

# ISOPE-2011

Hyatt Regency Maui Hotel, Hawaii, USA, June 19–24

## The Twenty-first (2011) International Offshore (Ocean) and Polar Engineering Conference

*Including ISOPE symposia:*

- 1st Arctic Materials
- 2nd Arctic Science & Technology
- 2nd Renewable Energy & Environment
- 3rd Sloshing Dynamics & Design
- 3rd Nanotechnology
- 3rd Frontier & Clean Energy Tech
- 9th High-Performance Materials
- 5th Strain-Based Design
- 9th (Deep) Ocean Mining (& Gas Hydrates)

## Technical Program (March 24)

Refereed papers from **51** countries in **150** technical,  
general and keynote presentations

General Information, Reservations, Publications  
and Program Updates on [www.isopec.org](http://www.isopec.org)  
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# TECHNICAL PROGRAM

ISOPE–2011 Maui, Hawaii  
June 19–24, 2011

Updates with full author information on [www.isopec.org](http://www.isopec.org);  
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## Annual Banquet Photos

*The 20th ISOPE Conference Anniversary Ceremony,  
Awards for Best Student Paper, Session Organizer Award,  
Jin S. Chung Award & Lecture, 2010 ISOPE Award:*

*Photos at ISOPE-2010 Beijing Banquet on [www.isopec.org](http://www.isopec.org) >  
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## Forthcoming ISOPE Meetings

*The 22nd ISOPE–2012 Conference, Rhodes (Rodos), Greece, June 17–23*

*The 10th ISOPE PACOMS-2012 Symposium, Vladivostok, Russia, September 17-20*

*The 23rd ISOPE–2013 Conference, Anchorage, Alaska, USA, June 30–July 4*

*Deep Ocean Mining & Gas Hydrates: The 10th ISOPE OMS-2013 Symposium, to be announced.*

## TECHNICAL PROGRAM

# ISOPE-2011 Maui Conference

## The Twenty-first (2011) International Offshore and Polar Engineering Conference

Maui, Hawaii, USA, June 19–24, 2011

The number at end of the session title indicates the tentative number of the proceedings volume. Only the changes on titles or authors the ISOPE-2011 Technical Program Committee (TPC) received in writing before January 29, 2011 are reflected in this program with updates as of February 23. Final corrections will be updated in the Conference Proceedings of peer-reviewed papers and the Final Program. Conference Proceedings (ISBN 978-1-880653-96-8; ISSN 1098-6189) and Ocean Mining Symposium Proceedings (ISBN 1-978-1-880653-95-1; ISSN 1946-0066) will be available as a set of 4 volumes (4,200 pp. est.) from ISOPE during and after the Conference.

Paper listing in sessions may be slightly modified in the Final Program

ISOPE conference and symposium proceedings papers are **peer-reviewed**, and **indexed** by **Engineering Index** and Compendex and others.

### SUNDAY, June 19 Conference Reception

17:00

Napili Garden

### MONDAY 10:30

#### 1. Opening General Session: OCEAN AND ENERGY INDUSTRY REVIEW—2011 (V. 1)

Monday June 20 08:30 Monarchy Ballroom

**Chair:** Raghavan Ayer, ExxonMobil Research & Engineering, USA

#### **Conference Opening Address**

Raghavan Ayer, ISOPE President, ExxonMobil Research & Engineering, USA

#### **Lessons Learned from Recent Tsunami Disasters in Asia-Pacific Region**

T Tomita, Port and Airport Research Inst, Japan

#### **The Challenges of Deepwater High Arctic Development**

Jed M Hamilton, ExxonMobil Upstream Research Co, USA

#### **Recent Advances on Operation of Jackup Rigs in China**

WL Dong, Vice President, CNOOC-COSL, China

#### **Floating Wind Power – Hywind: From Idea to Commercial Product [Oral presentation]**

FG Nielsen, KE Steen, S Bratland, Statoil, Norway

## 2. LNG SLOSHING I: Numerical Modeling (V. 3)

Monday June 20 10:30 Room 1

Chair: F Dias, Univ College Dublin, Ireland

Co-Chair: L Diebold, Bureau Veritas, France

### Introductory Remarks

J S Chung, ISOPE, USA

### Coupled LNG Carrier Sloshing-structure Dynamics in a Lightweight Multi-tank Configuration

A Baeten, Augsburg Univ of Applied Sciences, Germany

### Fully Coupled Analysis for Wave Induced Responses of Movable Wave Energy Converter with Link Connection and Oscillating Water Column

BW Kim, SK Cho, SY Hong, Maritime & Ocean Engineering Research Inst; DS Yang, Korea Electric Power Research Inst, Korea

### Influence of Raised Invar Edges on Sloshing Impact Pressures - Numerical Investigations

L Diebold, T Gazzola, N Moirod, J De Lauzon, Bureau Veritas, France; D Villa, S Brizzolara, Univ of Genoa, Italy

### Numerical Simulation of 3D Sloshing Using LS-DYNA Code [Oral presentation]

SG Lee, BHA Nguyen, Korea Maritime Univ, Korea

### Numerical Simulation of Sloshing Waves in a 3D Tank Based on an Image Green Function Method

D Ning, WH Song, B Teng, Dalian Univ of Tech, China

### Sloshing Effects on Multi-Vessel Motions by Using Moving Particle Simulation

KS Kim, MH Kim, Texas A&M Univ, USA; BH Lee, Hyundai Heavy Industries; SC Hwang, JC Park, Pusan National Univ, Korea

### An Improved MPS Method for Three-dimensional Liquid Sloshing

YX Zhang, C Zhang, DC Wan, Shanghai Jiao Tong Univ, China

## 3. HYDRODYNAMICS I: MetOcean 1 (V. 3)

Monday June 20 10:30 Room 2

Chair: M Kashiwagi, Osaka University, Osaka, Japan

### Long-term Variability and Trends of Wave Climate in the Southern East China Sea and Northwestern Pacific Ocean from 1958 to 2009 with Wave Modeling Validation

TC Yang, YM Fan, National Cheng Kung Univ; CC Kao, Taiwan Ocean Research Inst; BC Lee, Huafan Univ, Taiwan, China

### Ocean Wave Reconstruction Algorithms Based on Sparse Spatio-Temporal Data Acquired by a LIDAR Camera

ST Grilli, Univ of Rhode Island, USA; C-A Guerin, Univ de Toulon et du Var, France; B Goldstein, Advanced Scientific Concepts, USA

### Optimization of Integrated Weather Routing System for the Sailing Cargo Ship

T Nishida, Univ of Tokyo; M Katori, North Sails Japan; K Uzawa, K Ohuchi, T Waseda, Univ of Tokyo, Japan

### Statistics of Met-Ocean Conditions between West and Central Gulf of Mexico

CX Li, L Su, AF Kiecke, J Zhang, Texas A&M Univ; J Tule, Anadarko Petroleum, USA

### Guidelines for Metocean Data Analysis

J Van Os, S Caires, M Van Gent, Deltares, Netherlands

### Transition from Long-crested to Short-crested Seas by Wind-Wave Interaction

SS Lee, DW Wundrow, Naval Surface Warfare Center, USA

**Verification on Swell Simulation of WAVEWATCH III Wave Modeling**  
BC Lee, Huaifan Univ; YM Fan, National Cheng Kung Univ; CT Terng, CH Chu, Central Weather Bureau, Taiwan, China

**Individual Wave Height Distribution in Constant and Finite Depth Regions**  
MRA Van Gent, S Caires, Deltares, Netherlands

**The Evaluation of Marine Hazard for Northeast Asian Waters Based on Freak Wave Occurrence Characteristics**  
JY Park, SH Shin, KY Hong, Maritime & Ocean Engineering Research Inst, Korea

**4. RENEWABLE ENERGY I: Offshore Wind Structures 1 (V. 1)**  
**Monday June 20 10:30 Room 3**

**Chair:** T Ummenhofer, Karlsruhe Inst of Technology, Germany  
**Co-Chair:** JP Liyanage, Univ of Stavanger, Norway

**Integration of Support Structure and Turbine Design – Final Results of WP4-Task4.1 on Offshore Support Structures of the EU Upwind Project**  
T Fischer, Univ of Stuttgart, Germany

**Comparison of Dynamic Response of Monopile, Tripod and Jacket Foundation System for a 5MW Wind Turbine**  
HC Park, W Shi, CW Chung, YC Kim, Pohang Univ of Sci & Tech, Korea

**Optimization of Supporting Structures of Offshore Wind Plants - New Research Approaches**  
M Albiez, S Herion, T Ummenhofer, Karlsruhe Inst of Tech, Germany

**Dynamic Analysis of Offshore Wind Turbines**  
SM Jafri, A Eltaher, P Jukes, MCS Kenny, USA

**Fully-Coupled Wind Turbine Simulation Including Substructuring of Support Structure Components: Influence of Newly Developed Modeling Approach on Fatigue Loads for an Offshore Wind Turbine on a Tripod Support Structure**  
F Vorpahl, Fraunhofer IWES, Germany

**Coupled AeroHydroDynamic Structural Optimization of Floating Substructure for Offshore Wind Turbines [Oral presentation]**  
A Rodriguez Tsouroukdissian, ALSTOM Wind R&D Europe, Spain; SH Lee, YW Cho, T Luypaert, MIT; A Fisas, ALSTOM Win North America; P Sclavounos, MIT, USA

**5. ADVANCED SHIP TECH I: New Design and Feasibility (V. 4)**  
**Monday June 20 10:30 Room 4**

**Chair:** SG Lee, Korea Maritime Univ, Korea

**Online Concrete Strength Inventory Application: Mobile Data Collection**  
E Ekin, Y Guney, Anadolu Univ, Turkey

**Comparative Study for Results of 3D Beam Analysis and 3D FE Analysis on Inclined Condition of Ro-Ro Passenger Ferry**  
YJ Jeong, Daewoo Shipbuilding & Engineering, Korea

**Numerical Study of Ore Pressure Considering Coupling Effect of Hull Deformation**  
T Yoshikawa, M Maeda, Kyushu Univ, Japan

**A Feasibility Study on Containerization of a Pure Car Carrier**  
T Momoki, H Enokida, Y Ikeda, Osaka Prefecture Univ, Japan

**Development of Structural Analysis System for Propeller Strength Evaluation**  
J Kim, MS Kim, BJ Kim, BJ Chang, Hyundai Heavy Industries, Korea

**Monday**                      **6. HPM I: Shipbuilding Steels (V. 4)**                      **June 20**                      **10:30**                      **Room 5**

**Chair:** KB Kang, POSCO, Korea

**Establishment of Required Brittle Crack Arrest Toughness Kca Value with Actual Scale Model Tests**

T Inoue, Nippon Steel; T Matsumoto, Nippon Kaiji Kyokai; H Yajima, Nagasaki Inst of Applied Sci; S Aihara, Univ of Tokyo, H Yoshinari, National Maritime Research Inst; K Hirota, Mitsubishi Heavy Industry; M Toyoda, IHI Marine United; T Kiyosue, Kawasaki Shipbuilding; T Handa, JFE Steel, Japan

**Application of New Structure and High Deformability Steel to Bulbous Bow for Reducing the Damage to the Other Ship during Collisions**

K Kamita, Imabari Shipbuilding; Y Funatsu, J Otani, H Shirahata, Nippon Steel; Y Yamada, National Maritime Research Inst, Japan

**A Study on the Countermeasures against Unstable Fracture at the Hatch Coaming FCA Butt Weldment Having Embedded Cracks in an Ultra-large Containership**

SB Shin, DJ Lee, WS Kim, Hyundai Heavy Industries; JS Lee, Univ of Ulsan, Korea

**Improvement of Fracture Toughness, Kc, of Welded Joint: Development of Higher Toughness YP47(460N/mm<sup>2</sup>) Class Steel Plate for Ultra-large Container Ships-2**

H Shirahata, J Otani, Y Funatsu, T Inoue, Nippon Steel, Japan

**Improvement of Arrestability for Brittle Crack for Welded Jointed Development of Higher Toughness YP47(460N/mm<sup>2</sup>) Class Steel Plate for Ultra-large Container Ships-3**

J Otani, Y Funatsu, T Inoue, H Shirahata, Nippon Steel, Japan

**Proposal for Brittle Crack Arrest Methods Using Various Weld Arrestors: Development of Higher Toughness YP47(460N/mm<sup>2</sup>) Class Steel Plate for Ultra Large Container Ships-4**

T Inoue, Y Funatsu, J Otani, H Shirahata, T Ishikawa, Y Hashiba, Nippon Steel, Japan

**Increase of Brittle Crack Arrestability Using Arrest Welding of Thick Steel Plate in Large Container Ship**

GB An, KM Ryu, JS Park, POSCO; TD Park, Hyundai Heavy Industries; YT Shin, Samsung Heavy Industries; SK Kang, Shipbuilding & Ocean Research Inst; JS Lee, Hanjin Heavy Industries; BJ Chang, Korean Register of Shipping; Y Shim, ABS, USA; JS Lee, POSCO, Korea

**Dynamic Measurement Analysis of Brittle Crack Propagation Behavior in Large-scale Structural Component Model Test for Large Container Ships**

T Handa, JFE Steel; T Matsumoto, Nippon Kaiji Kyokai; H Yajima, Nagasaki Inst of Applied Science; H Aihara, Univ of Tokyo; H Yoshinari, National Maritime Research Inst; K Hirota, Mitsubishi Heavy Industries; M Toyoda, IHI Marine United; T Kiyosue, Kawasaki Heavy Industries; T Inoue, Nippon Steel; T Kawabata, Sumitomo Metal Industries, T Tani, Kobe Steel, Japan

**Monday**                      **7. NANOMATERIALS I (V. 4)**                      **June 20**                      **10:30**                      **Room 6**

**Chair:** I. Kabacoff, Office of Naval Research, USA  
**Co-Chair:** E. Koray Akdogan, Rutgers University, USA

**Introductory Remarks: Nanomaterials and Nanotechnology**

L Kabacoff, Office of Naval Research and T Tsakalakos, Rutgers Univ, USA

**The Nano-Scale Materials Revolution**

LC Feldman, Rutgers Univ, USA

**Recent Progress in Search for a Refinable Model of a Nanocrystal by Diffraction Methods**

B Palosz, E Grzanka, S Stelmakh, Inst of High Pressure Physics  
UNIPRESS, Poland

**Hall-Petch Relationship in Nanocrystalline Materials**

CS Pande, Naval Research Lab, USA

**New Possibilities of Graphene for Generation of Ultrashort Laser Pulses**

ED Obraztsova, MG Rybin, PS Rsakov, II Kondrashov, VR Sorochenko,  
A.M. Prokhorov General Phys Inst, RAS, Russia

**Electron-Irradiation-Induced Phase Change in Nanomaterials**

JG Lee, Korea Inst of Materials Science, Korea; CL Chen, Osaka Univ,  
Japan; CJ Choi, Korea Inst of Materials Science, Korea; M Hirota,  
Osaka Univ, Japan

**Mechanical Behavior of  $Y_2O_3$ -MgO Nanocomposites under Equibiaxial State of Stress by Synchrotron EDXRD “Pseudo-plasticity at Room Temperature?”**

T Tsakalagos, EK Akdoğan, Rutgers Univ, USA

**Fabrication of Submicrometer Spherical Particles of Metal and Ceramics by Pulsed Laser Melting of Nanoparticles in Liquid**

N Koshizaki, Nanosystem Research Inst, AIST; Y Ishikawa, Kagawa Univ, Japan

**8. VORTEX-INDUCED VIBRATIONS I (V. 3)**

**Monday June 20 10:30 Room 7**

**Chair:** RW Miksad, University of Virginia, Charlottesville, USA

**The Vital Nonlinear Mechanics of Vortex-induced Vibrations**

RF Zueck, NAVFAC-ESC, USA

**Galloping of Square Cylinders in Cross-flow at Low Reynolds Numbers [Oral presentation]**

A Joly, Ecole Polytechnique de Montreal, Canada/Ecole des Ponts Paris Tech, France; S Etienne, D Pelletier, Ecole Polytechnique de Montreal, Canada

**Three Dimensionality of Flow Bifurcation in Wakes of a Bluff Body**

CM Hsieh, National Kaohsiung Marine Univ, Taiwan; A Sau, Gyeongsang National Univ, Korea; RR Hwang, Inst of Physics, Academia Sinica, Taiwan, China

**Vortex Flow Past a Sphere in a Constant-diameter Pipe**

L Grinis, U Tzadka, Sami Shamon College of Engineering, Israel

**Experimental Investigation on the J-Tube in Offshore Oilfield**

MA Lin, Inst of Mechanics, CAS, China

**Hydrodynamic Forces on a Transverse Oscillating Vertical Circular Cylinder in Regular Waves**

ZH Huang, ZD Yuan, Nanyang Technological Univ, Singapore

**9. SUBSEA & INSTALLATION (V. 2)**

**Monday June 20 10:30 Room 8**

**Chair:** M Wu, J. Ray McDermott, USA

**Deepwater Monitoring System Using Logistic-Support Vessels in Underwater Sensor Networks**

FJL Ribeiro, Petrobras; ACP Pedroza, LHMK Costa, COPPE/UFRJ, Brazil

**Remotely Operated Underwater Machining and Installation as an Advanced Intervention Tool on Installed Subsea Production Systems**

GG Fuhr, R Laug, Statoil, Norway

**Structural Design and Analysis of Subsea Camera Shell in Deepwater**

HD Wei, H Shang, LY Liang, DY Zhao, Offshore Oil Engineering; P Ren, XF Ma, Shanghai Jiao Tong, Univ, China

**Structures for Dry Tree Wells in Deep Water**

P Marshall, National Univ of Singapore, Singapore; C Llorente, J Ray  
McDermott, USA

**Fault Protection on Direct Electrical Heating Cables**

A Bruaset, H Kulbotten, SINTEF, Norway; J Hoj-Hansen, Woodside  
Energy, Australia

**Research on Typhoon-Evacuation Device for Rig of Deepwater in  
South China Sea**

YF Guo, SH Ji, CQ Tang, China Oilfield Services Ltd, China

**The Design and Performance Analysis of a Reliable Seal Structure  
for Subsea Construction**

C Cao, HJ Guo, FX Hou, CNPC Drilling Research Inst, China

**Numerical Simulation of the Installation Procedure of an Optical  
Fiber Cable in the Negro River - Amazon Rainforest**

OO Machado Jr, PETROBRAS; BP Jacom, MHA Lima Jr, AR Medeiros,  
COPPE/UF RJ, Brazil

**Remotely Operated Underwater Machining and Installation as an  
Advanced Intervention Tool on Installed Subsea Production Systems  
[Proceedings only]**

GG Fuhr, R Laug, Statoil, Norway

**The Implementation of Drilling Simulation for Offshore Rig  
Education**

JY Park, YJ Lim, JY Park, JH Lee, HS Oh, Korea Maritime Univ, Korea

**Continue at 14:00**

**10. FRONTIER ENERGY I: Clean Energy (V. 1)**

**Monday June 20 10:30 Room 9**

**Chair R Ayer, ExxonMobil Research & Engineering Co., USA**

**CNG - Technologies: A Comparison Study**

P Kaeding, U Ruppin, N Noetzold, P Pentschew, Univ of Rostock,  
Germany

**Conveying Oil and Gas with Twin-Screw Multiphase Pumps Taking  
in Account Sorption Phenomena**

F Hatesuer, T Groth, Leibniz Univ of Hanover; M Reichwage, J  
Lewerenz, Bornemann GmbH; A Luke, Univ of Kassel, Germany

