17th Australasian Coastal and Ocean Engineering Conference 2005 and the 10th Australasian Port and Harbour Conference 2005

(COASTS AND PORTS 2005)

Adelaide, South Australia 20-23 September 2005

Editors:

M. Townsend

D. Walker

ISBN: 978-1-62276-427-3

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© (2005) 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

CONTENTS

KEYNOTE PRESENTATION	
The Role of PIANC in the Environmental Management and Navigation Infrastructure	
Dr Robert Engler, PIANC	7
SESSION 1 DREDGING I	
The Van Oord Projects in Dubai	
J Pronk	13
Dredging of Rangitoto Channel Auckland, New Zealand	
J Youdale, S Priestley	19
Dredging and Port Expansions Modelling Impacts and Obtaining Approvals	
R Fryer, I Botev, S Trimarchi	25
State Government Responsibility for Maintenance Dredging in WA	
B Brodie-Hall, S Barr	
Strategy for the Removal and Disposal of Material for the Proposed Extension of Shipping Channels at the	
Port of Newcastle	
A Betts, M Wright, T Heise	
Newcastle Port Sediment Toxicity Investigations to Identify Sediment Suitable for Unconfined Sea Disposal	
T Heise, G Britton, A Stone, S Simpson	

SESSION 2 ENVIRONMENTAL AND COASTAL MANAGEMENT

Challenges Facing the Marine Environment on the Straits of Malacca	
KLee	
Mussel Farm Hydrodynamics	
C Stevens, D Plew, S Popinet, D Fredriksson	
Variability of the Coastal Dynamics of New South Wales, Australia and its Relevance to Anthropogenic Impact	sts
T Pritchard, C Holden, T Healy	61
Measurement and Analysis of Boat Wake Waves: Management Implications	
W Glamore, R Hudson, R Cox	67
Recent Publications from the National Committee on Coastal and Ocean Engineering	
T Webb	

SESSION 3 PORT INFRASTRUCTURE I

Planning & Managing The First Shiplift Project In India	
K Navalli	
Project Seabird Shiplift Civil Works - An Overview	
R Turland	
Project Seabird Shiplift Civil Works - Key Design Issues	
R Turland, K Navalli	
Project Seabird Shiplift Civil Works – Construction	
R Casimir	
Design Aspects of the Fergusson Container Terminal Expansion, Auckland, New Zealand	
S Priestley	101

SESSION 4 REPLENISHMENT, BYPASSING

Oriental Bay Foreshore Development, Part 1: Design	
R Reinen-Hamill, C Andrews, F McDonald	107
Oriental Bay Foreshore Development, Part 2: Shoreline Monitoring	
R Reinen-Hamill, T Brueggar, P Hemsley 1	113
Beach Response to Tweed River Entrance Sand Bypassing Operations	
P Boswood, CJ Voisey, SJ Victory, DA Robinson, A Dyson, SR Lawson	119
Design and Performance of Replenishment Projects on Auckland's Eastern Beaches	
D Papps, S Priestley1	125
A Review of Sand Bypassing Techniques for Bandy Creek Boat Harbour, Esperance	
R Mocke, A Edwards, S Barr	131

SESSION 5 NAVIGATION

Rissaga (long-wave events) on New Zealand's Eastern Seaboard: A Hazard For Navigation	
D G Goring	37
Vessel Interaction Investigations at the Port of Brisbane	
J Savioli R Johnson, G Rolph, J Kirkegaard, K Dwyer and P Sloth1	43
Data Analysis of Vessel Mounted ADCP Measurements of Tidal Currents for Port Vessel Simulators	
R Vennell	49
A Dynamic Approach to Determining Waterway Capacity	
M O'Halloran, K Wahren, T Heise	61

SESSION 6 WAVES I

Future Directions for Wave Data Collection in New South Wales	
M Kulmar, D Lord	167
Wave Deformation in the Vicinity of a Long Ocean Outfall at Wanganui, New Zealand	
T Shand, R Shand, D Bailey, C Andrews	173
Numerical Wave Forecasting for the New Zealand Region	
R Gorman	179
The Role of HF Ocean Surface Radar in Australia as a Long-term Coastal Ocean Monitoring Facility	
ML Heron	185
Swell Waves Monitored by HF Ocean Surface Radar at Tweed Heads and Bass Strait	
J Bathgate, M Heron	191
Depth-Limited Wave Heights Associated with Wave Groups Propagating onto Horizontal Beds	
D Dack, W Peirson	197

SESSION 7 PORT INFRASTRUCTURE II

Westport Malaysia Port Expansion Study	
in outpoint management of the Expansion of the ay	
CAndrews D Dainen Hamill T Fisher	

C Andrews, R Reinen-Hamill, T Fisher	. 203
Design and Construction of Nine Navigation Aid Structures for LADS Passage & Fairway Channel, Qld C Vanderloos	. 209
Sophisticated and Interactive Design Process Delivers Success for Brisbane's Seawall Project M Andrews, P Boyle, J Ameratunga, K Jordon	. 215
Innovative Techniques Deliver the Foundation for Construction of a 4.6km Seawall in Brisbane M Strevens, J Ameratunga, P Boyle, G Fokes	
The Master Planning of Robe Marina T Austin	
Pattern Recognition Techniques For Long-Range Vehicle Position Tracking V Rouillard, M Wingate, A Finlay	

