimensional Model, Field Data and Dimensionless Parameters in a Study of Estuarine Circulation	73
<i>Errol J. McLean, Jon B. Hinwood</i>	

CLIMATE CHANGE

Climate Change Impacts on NSW Coasts and Estuaries	80
<i>Roshanka Ranasinghe, Dougl Lord, David Hanslow, Kathleen McInnes</i>	
Projected Changes in Climatotological Forcing Conditions for Coastal Erosion in NSW	86
<i>Kethleen L. Melnnes, Ian Macadam, Deborah J. Abbs, Siobhan P. O'Farrell, Julian O'Grady, Roshanka Ranasinghe</i>	
Sea Level Rise, Coastal Recession and the Bruun Rule	93
<i>Roshanka Ranasinghe, Phil Watson, Doug Lord, David Hanslow, Peter Cowell</i>	
Climate Change Impact on Seabed Sediment Deposition in SW Region, Australia	99
<i>Fangjun Li, Cedric M. Griffiths, Pierre Weill, Chris P. Dyt, Peter Oka, Ming Feng, Kathlee McInnes</i>	
Impact of Sea Level Rise on Sediment Transport Capacity of Semidiurnal Tidal Regime Estuary	105
<i>Hamid Mirfenderesk, Rodger Tomlinson</i>	

NAVIGATION

Assessment of Shiphandling Difficulty for an Approach Channel of a Harbor	111
<i>Inyoung Gong, Yeongyu Kim, Younghun Kim, Segil Park, Namsun Kang</i>	
Vessel Interaction - A Case Study	117
<i>Peter O'Brien, Terry O'Brien, Chris Hens</i>	
Ship Underkeel Clearance Waves	123
<i>Tim Gonrley</i>	
Managing and Assessing Boat Wake Waves	129
<i>William C. Glamore, Alexandra M. Badenhop</i>	

PHYSICAL MODELLING

Dalrymple Bay Coal Terminal Causeway Extension	135
<i>Arne Nilsen, Gildas Colleter, Brett Miller, Judith Louys</i>	
Two-Dimensional Physical Modelling of Wavescreen Breakwaters	142
<i>Ian Coghlan, William Glamore, Ron Cox</i>	
Pressure on Slabs: Physical Modelling of Uplift Pressures and Overtopping on a Wharf, Koniambo New Caledonia	148
<i>Alessio, Brett Miller, Gildas Colleter</i>	
Stability and Design of Rubble Toe Protection for Vertical Seawalls	153
<i>Matthew Blacka, James Carley, Ronald Cox</i>	
Physical Modelling of Coastal Structures for Gorgon Project, Barrow Island, Western Australia	159
<i>James Carley, Mathew Blacka, Alessio Mariani, Stuart Bettington, John Dimock, Geoff Prior</i>	

COASTAL PLANNING

Use of Exceedance Curves for Defining MHWS and Future Sea-level Rise	165
<i>Robert G. Bell</i>	
A Lesson in Managing Political Will, Community Pressure and State Government Constraints at a Local Government Level - Toogoom Seawall Project	171
<i>S. Lawson, S. Hunt, J. Bunt, M. Waddell</i>	
Queensland Coastal Forum; Local Governments Looking After the Coast	177
<i>Shannon Hunt, Greg Stuart, Denis Shaw</i>	
Selection of Appropriate Hazard Levels for Coastal Hazards Mapping of Variable Shortline Types	182
<i>Richard A. Reinen-Hamill, Tom D. Shand</i>	

COASTAL STRUCTURES

Shoreline Response to an Offshore Wave Screen, Blairgowrie Safe Boat Harbour, Victoria Australia	189
<i>Thomas R. Atkins, Gregory J. Morris, Adam R. Bartle</i>	
Transferring Design Strategies from Model to Prototype Darwin Waterfront and Convention Centre Breakwater	195
<i>I. F. W. Jayewardene, K. R. K. Blake, P. Cummings</i>	
Review of Existing Multi-Functional Artificial Reefs	202
<i>Leslie Jackson, Bobbie B. Corbett</i>	
Field Measurements of Full Sized Geocontainers	208
<i>Matthew Blacka, James Carley, Ronald Cox, Warren Hornsey, Simon Restall</i>	
Nearshore Wave Climate and Localised Erosion During High Wave Events - SE Australia	214
<i>Mitchell D. Harley, Ian L. Turner, Bradley D. Morris, Andrew D. Short, Roshanka Ranasinghe</i>	