**Effects of Swirls on Natural Gas Flow in Supersonic Separators**

C Wen, XW Cao, Y Yang, J Zhang, GD Wang, China Univ of Petroleum,  
China

**Development of a Design Tool for Modeling Hydrogen Distribution  
Systems**

S Riedl, RH Knapp, Univ of Hawaii at Manoa, USA

**Experimental Investigation into Replacement of CH<sub>4</sub> in Hydrate in  
Porous Sediment with Liquid CO<sub>2</sub> Injection**

XS Li, LJ Xiong, G Li, ZY Chen, ZY Zeng, Guangzhou Inst of Energy  
Conversion, CAS, China

**Geochemistry of Methane in Gas Hydrate from ShenHu of the  
Northern South China Sea**

X Huang, YH Zhu, PK Wang, XW Guo, Chinese Academy of Geological  
Sciences, China

**Simulation of Standing Column Well Geothermal Heat Pump System  
for Design**

DH Park, JS Park, Hanyang Univ; SS Park, SM Na, GS E&C Research  
Inst, Korea

**Investigation of Asphaltene Precipitation Problems During  
CO<sub>2</sub>/Hydrocarbon Injection Project for EOR Application**

G Oskui, Kuwait Inst for Scientific Research, Kuwait



**11. UNDERWATER I: Communication and Navigation (V. 2)**  
**Monday June 20 10:30 Room 10**

**Chair:** H Palmer, General Dynamics Information Tech, USA  
**Co-Chair:** SC Yu, Pohang Univ of Science & Tech, Korea

**Identification of Vibro-acoustic Fields of a Cylinder Underwater Using Phase Conjugation Arrays**

S Li, S Liu, DY Zhao, Dalian Univ of Tech, China

**An Experimental Study on the High Frequency Vibration Analysis of a Circular Cylindrical Shell in Contact with Water**

CH Min, HI Park, Korea Maritime Univ; HG Jung, Agency of Defense Development; JH Wu, Korea Maritime Univ, Korea

**Side Scan Sonar Grid Map for Unmanned Underwater Vehicle Navigation**

E Chen, National Taiwan Univ; SW Huang, Taiwan Ocean Research Inst; WH Wang, JH Guo, National Taiwan Univ, Taiwan, China

**MONDAY 14:00**

**12. LNG SLOSHING II: Sloshing Loads (V. 3)**  
**Monday June 20 14:00 Room 1**

**Chair:** M Kaminski, Delft Univ of Technology, Netherlands  
**Co-Chair:** BW Nam, Maritime & Ocean Engineering Research Inst, Korea

**Statistical Post-Processing of Long-Duration Sloshing Test**

L Diebold, B Fillon, J Henry, Q Derbanne, E Baudin, G Parmentier, Bureaus Veritas, France

**Sloshing Load Due to Liquid Motion in 3D Tanks**

YS Cao, FW Zhang, MARINTEK; AF Yao, S Liapis, S Wu, Shell Global Solutions, USA

**Comparative Study on Model-scale Sloshing Tests**

SY Kim, KH Kim, Y Kim, Seoul National Univ; TH Park, Hyundai Heavy Industry; JJ Park, Samsung Heavy Industry; JH Park, Daewoo Shipbuilding & Marine Engineering; JK Heo, TMS; JO Sun, STX Offshore & Shipbuilding, Korea

**Sloshing Model Tests for a Cargo Hold of VLCC Considering the Effect of Internal Cross-Tie Structures**

SS Jeon, JH Jung, YS Hwang, MC Ryu, Daewoo Shipbuilding & Marine Engineering, Korea

**Analysis of Buckling Load of Fiber-reinforced Plywood Plates for NO 96 CCS**

SW Choi, JU Rho, WI Lee, Seoul National Univ, Korea

**13. HYDRODYNAMICS II: MetOcean 2 (V. 3)**  
**Monday June 20 14:00 Room 2**

**Chair:** JS Chung, ISOPE, USA

**Hamiltonian Modulation Theory for Water Waves on Arbitrary Depth**

P Guyenne, Univ of Delaware, USA; W Craig, McMaster Univ, Canada; C Sulem, Univ of Toronto, Canada

**Large Storm Seas: Asymptotic Distributions and Non-linear Effects**

MA Tayfun, Kuwait Univ, Kuwait

**Some Exact Solutions of Nonlinear Deep-water Wave**

YF Zhang, Tianjin Inst for Water Transport Engineering, China

**A 3D Gauss-Lagrange Wave Model for Asymmetric Ocean Waves with Directional Spreading**

G Lindgren, Lund Univ, Sweden; F Lindgren, NTNU, Norway

**Stochastic Sea-state Simulation by Convolution Integral of Independent Components**

M Minoura, Osaka Univ, Japan

**Boussinesq Modelling of Undertow Profiles**

KZ Fang, ZL Zou, Dalian Univ of Tech, China; P Dong, Univ of Dundee, UK

**Numerical Simulation of Long Wave Propagation and Run-up Using a Lattice Boltzmann Approach on GPGPU Hardware**

CF Janssen, M Krafczyk, Tech Univ Braunschweig, Germany; ST Grilli, Univ of Rhode Island, USA

**Wind Forcing and Dissipation in a High Order Spectral Deterministic Wave Model**

YL Perignon, G Ducrozet, F Bonnefoy, P Ferrant, Ecole Centrale de Nantes, France

**A Fast and Accurate Method for Derivation of Design Waves in Confined Areas**

J Skourup, Rambøll Danmark A/S, Denmark

**14. RENEWABLE ENERGY II: Offshore Wind Structures 2 (V. 1)**  
**Monday June 20 14:00 Room 3**

**Chair:** F Vorpahl, Fraunhofer IWES, Germany

**Co-Chair:** W de Vries, TU Delft, Netherlands

**Fixed Bottom Tripod Type Offshore Wind Turbines under Extreme and Operating Conditions**

G Farmakis, DC Angelides, Aristotle Univ of Thessaloniki, Greece

**Design Formula for Scour Protection around Offshore Monopiles**

TC Raaijmakers, D Rudolph, B De Sonnevile, GJCM Hoffmans, H Verheij, Deltares, Netherlands

**Cyclic Response of Granular Subsoil under a Gravity Foundation for Offshore Wind Turbine**

S Safinus, G Sedlacek, U Hartwig, Ed Zueblin AG, Germany

**Full-scale Model Tests on a Gravity Based Foundation for Offshore Wind Turbines**

U Hartwig, Ed Zueblin AG, Germany

**Designing the Next Generation of Computational Codes for the Analysis of Wind Energy Systems**

M Muskulus, NTNU, Norway

**15. ADVANCED SHIP TECH II: Ultimate Strength & Buckling (V. 4)**  
**Monday June 20 14:00 Room 4**

**Chair:** T Yao, Osaka Univ, Osaka, Japan

**Co-Chair:** HS Seol, Maritime & Ocean Eng Research Inst, Korea

**Collapœ and Buckling of Conical Shells**

J Blachut, O Ifayefunmi, M Corfa, Univ of Liverpool, UK

**Material Utilization in Design of Stiffened Cylindrical Shells**

X Bai, LP Sun, XT Wang, Harbin Engineering Univ, China

**Parametric Study of Beam-to-Column Connections for Self-centering Steel Moment Frames by Using Finite Element Program**

P Pan, ZH Pan, FW Qiu, LP Ye, JR Qian, Tsinghua Univ, China

**Collapse Analysis of Container Ship Model under Combined Torsion and Bending Applying Idealized Structural Unit Method**

Z Pei, C Gao, Tsuneishi Shipbuilding; Y Tanaka, National Maritime Research Inst; S Tanaka, S Okazawa, Hiroshima Univ; K Iijima, M Fujikubo, Osaka Univ; T Yao, Tsuneishi Shipbuilding, Japan

**Progressive Collapse Analysis of Double Bottom Structures Considering Shear, Lateral Pressure and Welding Residual Stresses**

C Gao, Z Pei, Tsuneishi Shipbuilding; A Yasuoka, S Tanaka, S Okazawa, Hiroshima Univ; K Iijima, M Fujikubo, Osaka Univ; T Yao, Tsuneishi Shipbuilding, Japan

**Ultimate Longitudinal Strength of Ship Hull Girder with Bottom Damage**

MA Zubair, M Fujikubo, K Iijima, H Ogawa, Osaka Univ, Japan

**Study on Longitudinal Ultimate Strength Analysis Method for High Speed Trimaran**

WQ Liu, Wuhan Univ of Tech, China

**16. HPM II: Non-Destructive Testing (V. 4)**

**Monday June 20 14:00 Room 5**

**Chair:** DI Kwon, Seoul National Univ, Korea

**The Study of Engineering Critical Assessment Applications in Welding Flaw Acceptance Criteria for Offshore Pipeline Installation**

WB Ding, W Liu, SY Zhang, Offshore Oil Engineering, China

**Residual Stresses in Welded Steels with Longitudinal Stiffeners**

T Nitschke-Pagel, K Dilger, Univ of Braunschweig, Germany

**Laser Based Inspection Systems**

J Jennings, C Reichert LaMorte, A Channell, EWI, USA

**In-Service Safety Assessment of Industrial Facilities Using Instrumented Indentation**

WS Song, YC Kim, WJ Jo, DI Kwon, Seoul National Univ, Korea

**17. NANOMATERIALS II (V. 4)**

**Monday June 20 14:00 Room 6**

**Chair:** R Ellis-Behnke, MIT, USA & Univ of Hong Kong, China

**Co-Chair:** LC Feldman, Rutgers Univ, USA

**High Strain-rate Scratch Methods for the Nanoscale**

AF Jankowski, Texas Tech Univ, USA

**High Resolution Chemical and Mechanical Characterization of Nanocomposite Materials**

ML Trudeau, L Rodrigue, R Veillette, Hydro-Quebec Research Inst, Canada

**Reactivity Measurement with Electrochemical SPM**

H Wolfschmidt, U Stimming, Tech Univ München, Germany

**Metallic Nanoporous Solids for Device Applications**

RN Viswanath, Indira Gandhi Centre for Atomic Energy, India

**Processing of Nanostructured c-BN and B<sub>4</sub>C**

J Doyle, HF Lee, JF Al-Sharab, AA Pelegri, BH Kear, Rutgers Univ; O Voronov, Diamon Materials; SD Tse, Rutgers Univ, USA

**Phase-Equilibrium-Dominated Vapor-Liquid-Solid Growth Mechanism**

Z Hu, Nanjing Univ, China

**18. VORTEX-INDUCED VIBRATIONS II (V. 3)**

**Monday June 20 14:00 Room 7**

**Chair:** S Etienne, Ecole Polytechnique de Montreal, Canada

**Moment Based Empirical Estimation of Rayleigh-Stokes Distribution Parameters**

H Zhang, LF Xiao, HN Lu, Shanghai Jiao Tong Univ, China

**Influence of Attack Angle on VIV Suppression by Multiple Control Rods for Long Flexible Riser Model**

L Lu, H Wu, DP Sun, B Teng, J Song, GQ Tang, Dalian Univ of Tech, China

**Experimental Investigation into a New Device in Suppressing the Vortex-induced Vibration**

LM Lin, XF Zhong, YX Wu, Inst of Mechanics, CAS, China

**Experimental Study of Flow-Induced Vibration (VIV) and Hydrodynamic Forces on a Horizontally-Mounted High Flexible Tensioned Riser in Uniform Cross-Flow**

B Sanaati, N Kato, H Senga, T Fujimoto, Osaka Univ, Japan

**19. FRONTIER ENERGY II: Clean Coal (V. 1)**

**Monday**                      **June 20**                      **14:00**                      Room 9

**Chair:** DS Kim, SK Energy, Korea

**Co-Chair:** S Patil, Univ of Alaska, USA

**Methanation Reaction for the Production of Synthetic Natural Gas from Synthesis Gas Produced by Coal Gasification**

KB Lee, WR Kang, SI Im, Korea Univ, Korea

**Fundamental Study on the Hybrid Fluidized Bed Combustion under Combination of Petroleum Cokes and Biomass Fuel for a Small and Mid-sized Industrial Boiler**

DH Lee, SK Lim, YJ Kim, GT Kim, SR Park, SK Energy, Korea

**The Coal Gasification Study of  $K_2CO_3$  Impregnated Lignite**

SR Park, GT Kim, JH Kim, HM Shim, JW Park, NH Ko, SK Energy Inst of Tech, Korea

**The Effect of Pressure on Coal Gasification Behaviors in a 1 Ton/Day Scale Partitioned Fluidized Bed Gasifier**

GT Jin, JH Moon, SY Lee, YC Park, HJ Ryu, Korea Inst of Energy Research, Korea

**Modeling of Coal/Biomass Gasification in a Dual Circulating Fluidized Bed Reactor**

MW Seo, SD Kim, KAIST; TDB Nguyen, YI Lim, Hankyong National Univ; SW Park, KAIST, Korea

**Process Development in the Coal Drying System**

K Oh, MK Kim, MH Yi, JH Bahng, GT Kim, SY Park, SK Energy, Korea

**20. UNDERWATER II: AUV and Robotics 1 (V. 2)**

**Monday**                      **June 20**                      **14:00**                      Room 10

**Chair:** S Yamaguchi, Kyushu Univ, Japan

**The Development of the Working AUV**

H Ishibashi, H Yoshida, T Hyakudome, T Sawa, JAMSTEC, Japan

**The Preliminary Study on a Submersible Robotic Amphibious Vehicle**

SC Yu, JH Pyo, POSTECH, Korea; P Cho, US Office of Naval Research, Japan; CS Hwang, Kyungbuk National Univ; JY Kim, Cheju National Univ, Korea

**Development of Experimental System to Study Swarm Formation by Underwater Robots**

Y Ohkubo, K Suzuki, S Suzuki, A Konno, S Ito, Kogakuin Univ; K Hirata, Y Niki, Y Ichikawa, National Maritime Research Inst, Japan

**Development of the Ocean-going Underwater Glider with Independently Controllable Main Wings, SOARER**

M Arima, Osaka Prefecture Univ; K Ishii, AAF Nassirei, Kyushu Inst of Tech, Japan

**Development of a Removable Multi-DOF Manipulator System for Man-portable Underwater Robots**

N Sakagami, K Ibata, T Ikeda, Tokai Univ; M Shibata, T Ueda, K Ishimaru, Ritsumeikan Univ; H Onishi, S Murakami, Dainippon Screen Mfg; S Kawamura, Ritsumeikan Univ, Japan

## MONDAY 16:20

### 21. LNG SLOSHING III: Sloshing Physics (V. 3)

Monday June 20 16:20 Room 1

Chair: Q Ma, City Univ, United Kingdom

Co-Chair: P-M Guilcher, HydrOcean, France

#### **Model-scale Sloshing Tests for the Validation of an Anti-sloshing Floating Blanket System**

Y Kim, SY Kim, KH Kim, Seoul National Univ; SE Jeon, YS Seo, JJ Park, SM Hwang-Bo, Samsung Heavy Industry; YJ Lee, BASF, Korea

#### **Experimental and Numerical Investigations for all Filling Levels and Irregular Excitations of the Global Forces Exerted by Fluid Motions on LNGC Prismatic Tanks Boundaries**

L Diebold, E Baudin, N Moirod, T Gazzola, Bureau Veritas, France

#### **Experimental Study on the Effect of Sloshing on Side-by-Side Moored FSRU and LNGC**

SK Cho, HG Sung, SY Hong, SW Hong, Maritime & Ocean Engineering Research Inst; YS Kim, Daewoo Shipbuilding & Marine Engineering; MK Ha, Samsung Heavy Industries; YD Choi, STX Offshore & Shipbuilding; BS Yu, Total Marine Services; RD Jang, Korean Register of Shipping, Korea

#### **Numerical Study on the Motions and Drift Forces of the Side-by-Side Moored FSRU and LNGC Containing Sloshing**

SK Cho, HG Sung, SY Hong, BW Nam, Maritime & Ocean Engineering Research Inst, Korea

#### **Amplitude-Dependent Damping of Liquid Sloshing**

B Mehl, S Schreier, Univ of Rostock, Germany

#### **A Numerical Study of the Coupling between Ship Motions and Sloshing in Frequency & Time Domain Approaches**

Y Gou, YH Kim, TY Kim, BW Nam, Seoul National Univ, Korea

#### **A Study of the Sloshing Mode on the Motion of 2D Rectangular Cylinders in Regular Waves**

DY Lee, YH Kim, HS Choi, Seoul National Univ, Korea

### 22. HYDRODYNAMICS III: MetOcean 3 (V. 3)

Monday June 20 16:20 Room 2

Chair: A Baxevani, Univ of Gothenburg, Göteborg, Sweden

#### **Infrastructure for 3D Model Reconstruction of Marine Structures**

H Kurniawati, National Univ of Singapore, Singapore; JC Schulmeister, MIT, USA; T Bandyopadhyay, National Univ of Singapore, Singapore; G Papadopoulos, FS Hover, NM Patrikalakis, MIT, USA

#### **Mapping Linear Sea Level Trends in the China Sea from Multi-mission Altimeter Measurements**

YC Cheng, OB Andersen, National Space Center, Denmark; Q Xu, Hohai Univ, China

#### **Radar and Optic Investigations of Surface Wave Variability in the Field of Inhomogeneous Currents**

V Bakhanov, N Bogatov, A Ermoshkin, O Kemarskaya, V Titov, E Zuikova, Inst of Applied Physics, RAS, Russia

#### **GPS-based Wave Observation Using a Moored Oceanographic Buoy in the Deep Ocean**

T Waseda, M Sinchi, Univ of Tokyo; H Tamura, Y Miyazawa, Y Kawai, H Ichikawa, JAMSTEC, Japan

#### **Application of LiDAR as a Measurement Tool for Waves**

MJ Allis, WL Peirson, ML Banner, Univ of New South Wales, Australia

**Accuracy Improvement of Directional Spectrum Estimation with Submerged Doppler Type Directional Wave Meter**

M Mitsui, Sonic Corp.; N Hashimoto, Kyushu Univ; H Kawai, Port & Airport Research Inst; M Yokota, Kyushu Univ; Y Kitamura, Sonic Corp., Japan

**Velocity and Temperature Distributions of Turbulent Plane Jet Interaction with the Nonlinear Opposite Progressive Gravity Waves**

HC Hsu, National Cheng Kung Univ; YY Chen, CW Su, YP Lin, National Sun Yat-sen Univ, Taiwan, China

**Successive Inverse Estimation of Directional Wave Spectra by Using Ship Motions Based on State-Space Modeling Procedure**

D Terada, A Matsuda, National Research Inst of Fisheries Engineering, Japan

**Research on Critical Depth of Water for a Deep Sea Semi-submersible Drilling Platform Based on Dynamic Positioning**

L Wang, H Yang, P Sun, Shanghai Jiao Tong Univ, China

**23. RENEWABLE ENERGY III: Offshore Wind Loads (V. 1)**

Monday June 20 16:20 Room 3

Chair: TA Fischer, Univ of Stuttgart, Germany

Co-Chair: JD Sørensen, Aalborg Univ, Denmark

**Numerical Analysis of Turbulent Flow past a Truss-tower and Implications for Offshore Downwind Turbines**

TR Hagen, M Reiso, M Muskulus, NTNU, Norway

**Rotor Design for a 10 MW Offshore Wind Turbine**

L Froyd, OG Dahlhaug, NTNU, Norway

**Tower Shadow - Experiment Comparing Wake Behind Tubular and Truss Towers**

M Reiso, G Moe, NTNU, Norway

**Wave Loads on Offshore Wind Turbines, Regular and Focused Waves**

JR Ramirez, P Frigaard, T Lykke, Aalborg Univ, Denmark

**Dynamic Ice Load Model in Overall Simulation of Offshore Wind Turbines**

S Hetmanczyk, Inst for Wind Energy & Energy System Tech, Germany; J Heinonen, Technical Research Centre of Finland, Finland