SESSION 8 HYDRODYNAMICS

Rip Characterisation on the Gold Coast, Australia: An Analysis using Coastal Imaging Techniques	
D Whyte, I Turner, R Ranasinghe	233
Rip Currents in the Vicinity of Coastal Structures	
D Olsson, C Pattiaratchi	239
Hydrodynamics of Port Phillip Heads	
D Provis, S Aijaz	245
Mass Flux Transported by Breaking Wave Rollers Over Submerged Breakwaters	
M Tajziehchi, R Cox	251

SESSION 9 SEDIMENT TRANSPORT

Sediment Processes in a Coastal Lake: Causeway Lake, the Capricorn Coast	
J Piorewicz, B Soetanto	
Erosion and Deposition of Mud by Random Waves	
D Myrhaug, LE Holmedal, H Rue	
Preliminary Study of Seabed Sediment Transport in SE Region, Australia	
F Li, C Dyt, C Griffiths	
Port Beach Erosion Study: Historic Influences on a Modern Shoreline	
S Barr, P Boreham	
Long-term Coastal Sedimentation Model	
F Li, C Dyt, C Griffiths	

SESSION 10 WAVES II

The Inherent Variability of Wave-Formed Ripples	
J Davis, D Walker, M Townsend, I Young	37
Field and Laboratory Measurements of Wave-Bottom Interaction	
A Babanin, IYoung, H Mirfenderesk	33
A Numerical Study Four-Wave Non-Linear Interactions in Finite-Depth Water	
K Tsagareli, AV Babanin, DJ Walker, IR Young	99
Modelling of Waves and Currents at the Raglan Headland, NZ	
D Phillips, T Healy, K Black	05
Wave and Tidal Power Along the Victorian Coastline	
A Charteris, AD McCowan, M Wheatley	11

SESSION 11 PORT INFRASTRUCTURE III

PAVE - A Mechanistic Design Tool for Flexible Port Pavements	
Wardle, D Oldfield	
rediction of Mooring Line Loads on Cape Size Vessels Berthed at Cape Lambert	
Duffy	
oncrete Segmental Paving in Australian Container Ports - Achievements, Challenges and Opportunities	
Shackel, A Pearson	
trategy for Upgrading E and F Appleton Dock, Melbourne, Australia	
Naidu, A Aziz, K Kugathasan, I Cookson	335

SESSION 12 REPLENISHMENT, SWASH

Beach Nourishment with the Submarine Sandshifter	
L Nankervis	
Physical Modelling of Wave Driven Suction Dredging Device	
L Tao, I Mircev	
Swash-aquifer Interaction in Sandy Beaches	
N Cartwright, T Baldock, P Nielsen, D-S Jeng, L Tao	
The Autoregressive Behaviour of Swash on Beaches	
KR Bryan, Ğ Coco	
Continued Beach Renourishment from Dredge Spoil Disposal, Bay of Plenty, New Zealand	
K Spiers, T Healy	
·····	

KEYNOTE PRESENTATION

Future Trends in Wind-Wave Research	
Prof. Ian Young, Vice Chancellor and President, Swinburne University of 7	Fechnology

SESSION 13 POLICY AND PLANNING

Coastline Management In New South Wales Over-Regulation or a Sound Investment in the Future? P Watson, D Lord	377
The Modified Doctrine of Erosion and Accretion & MHWM Boundary Re-determination in NSW P Watson, P Harcombe	
Influence of the El Ninő Southern Oscillation on Storm Severity Along the NSW Coast	
Z-J You, D Lord Living On The Coast But How Close Is Safe?	
M Rogers, BJ Saunders, TS Hunt Strategic Coastal Planning - a Vision for the Future	
L Brake Should Those Who 'Occupy' Coastal Space Pay To Do So? - The New Zealand Experience	
H Leersnyder, G Hill, B Cork	
G Harrison	411

SESSION 14 COASTAL STRUCTURES

Geotechnical Challenge in Construction of Coastal Protection Structure on Soft Marine Clay	
N Mohd Ni Hassan, S Wahid, MT Abd Wahab	417
Toe Protection and Remedial Options for Historical Seawalls	
JT Carley, MJ Blacka, RJ Cox, AB Philips	
Physical Modelling of Breakwater Damage and Redesign, Nafanua Harbour, 'Eua Island, Tonga	
JT Carley, MJ Blacka, PB Stone, RJ Cox, I Pulin	429
2D Physical Model Appraisal of A-Jacks Armour Units	
IFW Jayewardene, S Driscoll, J Pascoe, F Atkinson	435
Transferring Forster Head Repair Strategies From Model to Prototype	
IFW Jayewardene, M Kulmar, B Beljaars, B Semple, R Cooke	441
Assessment of the Use of Concrete Hanbar Armour Units on NSW Breakwaters	
	447
M Blacka, J Carley, R Cox, I Jayewardene Engineering Assessment of Shoreline Realignment in the Lee of Nearshore Breakwaters and Reefs	
IL Turner	