ENVIRONMENTAL MODELLING / PHYSICAL MODELLING

An Integrated Catchment and Receiving Model for Port Phillip Bay and Western Port to Address Pressing Environmental Concerns	220
<i>Shawn Harrison, Randall Lee, Cyprien Bosserelle, Kerry Black</i>	

Long-term Morphological Change at an Engineered Coastal Lagoon Entrance: An Appraisal Using GIS Depth Shading Techniques	227
<i>Peter J. Wheeler, Jim Peterson</i>	
Pollutant Build-up and Wash-off from Selected Land Uses within a Port Environment: An Insight into Stormwater Quality Improvement	233
<i>B. Kitchen, A. Goonetilleke, S. Sivapalan</i>	
Effluent Dispersion Modelling in Darwin Harbour	240
<i>Eric M. Valentine, Philip J. Totterdell</i>	
Physical Modelling of Innovative Solutions to Wave Impacts and Inundation, Rarotonga, Cook Islands	246
<i>James Carley, Alessio Mariani, Don Dorrell</i>	

KEYNOTE

Risk-Informed Decision Making for Coasts and Ports	252
<i>Todd S. Bridges</i>	

PORT STRUCTURES (NEW)

Case Study - Innovation in the Construction of Northport Berth NO 3	300
<i>Tony Pike</i>	
Design and Construction of Tanjung Bin Fly-Ash Jetty in Johor, Malaysia	308
<i>Wesley Wong, Rick Turland</i>	
Value Engineering and Project Enhancement - A Case Study of the Goro Port Project	315
<i>Bob Lamont-Smith, Graham Hooper</i>	
Goro Nickel Project Detail Design of Port Works	329
<i>Ian Putt, Clem Vanderloos</i>	
Woodside Train 5 LNG Project Jetty Spur - A Case Study of Process Piping Integration and Constructability	340
<i>Dean Warwick, Richard Cox</i>	
Simplified Method of Analysis of Piled Berthing Structure for Horizontal Point Load	348
<i>Harish K. Srivastava, Peter N. Atkinson</i>	

COASTAL INSTRUMENTATION & MEASUREMENTS

Operational Application of X-band Radar Measurements of Directional Surface Waves	354
<i>Konstanze Reichert, Bjorn Lund</i>	
Modelling Wind-Generated Waves at Moderate-to-Extreme Conditions	360
<i>Alexander V. Babanin, Ian R. Young</i>	
Empirical Modeling of Surface Currents for Maritime Operations	367
<i>Yadan Mao, Mal Heron, Peter Ridd</i>	
HF Coastal Ocean Radar in an Observing System	373
<i>M. L. Heron, P. V. Ridd, D. J. M. Greenslade, W. J. Skirving, S. F. Heron</i>	
Forecasting Rip Currents at Tairua Beach, New Zealand	379
<i>Scott A. Stephens, Giovanni Coco, Richard M. Gorman, Darcel Rickard, K. R. Bryan</i>	
Estimating Weather Downtime for Ocean Engineering using Sequential Downtime Analysis (SDA)	386
<i>Brett J. Beamsley, Peter McComb, David Johnson, Jamie Silk</i>	

COASTAL PLANNING / NUMERICAL MODELLING

Viscous Attenuation of Interfacial Waves Over a Porous Elastic Seabed: A Boundary Layer Approximation	392
<i>S. J. Williams, D. S. Jeng</i>	
Assessing Estuary Stability	399
<i>Alexander F. Nielsen, Angus D. Gordon</i>	
Swell Impacts on Lagoon Hydrodynamics	406
<i>Stuart H. Bettington, Jenny L. McKenna</i>	