**24. ADVANCED SHIP TECH III: Optimum Design (V. 4)**

Monday June 20 16:20 Room 4

Chair: C Yang, George Mason Univ, USA

**Hull Form Design Exploration Based on the Response Surface Method**

HY Kim, George Mason Univ; SK Jeong, George Mason Univ/Tohoku Univ, Japan; C Yang, George Mason Univ; F Noblesse, NSWC-CD, USA

**Parameter Optimization on Experiment and Numerical Simulation of a SWATH**

TL Liu, SJ Wu, CM Yang, CC Lin, National Defense Univ, Taiwan, China

**The Development and Application of Prototype System of Ship Multi-disciplinary Design Optimization**

BW Feng, ZY Liu, HC Chang, XD Cheng, W Cai, Wuhan Univ of Tech, China

**Shape and Size Optimization of the Double Bottom Structure of Bulk Carrier at the Design Stage with Finite Element Analysis**

M Kitamura, Hiroshima Univ; T Uedera, Kure National College of Tech; K Hamada, Hiroshima Univ, Japan

**Application of Genetic Algorithm to Structural Design of 150KDWT**

**Tanker Using PrimeShip-HULL Rule Calculation Software**

S Hirakawa, Universal Shipbuilding; M Kitamura, M Maki Hiroshima Univ, Japan

**A Practical Study on Optimum Propeller Analysis by Using Lifting Surface Method**

B Bicer, Kobe Univ, Japan

**25. HPM III: Advanced Materials & Offshore Structures 1 (V. 4)**  
**Monday June 20 16:20 Room 5**

**Chair:** S Herion, Karlsruhe Inst of Technology, Germany

**Corrosion Protection - Robust Retrofit of a Gravity Based Production Structure in Frozen Arctic High Scour Conditions**

MB Surkein, JP LaFontaine, ExxonMobil Development, USA

**Strength of T-joint with Volumetric Surface Defect under Cyclic Inner Pressure**

P Yukhymets, EO Paton Electric Welding Inst, Ukraine

**Ferrite to Austenite Transformation Behavior of a Martensite and Bainite Microstructure with Various Heating Rate**

T Hara, G Shigesato, N Sugiyama, Nippon Steel, Japan

**In-situ EBSD Investigation of Arctic Steel at Sub Zero Temperatures**

SP Astad, Statoil; JH Pedersen, NTNU; M Karlsen, Statoil; J Hjelen, JK Solberg, NTNU; OM Akselsen, E Østby, SINTEF, Norway

**Microstructure Examination of Arctic Steel during In-situ Heat Treatment in High Resolution Scanning Electron Microscope**

SP Astad, Statoil; AJ Ensjø, NTNU; M Karlsen, Statoil; J Hjelen, JK Solberg, NTNU; OM Akselsen, E Østby, SINTEF, Norway

**Material Design Concept in Heavy Wall X100 High Strain Pipelines for Seismic Region**

J Shimamura, M Okatsu, N Ishikawa, K Nishimura, Y Murakami, JFE Steel, Japan

**High Strength Linepipes with Excellent Toughness for Corrosive Environments**

A Mannucci, P Novelli, Tenaris, Italy

**Crack Driving Force and Ultimate Strength of Thick-walled CHS X-joints with Near-toe Cracks**

XJ Wang, JF Wu, ABS; XD Qian, National Univ of Singapore, Singapore

**26. NANOMATERIALS III (V. 4)**  
**Monday June 20 16:20 Room 6**

**Chair:** HW Jin, Exxon-Mobil Research & Engineering Co, USA

**Co-Chair:** M Akinc, Iowa State Univ, USA

**Extreme High Temperature Stability and Creep Resistance of a Silicon Nitride Nanocomposite**

AK Mukherjee, Univ of California Davis, USA

**Application of High-pressure High-temperature Technique to Synthesis of Nanocomposites**

B Palosz, S Gierlotka, Inst of High Pressure Physics UNIPRESS, PAS, Poland

**The Electrochemical Preparation and Advanced Performance of Composite Coating with Amorphous and Nano-Crystalline**

DB Sun, HY Yu, XT Yuan, Univ of Sci & Tech, China

**Flame Synthesis of Nanostructured Carbon**

N Memon, J Al-Sharab, Y Jaluria, B Kear, M Chhowlla, SD Tse, Rutgers Univ, USA

**Nanotechnology in Electrochemical Energy Conversion and Storage**

H Wolfschmidt, U Stimming, Tech Univ München, Germany

**High-Pressure and High-Temperature X-ray Diffraction Studies of Ceramic Nanocomposites**

EK Akdoğan, I Savkilyildiz, B Berke, T Tsakalagos, Rutgers Univ, USA

### 27. VORTEX-INDUCED VIBRATIONS III (V. 3)

Monday June 20 16:20 Room 7

**Chair:** RF Zueck, NAVFAC-ESC, USA

**Co-Chair:** YX Wu, Inst of Mechanics, CAS, China

#### **Flexible Jumper VIV Simulation in Uniform Current**

HC Chen, K Huang, CR Chen, Texas A&M Univ, USA

#### **An Experimental Study on Dynamic Behavior of Flexible Risers under Vibration Applications in Still Water**

N Hayashi, T Matsubara, Nippon Steel Engineering; S Uto, National Maritime Research Inst, Japan

#### **Torsional VIV Damage Assessment of Multi-Planar Structures**

AR Nair, R Kadiyala, A Whooley, A Eltaher, P Jukes, MCS Kenny, USA

#### **The GulfStar Standard Floater and Its Vortex Induced Motion Model Tests**

YC Park, R Converse, William Field Services; J Zou P Poll, A Antony, Houston Offshore Engineering, USA

#### **VIV Analysis of Riser Considering Keulegan-Carpenter Number under the Top Excitation Condition**

DH Jung, HJ Kim, SH Shin, HS Lee, DS Moon, Maritime & Ocean Engineering Research Inst, Korea

### 28. Deepwater Systems & Installation (V. 1)

Monday June 20 16:20 Room 8

**Chair:** ML Duan, China Univ of Petroleum, China

#### **General Subsea Pig Launcher Concepts and their Applications to Deepwater Field Development**

RG Rinehart, Chevron Energy Technology, USA; S Sinha, Chevron Indonesia, Indonesia

#### **Research of Clamping Force of a Deepwater Flange Connecting Tool and Bearing Capacity of the Pipeline**

MZ Liu, L Bin, JH Zhang, KK Wang, CNPC Research Inst of Engineering Technology, China

#### **Floatover Installation Analysis and Its Application in Bohai Bay**

M He, RH Yuan, HL Li, WT Yu, JW Qian, AM Wang, Offshore Oil Engineering, China

#### **Numerical Investigation on the Effectiveness of the Combination of Tuned Mass Dumper with Impact Damper**

E Dehghan Niri, State Univ of New York at Buffalo, USA

#### **Experimental Study on a Stable Platform System for Shipborne Helicopter**

YM Chen, JW Ye, XL Zhang, FL Liang, South China Univ of Tech, China

#### **Examination of the Effectiveness of Modelling Towline Response using Strapdown INS Techniques**

JA MacSween, Malin Marine Consultants, UK

### 29. RENEWABLE ENERGY XVI: Tidal & Current Energy 2 (V. 1)

Monday June 20 16:20 Room 9

**Chair:** TA Newson, Univ of Western Ontario, Canada

#### **A Numerical Study of Darrieus Water Turbine**

I Paraschivoiu, NV Dy, Ecole Polytechnique de Montreal, Canada

#### **A Review of Foundation Concepts for In-Stream Tidal Turbine Systems**

TA Newson, Univ of Western Ontario, Canada; P Larkin, Senergy, UK; R Maynard, Rm Associates, UK



**Numerical and Experimental Analysis of a Shrouded Hydroturbine**

DP Coiro, F Scherillo, G Troise, U Maisto, Univ of Naples, Italy

**Experimental Tests on a Submerged Tethered System for Marine Current Energy Production**

DP Coiro, G Troise, F Scherillo, A De Marco, U Maisto, Univ of Naples, Italy

**Study of Gear Ratio in the Tidal Current Generation System**

K Naoi, M Shiono, K Suzuki, Nihon Univ, Japan

**30. UNDERWATER III: Aquabiomechanics (V. 2)**

**Monday June 20 16:20 Room 10**

**Chair:** N Kato, Osaka Univ, Osaka, Japan

**Investigation of Analysis Method of Flow Field around Flapping Wing by OpenFOAM**

S Watanabe, T Satoshi, K Akihisa, Kogakuin Univ, Japan

**Swimming and Walking Performance in Water of Robotic Turtle Robot with Fin Actuators**

N Kato, J Shimoya, E Yoshida, H Suzuki, H Senga, Osaka Univ, Japan

**A Study on a Control Method of Artificial Muscle Using Segmented Binary Control for an Up-scaled Fish Type Robot**

H Sumoto, S Yamaguchi, Kyushu Univ, Japan

**Modeling and Analysis of Variable Density Device Simulating Waterfowl Plumage Structure**

XB Yang, JH Liang, Y Li, Beihang Univ, China

**Suspension Biomechanics of Swimming Micro-organisms**

T Ishikawa, Tohoku Univ, Japan

**Dynamic Response of a Flapping Foil with a Non-sinusoidal Kinematic Motion**

JX Hu, Q Xiao, A Incecik, Univ of Strathclyde, UK

**Analysis on Swimming Behavior of Dolphin with Artificial Tail Flukes**

H Morikawa, R Mori, QL Sun, Shinshu Univ; M Nakashima, Tokyo Inst of Tech; S Ito, Kobakuin Univ; K Ueda, H Miyahara, Okinawa Churaumi Aquarium, Japan

**Mechanical Stimuli and Structural Changes in the Tunic of *Halocynthia roretzi***

Y Kato, Tohoku Gakuin Univ, Japan

**Propulsion Mechanism in Fluid Using Variable Stiffness Fin with Torsional Rectangular Elastic Plates**

S Kobayashi, H Soyano, M Nakabayashi, H Morikawa, Shinshu Univ, Japan

**TUESDAY 08:00**

**31. LNG SLOSHING IV: Sloshel (V. 3)**

**Tuesday June 21 08:00 Room 1**

**Chair:** YH Kim, Seoul National Univ, Korea

**A Mark III Panel Subjected to a Flip-through Wave Impact: Results from the Sloshel Project**

L Brosset, Gaztransport & Technigaz, France; H Bogaert, MARIN, Netherlands; P Carden, Lloyd's Register, UK; M Kaminski, MARIN, Netherlands; J Maguire, Lloyd's Register, UK; M Marhem, Gaztransport & Technigaz, France

**Full Scale Sloshing Impact Tests - Part III**

ML Kaminski, H Bogaert, MARIN, Netherlands

**Loads on Mark III Corrugations: Findings from the Sloskel Project**  
H Bogaert, MARIN, Netherlands; L Brosset, Gaztransport & Technigaz, France; ML Kaminski, MARIN, Netherlands

**Modal Testing and Model Reconciliation of the Sloskel MkIII Test Panel**  
EP Caren, JR Maguire, Lloyd's Register, UK

**Fully Coupled Modelling of Full Scale Wave Impacts on the Sloskel MkIII Test Panel**  
EP Carden, C Zegos, S Whitworth, D Radosavljevic, JR Maguire, Lloyd's Register, UK

**Using Sloskel Data to Validate and Improve LNG CCS Strength Assessment**  
J de Lauzon, L Diebold, Bureau Veritas, France

**Full Scale Test and FE Modeling of LNG MK III Containment System under Sloshing Loads**  
B Wang, YS Shin, ABS, USA

### 32. HYDRODYNAMICS IV: MetOcean 4 (V. 3)

Tuesday June 21 08:00 Room 2

Chair: MH Kim, Texas A&M Univ, USA

**Development of Support System for the Selection of Optimal Route in Stormy Weather**  
I Habu, H Furukawa, H Ibaragi, Kyushu Univ; I Aoki, Oshima Shipbuilding, Japan

**Modelling Typhoon-induced Waves and Surge in East China Sea**  
SQ Pan, Univ of Plymouth, UK; XJ Geng, Tsinghua Univ, China; YP Chen, Hohai Univ, China; XP Yu, Tsinghua Univ, China; J Wolf, National Oceanography Centre, UK

**Effects of Coriolis Force on Storm Surge along West Coast of Japan Sea**  
SY Kim, Y Matsumi, Tottori Univ; T Yasuda, H Mase, Kyoto Univ, Japan

**Analysis of Nearshore Wave Data Collected During Severe Storm Conditions**  
A Jafari, Griffith Univ, Australia

**Statistical Analysis on the Extreme Events of Big Waves under Wave Climate Change around Taiwan Waters**  
CH Hwang, Chienkuo Tech Univ; CP Tsai, National Chung Hsing Univ; H Chien, National Central Univ; WC Lee, Chienkuo Tech Univ, Taiwan, China

**Experimental Study of Effects of Building on Flooding Patterns in Coastal Cities**  
SY Sim, ZH Huang, Y Yao, Nanyang Technological Univ, Singapore

**Internal Wave Generation in Flow3D Model**  
KO Ko, Hyundai Inst of Construction Tech; JW Choi, Korea Inst of Construction Tech; SB Yoon, Hanyang Univ, Korea

**Inverse Estimation Experiment of Drag Coefficient with Propagated Wave Data**  
M Yokota, N Hashimoto, Y Tanaka, Kyushu Univ, Japan

**Storm Surge Defense Capability Assessment of a Newly-Built Sea Dike at Harbor City, Shanghai**  
LH Pan, YJ Lu, Shanghai Hydraulic Engineering Design & Research Inst; JR Zhu, East China Normal Univ; SD Xu, Southeast Univ, China

### 33. RENEWABLE ENERGY IV: Offshore Wind Floating 1 (V. 1)

Tuesday June 21 08:00 Room 3

Chair: C Capanoglu, International Design and Analysis Services, USA

**Experimental and Computational Comparisons of the OC3-HYWIND and Tension-Leg-Buoy (TLB) Floating Wind Turbine**

**Conceptual Designs**

TA Nygaard, Inst for Energy Tech; A Myhr, KJ Maus, Norwegian Univ of Life Sciences, Norway

**Model Test of the OC3-Hywind Floating Offshore Wind Turbine**

HK Shin, Univ of Ulsan, Korea

**State-of-the-art in Floating Wind Turbine Design Tools**

A Cordle, GL Garrad Hassan, UK; J Jonkman, National Renewable Energy Lab, USA

**Dynamic Mooring Line Modeling in Hydro-Aero-Elastic Wind Turbine Simulations**

BS Kallesoe, Tech Univ of Denmark, Denmark; Y Rune, Statoil, Norway

**Development of Multibody Dynamics Kernel for Motion Analysis of Floating Wind Turbine**

NK Ku, JH Cha, AR Jo, Seoul National Univ; KP Park, Daewoo Shipbuilding & Marine Engineering; S Ha, M Friebe, KY Lee, Seoul National Univ, Korea

**Dynamics of a Floating Wave Energy Platform with Three Wind Turbines Operating**

TJ Larsen, BS Kallesoe, Tech Univ of Denmark; HF Hansen, Danish Hydraulic Inst, Denmark

**Gyro Effect of Rotating Blades on the Floating Wind Turbine Platform in Waves**

T Tsubogo, H Fujiwara, Y Nihei, Osaka Prefecture Univ, Japan

**Ducted Turbine Blade Optimization Using Numerical Simulation**

M Shives, C Crawford, Univ of Victoria, Canada

**34. ADVANCED SHIP TECH IV: Impact & Earthquake (V. 4)**

Tuesday

June 21

08:00

Room 4

Chair: T Shibue, Kinki Univ, Japan

**Falling Behavior Simulation of a Standing Passenger on a High Speed Ship at the Collision Accident**

T Shibue, T Hayami, T Sawai, M Ohmasa, N Hirokawa, Kinki Univ, Japan

**Impact Analysis of Cross Sea Bridge and Ship**

ZD Zhang, L Li, XL Bai, YH Xie, Zhejiang Ocean Univ, China

**Risk Degree Analysis of Bridge Damage Caused by Collision of the Disabled Ships Based Ordered Probit Model [Proceedings only]**

LX Gan, Shanghai Jiao Tong Univ/Wuhan Univ of Tech; H Zheng, Wuhan Univ of Tech; ZJ Zou, Shanghai Jiao Tong Univ; YQ Wen, Wuhan Univ of Tech, China

**The Forecast of the Cortical Earthquakes on Variations of Strain-deformations Earth Field**

GI Dolgikh, VI Il'ichev Pacific Oceanological Inst, FEB-RAS, Russia

**Development and Application of Acceleration Monitoring-based Earthquake Alarming System for a Model Port in Korea**

CG Sun, BS Jung, YS Jo, Korea Inst of Geoscience & Mineral Resources, Korea

**Earthquake Prediction Concept, Results of Monitoring and Forecasting Experiment for Seismic Activity in Taiwan - Philippines Region**

IV Shugan, National Cheng Kung Univ, Taiwan, China; LN Doda, Research Center for Earth Operative Monitoring; OV Martynov, Tula State Univ, Russia; HH Hwung, RY Yang, National Cheng Kung Univ, Taiwan, China

**Experimental and Numerical Study on Slamming Load of the Trimaran**

S Peng, WG Wu, HX Sun, J Pan, ZY Xia, Wuhan Univ of Tech, China

**35. HPM IV: Advanced Materials & Offshore Structures 2 (V. 4)**

Tuesday

June 21

08:00

Room 5

**Chair:** P Jukes, MCS Kenny; USA

**The Research on Hysteretic Behavior of Rectangular Section Components of Cold-formed Thin-wall Steel**

YN Zhong, N Yang, Beijing Jiaotong Univ; QT Meng, Beijing Bidding for Construction Projects Management Office, China

**Dynamic Response Control of a Jacket Platform Using MR Dampers Based on an Inverse Dynamic Model**

XC Yu, HS Kang, LQ Huang, Texas A&M Univ, USA; YH Xie, Zhejiang Ocean Univ, China; Q Zhai, Univ of Wisconsin Milwaukee, USA; GJ Chen, Shanghai Jiao Tong Univ, China

**Study on the Accuracy of Influence Factor Method when Applied to Surface Cracks in a Welded Joint of a Ship Structure**

N Osawa, J Sawamura, Osaka Univ; S Okada, Nippon Kaiji Kyokai; K Shigeta, T Tsuji, Osaka Univ, Japan

**Finite Element Analyses on Fracture Toughness Demands in Butt Weld of Steel Box Column with Thick Plate**

YQ Wang, H Zhou, YJ Shi, H Chen, Tsinghua Univ, China

**Experimental Study on the Dynamic Behavior of Concrete under Tension-Compression Dynamic Stress States**

YP Song, Dalian Univ of Tech; HL Wang, Dalian Univ, China

**Polychloroprene Behaviour in Sea Water: Comparison between Accelerated and Natural Ageing**

PY Le Gac, IFREMER; V Le Saux, Y Marco, Laboratoire Bretois de Mécanique et des Systèmes, France