SESSION 15 MONITORING

Baseline Bathymetric Data Collection for Monitoring of Bar, Rip and Salient Response to an Artificial Surfing	
Reef - Mount Maunganui, New Zealand B Scarfe, T Healy	150
Comparison of Video, RTK-GPS and Conventional Beach Survey Methods	
M Harley, IL Turner, AD Short, R Ranisinghe	465
Video Observations of Shoreline and Sandbar Coupled Dynamics	
G Coco, KR Bryan, MO Green, BG Ruessink, IL Turner, IMJ van Enckevort	471
Field Data Collection at the Broadwater (Gold Coast)	
H Mirfenderesk, R Tomlinson, L Hughes	477
A Laboratory Study of the 'Shoreline' Detected in Video Imagery	400
E H Boak IL Turner RN Merton	463
Northern Gold Coast Beach Topography from Imaged Shadow Observations WR. Curtis, RA Holman, IL Turner	
An Assessment by Instrumented Ferry Routes of Plume-Bloom Dynamics in the Strait of Georgia, British	
Columbia, Canada	
R Lee, M Halverson, R Pawlowicz	

SESSION 16 NUMERICAL MODELLING

The Effect of Ocean Swell on the Stability of Adelaide's Metropolitan Beaches P Reidel, P O'Brien, M Townsend	499
Assimilation of Sea-Surface Temperature into a Hydrodynamic Model of Port Phillip Bay, Australia	
M Turner, J Walker, P Oke, R Grayson	511
A Statistical Desciption of Nearfield Dilution for Wastewater Outfalls	
D Taylor, D Treloar	517
A Rational Protocol for Quantifying the Coastal Storm Erosion Hazard	
CA. Adamantidis, AF. Nielsen, M Bergs, R Massie	523
Port River Delft3D Water Quality Model. Setup and Calibration	
D Taylor, D Treloar, P Christy, S Gaylard	529
Canal Estate Siltation Modelling. A Case Study: Newport Waterways, Redcliffe, Qld, Australia	
S Bettington, P Cummings	535

SESSION 17 THE ADELAIDE COASTAL WATERS STUDY I

Seasonal Variation of Nutrients and Phytoplankton in Adelaide Metropolitan Waters	
S Byrnes, J Kaempf	541

SESSION 18 ENVIRONMENTAL AND COASTAL MANAGEMENT

47
53
59
65
71
77

SESSION 19 ESTUARIES

Application of Numerical Models for Management of the Murray Mouth and Coorong Environmental Values D Patterson, D Treloar	
Significance of Spatially and Temporally Varying Bedform in Modelling Estuarine Hydrodynamics and Morphology D Wainwright, D Patterson	
The Dynamic Behaviour of a River-dominated Tidal Inlet, River Murray, Australia B Shuttleworth, A Woidt, A Paparella, S Herbig, D Walker	
Spring Tidal Pumping JB Hinwood, EJ McLean, M Trevethan	
Inlet Equilibrium Morphological Modelling: Comparison of a Laboratory Study and an Entropy Based Model JM Nield, DJ Walker, MF Lambert	607
Boundary Conditions for Estuarine Flood Modelling Using Joint Probability Analysis I Teakle, G Colleter, K Rahman, M Breen, D McGarry	
A Multi-Staged Management Strategy for Restoring Tidal Flushing W Glamore, B Indraratna	

SESSION 20 THE ADELAIDE COASTAL WATERS STUDY II

Nearshore Currents and Surf Zone Dispersion on Adelaide Metropolitan Beaches	
R Jones, C Pattiaratchi	25

SESSION 21 DREDGING II

Dredging Simulations for the Port Adelaide Channel Deepening	
A McCowan, A Kahi	
Site Investigations for Dredging Projects	
R Tyshing	637
Assessment of Dredging Impacts on the Wave Climate of Barker Inlet, South Australia	
J Davis	643
Issues Associated With the Environmental Management of Dredging in Queensland Ports	
S Trimarchi	649
A Case Study of Dredging Management of Acid Sulphate Soils, Peel Inlet Western Australia	
B Hegge, S Shute	
Recent Dredging in Western Australia	
T Green	661

SESSION 22 SURFING REEFS, BREAKWATERS

Shoreline Response to Artificial Surfing Reefs

R Ranasinghe, I Turner,	667
Reef Breakwaters for Coastal Protection Safety Aspects and Tolerances	
B Corbett, R Tomlinson, A Jackson,	673
Development of a Multi-Purpose Reef at Orewa Beach, New Zealand	
S Mead, K Black	679
Sand-filled Geotextile Breakwater at Beachport, South Australia	
S Detmar, R Tucker, D Fotheringham,	685
Semaphore Park Offshore Breakwater: A Trial	
M Townsend	691
Limeburners Breakwater the Innovative Use of Geotextile Sand Containers	
WP Hornsey, M Jackman	697

ADDITIONAL PAPER

Practical Aspects of Coastal Morphodynamic Model Calibration