Assessing the Effectiveness of Approval Processes: Case Study of the Port of Hay Point Capital Dredging Project	414
<i>Julie A. Keane</i>	
Implementation of Adelaide's Living Beaches Project	423
<i>Robert Tucker</i>	
Eco-Hydraulic Benefits and Threats of a Second Entrance to the Gippsland Lakes	430
<i>Allan B. Charteris, David B. Sheehan, Chris R. Barry</i>	

COASTAL STRUCTURES / GEOTECH

Extension of Muuga Port, Tallinn, Estonia	436
<i>Torsten Retzlaff</i>	
Design Challenges Associated with the Berth 7 Albany Port Expansion	443
<i>Brendon Brodie-Hall, Richard Mocke, Simon Fretton, Robert Semple</i>	
Advanced Geotechnical Modelling and Monitoring for the Port Coogee Project	448
<i>Michael Hillman, Eric Y. S. Tam, Richard Mocke, Bruce Keay</i>	
Planning for the Future - Ground Improvement Trials at Port of Brisbane	454
<i>Peter Boyle, Jay Ameratunga, Cynthia De Bok, Bill Tranberg</i>	
New Sheet Pile Quay Walls in Aveiro Port	460
<i>Daniel Reiter, Daniel Ferron, J. M. Morim de Oliveira, J. L. Rocha, Luis Godinho</i>	

COASTAL INSTRUMENTATION & MEASUREMENTS

Empirical Modelling of Run-up and Overtopping at a Boulder Beach, Raglan, New Zealand	464
<i>Tom D. Shand, Richard A. Reinen-Hamill, Roger D. Shand, Wouter Viljoen</i>	
Storm Erosion and Accretion at Collaroy Narrabeen Beach	470
<i>Mohammed Habib Ullah</i>	
Observations of Secondary Flow Induced by a Wharf	476
<i>Peter Russell, Ross Vennell</i>	
Semaphore Park Offshore Breakwater Trial - Interim Performance Review	481
<i>Murray Townsend, James Guy</i>	

COASTAL PROCESSES

Berm Growth and Closure of a Coastal Lagoon Entrance by Swash Overwash	487
<i>Tom E. Baldock, Felicia Weir, Michael G. Hughes</i>	
Simulation of Development of Cimanuk River Delta, Indonesia	493
<i>Nita Yuanita, Tawatchai Tingasanchali</i>	
Numerical Modelling of Estuarine Saline Dynamics: A Case Study of the Shoalhaven Estuary	500
<i>Keryn M. Hawker, Brett M. Miller, Alexandra M. Badenhop</i>	
Rapid Infilling of an Intermittently Open-Closed Lagoon Entrance Following Mechanical Clearence	507
<i>Bradley D. Morris, Ian L. Turner</i>	
Considerations of Natural and Anthropogenic Sand Source for Recreation Beach Enhancement	513
<i>Richard Reinen-Hamill, Alex Wilson, Edryd Breese, Peter Hemsley</i>	

PORT STRUCTURE REPAIRS / PORT STRUCTURES (NEW)

The Port of Fremantle - Upgrading of Container Berths for Post-Panamax Shipping	520
<i>Paul Kong</i>	
Re-engineering and Upgrade of the Tug "W H Parr" at Port Nelson, New Zealand	529
<i>R. J. Carter, Drew Bryant</i>	
Queensland Maritime Museum Dry Dock - New Dock Gate Project	535
<i>Christopher Best</i>	
Durability Strategy in Relation to Service Life for Structures in Marine Environments	541
<i>Atef Cheaitani, Paul Daffy</i>	
Design Implications of Recent Extreme Cyclone Impacts at Cape Lambert	548
<i>Stephen Oliver, Richard Mocke</i>	

NUMERICAL MODELING (PURE)

Directional Spectra of Tropical Cyclone Waves	554
<i>I. R. Young</i>	
Modeling of Forced Vibration of Marine Structural Systems under Dynamic Loads of Sea Waves	560
<i>Alireza Jafari, Arash Kanani, Rozita Jalali Farahani</i>	
Extrapolation of Extreme Wave Height with a Proper Probability Distribution Function	566
<i>Zai-Jin You</i>	
Spectral Wave Prediction with Imperfect Forecasts	572
<i>Gregory Hibbert, Giles Lesser, Ken Wahren</i>	
Breaking Wave Uplift and Overtopping on a Horizontal Deck using Physical and Numerical Modelling	579
<i>Gildas Colleter</i>	