**Characterizing Oxygen Permeation of Polymer Materials Used for Infrastructure Repair**

R Sen, C Khoe, VR Bhethanabotla, Univ of South Florida, USA

**Comparison of Shell and Solid Elements for Hot Spot Stress Analysis of Complex Welded Joints**

G Liu, Y Huang, Dalian Univ of Tech, China

**Study on the Preciseness of Hot Spot Stress of Welded Joints Derived from Shell Finite Element Analyses**

N Osawa, Osaka Univ; N Yamamoto, Nippon Kaiji Kyokai; J Sawamura, S Maeda, H Nakajima, Osaka Univ, Japan

**Structural Optimization of Bridge Wing for Anti-Vibration Design using Genetic Algorithm**

J Noguchi, T Kiyosue, T Shimoda, H Nishikawa, N Izumi, Kawasaki Heavy Industries, Japan

**Continue at 10:30**

**Tuesday**                      **36. NANOMATERIALS IV: (V. 4)**  
**June 21**                      **08:00**                      **Room 6**

**Chair:** HW Jin, Exxon-Mobil Research & Engineering, USA  
**Co-Chair:** R Ellis-Behnke, MIT, USA & Univ of Hong Kong, China

**Bioinspired Synthesis of Nanocomposites Using Self-assembling Natural and Synthetic Polymers**

MAkinc, XP Liu, YY Hu, Iowa State Univ; Y Yusufoglu, Argonne National Lab; K Schmidt-Rohr, S Mallapragada, Iowa State Univ, USA

**Nanotechnology for Reducing Bacterial Functions**

TJ Webster, Brown Univ, USA

**Nanostructured Surfaces: Organising Atoms, Nanoparticles and Proteins to Create Functional Architectures**

RE Palmer, Univ of Birmingham, UK

**Probing Nanostructure in Functional Materials with Total Scattering**

K Page, Los Alamos National Laboratory, USA

**Novel Nanocrystalline TiO<sub>2</sub>-Coatings with High Photocatalytic Activity for Environmental Technology**

T Klassen, J-O Kliemann, H Gutzmann, F Gärtner, Helmut Schmidt Univ; D Bahnemann, Gottfried Wilhelm Leibniz Univ, Germany

**Surface Reactions of Polycrystalline Y<sub>2</sub>O<sub>3</sub> at High Pressure**

S Deutsch, JF Al-Sharab, BH Kear, OA Voronov, SD Tse, Rutgers Univ, USA

**Nano-crystals and Nano-crystallography: Ordinary Materials with Extraordinary Properties**

BF Palosz, S Stelmakh, E Grzanka, S Gierlotka, Inst of High Pressure Physics UNIPRESS, PAS, Poland; WF Palosz, Brimrose Corp, USA

**Zinc Oxide Based Nanomaterials as an Additive to Enhance the Properties of Polymer Nanocomposites**

Z. Crnjak Orel, P Podbrsec, M Bitenc, National Inst of Chemistry, Slovenia

**37. SBD I: Materials for SBD (V. 4)**

**Tuesday June 21 08:00 Room 7**

**Chair:** B Newbury, ExxonMobil Development Co, USA

**Co-Chair:** E Tsuru, Nippon Steel Corp, Japan

**Effect of Mechanical Properties on Tensile Strain Limit for Leak of High-Pressure Pipe with Surface Crack**

M Ohata, Osaka Univ; S Igi, JFE Steel; Y Takada, Osaka Univ; T Sakimoto, S Endo, JFE Steel; F Minami, Osaka Univ, Japan

**Metallurgical Design and Microstructure for High Deformability of X100 Linepipe Steel**

H Igari, H Nakamura, S Okaguchi, Sumitomo Metal Industries, Japan

**Development and Mass Production of X60 High Deformable Line Pipe Suitable for Strain-Based Design**

T Hara, Y Shinohara, N Doi, M Taro, Nippon Steel, Japan

**Evaluation of High Strain Line Pipe Material**

HY Chen, LK Ji, China National Petroleum, China

**Effects of Cross-sectional Strain Distribution on the Critical Buckling Strain of Energy Pipelines**

A Fathi, JJR Cheng, Univ of Alberta, Canada

**38. RENEWABLE ENERGY XVII: Energy & Resources (V. 1)**

**Tuesday June 21 08:00 Room 9**

**Chair:** T. Mathai, The Glosten Assoc., USA

**Performance Analysis of Ocean Geothermal Power Generation Cycle with Generator**

HJ Kim, HS Lee, DH Jung, DS Moon, KORDI, Korea; GC Nihous, Univ of Hawaii, USA

**Prospective Energy Sources for Autonomous Unmanned Underwater Vehicles**

VV Slesarenko, VV Knyazhev, Inst of Marine Tech Problems, FEB-RAS, Russia

**A Quantitative Evaluation on Habitat Network of the Clam *Ruditapes Philippinarum* in Tokyo Bay**

F Otsuka, K Masuda, T Ikoma, Nihon Univ, Japan

**Determining Renewable Energy Efficiency in Turkey: A GIS Based Solution**

E Cengiz, A Cabuk, Y Guney, Anadolu Univ, Turkey

**Determining the Most Suitable Place for Solar Farm in Eskisehir Using GIS**

S Mutlu, A Cubak, Y Guney, Anadolu Univ, Turkey

**39. UNDERWATER IV: AUV and Robotics 2 (V. 2)**

**Tuesday June 21 08:00 Room 10**

**Chair:** M Nakamura, Kyushu Univ, Japan,

**A Stream Function Approach to Design Obstacle Avoidance Path Planning Algorithm for Autonomous Underwater Vehicles**

MH Kim, LIGNEX1; JN Sur, Naval Academy, Korea

**Design, Implementation and Navigation Test of Manta-type UUV**

JY Kim, Jeju National Univ; SW Byun, Samsung Thales; SH Ko, Jeju National Univ; HD Kim, SK Lee, Pusan National Univ; KY Sohn, Korea Maritime Univ, Korea

**Performance Evaluation of MEMS-based AHRS for UUV**

A Hwang, SI Yoon, SY Lee, LIG Nex1; JS Hong, ES Choi, Microinfinity, Korea

**Field Experiments on Direction Control of AUV "MR-X1"**

M Nakamura, Kyushu Univ; S Ishibashi, JAMSTEC, Japan

**Hydrodynamic Coefficients Establish and Drag Experiment on a Depth-setting TUV System**

K Yu, GH Xu, X Shen, Huazhong Univ of Sci & Tech, China

**Chaos Anti-Control of Motor Systems of Underwater Vehicle**

YL Liu, Zhejiang Ocean Univ, China

**40. LNG SLOSHING V: Strength Assessment (V. 3)**

**Tuesday June 21 10:30 Room 1**

**Chair:** L Brosset, Gaztransport & Technigaz, France

**Co-Chair:** YI Kim, Daewoo Shipbuilding & Marine Engineering, Korea

**Development of the Response-based Strength Assessment Procedure of the LNG Cargo Containment System under Sloshing Impact Load**

YI Kim, CH Jang, JK Kang, Daewoo Shipbuilding & Marine Engineering, Korea

**Repeatability and Two-Dimensionality of Model Scale Sloshing Impacts**

A Souto-Iglesias, E Botia-Vera, Tech Univ of Madrid, Spain

**Characteristics of Dynamic Response of Mark III LNG Containment Subjected to Idealized Tri-angular Sloshing Impacts**

JH Lee, MJ Yoo, SJ Lee, Inha Univ; SC Kim, Inha Technical Collge; IS Nho, Chungnam National Univ, Korea

**Strength Assessment Procedure of LNG CCS under Sloshing Load Based on the Direct Approach**

JH Lee, SJ Lee, BJ Kim, Inha Univ; SC Kim, Inha Technical College, Korea

**Direct Assessment of Structural Capacity against Sloshing Loads Using Dynamic Nonlinear FE Analysis Including Hull Structural Interactions**

SE Chun, JO Hwang, S Yongsuk, MK Ha, SM Hwangbo, Samsung Heavy Industries, Korea; N White, ZH Wang, Lloyd's Register, UK

**Sloshing Assessment of Cargo Tank Design for Large LNG Carrier**

TH Park, MK Park, Hyundai Heavy Industry, Korea

**A Study on the Sloshing Impact Response for the Insulation System of Membrane Type LNG Cargo Containment System**

IS Nho, JM Lee, MS Ki, Chungnam National Univ; SC Kim, Inha Tech College, Korea

**41. HYDRODYNAMICS V: Tsunami (V. 3)**

**Tuesday June 21 10:30 Room 2**

**Chair:** Y-S Cho, Hanyang Univ, Korea

**The Parametric Equations on the Travel Time Estimation of Tsunami Waves Generated by Submarine Mass Failure (SMF) Located near the Coastline**

I Kilinc, A Hayir, HK Cigizoglu, Istanbul Tech Univ, Turkey

**Application of Adaptive Mesh Refinement to Tsunami Computation**

Y Watanabe, Y Mitobe, N Yasuo, Y Tomohito, Hokkaido Univ, Japan

**Full Frequency Dispersive Numerical Modelling of Tsunamis**

L Franco, Univ Roma Tre; P Sammarco, Univ Roma Tor Vergata; G Bellotti, C Cecioni, Univ Roma Tre; P De Girolamo, M Di Risio, Univ of L'Aquila, Italy

**Simulation of Solitary Breaking Waves Using a Two-Fluid Hybrid Turbulence Approach**

ZH Ma, L Qian, DM Causon, CG Mingham, Manchester Metropolitan Univ, UK

**On Step Approximation to Water-Wave Scattering by a Steep Slope**

CC Tsai, National Kaohsiung Marine Univ; TW Hsu, National Cheng Kung Univ, Taiwan, China

**Numerical Study of a Breaking Wave Threshold Parameter**

X Barthelemy, W Peirson, M Banner, Univ of New South Wales, Australia; F Dias, Univ College Dublin, Ireland

**On the Use of Finite-Fault Solution for Tsunami Generation Problems [Oral presentation]**

D Dutykh, Univ de Savoie, France; D Mitsotakis, Univ of Minnesota, USA; X Gardeil, Univ de Savoie, France; P Christodoulides, Cyprus Univ of Technology, Cyprus; F Dias, ENS-Cachan, France/University College Dublin, Ireland

**Tsunami Impact Assessment for Apra Harbor, Guam**

R Chiou, NAVFAC Engineering Service Center; KF Cheung, Univ of Hawaii; Y Wei, Univ of Washington, USA

**Development of a Nested Tsunami Propagation Model**

YS Cho, JH Kim, SH Ahn, TM Ha, Hanyang Univ, Korea

**Generation of Tsunami Hazard Map at Imwon, Korea**

YS Cho, JH Kim, Hanyang Univ, Korea

**42. RENEWABLE ENERGY V: Offshore Wind Floating 2 (V. 1)**  
**Tuesday June 21 10:30 Room 3**

**Chair:** J Jonkman, NREL, USA

**Co-Chair:** TA Nygaard, Inst for Energy Technology, Norway

**Innovative Design of a Wind Generation System for Marine Structures and Model Testing**

A Courbois, CSTB; P Ferrant, J-M Rousset, Ecole Centrale de Nantes; O Flamand, CSTB, France

**Challenges in Simulation of Aerodynamics, Hydrodynamics and Mooring Line Dynamics of Floating Offshore Wind Turbines**

D Matha, Univ of Stuttgart, Germany; A Cordle, GL Garrad Hassan, UK; R Pereira, Germanischer Lloyd Industrial Services, Germany; J Jonkman, National Renewable Energy Lab, USA

**Aero-Elastic-Control-Floater-Mooring Coupled Dynamic Analysis of Floating Offshore Wind Turbines**

MH Kim, YH Bae, Texas A&M Univ, USA; SW Im, IH Chang, RIST, Korea

**Influence of Control Strategy to Floating OWT Hull Motions by Aero-Elastic-Control-Floater-Mooring Coupled Dynamic Analysis**

YH Bae, MH Kim, Texas A&M Univ; Q Yu, KH Kim, ABS, USA

**Loads Analysis of Several Offshore Floating Wind Turbine Concepts**

A Robertson, J Jonkman, National Renewable Energy Lab, USA

**43. ADVANCED SHIP TECH V: Propulsion and Cavitation (V. 4)**  
**Tuesday June 21 10:30 Room 4**

**Chair:** SK Lee, ABS, USA

**Onboard Measurement for Verification of a Calculation Method on Decrease of Ship Speed for a RoRo Cargo Ship and Oil Tanker**  
N Sogihara, M Ueno, T Fujiwara, M Tsujimoto, N Sasaki, National Maritime Research Inst, Japan

**Performance Analysis of a Bulk Carrier in Service at Sea Using Abstract Logbook**  
S Tanaka, Y Fujita, Hiroshima Univ; JG Shi, GW Tan, Tsuneishi Shipbuilding, Japan

**Marine Propeller Noise and its Adverse Effect on Marine Mammals; Numerical Prediction and Model Scale Measurement of Large Commercial Vessels' Propeller Noise**  
HS Seol, CS Park, IS Moon, KS Kim, Maritime & Ocean Engineering Inst, Korea

**The Prediction of the Viscous Cavitation Flow around a Hydrofoil Section**  
FN Chang, United Ship Design & Development Center, Taiwan, China

**A Basic Study for Propulsive Performance Prediction of a Cascade of Wing Sails Considering Their Aerodynamic Interaction**  
T Nakashima, Y Yamashita, Hiroshima Univ; Y Nihei, Q Li, Osaka Prefecture Univ, Japan

**44. COASTAL I: Coastal Waves 1 (V. 3)**  
**Tuesday June 21 10:30 Room 6**

**Chair:** H-C Chen, Texas A&M Univ, USA

**Co-Chair:** KY Hong, Maritime & Ocean Engineering Research Inst, Korea

**Optimized Green-Naghdi Equations for the Modelling of Waves Nearshore Transformations**

F Chazel, Univ de Toulouse; D Lannes, Ecole Supérieure, F Marche, Univ Montpellier 2; P Bonneton, M Tissier, Univ Bordeaux 1, France

**Lagrangian Experiment and Solution for Progressive Gravity Waves on Sloping Bottoms**

YY Chen, MS Li, National Sun Yat-sen Univ; HC Hsu, National Cheng Kung Univ, Taiwan, China

**On the Reflection of Viscous Waves Scattering**

CC Tsai, National Kaohsiung Marine Univ; YT Lin, TW Hsu, National Cheng Kung Univ, Taiwan, China

**Wave Setup: A Non-Linear Approach**

B Shabani, P Nielsen, TE Baldock, Univ of Queensland, Australia

**Validation of a Double-Layer Boussinesq-Type Model for Highly Dispersive and Nonlinear Waves**

F Chazel, Univ de Toulouse; M Benoit, Univ Paris-Est, France

**Tidal Bore Propagation in the Garonne River**

P Bonneton, J-P Parisot, N Bonneton, N Pochon, J Van de Loock, Bordeaux 1 Univ, France

**Application of Wave Model YW-WAM to Coastal Engineering**

L Xiang, LQ Ming, Y Bo, Hohai Univ, China

**45. SBD II: Modeling in SBD (V. 4)**  
**Tuesday June 21 10:30 Room 7**

**Chair:** A Fonzo, Centro Sviluppo Materiali, Italy

**Co-Chair:** E Østby, SINTEF, Norway

**Small-Scale Testing of the Effect of Embedded Defect Position in the**



**Thickness Direction of an X65 UOE Pipe**

E Østby, B Nyhus, SINTEF; C Thaulow, NTNU, Norway

**Possibilities and Restrictions of Finite Element Modelling in Strain-based Design**

SMM Hertele, M Verstraete, W De Waele, R Denys, Ghent Univ, Belgium

**An Efficient FE-Based Probabilistic Model for Ductile Fracture Assessment of Pipelines with Surface Defects**

A Sandvik, Statoil; E Østby, SINTEF; E Berg, LINKftr; C Thaulow, NTNU, Norway

**Application of Digital Image Correlation in Testing of Weldments**

MA Verstraete, W De Waele, RM Denys, S Herteli, Univ of Gent, Belgium

**Advanced Continuum Modeling to Determine Offshore Arctic Pipeline Strain Demand Due to Ice-Gouging**

SP Lele, JM Hamilton, M Panico, H Arslan, ExxonMobil Upstream Research, USA

**Shear Generated Fracture in Predicting Oil Leak in the BP Accident**

KN Kofiani, T Wierzbicki, K Evangelos, MIT, USA

**46. GEOTECH I: Mechanics of Soils (V. 1)**

Tuesday

June 21

10:30

Room 8

**Chair:** J-W Chen, National Cheng Kung Univ, Taiwan, China

**Co-Chair:** Y-S Kuo, National Cheng Kung Univ, Taiwan, China

**Unsaturated Shear Strength Characteristics of Nak-dong River Sand**

DY Lee, Korea Inst of Construction Technology; NK Cho, Seoyeong Engineering; JM Kim, Korea Inst of Construction Technology, Korea

**Back Analysis of the Viscoelastic Parameters of Layered Soft Ground and Long-term Settlement Prediction**

DD Shi, Shanghai Maritime Univ; J Zhou, Tongji Univ; WB Liu, YB Deng, Shanghai Maritime Univ, China

**Prediction of Settlement of Cohesive Soil by Plastic Index**

CK Kim, WB Cho, JC Kim, WK Park, Daejin Univ, Korea

**Effect of Various Fines Content on the Shear Moduli of a Volcanic Soil "Shirasu"**

T Hyodo, Waseda Univ; S Yamada, Univ of Tokyo; M Hyodo, Yamaguchi Univ; T Okabayashi, Kagoshima National College of Tech, Korea

**Stratigraphy of Intertidal Flats with Various Scales and Soil Types: Sandflats, Mudflats and Subtropical Intertidal Flats**

Y Watabe, S Sassa, Port & Airport Research Inst, Japan

**Monotonic and Cyclic Experimental Results of Chamkhaleh Sand in Southern Caspian Sea**

K Fakharian, F Shabani, Amirkabir Univ of Tech, Iran

**47. FRONTIER ENERGY III: Materials for Clean Energy 1 (V. 1)**

Tuesday

June 21

10:30

Room 9

**Chair:** L Zheng, Tsinghua Univ., China

**Co-Chair:** R Palmer, Univ of Birmingham, UK

**Introductory Remarks: Nanomaterials and Nanotechnology**

Tsakalagos & Kabacoff

**Heterogeneous Catalysis for Clean Energy with Novel Size-Selected Nanocluster Powders**

V Habibpour, MY Song, ZW Wang, Univ of Birmingham; J Cookson, C Brown, PT Bishop, Johnson Matthey Tech Centre; RE Palmer, Univ of Birmingham, UK

**High-Resolution Structural and Chemical Analysis of Nanostructured Materials for Li-Ions Batteries**

ML Trudeau, R Veillette, K Zaghbi, Hydro-Quebec Research Inst, Canada

**Modern Catalytic Nanotechnologies for Sustainable Chemistry and Environmental Protection**

EM Sulman, Tver Tech Univ, Russia

**New Solid Inorganic Photovoltaics and Thermoelectrics with Nanolayered Structures**

K Xhaxhiu, A Korpa, Univ of Tirana, Albania

**48. ARCTIC MATERIALS I: Materials & Developments (V. 2)**  
Tuesday June 21 10:30 Room 10

Chair: OM Akselsen, SINTEF, Norway

**Contamination Resistant Phosphate Ceramic Cement for Arctic Applications**

N Limaye, SL Patil, PB Vohra, S Khataniar, G Chen, AY Dandekar, Univ of Alaska Fairbanks, USA

**Forgings for Low Temperature Applications - Influences of the Alloying Concept and Advanced Forging Procedures on Impact Strength and Fracture Toughness**

MT Welsch, D Bruch, Bruck Forgings, Germany; E Østby, SINTEF, Norway

**Arctic Composite Pressure Vessels**

TK DeLay, Cimarron Composites, USA

**Development of SMYS 345/420 MPa Steel Plates for Arctic Offshore Structures**

IS Suh, SH Kim, YH Park, WG Kim, JK Lee, CS Lee, POSCO, Korea

**Material Qualification for Arctic Applications**

AM Horn, Det Norske Veritas; M Hauge, Statoil, Norway

**Thermal Conductivity and Expansion of Carbon Fiber Reinforced Composites at Low Temperature**

WO Lee, SB Lee, JW Yi, MK Um, Korea Inst of Materials Science, Korea

**49. LNG SLOSHING VI: Panel 1 (V. 3)**  
Tuesday June 21 14:00 Room 1

Chair: YH Kim, Seoul National Univ, Korea

Co-Chair: F Dias, University College Dublin, Ireland

**Experiment and Analysis**

Pierre-Emmanuel de Seze, GTT, France

Mirek Kaminski, TU Delft, Netherlands

**TUESDAY 13:15**

**Keynote Presentation (MOVED TO OPENING)**  
Tuesday June 21 13:15 Room 2

**50. HYDRODYNAMICS VI: Roll/Stability (V. 3)**  
Tuesday June 21 14:00 Room 2

Chair: Wan, DC, Shanghai Jiao Tong Univ, China

**The Theoretical and Experimental Research of Fishing Vessel Stability in Beam Sea**

S Ou, XF Mao, Wuhan Inst of Tech, China; CG Liu, Inst of CISC 701, China

**An Experimental Study on Nonlinear Roll Motion & Extreme Responses of a Semi-submersible Rig**

JH Kim, YS Kim, SY Hong, BW Kim, SH Shin, Maritime & Ocean Engineering Research Inst, Korea

**Model Tests and Numerical Analyses for Parametric Roll Assessment of a Large Container Carrier**

HH Lee, Hyundai Heavy Industries, Korea; SP Kim, ABS, USA; JH Choi, JH Yang, Hyundai Heavy Industries, Korea

**On Predicting Boat Drift under Time-Varying and Uncertain Sea Environment**

Z Ni, ZP Qiu, Beijing Univ of Aeronautics & Astronautics, China; TC Su, Florida Atlantic Univ, USA

**On the Prediction of Parametric Roll Resonance by Multilayer Perceptron Neural Network**

M Míguez-Gonzalez, F Lopez-Peña, V Diaz-Casas, Univ of A Coruña, Spain; M Blanke, R Galleazzi, Tech Univ of Denmark, Denmark

**Safety of Caisson Transport on a Floating Dock**

HY Kang, MH Kim, Texas A&M Univ, USA; J Seok, JC Park, Pusan National Univ; YK Kang, Samsung C&T, Korea

**Measurement System for Hydrodynamic Forces Acting on a Largely Heeled Ship Running in Following and Quartering Seas**

A Matsuda, National Research Inst of Fisheries Engineering; H Hashimoto, Osaka Univ, Japan

**51. RENEWABLE ENERGY VI: Offshore Wind Reliability (V. 1)**  
Tuesday June 21 14:00 Room 3

**Chair:** I Langen, Univ of Stavanger, Norway

**Challenges for Risk-based Maintenance Planning for Offshore Wind Turbines**

JJ Nielsen, JD Sørensen, Aalborg Univ, Denmark

**Development of an Autonomous Meshing Tool for Multi-Dimensional Deformed Thick Plates**

P Kaeding, R Labecki, M Bojahr, R Tschullik, Univ of Rostock, Germany

**Reliability-Based Calibration of Safety Factors for Offshore Wind Turbines**

JD Sørensen, Aalborg Univ, Denmark

**Reliability on Offshore Wind Energy Platform to Dynamic Forces**

K Kawano, K Nagafuchi, Kagoshima Univ; K Venkataramana, Kumamoto Univ; T Iida, Osakasangyo Univ, Japan

**Risk Assessment and Sensitivity Analysis for Offshore Wind Turbines**

AA Taflanidis, Univ of Notre Dame, USA; E Loukogeorgaki, DC Angelides, Aristotle Univ of Thessaloniki, Greece

**An Asset Management Solution for Offshore Wind Farms Based on System Dynamics Simulation: A Case Study**

I El-Thalji, Linnaeus Univ, Sweden; JP Liyanage, Univ of Stavanger, Norway

**52. ADVANCED SHIP TECH VI: Seakeeping (V. 4)**  
Tuesday June 21 14:00 Room 4

**Chair:** KP Rhee, Seoul National Univ, Korea

**Off Design Propulsion Power Plant Investigations by Means of Free Running Manoeuvring Ship Model Tests**

S Mauro, G Dubbioso, INSEAN, Italy

**On the Flow Pattern around a Twin Rudder According to the Body Gap to Improve the Manoeuvrability of Super Yacht**

OS Gim, YG Ku, Mokpo Maritime Univ; CB Shon, Korea Maritime Univ; WJ Oh, CW Lee, GW Lee, Mokpo Maritime Univ, Korea

**Bow Design Innovations: Effects on Seakeeping Performance and Added Resistance**

MC James, DA Hudson, Univ of Southampton, UK

**Prediction of Ship Maneuvering in Non-uniform Flow Field**

H Muto, Namura Shipbuilding; Y Furukawa, H Ibaragi, I Habu, Kyushu Univ, Japan

**The Effect of Appendages on the Course Keeping Ability of a Semi-displacement Round Bilge Ship**

HS Park, DJ Kim, SK Lee, KP Rhee, Seoul National Univ, Korea

**Numerical Study about Effects of Stern Skeg on Course Stability**

H Miyazaki, M Ueno, Y Tsukada, National Maritime Research Inst, Japan

**Fully Nonlinear Seakeeping Analysis of a Container Carrier based on CFD Simulations**

SP Kim, ABS, USA; HH Lee, Hyundai Heavy Industries, Korea

**53. HPM V: Fatigue & Fracture I (V. 4)**

**Tuesday**

**June 21**

**14:00**

**Room 5**

**Chair:** HW Jin, ExxonMobil Research & Engineering, USA

**Numerical Simulation of Cleavage Crack Path in a Welded Joint**

S Aihara, N Hiroaki, Univ of Tokyo, Japan

**Drop Weight Tear Testing of Seamless Linepipe**

A Hasenhütl, M Erdelen-Peppler, Salzgitter Mannesmann Forschung; T Schmidt, V&M Deutschland, Germany

**Effect of Separation on Ductile Crack Propagation Behavior during Drop Weight Tear Test**

T Fujishiro, T Hara, Nippon Steel, Japan

**CO<sub>2</sub> Anthropogenic Pipeline Transportation**

A Lucci, G Demofonti, Centro Sviluppo Materiali; CM Spinelli, Eni Gas & Power, Italy

**CCTS (Carbon Capture Transportation & Storage) Transportation Issues**

A Lucci, G Demofonti, Centro Sviluppo Materiali; CM Spinelli, Eni Gas & Power, Italy

**54. COASTAL II: Coastal Waves 2 (V. 3)**

**Tuesday**

**June 21**

**14:00**

**Room 6**

**Chair:** R-Y Yang, National Cheng Kung Univ, Taiwan, China

**Shallow Flows in Coastal Regions**

F Lalli, A Bruschi, V Pesarino, ISPRA; P Blondeaux, Università degli Studi di Genova; M Miozzi, Università degli Studi di Roma "La Sapienza"; GP Romano, Università degli Studi di Roma "Tor Vergata"; R Verzicco, G Bittori, Università degli Studi di Genova, Italy

**Empirical Moment-based Empirical Estimation of Rayleigh-Stokes Distribution Parameters**

AH Izadparast, JM Niedzwecki, Texas A&M Univ, USA

**Experimental and Numerical Study on the Flow Field around Artificial Reef with Star Shape**

Y Liu, GH Dong, YP Zhao, YC Li, Dalian Univ of Tech, China

**Numerical Study of Solitary Wave Interaction with a Porous Barrier**

YT Wu, SC Hsiao, National Cheng Kung Univ, Taiwan, China

**Bragg Reflection of Water Waves over Triply Composite of Rectangular Bars**

LH Tsai, Inst of Transportation; TW Hsu, National Cheng Kung Univ, Taiwan, China

**Numerical Simulation of Wind Effects on Wave Overtopping by a Two-phase Solver**

TQ Li, Wuhan Univ of Tech, China

**Wave Energy Absorption Method against the Movement of Floating Aquaculture Preserve and its Practical Use**

Y Matsuuchi, Kagawa Univ; K Hamada, National Research Inst of Aquaculture; M Aminaka, T Kameyama, H Komatsu, Kagawa Univ; M Miyagawa, Kagawa Prefectural

Fisheries Experimental Station; Y Suenaga, Kagawa Univ, Japan

**Boussinesq Modeling of Regular Wave Transformation over a Idealized Fringing Coral Reef**

Y Yao, ZH Huang, EYM Lo, Nanyang Technical Univ, Singapore; SG Monismith, Stanford Univ, USA

**55. SBD III: Full Scale Testing in SBD (V. 4)**

**Tuesday June 21 14:00 Room 7**

**Chair:** E Østby, SINTEF, Norway

**Co-Chair:** B Newbury, ExxonMobil Development Co, USA

**Full Scale Bend Testing of Strain Based Designed High Grade Buried Gas Pipeline**

G Mannucci, A Lucci, Centro Sviluppo Materials; CM Spinelli, ENI Gas & Power; A Baldi, G Mascia, Univ of Cagliari, Italy

**Material Guideline on Turning Point between Wrinkle and Rupture Developed under Bending**

E Tsuru, Y Shinohara, Y Nagata, J Agata, Nippon Steel, Japan

**Tensile Strain Capacity of 48" OD X80 Pipeline in Full-scale Bending Test with High Internal Pressure**

S Igi, T Sakimoto, N Suzuki, R Muraoka, JFE Steel, Japan

**Full-Scale Bending Test of 48" X80 Line Pipes**

H Tajika, N Suzuki, JFE Steel, Japan

**Full-scale Test Protocol for Measurement of Tensile Strain Capacity of Welded Pipelines**

S Kibey, SF Lele, M Macia, DP Fairchild, WT Cheng, ExxonMobil Upstream Research; WC Kan, MF Cook, R Noecker, B Newbury, ExxonMobil Development, USA

**56. GEOTECH II: Soil Properties & Test (V. 1)**

**Tuesday June 21 14:00 Room 8**

**Chair:** SS Kim, Korea Land & Housing Corp, Korea

**Co-Chair:** Y Watabe, Port & Airport Research Inst, Japan

**Characteristics of Unfrozen Water in Soil Strength Test**

YK Seo, JH Nam, HJ Lee, Korea Maritime Univ, Korea

**Weight Line/Gravel Bed Interaction Field Model Tests**

G Saygili, PM Aas, K Tronstad, Norwegian Geotech Inst; P Pettersen, Framo Engineering, Norway

**Engineering Properties of Reconstituted Ariake Clay Subjected to Different Overconsolidation Histories**

M Tanaka, Port & Airport Research Inst; T Kamei, Miyazaki Univ, Japan

**Centrifuge Experiments of Hybrid Foundation under Combined Loading**

C Gaudin, H Mohr, B Bienen, MJ Cassidy, Univ of Western Australia, Australia; OA Purwana, Keppel Offshore & Marine, Singapore

**Ring Shear Test on Peat**

J Komatsu, Okuyama Boring Co; H Oikawa, Akita Univ; M Tsushima, Akita National College of Tech; T Ogino, Akita Univ, Japan

**Estimation of Spatial Deformation Distribution in Granular Soil Specimens by Pane Strain Test with Digital Image Analysis**

ER Jang, CK Chung, YS Choo, Seoul National Univ, Korea

**An Experimental Study on Geotechnical Properties of Micaceous Sands**

TW Feng, Chung Yuan Christian Univ, Taiwan, China

**Rubber Effects on Geotechnical Properties of Composite Geomaterial**

YT Kim, Pukyong National Univ; J Ahn, Pusan National Univ, Korea

**57. FRONTIER ENERGY IV: Materials for Clean Energy 2 (V. 1)**  
**Tuesday June 21 14:00 Room 9**

**Chair:** J Ying, National Singapore Univ, Singapore  
**Co-Chair:** A Mukherje, Univ of California Davis, USA

**Nanostructured Metal Hydrides for Hydrogen Storage**

T Klassen, U Bösenberg, C Pistidda, C Bonatto-Minella, R Gosalawit, G Lozano, K Suarez, J Bellosta von Colbe, G Barkhordarian, K Pranzas, M Dornheim, Helmholtz-Zentrum Geesthacht, Germany

**Energy Harvesting Using Piezoelectric & Electromechanical Transducers**

EK Akdoğan, I Savkilyildiz, B Berke, T Tsakalakos, Rutgers Univ, USA

**Molecular Simulation Studies of Adsorption and Diffusion Separation of CH<sub>4</sub>/H<sub>2</sub> Mixture in Metal-organic Frameworks with Interpenetration and Mixed-Ligand**

B Liu, GJ Chen, China Univ of Petroleum, China

**Nanomaterials for Clean Energy Applications**

T Tsakalakos, EK Akdoğan, Rutgers Univ, USA

**Efficient Solid-State Dye-sensitized Solar Cells Elaborated Form Laser Synthesized TiO<sub>2</sub> Nanocrystals**

H Melhem, Univ of Limoges; P Simon, CEA; C Di Bin, Univ of Limoges; Y Lecomte, CEA; B Ratier, J Bouclé, Univ of Limoges; N Herlin-Boime, CEA, France

**58. ARCTIC MATERIALS II: Steel & Weldments (V. 2)**  
**Tuesday June 21 14:00 Room 10**

**Chair:** HW Jin, Exxon-Mobil Research & Engineering Co, USA  
**Co-Chair:** M Hauge, Statoil, Norway

**Application of Electron Backscatter Diffraction (EBSD) on Face Crystallographic Orientation Studies in Arctic Steels**

P Mohseni, JK Solberg, NTNU; OM Akselsen, NTNU/SINTEF; E Østby, SINTEF, Norway

**Comparison of Hybrid Laser-Arc Welding with Conventional MIG Welding for Arctic Application**

XB Ren, NTNU; SK Å, SINTEF; OM Akselsen, NTNU/SINTEF; B Nyhus, SINTEF, Norway

**Low Temperature Toughness in a SA Welding of 420 MPA Steel**

OM Akselsen, NTNU/SINTEF; E Østby, SINTEF; C Thaulow, NTNU, Norway

**Fracture Mechanics Testing of Weldments - Surface versus Through Thickness Notching**

C Thaulow, NTNU; HI Lange, S Åldstedt, E Østby, SINTEF; OM Akselsen, NTNU/SINTEF, Norway

**Investigation of New Nanomechanical Test Methods on Arctic Steels**

BRS Rogne, C Thaulow, NTNU, Norway

**Atomistic Simulations of Semi-infinite Cracks in Bcc Iron using an Analytic Bond-order Potential**

CH Ersland, C Thaulow, NTNU; E Østby, SINTEF, Norway

**59. LNG SLOSHING VII: Panel 2 (V. 3)**  
**Tuesday June 21 16:20 Room 1**

**Chair:** Dias, University College Dublin, Ireland  
**Co-Chair:** YH Kim, Seoul National Univ, Korea

**Structures and Design**

YI Kim, Daewoo Shipbuilding & Marine Engineering, Korea  
YS Shin, ABS, USA

**60. HYDRODYNAMICS VII: Springing/Whipping (V. 3)**  
Tuesday June 21 16:20 Room 2

**Chair:** SY Hong, Maritime & Ocean Eng Research Inst, Korea  
**Co-Chair:** H Rathje, Germanischer Lloyd, Germany

**Fatigue Damage Assessment Based on Full Scale Measurement Data for the Large Container Carrier**

JB Koo, KB Jang, YS Suh, YS Kim, MS Kim, Samsung Heavy Industry, Korea; H Yu, ABS, USA; JSC Tai, Orient Overseas Container Line, Hong Kong, China

**Ship Springing Analysis by Using WISH-FLEX**

JH Kim, BC Kang, Seoul National Univ; YI Kim, Daewoo Shipbuilding & Marine Engineering; YH Kim, Seoul National Univ, Korea

**Comparison of Springing and Whipping Responses of Model Tests with Predicted Nonlinear Hydroelastic Analyses**

YW Lee, ZH Wang, N White, S Hirdaris, SM Zhang, Lloyd's Register, UK

**Numerical and Experimental Investigations of Whipping and Springing of Ship Structures**

J Oberhagemann, O el Moctar, Univ of Duisburg-Essen, Germany

**High-Frequency Ship Response Assessment of Large Containerships**

H Rathje, A Kahl, TE Schellin, Germanischer Lloyd, Germany

**Global Hydroelastic Ship Response: Comparison of Numerical Model and WILS Model Tests**

F Bigot, Q Derbanne, F-X Sireta, S Malenica, Bureau Veritas; J Tuitman, TNO, Netherlands

**Experimental Study on Torsion Springing and Whipping of a Large Container Ship**

SY Hong, BW Kim, BW Nam, Maritime & Ocean Engineering Research Inst, Korea

**A Study for Springing Problem on Very Large Ore Carrier**

JO Sun, BJ Park, KW Lee, SG Jeong, YD Choi, STX Offshore & Shipbuilding, Korea

**61. RENEWABLE ENERGY VII: Offshore Wind Resource & Farm Optimization (V. 1)**  
Tuesday June 21 16:20 Room 3

**Chair:** AJNA Sarmiento, Technical Univ of Lisbon, Portugal

**Wind Resource Estimation Using QuikSCAT Ocean Surface Winds**

Q Xu, GS Zhang, Hohai Univ, China; YC Cheng, Tech Univ of Denmark, Denmark; QY Ji, Hohai Univ, China

**The First Met-mast for Offshore Wind Farm in Korea and its Remote Sensing System**

MS Ryu, JS Lee, Korea Electric Power Corp Research Inst, Korea

**Multi-fidelity Optimization of Offshore Wind Farm Layout**

P-E Réthoré, P Fuglsang, GC Larsen, TJ Larsen, HA Madsen, T Buhl, Tech Univ of Denmark, Denmark

**Ecosystem Service Typology: A Wind Farm Siting Tool**

AR Grilli, T Lado, M Spaulding, Univ of Rhode Island, USA

**A Numerical Assessment for Wave Transformation around the Wind Farm**

CM Hsu, WL Yang, CJ Tseng, Taiwan Ocean Research Inst, Taiwan, China

**Design of Wind Power Systems for Environmental Compatibility: A Study on Offshore and Cold Climate Case from a Dependability Perspective**

I El-Thalji, Linnaeus Univ, Sweden; JP Liyanage, Univ of Stavanger, Norway

**Framework to Assess System Risks Associated with Design and Deployment of Large Scale Offshore Wind Farms in Northern Context**

R Tiusanen, J Jännes, VTT Technical Research Centre of Finland, Finland; JP Liyanage, Univ of Stavanger, Norway