COASTAL PROCESSES

A Field Investigation of Dispersion in a Surfzone Dominated by Longshore Currents	586
<i>Alessio Mariani, C. B. Pattiaratchi</i>	
Comparison of Recorded Brisbane and Byron Wave Climates and Implications for Calculation of Longshore Sand Transport in the Region	592
<i>Dean Patterson</i>	
Sediment Cells Along the Perth Metropolitan Coast	598
<i>Tanya Stul, Ian Eliot, Charitha Pattiaratchi</i>	
Statistical Modelling of Ocean Storminess	604
<i>William Dorsch, Tom Newland, David Tassone, Samuel Tymons, David Walker</i>	
Temporal and Spatial Variation of a Large Offshore Sandbar at Raglan, NZ	610
<i>Shaw Mead, David Phillips</i>	

MARINA PLANNING / DREDGING

Pumped Recirculation to Enhance Flushing of a Marina and Canal Estate Development	616
<i>Andrew McCowan, Ketah Jansons, Sarah Law</i>	
Marina Design to Incorporate Superyachts: A Case Study	622
<i>Bobbie B. Corbett, Leslie Jackson</i>	
Investigation and Design of Shell Cove Boatharbour and Marina	627
<i>Greg Britton, Cameron Smith, Christian Taylor</i>	
A State of the Art Shore Crossing - Otway Gas Project	632
<i>Eric Jas, Dean Campbell, Simon Van Boeschoten</i>	
Annual Mechanical Sand Bypassing at the Mandurah Ocean Entrance and Dawesville Channel	638
<i>Laura T. Dubczuk</i>	
Dredging and Cement Treating Harbour Sediments, Fergusson Container Terminal Expansion, Auckland	643
<i>Alan R. Hughes</i>	

NUMERICAL MODELING (APPLIED)

Modelling Queensland Tides from the Gold Coast to Cooktown	648
<i>David P. Callaghan, Paul K. Boswood, Chris Voisey</i>	
3D Hydraulic Modelling of a Canal Development on the Wairoa River	654
<i>Tim S. R. Fisher, Tom D. Shand, Richard Reinen-Hamill</i>	
The Darwin City Waterfront Wave and Water Quality Modeling	660
<i>Gildas C. Colleter, Kevan R. K. Blake</i>	
A Design Criterion to Determine the Mode of Shoreline Response to Submerged Breakwaters	666
<i>Juan Saviolli, Roshanka Ranasinghe, Magnus Larson</i>	
Defining the Extent and Hazard of Ocean Inundation Wave Overtopping and Flooding along the NSW Coast	671
<i>Sean J. Garber, Doug Treloar, David R. Taylor</i>	

3-D Model for Wave-Induced Seabed Response Around Submarine Buried Pipelines.....	678
<i>Behnam Shabani, Dong-Sheng Jeng</i>	

TSUNAMI

Guide to Disaster Reduction on Coasts.....	684
<i>Paul Grundy, Jon Hinwood</i>	
Modelling of Underwater Landslide Induced Tsunami.....	688
<i>Langford P. Sue, Roger I. Nokes, Roy A. Walters</i>	
Using 3DD to Model Tsunami Inundation.....	694
<i>Jose C. Borrero, Cyprien Bosserelle, Gegar Prasetya, Kerry P. Black</i>	
Tsunami Shoaling Behavior: Numerical Analysis.....	700
<i>S. M. Davin, J. Hinwood</i>	
Design for Tsunami Resistance: The Role of Buildings in Reducing Tsunami heights.....	706
<i>Georgina Lee, Jon Hinwood</i>	
Tsunami Shoaling on a Beach of Uniform Slope.....	712
<i>Anil J. D'Cruz, Muhammad Syueib Mohammed Ali, Jon B. Hinwood</i>	