**62. ADVANCED SHIP TECH VII: Fatigue Strength (V. 4)**  
Tuesday June 21 16:20 Room 4

**Chair:** HW Jin, ExxonMobil Research & Engineering, USA

**Fatigue Assessment of a Large Container Ship Considering Influence of Thickness and Material**

OS Kwon, DH Kim, WS Kim, Hyundai Heavy Industries, Korea

**Study on the Effect of Storm Duration Fluctuation on the Accuracy of Fatigue Assessment of Ship Structural Members**

FA Prasetyo, N Osawa, M Minoura, J Sawamura, Osaka Univ, Japan

**Comparison of Some Formulas for the Fatigue Damage from Multimodal Broadband Loads**

Z Guédé, M Olagnon, IFREMER, France

**Evaluation of Rule-Based Fatigue Design Loads Associated at a New Probability Level**

Q Derbanne, F Rezende, G de Hauteclocque, XB Chen, Bureau Veritas, France

**Spectral Fatigue Analysis of a Transportation Barge**

A Negi, SS Dhavalikar, Indian Register of Shipping, India

**63. HPM VI: Fatigue & Fracture II (V. 4)**  
Tuesday June 21 16:20 Room 5

**Chair:** DP Fairchild, ExxonMobil Upstream Research Co, USA

**Application of BS7910 Fatigue Assessment Standard in Offshore Engineering**

CR Li, ZT Fang, CNPC, China

**Research Progress of Methods to Improve Fatigue Strength of Welded Structures**

ZT Fang, DY Tang, YH Hu, CR Li, CNPC, China

**Influence of Environmental and Mechanical Parameters on Fatigue Behavior of Metals: Implications on Fatigue life Assessments**

TM Ahmed, Wood Group Integrity Management, USA

**Effects of Post Weld Treatment and Loading Condition on the Fatigue Life of Ultra High Strength Steels**

T Ummenhofer, S Herion, R Puthli, P Weidner, Karlsruhe Inst of Tech, Germany

**Fatigue Crack Growth Behaviour of Steel Connections under Combined Actions Using Boundary Element Method**

HB Liu, XL Zhao, Monash Univ, Australia

**Low Cycle Fatigue Behaviour of High-strength Steel Butt Welds**

S Herion, J Hrabowski, T Ummenhofer, Karlsruhe Inst of Tech, Germany

**Dependency of Static and Fatigue Resistance of Steel Members on Wall Thickness and Temperature**

J Hrabowski, S Herion, Center for Competence for Tubes and Hollow Sections, Germany

**64. COASTAL III: Tsunami & Storm Surge (V. 3)**  
Tuesday June 21 16:20 Room 6

**Chair:** H Kawai, Port & Airport Research Inst, Japan

**An Experimental Study of Reduction of Tsunami Inundation by Layered Coastal Vegetations**



ZH Huang, YYao, SY Sim, JYR Chan, KS Lee, Nanyang Technological Univ, Singapore

**Disaster Investigation and Failure Analysis of Debris-flow at Liugui Town, Kaohsiung, Taiwan on August 8, 2009 Morakot Typhoon**

DH Hsiao, CS Hsieh, National Kaohsiung Univ of Applied Sci, Taiwan, China

**Numerical Model Research of Extreme Water Level of Multiyear Return Period in Bohai Sea**

JC Zuo, SD Zhang, YQ Yang, Hohai Univ; L Mu, National Marine Data & Informational Service, China

**Adaptive Measures for Future Storm Surge and Coastal Hazards Considering Multi-decadal Fluctuation of Climate Change in Western North Pacific**

HS Lee, T Yamashita, Hiroshima Univ, Japan

**The 2010 Chilean Tsunami Observed on the Japanese Coast by GPS Buoys, Seabed Wave Gauges and Coastal Tide Gauges of NOWPHAS**

H Kawai, M Satoh, M Miyata, T Kobayashi, Port & Airport Research Inst, Japan

**Numerical Modelling of Sediment Siltation in Channel due to Typhoon**

HB Zhao, T Xu, Tianjin Research Inst of Water Transport Engineering, China

**Simulating a Typhoon Storm Surge in the Bohai Sea Using a Coupled Model**

L Xiang, Y Bo, LQ Ming, Hohai Univ, China

**Analysis of Storm Surge and its Numerical Simulation in Jiangsu Offshore Areas, China**

Y Tan, Hohai Univ, China

**Effect of the Sea Level Variation on Storm Surge in the East China Sea**

J Li, L Du, JC Zuo, F Han, Ocean Univ of China, China

**65. SBD IV: Fracture Mechanics in SBD (V. 4)**

**Tuesday June 21 16:20 Room 7**

**Chair:** E Tsuru, Nippon Steel Corp, USA

**Co-Chair:** D McColskey, NIST, USA

**Evaluation for Fracture Toughness in Welded X80 Linepipes**

Y Shinohara, E Tsuru, T Hara, Nippon Steel, Japan

**Constraint-Based Assessment of CTOD Toughness Requirement for High-Strain Line**

F Minami, Y Takashima, M Ohata, Osaka Univ, Japan

**A New Assessment Approach for ECA of Clad and Lined Pipes Based on Shell and Line-Spring Finite Elements**

E Olsø, SINTEF; E Berg, LINKfr; B Nyhus, SINTEF; C Thaulow, NTNU; E Østby, SINTEF

**DNV's Strain-Based Fracture Assessment Approach for Pipeline Girth Welds**

SL Bjerke, S Wastberg, Det Norske Veritas, Norway

**A Multi-Tiered Procedure for Engineering Critical Assessment of Strain-Based Pipelines**

DP Fairchild, M Macia, S Kibey, V Krishnan, F Bardi, H Tang, ExxonMobil Upstream Research, USA

**66. GEOTECH III: Soil Dynamics & Liquefaction (V. 1)**

**Tuesday June 21 16:20 Room 8**

**Chair:** JC Cao, SBM Atlantia, USA

**Co-Chair:** YK Seo, Korea Maritime Univ, Korea

**Unconfined Compressive Strength Characteristics of Remolded and**

**Undisturbed Peat Consolidated under Cyclic Loading**

M Tsushima, Akita National College of Tech; H Oikawa, T Ogino, Akita Univ; J Komatsu, Okuyama Boring Co, Japan

**Shear Strength Variation of Clay under Dynamic Loading**

Y Hong, Qingdao Technological Univ, China

**Soil Deformation during Pipe Uplift in Liquefiable Soil**

SC Chian, J Wang, SK Haigh, SPG Madabhushi, Univ of Cambridge, UK

**Evaluation of Dynamic Group Pile Effect in Dry Sand by Centrifuge Model Tests**

MM Kim, SH Cha, JI Choi, MT Yoo, JT Han, EK Yang, Seoul National Univ, Korea

**Long Term Behaviour of Lateral Dynamically Loaded Steel Grout Joints**

NF Gersøe, N-E Ottesen Hansen, LICEngineering, Denmark

**The Effect of Plasticity on Static and Cyclic Behavior of Low-Plasticity Mississippi River Valley Silt**

SY Wang, R Luna, Missouri Univ of Sci & Tech, USA

**67. OCEAN MINING I: Gas Hydrates – Modeling (V. 1)**

**Tuesday June 21 16:20 Room 9**

**Chair:** H Minagawa, AIST, Japan

**Co-Chair:** GJ Chen, China Univ of Petroleum, China

**Experimental and Modeling Study on Kinetics of Gas Hydrate Formation in Spray Tower**

QL Ma, SX Zhang, GJ Chen, China Univ of Petroleum, China

**Effect of Clay Particle for Methane Hydrate Formation - Dissociation Behavior**

T Kawamura, T Tetsu, T Tsubaki, S Hirabayashi, Y Yamamoto, K Ogasawara, F Kiyono, AIST, Japan

**Effect of Micro-Sized Geometrical Constraint on Swapping Phenomena between CH<sub>4</sub> Molecules in Hydrate Cages and CO<sub>2</sub>+N<sub>2</sub> Mixed Gas Molecules [Oral presentation]**

H Lee, DO Kim, DY Koh, KAIST; YW Seo, Changwon National Univ, Korea

**Static and Dynamic Mechanical Behavior of Gas Hydrate Sediment**

XB Lu, XH Zhang, SY Wang, QP Li, Inst of Mechanics, CAS, China

**68. ARCTIC MATERIALS III: Weldment & Coatings (V. 2)**

**Tuesday June 21 16:20 Room 10**

**Chair:** C Thaulow, NTNU, Norway

**Co-Chair:** AM Horn, Det Norske Veritas; Norway,

**Crystal Plasticity Modeling of the Local Crack Tip Stress Field**

A Kane, E Østby, SINTEF Materials and Chemistry, Norway

**Fracture Toughness Scatter and Effect of Constraint in Weld Thermal Simulated HAZ Microstructures at -60°C**

E Østby, SINTEF; C Thaulow, NTNU; OM Akselsen, SINTEF, Norway

**Statistical Interpretation of Fracture Toughness Test Data for Qualification of Weldability and Integrity Assessment of Arctic Structures**

M Hauge, Statoil, Norway

**Fracture Driving Forces of Cracked Girth Welds with Mechanical Heterogeneity for X80 Pipes**

QR Xiong, Tubular Goods Research Inst of CNPC; L Yan, JX Zhang, Xian Jiaotong Univ; YR Feng, HY Chen, WW Zhang, Tubular Goods Research Inst of CNPC, China

## WEDNESDAY 08:00

**69. RISK & RELIABILITY I (V. 4)**  
Wednesday June 22 08:00 Room 1

**Chair:** M Fujikubo, Osaka Univ, Osaka, Japan

**Application of a Particle Filter-based Subset Simulation to the Reliability Assessment of a Marine Structure**

Z Guide, IFREMER, France; A Tantar, E Tantar, Univ of Luxembourg, Luxembourg ; P Del Moral, Centre de Recherche Bordeaux Sud-Ouest & Inst de Mathematique de Bordeaux, France

**Numerical Simulation of Fire Suppression in a Ship Accommodation Deck Using CFD**

Shivaji Ganesan T, A Lal, AR Kar, Indian Register of Shipping, India

**Structural Reliability Prediction by an Interactive Finite Element-based Method**

AU Ibekwe, YC Pu, RS Dow, Newcastle Univ, UK

**Risks in Docking Projects for Oil Tankers**

JE Modica, Transpetro; MR Martins, Univ de São Paulo, Brazil

**Reliability Assessment of Coupled Spar Platform**

M Jameel, Univ of Malaya, Malaysia; S Ahmad, IIT Delhi, India

**70. HYDRODYNAMICS VIII: Dynamics 1 (V. 3)**  
Wednesday June 22 08:00 Room 2

**Chair:** HS Choi, Seoul National Univ, Korea

**Co-Chair:** CG Mingham, Manchester Metropolitan Univ, UK

**Validation of GulfStar Global Responses in Central CoM Irregular SeasL Model Tests vs Analysis**

X Xu, X Li, HN Lu, LF Xiao, Shanghai Jiao Tong Univ, China

**UNIOM for Vertical Motion of a Structure in the High Seas**

S Rajendran, Instituto Superior Tecnico, Portugal; CH Kim, Texas A&M Univ, USA; SH Kwon, Pusan National Univ, Korea

**On a Mathematical Model for the Hydrodynamic Interaction of Ships in Tandem**

JR Souza Jr, CG Ragazzo, LL de Cerqueira, Univ of São Paulo, Brazil

**Motion Responses of a Circular Cylinder with a Heave Plate in Waves**

HJ Koh, IH Cho, Jeju National Univ, Korea

**Numerical Simulation for Truncated Model Tests of Deepwater Semi-submersible Platform with Viscous Damper Compensated System in Mooring Lines**

DS Qiao, H Zhu, Harbin Inst of Tech; JP Ou, Dalian Univ of Tech, China

**Computation of Wave Drifting Forces on an Elastic Structure**

F Lin, N White, M Johnson, Lloyd's Register, UK; E Li, R Byers, Martec, Canada

**Numerical and Experimental Study on Interaction of Extreme Waves with a Floating Body**

XZ Zhao, CH Hu, Kyushu Univ, Japan; ZC Sun, Dalian Univ of Tech, China

**71. RENEWABLE ENERGY VIII: Wave Energy 1 (V. 1)**  
Wednesday June 22 08:00 Room 3

**Chair:** S Nagata, Saga Univ, Japan

**A Finite Element Model for Efficiency of a Moored Floating OWC**

**Device**

J-R P Nader, SP Zhu, P Cooper, B Stappenbelt, Univ of Wollongong, Australia

**Performance Assessment of the Pico OWC Power Plant Following the EquiMar Methodology**

A Pecher, Aalborg Univ, Denmark; I Le Crom, Wave Energy Centre, Portugal; JP Kofoed, Aalborg Univ, Denmark; F Neumann, Wave Energy Centre, Portugal

**Consideration on Experimental Data Analysis Method and Equivalent Linearization for Nonlinear Load of OWC Type Wave Power Generation**

M Suzuki, Univ of Tokyo, Japan

**Extreme Value Analysis of Wave Energy Converters**

KJ Doherty, Aquamarine Power; M Folley, Queen's Univ, UK; R Doherty, Univ College Dublin, Ireland

**Fully Nonlinear Simulation of Wave Interaction with Fixed and Floating Wave Energy Devices**

ZZ Hu, DM Causon, CG Minham, L Qian, Manchester Metropolitan Univ, UK

**A Study of Modeling Point Absorber Wave Energy Conversion Systems: RANS CFD, Potential Flow and Empirical Approach**

YH Yu, Y Li, National Renewable Energy Lab, USA

**Statistical Availability Analysis of a Wave Energy Converter**

KJ Doherty, K Abdulla, J Skelton, P O'Kane, Aquamarine Power, UK; R Doherty, Univ College Dublin, Ireland; G Bryans, Aquamarine Power, UK

**72. LNG FPSO/FSRU & TOPSIDE (V. 1)****Wednesday****June 22****08:00****Room 4****Chair:** SY Hong, Maritime & Ocean Eng Research Inst, Korea**Study on the Development of Super Large LNG Storage Tank**

MS Kim, KW Lee, JH Kim, KM Lee, Korea Gas, Korea

**Structural Analysis and Design of Anchor Strap Integration with Corner Protectors in a Large Scale LNG Storage Tank**

CZ Jin, KK Jin, SK Ha, Hanyang Univ; HS Seo, IS Yoon, KOGAS, Korea

**The Application of Green Insulator into SPB Cargo Containment System**

JJ Kim, JH Bae, JN Lee, KH Joh, MK Ha, Samsung Heavy Industries, Korea

**Improvement Methods on Offloading Operability of Side-by-Side moored FLNG**

MS Kim, HS Jeong, Offshore Tech Research; HW Kwak, HJ Kim, Samsung Heavy Industries; BW Kim, Offshore Tech Research; MK Ha, Samsung Heavy Industries, Korea

**Safety Assessment of Ship-to-Ship Lightering Operations by Means of Collision Danger Zones Due to Interaction Effects**

K Kirimoto, D Husjord, E Pedersen, NTNU, Norway

**A Study on SPM Mooring System for Side-By-Side Two Vessels**

Z Zhang, FloaTEC, USA; MH Kim, Texas A&M Univ, USA; Y Zong, Keppel Offshore & Marine Tech, Singapore

**Development of Risk-based Inspection Method for LNG Plant**

SC Choi, WJ Kim, JC Ha, YD Jo, Korea Gas Safety Corp, Korea

**The Study on Natural Gas Liquefaction Cycle Development for LNG-FPSO**

SG Lee, KH Choe, CG Lee, YM Yang, KOGAS, Korea

**Assessing Structural Safety of Inner Hull Structure under Cryogenic Temperature**

SM Han, JH Bae, ME Ha, KH Joh, YS Suh, Samsung Heavy Industries, Korea

**Continue 10:30**

**73. HPM VII: Corrosion (V. 4)**  
**Wednesday June 22 08:00** Room 5

**Chair:** KY Kim, POSTECH, Korea

**Design of a Cathodic Protection System for a Refurbished Jetty**  
MB Surkein, JP LaFontaine, RE Tanner, ExxonMobil Development, USA

**Effect of Microstructure on Electrochemical Property and Hydrogen Diffusion Behavior of Pressure Vessel Steel**  
KY Kim, SJ Kim, POSTECH; HG Jung, POSCO, Korea

**Steel Constructions Corrosion Wear Processes Modelling of Sea Hydraulic Engineering Structures**  
AT Bekker, RG Kovalenko, VS Lyubimov, LV Kim, Far-Eastern National Tech Univ, Russia

**Phase-field Model for the Corrosion and Cracking of Metals in Aqueous Environments**  
E Fried, McGill Univ, Canada; MN da Silva, FP Duda, COPPE/UFRJ, Brazil

**A Discussion of Relationship between Corrosion Ratio of Reinforcement and Crack Width**  
ZQ Ying, H Lv, LW Su, CCCC Fourth Harbor Engineering, China

**Influence of Environmental Factors on Corrosion Fatigue Properties of Seamless Linepipes**  
J Nakamura, K Kobayashi, T Omura, K Hitoshio, Sumitomo Metal Industries, Japan

**Condensing Corrosion Modelling, Reality and Design in Deep Water Wet Gas Pipelines**  
C Selman, Wood Group Integrity Management, Australia

**The Corrosion Behavior of X70 Steel in the Supercritical CO<sub>2</sub> mixed with SO<sub>2</sub> and Saturated Water**  
Y Xiang, Z Wang, XX Yang, WD Ni, Z Li, Tsinghua Univ, China

**Effect of Sour Service Environment on Sulfide Stress Cracking Resistance of X65 Reeled Linepipe and Girth Welds**  
WH Van Geertruyden, L De Pari, CC Monahan, ExxonMobil Development, USA

**Corrosion-Sensing Coatings for Steel and Aluminum Alloys**  
HG Wheat, G Liu, A Alonzo, K Johnson, Univ of Texas at Austin, USA

**74. COASTAL IV: Current & Waves (V. 3)**  
**Wednesday June 22 08:00** Room 6

**Chair:** B Teng, Dalian Univ of Technology, China

**Co-Chair:** Y Yamamoto, Tokai Univ, Japan

**Application of the COHERENS-SED Model at Offshore Area of the Yellow River Delta**  
JJ Qi, FL Long, ZQ Yin, QH Li, SINOPEC, China

**Numerical Study on Current and Sediment Characteristics with 3D Numerical Model in Beilun Estuary**  
JH Zheng, YH Zhao, Hohai Univ; DW Wang, CCCC Shanghai Waterway Engineering Design & Consulting, China

**Numerical Analysis of Current Characteristics in Submerged Tidal Inlet off Jiangsu Coasts**  
JH Zheng, YH Zhao, Hohai Univ; KF Chen, Hohai Univ/Nanjing Hydraulic Research Inst; P Liu, Hohai Univ; C Tang, CCCC Second Harbor Consultants, China

**Characteristics of the Current Pattern near the Entrance of Keelung Harbor**  
SS Hsiao, HM Fang, National Taiwan Ocean Univ; LM Chern, National Kaohsiung Marine Univ; SY Wang, National Taiwan Ocean Univ; CL

Ting, National Taiwan Univ, Taiwan, China

**Mapping Surface Current around Taiwan — Some Preliminary Results**

WC Yang, EY Liang, YJ Wang, SH Chen, Taiwan Ocean Research Inst, Taiwan, China

**Numerical Study on Tidal Upwelling Over the Sill in the Lombok Strait (Indonesia)**

IG Hendrawan, K Asai, Yamaguchi Univ, Japan

**Three Dimensional Numerical Modelling of the Wave-Induced Current Characteristics for Muddy Coasts**

MX Xie, Tianjin Research Inst of Water Transport Engineering, China

**Numerical Simulation of the Flow Field around Fishing Net under Current**

YP Zhao, X Liu, GH Dong, YC Li, Dalian Univ of Tech, China

**75. PIPELINES & RISERS I: Riser Integrity (V. 2)**

**Wednesday June 22 08:00 Room 7**

**Chair:** D A G Walker, BP, UK

**Study on Weight-on-Bit Fluctuations for Coring Operations on the D/V Chikyu during the Nankai-trough Seismogenic Zone Experiments**

Y Shinmoto, T Miyazaki, E Miyazaki, K Wada, JAMSTEC, Japan

**Hybrid Riser Tension Monitoring for BP Angola Block 31 NE [Oral presentation]**

N Willis, Intecsea UK; D McCann, Schlumberger Oilfield UK; J Rutten, BP UK, UK; R de Haas, Heerema Marine Contractors, Netherlands

**Approach to Validate Deepwater Riser Design: Challenges in Selecting an Effective Spar Motion Monitoring System**

P Enuganti, M Campbell, 2H Offshore; Y Constantinides, Chevron, USA

**Integrity Management System for Work-over Risers (WORS)**

RH Kirkvik, Kongsberg Oil & Gas Technologies; T Berge, Statoil, Norway

**Riser AUT/NDT Technology Pre-qualification Program**

TA Widener, H Wang, W Kan, C Monahan, J Sutherland, ExxonMobil Development, USA

**Fatigue Damage of Flexible Risers due to Combined Swell and Sea Waves**

KS Francis, MCS Kenny, USA

**A Case Study of Structural Evaluation of a Flexible Riser with Tensile Armour Damaged**

CAD Lemos, GC Campello, Petrobras; JRM Sousa, COPPE/UFRJ, Brazil

**76. GEOTECH IV: Foundations & Anchors (V. 1)**

**Wednesday June 22 08:00 Room 8**

**Chair:** C. Gaudin, Univ of Western Australia, Australia

**Numerical Analysis of Uplift Behavior of Ground Anchor Underreamed by Pulse Discharge Technology**

SR Lee, HK Park, KAIST; TH Kim, KS Cha, Daewoo E&C, Korea

**Interactive Behavior of Under-reamed Anchors in Sand**

ST Hsu, Chaoyang Univ of Technology, Taiwan, China

**Bearing Capacity of Strip Foundations on Undrained Two-layered Subsoil Subjected to V-H Loading**

YG Zhan, MT Luan, Dalian Univ of Tech; FF Yuan, Inst of Rock & Soil Mech, CAS, China

**Developing a New Force-resultant Model for Predicting the Behavior of Spudcans Deeply Embedded in Soft Clays: A Research Strategy**

YH Zhang, B Bienen, MJ Cassidy, Univ of Western Australia, Australia

**Modified Plastic Limit Solution to Predict the Interaction Response**

**of Plate Anchors under Combined Translational and Torsional Undrained Loading**

H Nouri, G Biscontin, C Aubeny, Texas A&M Univ, USA

**Spudcan Foundations on Multi-Layered Soils with Interbedded Stiff Clay and Sand Layers**

MS Hossain, MF Randolph, X Dong, Univ of Western Australia, Australia

**Effective Stress Analysis of Keying of Plate Anchors**

D Wang, MF Randolph, Univ of Western Australia, Australia

**Study on Behavior of Vertically Loaded Plate Anchor (VELPA) in Soft Clay**

JC Cao, SBM Atlantia, USA; S Alhayari, SBM, Monaco

**Model Tests and Analysis Method on Cyclic Bearing Capacity of Suction Caissons with the Taut Mooring System in Soft Clays**

JH Wang, JL Liu, Tianjin Univ, China

**77. OCEAN MINING II: Gas Hydrates – Geotechnical (V. 1)**  
**Wednesday June 22 08:00 Room 9**

**Chair:** K Suzuki, AIST, Japan

**Co-Chair:** QP Li, CNOOC, China

**Application of Nonlinear Elastic Constitutive Model to Artificial Methane-hydrate-bearing Sediment Sample**

K Miyazaki, K Aoki, N Tenma, Y Sakamoto, AIST; T Yamaguchi, Toho Univ, Japan

**Capillary Pressure Measurement of Unconsolidated Turbidite Sediment Sampled from Methane Hydrate Bearing Zones near NE-Nankai Trough**

K Suzuki, H Narita, AIST, Japan

**Deformation of Methane Hydrate Bearing Sand during Dissociation**

M Hyodo, Y Nakata, N Yoshimoto, J Yoneda, Y Imamura, Yamaguchi Univ, Japan

**Localized Plane Strain Deformation of Depressurized Methane Hydrate-bearing Sand**

J Yoneda, M Hyodo, Y Nakata, N Yoshimoto, Y Imamura, Yamaguchi Univ, Japan

**Geological and Geochemical Characteristics of Gas Hydrate in the Qilian Permafrost, Qinghai Province, China [Proceedings only]**

Lu, Z, Institute of Mineral Resources, CAS, China, et al

**Numerical Simulation of the Responses of the Seabed on the Dissociation of Gas Hydrates**

QP Li, CNOOC; XB Lu, Inst of Mechanics, CAS, China

**78. ARCTIC I: Ice Observation & Model (V. 2)**  
**Wednesday June 22 08:00 Room 10**

**Chair:** J Su, Ocean Univ of China, China

**Measurement of Sea Ice Thickness in the Arctic Ocean, July-August 2010**

SY Jeong, Maritime & Ocean Engineering Research Inst, Korea

**Snow and Ice Thickness Properties of Canadian Fjord, Lake Melville Located Along the Labrador Coast**

SJ Prinsenberg, IK Peterson, JS Holladay, L Lalumiere, Bedford Inst of Oceanography, Canada

**Thermodynamic Modeling of Hummocks Evolution**

B Ivanov, L Andreev, Arctic & Antarctic Research Inst, Russia

**Seasonal Simulations of a Coupled Ice-Ocean Model in the Bohai Sea**

Y Liu, QZ Liu, National Marine Environmental Forecasting Center; J Su, Ocean Univ of China; S Bai, MN Tang, National Marine Environmental Forecasting Center, China

**Fundamental Study about the Initial Pancake Ice Formation**

Y Matsubayashi, T Ito, S Sakai, Iwate Univ, Japan

**Seasonal Sea-Ice Prediction in the NCEP Climate Forecast System**

XR Wu, R Grumbin, S Saha, HL Pan, S Lord, NOAA, USA

**Aerial Observations of Melt Pond Distributions in Arctic Summer 2008**

P Lu, ZJ Li, RB Lei, R Zhang, Dalian Univ of Tech, China

**Discussion on the Simulation of Arctic Intermediate Water under NEMO Frame**

X Li, J Su, Ocean Univ of China, China

**The Arctic Sea Ice Surface Roughness Estimation and Application**

XY Wen, CJ Xue, Q Dong, Center for Earth Obs & Digital Earth, CAS, China

**79. RISK & RELIABILITY II (V. 4)**

Wednesday

June 22

10:30

Room 1

Chair: K Kawano, Kagoshima Univ, Japan

**Time-Dependent Reliability Analysis of Offshore Platforms Based on Random Process Theory**

BT Xie, CNOOC, China

**Risk and Reliability Analyses for Driving Design Improvements in Offshore Engineering**

S Sivandran, D Ruf, Bureau Veritas, France

**The Preliminary HAZOP: An Advocation for Use Early-on in the Design Process**

B Wittkower, JP Kenny; B Singh, Wood Group Integrity Management; P Jukes, MCS Kenny; A Botto, M Hull, Wood Group Integrity Management; D Kehn, Chevron, USA

**Selection Method of Maintenance Policies Based on Reliability Techniques: Case Study on Steering Gear System**

EM Portugal Hidalgo, DW Roldan Silva, GF Matha de Souza, Univ of São Paulo, Brazil

**Practical Application of FSA to Collision Accidents between Fishing Vessels and Cargo Vessels**

T Shinoda, Kyushu Univ; Y Tamura, ABS, Singapore

**On the Study of a Practical LCA Method for Steel Environmental Assessment of Marine Structure in China Using Chinese Environmental Impact Style and Standard Human Equivalence**

W Cai, FL Shi, W Laio, Wuhan Univ of Tech, China

**80. HYDRODYNAMICS IX: Dynamics 2 (V. 3)**

Wednesday

June 22

10:30

Room 2

Chair: M Minoura, Osaka Univ, Japan

**Numerical Methods for the Prediction of Unsteady Performance of Marine Propellers and Turbines**

S Kinnas, L He, W Xu, Univ of Texas at Austin, USA

**Numerical Modeling of Internal Waves and Their Influence on Deepwater Floating Systems in South China Sea**

NV Kurup, S Shan, Houston Offshore Engineering, USA; ZM Shi, CNOOC; WJ Miao, Harbin Engineering Univ, China

**Influence of a Side-Hull Position on Dynamic Behaviors of a Trimaran Running in Following and Quartering Seas**

H Hashimoto, S Amano, Osaka Univ; A Matsuda, National Research Inst of Fisheries Engineering, Japan

**Hydrodynamic Study on Added Resistance by Means of Unsteady Wave Analysis Method**

M Kashiwagi, T Sasakawa, T Wakabayashi, Osaka Univ, Japan



**Research on Resistance Performance Optimization of A-frame Struct  
SWATH**

YH Li, Y Hong, Shanghai Jiao Tong Univ, China

**Second Order Motion Responses of Semi-submersibles: Numerical  
and Experimental Study**

VJ Kurian, MA Yassir, IS Harahap, Universiti Teknologi PETRONAS,  
Malaysia

**81. RENEWABLE ENERGY IX: Wave Energy 2 (V. 1)**

**Wednesday June 22 10:30 Room 3**

**Chair:** AJNA Sarmiento, Technical Univ of Lisbon, Portugal

**Co-Chair:** YH Yu, National Renewable Energy Lab, USA

**Numerical Analysis on Primary Conversion Efficiency of Floating  
OWC-type Wave Energy Converter**

S Nagata, K Toyota, Y Imai, T Setoguchi, MAH Mamun, Saga Univ,  
Japan

**Study of Energy Absorbing from Ship Roll**

JY Liu, H Yi, YF Zhang, YH Li Shanghai Jiao Tong Univ, China

**Effect of Inlet Geometry Modification of Wave Conversion System on  
the Buoy**

JS Oh, SH Han, KJ Jo, Korea Maritime Univ, Korea; JM Kim, C  
Johnstone, Univ of Strathclyde, UK

**Experimental Study on a Floating Structure with a U-Tube**

CC Huang, DC Lai, MF Lee, YH Lin, National Sun Yat-sen Univ, Taiwan,  
China

**Small Buoys for Wave Energy Harvesting: Experimental and  
Numerical Modeling Studies**

AR Grilli, ST Grilli, Univ of Rhode Island; SP Bastien, RB Sepe, Electro  
Standards Lab; H Vincent, ML Spaulding, Univ of Rhode Island, USA

**82. HPM VIII: Advances in Welding Technology 1 (V. 4)**

**Wednesday June 22 10:30 Room 5**

**Chair:** H Murakawa, Osaka Univ, Japan

**Control of the Excessive Welding Distortion during the  
Manufacturing of Aluminum SPB Type LNG Tank**

DJ Lee, HG Kim, SB Shin, Hyundai Heavy Industries, Korea

**Prediction of Welding Distortion of Thin Deck Plate Considering  
Assembly Boundary Condition**

TJ Kim, CD Jang, Seoul National Univ; HC Song, GH Lee, Mokpo  
National Univ, Korea

**Prediction and Control of Laser Welding Deformation of Sandwich  
Panel Using Shell Element**

JW Kim, CD Jang, Seoul National Univ; YT Kim, Daewoo Shipbuilding &  
Marine Engineering; SW Kang, Seoul National Univ, Korea

**Application of Inherent Strain Analysis Using Idealized Explicit  
FEM for Prediction of Welding Deformation in Ship Block Building**

S Itoh, M Hata, M Shibahara, M Mochizuki, Osaka Univ, Japan

**Prediction of Heat-induced Deformation due to Line Heating Using  
Inherent Strain Method**

A Vega, Tech Univ of Panama, Panama; H Murakawa, R Sheriff, N Osawa,  
Osaka Univ; Y Tango, IHI Marine United; M Ishiyama, IEM Co, Japan

**Measurement of Welding Deformation Using Digital Image  
Correlation Technique**

M Shibahara, S Tsuboi, Osaka Prefecture Univ; S Itoh, Osaka Univ; T  
Fukasawa, Osaka Prefecture Univ, Japan

**Investigation of Buckling Deformation of Thin Plate Welded  
Structures**

JC Wang, S Rashed, M Shibahara, H Murakawa, Osaka Univ, Japan

**Prediction of Longitudinal Bending Deformation of Ship Produced by Block Assembly**

H Murakawa, H Serizawa, Osaka Univ; T Uesugi, Mitsui Engineering & Shipbuilding; S Iwasaki, Osaka Univ, Japan

**Experimental Analysis and Modelling of the Thermomechanical Behaviour of Field Joint of Thermally Insulated Pipeline**

D Choqueuse, INFREMER; T Phan, J-Y Cognard, ENSIETA; L Sohier, Univ de Bretagne Occidentale, France

**Reduction of Welding Distortion based on Theoretical Prediction Using Inherent Deformation Method**

H Murakawa, Y Okumoto, Osaka Univ; M Sano, Naikai Zosen; S Rashed, Osaka Univ, Japan

**83. COASTAL V: Monitoring & Simulation (V. 3)**

Wednesday June 22 10:30 Room 6

Chair: N Mizutani, Nagoya Univ, Japan

**The Dynamic Visual Post-processing System of Hydrodynamic Numerical Simulations**

Z Zhang, B Li, SH Zuo, Tianjin Research Inst of Water Transport Engineering, China

**Spectral Analysis of Pixel Intensity Time Series from Video Image for Wave Analysis at Hasaki Beach, Japan**

M Zikra, N Hashimoto, M Yamashiro, Kyushu Univ; K Suzuki, Port & Airport Research Inst, Japan

**GPS Comprehensive Oceanographic Monitoring System (GCOMS)**

S Okubo, Y Matsushita, Hitachi Zosen, Japan

**Longshore Current Estimation Using ETM+/LANDSAT and ASTER/TERRA Data**

S Takewaka, Univ of Tsukuba, Japan

**Field Observations of Wind Stress Over Surf Zone**

B Shabani, P Nielsen, TE Baldock, Univ of Queensland, Australia

**Acoustic Free Surface Tracking and ADCP Measurements of an Undular Tidal Bore on the Garonne River [Oral presentation]**

N Bonneton, JP Parisot, G Detandt, N Pochon, P Bonneton, Univ Bordeaux 1, France

**Measurements of Coastal Waves Using Stereo Matched Image Sequences**

M Arita, I Deguchi, Osaka Univ, Japan

**84. PIPELINES & RISERS II: Steel Catenary Risers (V. 2)**

Wednesday June 22 10:30 Room 7

Chair: YJ Chen, SBM Atlantia, USA

Co-Chair: N Willis, Intecsea UK

**Dynamic Amplification Factors for Response Analysis of Steel Catenary Risers at Touch Down Areas**

M Kimiaei, L Quiau, M Randolph, Univ of Western Australia, Australia

**Sizing a Semi-submersible for SCR Feasibility**

PV Mokkarala, V Jaiswal, Granherne, USA

**Lazy Wave SCR on Turret Moored FPSO**

B Yue, D Walters, 2H Offshore; WW Yu, K Raghavan, H Thompson, Chevron Energy Tech, USA

**Defect Tolerance in Fatigue of Steel Catenary Riser Girth Welds**

E Mecozzi, G Tamponi, LF Di Vito, Centro Sviluppo Materiali, Italy; P Darcis, I Marines-Garcia, EA Ruiz, Tanaris Tamsa, Mexico; M Armengol, Tenaris Dalmine, Italy

**A Review on Steel Catenary Riser Hang-off Connectors**

YY Wang, Offshore and Arctic Engineering, USA; J Cao, Y Sha, CNOOC, China; ML Duan, China Univ of Petroleum, China

**Project Execution and Lessons Learned for Riser Delivery in Deepwater**

M Wu, McDermott Subsea Engineering, USA

**85. GEOTECH V: Piles (V. 1)**  
**Wednesday June 22 10:30 Room 8**

**Chair:** CF Leung, National Univ of Singapore, Singapore

**Centrifuge Modeling on the Responses of Grouped Piles Subjected to Tunneling Nearby**

CJ Lee, KH Chiang, National Central Univ, Taiwan, China

**Optimizing Pile Group Design Using Real Genetic Algorithm**

JH Hwang, National Central Univ, Taiwan, China

**Pullout Characteristics of Belled Pile in Weathered Sandstones**

WJ Cho, Dankook Univ; SH Cho, Korea Rural Community Corp; HY Na, Dankook Univ; SK Jun, Yeosu Inst of Tech, Korea

**Evaluation of End Bearing Capacity of Piles with Different Post-grouting Pressures**

SJ Kim, SH Lee, Seoul National Univ; OS Kwon, Daelim Industrial; JT Han, Seoul National Univ, Korea

**Performance Evaluation of Offshore Piles with Enlarged Upper Section Subjected to Lateral Loading in Soft Ground**

IS Jang, OS Kwon, KORDI, Korea

**Pile Installation Effect on Dynamic P-Y Curves in Dry Sand**

MT Yoo, JI Choi, JT Han, MM Kim, Seoul National Univ, Korea

**Seismic Fragility Analysis Framework for Pile-supported Wharves**

GS Wang, Chaoyang Univ of Tech; FK Huang, Tamkang Univ; JL Huang, Chaoyang Univ of Tech, Taiwan, China

**Evaluation of Load Transfer Characteristics of Steel-Concrete Composite Drilled Shafts on Static Loading Tests**

JH Lee, MK Chung, KS Kwak, DW Kim, Korea Inst of Construction Tech; SR Kim, Dong-A Univ, Korea

**Case Study of Performance Verification of Single Column Drilled Pile Foundation**

KS Kim, SR Lee, Korea Expressway Corp, Korea

**86. OCEAN MINING III: Gas Hydrates – Assessment (V. 1)**  
**Wednesday June 22 10:30 Room 9**

**Chair:** JRMS Oliveira, Military Inst of Engineering, Brazil

**Co-Chair:** T Komai, AIST, Japan

**Natural Gas Hydrate Accumulation Simulation in Porous Media Using a One-dimensional Device**

CY Sun, LT Chen, Q Yuan, GJ Chen, China Univ of Petroleum, China

**Risk Assessment for CO<sub>2</sub> Capture and Geological Storage in Offshore Environment**

T Komai, Y Sakamoto, A Tanaka, AIST, Japan

**Characterization of Hydraulic Permeability and Pore Size Distribution of Methane-hydrate-bearing Sediment Using Proton Nuclear Magnetic Resonance Measurement**

H Minagawa, K Egawa, Y Sakamoto, T Komai, N Tenma, H Narita, AIST, Japan

**Development of the Geo-mechanical Simulation Code ‘COTHMA’**

M Kakumoto, N Tenma, Y Sakamoto, K Miyazaki, K Aoki, AIST; J Mori, West Japan Engineering Consultants, Japan

**Simulation of a Laboratory-scale Experiment for Flow Behavior of Supercritical CO<sub>2</sub> in Porous Media**

Y Sakamoto, AIST; Y Suzuki, Toho Univ; A Tanaka, N Tenma, T Komai, AIST; T Yamaguchi, Toho Univ, Japan

**Formation Efficiency of CO<sub>2</sub> Hydrate under Low Temperature and Low Pressure by Ultrasonic Mist**

S Hirabayashi, National Inst of Advanced Industrial Sci & Tech; M Takeuchi, A Murata, Nihon Univ; Y Yamamoto, National Inst of Advanced Industrial Sci & Tech, Japan