DREDGING

Geraldton Port Dredging Project 2002-3: The Issues, the Events and the Final Outcome.....	719
<i>Ian LeProvost, Peter Collins, Michael Mulligan, Graeme Hubbert</i>	
Maintenance Dredging and Water Quality Monitoring in Hanns Inlet, Western Port, Victoria.....	727
<i>Harry Houridis, Daniel Spooner</i>	
Collaborative Approach to Planning and Monitoring a Dredging Activity.....	734
<i>Fiona Hubczenko, Leonie E. Andersen, Joanna D. Lee</i>	
The Application of Water Injection Dredging Technology in the Widening of the Weipa South Channel.....	742
<i>Nicholas H. Van Amstel, Steven R. Della Mattea</i>	
Dredging in Sensitive Coral Environments, the GBRMPA Experience, Lessons Learned and Initiatives for the Future.....	748
<i>Adam Smith, Tom Foster, James Monkivitch, Phil Koloj, Kevin Edison, Fergus Molloy Matt Johnston</i>	
Sediment Plumes from Dredging.....	757
<i>Peter D. Cummings, Douglas I. P. Shooter, Ben Tuesley</i>	

NUMERICAL MODELING (APPLIED)

Understanding the Waves at Port Phillip Heads, Melbourne Australia.....	762
<i>Giles Lesser, Matthew Turner, David Provis</i>	
Mount Maunganui Reef - Amalgamating Design and the Constraints of Construction.....	768
<i>Shaw Mead, Kerry Black, Andrew Moores</i>	
2D Modelling Approach to Assess Coastal Processes at Stockton Beach.....	775
<i>J. Savioli, D. Hanslow, F. Cosgrove, G. Beattie, J. Simpson, R. Ranasinghe</i>	
Modelling the Recent History of Port Beach.....	782
<i>Clinton Doak, Peter Doust</i>	
Augmentation of Depth-limited Wave Heights within Groups Propagating onto Offshore Slopes of 1V:5H.....	786
<i>William Peirson, Tom D. Shand, Jonathan Hale, Billy Kwan, Ben Lynas, Brendan Short</i>	
Mathematical Model of Interaction between Finite Amplitude Wave and the Liquid Particles.....	791
<i>Anatoli Vakhguelt</i>	

TSUNAMI / COASTAL PROCESSES

Observations and Modelling of the May 4, 2006 Tonga Tsunami in New Zealand.....	797
<i>Jose C. Borrero, Derek Goring, Cyprien Bosserelle</i>	
Application and Testing of the Anuga Tsunami Model for Overtopping and Coastal Sediment Transport.....	803
<i>Tom E. Baldock, Matthew P. Barnes, Natasha Morrison, Tomoko Shimamoto, Duncan Gray, Ole Nielsen</i>	

Wamberal Beach Basement Structures: Provisional Model for Assessment of Additional Coastal Hazards	809
<i>Gary Blumberg, Phil Watson</i>	
Ship Surging Induced by Long Waves in Port Salalah, Oman	818
<i>Derek G. Goring</i>	
Storm Tide Inundation Levels during Tropical Cyclone Larry	824
<i>Paul K. Boswood, Naomi C. Cleaves, John A. Mohaupt</i>	
A Process-based Profile Evolution Model to Simulate Dune Erosion	830
<i>David P. Callaghan, Magnus Larson, Roshanka Ranasinghe</i>	

ADDITIONAL PAPERS

Simulation-based Method for Long-Term Prediction of Navigational Risk	836
<i>N. M. Quay, J. K. Vrijling, P. H. A. J. M. Van Gelder, R. Groenvelde, L. Guema</i>	
Comparison of Recorded Brisbane and Byron Wave Climates and Implications for Calculation of Longshore Sand Transport in the Region	841
<i>Dean Patterson</i>	
Ignorance is not Bliss - Lessons Learnt in Developing an Erosion Protection Strategy for Torquay and Urangan Beaches	847
<i>Jamie Bunt, Stephanie Lawson, Megan Waddell</i>	
The Role of Vegetation in Reducing Tsunami Heights	853
<i>Rhett Fraser, Jon Hinwood</i>	
Author Index	