**87. ARCTIC II: Ice and Ocean Environments (V. 2)**

**Wednesday June 22 10:30 Room 10**

**Chair:** DB Fissel, ASL Environmental Sciences, Canada

**Study on Sea Ice Area Interannual Variation in the Pacific Sector of the Arctic and the Correlative Ocean & Atmosphere Main Pattern**

J Su, JF Wei, D Zu, X Li, Y Zhang, Ocean Univ of China, China

**Analysis of Deepwater Horizon Accident in Relation to Arctic Waters**

CA Willemsse, PHAJM van Gelder, Delft Univ of Tech, Netherlands

**The Thermal Feedback Mechanism of Near Surface Temperature Maximum**

Y Cao, JP Zhao, Ocean Univ of China; ZH Chen, Bengbu Muyeuan School, China

**Semi-monthly Oscillation of the Bottom Current through Bering Strait [Oral presentation]**

L Du, JP Zhao, Ocean Univ of China; JC Zuo, Hohai Univ, China

**Polar Lows and Their Implications on Marine Operations**

M Pakkan, D Heng, Acergy Norway AS, Norway

**Decadal Change of Annual Range for the Arctic Sea Ice in Recent 30 Years**

F Huang, XL Shan, TT Fan, Ocean Univ of China, China

**Sea Ice Dynamic Monitoring Using RADARSAT-2 SAR in Polar Region**

CJ Xue, XY Wen, Q Dong, XX Wang, Center for Earth Obs & Digital Earth, CAS, China

**Long-Term Trends for Multi-year Ice in the Western Arctic Ocean: Implications for Shipping and Offshore Oil and Gas Activities**

DB Fissel, M Martinez de Saavedra Alvarez, N Kulan, TD Mudge, JR Marko, ASL Environmental Sciences, Canada

**Observing Polar Ocean with XCTD Launched from Helicopter**

JX Shi, JQ Hou, YT Jiao, Ocean Univ of China, China

**WEDNESDAY 13:15**

**Keynote Presentation**

**Wednesday June 22 13:15 Room 1**

**Approach to Design of Pipelines in Challenging Environments [Oral presentation]**

MF Cook, ExxonMobil Development, USA

**88. ENVIRONMENT I: Triple-I (V. 1)**

**Wednesday June 22 14:00 Room 1**

**Chair:** W Koterayama, Kyushu Univ, Japan

**Inclusive Impact Index Triple I and its Application for Ocean Nutrient Enhancer**

K Otsuka, Osaka Prefecture Univ, Japan

**Economical and Environmental Feasibility Study on CO<sub>2</sub> Ocean Sequestration by Using Triple I**

T Sato, O Toshitaka, Univ of Tokyo, Japan

**Development of Cost Effectiveness Index of Oil Tankers based on Triple-I**

T Yuzui, J Kaneko, National Maritime Research Inst, Japan

**Inclusive Environmental Impact Assessment for Newly-proposed Airport in Korea Using Triple I**

JC Park, HS Lee, Pusan National Univ, Korea

**A Study on the Scaling of Ecological and Economic Values in the Inclusive Impact Index**

H Yoshimoto, IHI Marine United; S Tabeta, Univ of Tokyo, Japan

**89. HYDRODYNAMICS X: CFD Impact (V. 3)**

**Wednesday June 22 14:00 Room 2**

**Chair:** DM Causon, Manchester Metropolitan Univ, UK

**3D Solver for Two Phases Flows Unstructured Grid: Application to Wave Impact on Structures**

P Fraunie, Univ of Toulon; A Sambe, PRINCIPIA/Univ of Toulon; F Golay, Univ of Toulon; R Marcer, PRINCIPIA; D Sous, Univ of Toulon, France

**Numerical Simulation of Sphere Water Entry Problem Based on VOF and Dynamic Mesh Methods**

ZR Shen, DC Wan, Shanghai Jiao Tong Univ, China

**On Issues Relating to the Numerical Modelling of Cavitation and Violent Wave Impact Loadings**

DM Causon, CG Mingham, Manchester Metropolitan Univ, UK

**Simulation of Solitary Wave Impact on Coastal Structures Using Weakly Compressible and Incompressible SPH Methods**

W Jian, DF Liang, Univ of Cambridge, UK

**Numerical Analysis of Acceleration of a Free-fall Lifeboat Using the MPS Method**

K Shibata, S Koshizuka, M Sakai, Univ of Tokyo; K Tanizawa, O Susumu, National Maritime Research Inst, Japan

**90. RENEWABLE ENERGY X: Wave Energy 3 (V. 1)**

**Wednesday June 22 14:00 Room 3**

**Chair:** SW Hong, Maritime & Ocean Eng Research Inst, Korea

**Optimization of the Performance of Overtopping Wave Energy Converters with a Simple Slope Built-in Sea Defense Structures by Geometry Control**

LB Victor, P Troch, Ghent Univ; JF Kofoed, Aalborg Univ, Denmark

**Wave Energy Production by a Flexible Floating Breakwater**

C Michailides, D Angelides, Aristotle Univ of Thessaloniki, Greece

**Multi-chamber OWC Devices to Reduce and Convert Wave Energy in Harbour Entrance and Inner Channels**

P Ruol, L Martinelli, P Pezzutto, Univ of Padova, Italy

**Experimental Study on Wave Energy Converting System Using Floating Breakwater**

W Peng, Y Watanabe, N Mizutani, Nagoya Univ, Japan

**Experimental Modelling of the Overtopping Flow on the Wave Dragon Wave Energy Converter**

S Parmeggiani, Wave Dragon, UK; JP Kofoed, Aalborg Univ, Denmark

**Practical Method for the Performance Estimation of Proposed Pilot OWC System in Korea**

BS Hyun, Korea Maritime Univ, Korea; Z Liu, Ocean Univ of China, China; JY Jin, Korea Maritime Univ; KY Hong, Maritime & Ocean Engineering Research Inst, Korea

**91. FLOATING STRUCTURES & FPSO/SPAR/TLP I (V. 1)**  
**Wednesday June 22 14:00 Room 4**

**Chair:** MH Kim, Texas A&M Univ, USA

**Structural Integrity of FPSO Hull Superstructures: Assessment Methodology, Applicable Regulations and Return of Experience**

B Garotte, G Gourdet, Bureau Veritas, France

**Determination of the Optimal Operating Condition of Dual Mixed Refrigerant Cycle at the Pre-FEED Stage of LNG FPSO Topsides Liquefaction Process**

JH Cha, JC Lee, Seoul National Univ; MI Roh, Univ of Ulsan; JH Hwang, Samsung Heavy Industries; HJ Cheon, KY Lee, Seoul National Univ, Korea

**Two-body Analysis for Side-by-Side Moored FSRU with LNGC**

HW Jee, JO Sun, SG Jeong, YD Choi, STX Offshore & Shipbuilding; SK Hong, HG Sung, Maritime & Ocean Engineering Research Inst, Korea

**Fully Nonlinear Simulation of Two Floating Structures in Close Proximity Subjected to Oblique Waves**

S Yan, QW Ma, City Univ, UK

**Structural Design of a Large Floating Offshore Coal Storage Platform**

C Sato, Nihon Univ; Y Yasuzawa, Kyushu Univ, Japan

**Conceptual Design of Floating, Recycling, Storage and Offloading Ship for a Garbage Patch**

HJ Kang, J Choi, GJ Lee, KORDI, Korea

**Coupled Response of a TLP and Tendon System in Time Domain**

B Teng, MD Yang, Dalian Univ of Tech, China

**Effect of Additional Dock Load and Mooring Configuration on the Response of Tension Leg**

P Malleswararao, M Geeta Madhav Babu, Andhra Univ; P Sunil Kumar, Shoft Shipyard, India

**92. HPM IX: Advances in Welding Technology 2 (V. 4)**  
**Wednesday June 22 14:00 Room 5**

**Chair:** N Osawa, Osaka Univ, Japan

**Properties of Non-load-carrying Welds of Structural Steel with Yield Strength 960 MPa**

I Valkonen, J Kuoppala, Rautaruukki OYJ, Finland

**Compression Behavior of Girth-welded Steel Pipes**

CH Lee, KH Chang, Chung-Ang Univ, Korea

**Guidelines for use of Hybrid Laser-arc Welding in Building of Ships and Offshore Structures**

PW Lohne, J-O Nøkleby, Det Norske Veritas, Norway

**The Study of Engineering Critical Assessment Applications in Welding Flaw Acceptance Criteria for Offshore Pipeline Installation**

WB Ding, Offshore Oil Engineering Co, China

**Computational Scheme for Large-scale Transient Problems in Welding Mechanics Using Explicit FEM**

K Ikushima, Osaka Prefecture Univ; S Itoh, Osaka Univ; M Shibahara, T Fukasawa, Osaka Prefecture Univ, Japan

**E-Training System of Welding Work**

Y Okumoto, Osaka Univ; K Murase, Kinki Univ; K Hiyoku, IHI Marine United, Japan

**Intelligent Recognition of Trajectory Deviation and Seam Tracking of Underwater Rotating Arc Welding**

YH Shi, GR Wang, JH Du, CX Liu, South China Univ of Tech, China

**Influence of Heat Input during GMAW on the Mechanical Properties**

**of Seamless Line Pipe Steels up to X80**

J Wiebe, W Scheller, Salzgitter Mannesmann Forschung; C Bruns, T Schmidt, V&M Deutschland, Germany

**Impact of FCAW on the Mechanical Properties of Seamless Line Pipe Steels of Grades X65 and X80**

J Wiebe, Salzgitter Mannesmann Forschung; C Bruns, V&M Deutschland; W Scheller, Salzgitter Mannesmann Forschung; T Schmidt, V&M Deutschland, Germany

**93. COASTAL VI: Seabed & Sediment Transport 1 (V. 3)**

**Wednesday June 22 14:00 Room 6**

**Chair:** I Deguchi, Osaka Univ, Japan

**Temporal and Spatial Variations of Bottom Sediment Characteristics around the Tama River Mouth in Tokyo Bay, Japan**

R Ariji, H Yagi, Port & Airport Research Inst; K Nadaoka, Tokyo Inst of Tech; Y Nakagawa, Port & Airport Research Inst; H Ogawa, Univ of Tokyo; K Simosako, Port & Airport Research Inst; K Shirai, Kanto Regional Development Bureau, Japan

**Wave-induced Soil Response around Breakwater Heads**

TL Lee, HM Lin, Leader Univ, Taiwan, China; DS Jeng, Univ of Dundee, UK; MH Chen, Leader Univ, Taiwan, China; B Yang, Southwest Jiaotong Univ, China

**Experimental Validation of Mathematical Modeling for Seabed Liquefaction in Waves**

BM Sumer, VSO Kirca, J Fredsøe, Technical Univ of Denmark, Denmark

**Pullout Characteristics of Belled Pile in Weathered Sandstones**

Z Gong, Delft Univ of Tech, Netherlands; CB Zuo, CK Zhang, Hohai Univ, China

**Characteristic of Sediment Transport by Boat Waves in the Vicinity of Shore Line**

K Uno, G Tsujimoto, T Kakinoki, Kobe City College of Tech, Japan

**A Window-Based Interface for Calculating Fundamental Properties of Wave-Mud Interaction**

CM Liu, Chienkuo Technology Univ; RY Yang, National Cheng Kung Univ; ZR Wang, Chienkuo Technology Univ, HH Hwung, National Cheng Kung Univ, Taiwan, China

**Numerical Study on the Behavior of Seabed Under Wave-Load**

SK Yun, TH Kim, SK Choi, Korea Maritime Univ, Korea

**Three-dimensional Coupled Fluid-sediment Interaction Numerical Model for Suspended Sediment Analysis**

T Nakamura, N Mizutani, Nagoya Univ, Japan

**Experimental Study on the Artificial Beach Stability under the Action of Wave**

LC Sun, F Gao, Tianjin Research Inst of Water Transport Engineering; YF Huang, Changsha Univ of Science & Technology, China

**94. PIPELINES & RISERS III: Mooring (V. 2)**

**Wednesday June 22 14:00 Room 7**

**Chair:** E Fontaine, AMOG Consulting, Australia

**Dynamic Behavior of Buried Circular Structures during Earthquake by Discrete Element Method**

Y Iwasaki, T Kawabata, Kobe Univ, Japan; HI Ling, Columbia Univ, USA; H Dodo, Kobe Univ, Japan

**A Study on the Falling Velocity and the Drag Coefficient of Torpedo Anchors during Acceleration**

D Hasanloo, GL Yu, Shanghai Jiao Tong Univ, China

**Taut-Slack Algorithm in Analyzing the Geometric Nonlinearity of Cable Structures**

Z Wang, TJ McCarthy, N Sheikh, Univ of Wollongong, H Marcollo, AMOG Consulting, Australia

**Simplifying Mooring Analysis for Deepwater Systems Using Truncation**

A Argyros, RS Langley, Univ of Cambridge; RV Ahilan, GL Nobel Denton, UK

**The Transient Behavior of Mooring System in Line-broken Condition**

HS Choi, JS Han, YJ Son, Seoul National Univ; JB Rho, Hyundai Heavy Industries

**95. GEOTECH VI: Soil Improvement (V. 1)**

**Wednesday June 22 14:00 Room 8**

**Chair:** SR Lee, KAIST; Korea

**Field Strength in Soil-Cement Columns Executed in Soft Bangkok Clay**

S Horpibulsuk, Suranaree Univ of Tech; R Rachan, Mahanakorn Univ of Tech, Thailand

**Improving Effects of the Bearing Capacity of Very Soft Ground by Restricting Conditions of Geotextile through Numerical Analyses**

DH Ahn, K Oda, K Tokida, Osaka Univ, Japan; SK You, Myongji College, Korea

**A Study on Numerical Technique for Bulb Formation When Grouting Method is Applied**

JH Lee, BS Chun, Hanyang Univ, Korea

**Comparison on Compressibility Characteristics of Non-salt and Salt-rich Stabilized Dredged Soil**

HT Do, YT Kim, Pukyong National Univ, Korea; P Vo, Ho Chi Minh Univ of Tech, Vietnam

**Consolidation Characteristics of Artificial Soil Mixture with Coal Combustion Byproducts**

WJ Cho, SW Park, DH Chae, Dankook Univ; KO Kim, Daewoo E&C, Korea

**Behavior of the Depth of Improvement Soft Ground Applied Individual Vacuum Pressure**

DW Ahn, POSCO; MS Yoon, Hanyang Univ; SJ Han, Expert Group for Earth & Environment; SS Kim, Land & Housing Inst, Korea

**Estimation of the Effect of High Pressure Post-grouting on Drilled Shaft in Weathered Rock by Static Load Test**

JH Lee, MK Chung, KS Kwak, Korea Inst of Construction Tech; SR Kim, Dong-A Univ, Korea

**Influence of Soil Characteristics on Gel Time and Unconfined Compression Strength of Ground Improved by Chemical Grouting Method**

T Sasaki, Kyokado Engineering; N Suemasa, Tokyo City Univ; S Shimada, T Oyama, Kyokado Engineering, Japan

**Effect of Coal Ash Contents on the Acceleration of Settling and Self-Weight-Consolidation of Clayey Ground**

HY Shin, KO Kim, YS Kim, Daewoo E&C; TH Kim, Korea Maritime Univ, Korea

**96. OCEAN MINING IV: Systems & Tech 1 (V. 1)**

**Wednesday June 22 14:00 Room 9**

**Chair:** SJ Liu, Central South Univ, China

**Co-Chair:** S Hong, Maritime & Ocean Engineering Research Inst; Korea

**Dynamic Analysis and Path Tracking Control of Tracked Underwater Miner in Working Condition**

QJ Han, SJ Liu, D Yu, Central South Univ, China



**Dynamic Analysis of an Articulated Tracked Vehicle on Undulating and Inclined Ground**

HW Kim, S Hong, CH Lee, JS Choi, TK Yeu, Maritime & Ocean Engineering Research Inst, Korea

**A Study on the Driving Performance of Tracked Vehicle on an Inclined Plane According to the Position of Buoyancy**

CH Lee, HW Kim, S Hong, Maritime & Ocean Engineering Research Inst, Korea

**Qualification Tests on Underwater Mining System with Manganese Nodule Collection and Crushing Systems**

S Rajesh, AA Gnanaraj, A Velmurugan, R Ramesh, P Muthuvel, MK Babu, NR Ramesh, CR Deepak, MA Atmanand, NIOT, India

**Reliability Based Design Optimization of Deepsea Miner on Seafloor Sediment Using Non-parametric Estimation Method**

JS Choi, S Hong, HW Kim, CH Lee, Maritime & Ocean Engineering Research Inst; HB Lee, SB Chi, KORDI; TK Yeu, Maritime & Ocean Engineering Research Inst; TH Lee, Hanyang Univ, Korea

**97. ARCTIC III: Ice-Structure Interactions 1**

(V. 2)

**Wednesday June 22 14:00 Room 10**

**Chair:** AT Bekker, Far Eastern State Tech. Univ., Russia

**Co-Chair:** K. Braun, PND Engineers, USA

**Effect of Water Depth on Ice Plate Deflections for Moving Submarine**

AV Pogorelova, VM Kozin, Inst of Machine Sci & Metallurgy, FEB-RAS, Russia

**Effect of Pack Ice Size and Channel Width in Ice Model Test**

SR Cho, CJ Lee, SH Kim, KORDI, Korea

**Two-dimensional Generalised Solitary Waves and Periodic Waves under an Ice Sheet**

EI Parau, Univ of East Anglia, UK

**A Hydrodynamic Ice Friction Theory Including Premelting, Pressure Melting and Frictional Melting**

EP Lozowski, Univ of Alberta; K Szilder, National Research Council, Canada

**Stability Analysis of an Artificial Island Structure Designed for Developing the Gas Field**

EN Bellendir, OM Finagenov, VB Glogovsky, JSC VNIIG, Russia

**98. ENVIRONMENT II: Oil Pollution & Water Quality 1 (V. 1)**

**Wednesday June 22 16:20 Room 1**

**Chair:** K Otsuka, Osaka Prefecture Univ, Japan

**Method and Apparatus for Containing Subsea Oil Spills Caused by a Defective Blowout Preventer (BOP) Stack**

S Wolinsky, Subsea Oil Technologies, USA

**An Application Research of Prediction Model of Oil Spill in Oil Spillage on the Sea**

T Xu, MG Li, HB Zhao, Tianjin Research Inst for Water Transport Engineering, China

**Inclusive Environmental Impact Assessment for Water Purification Technologies**

FJ Duan, Canon Inst for Global Studies; H Yamaguchi, M Kawabuchi, Univ of Tokyo, Japan

**Evaluation of Material Circulation System between Land and Sea Using Exergy Flows**

K Kuroda, Y Inui, N Nakatani, K Otsuka, Osaka Prefectural Univ, Japan

**Numerical Simulation of Three Dimensional Current Coupled with**

**Wave in the Near-shore Area and its Application Research on Pollution Transport**

T Xu, LC Sun, HB Zhao, Tianjin Research Inst for Water Transport Engineering, China

**Role of Contact Angle, Surface Tension and Zeta Potential on Oil Agglomeration of Celestite**

S Duzyol, A Ozkan, Selcuk Univ, Turkey

**99. HYDRODYNAMICS XI: CFD/NWT Waves (V. 3)**

**Wednesday June 22 16:20 Room 2**

**Chair:** P Ferrant, Ecole Centrale de Nantes, France

**Simulation Methods and Preliminary Investigation of Waves Generated by Two-sided Segmented Wavemakers**

J Li, G Chen, X Li, HN Lu, Shanghai Jiao Tong Univ, China

**Parallel Simulation of 3D Lid-driven Cubic Cavity Flows by Finite Element Method**

JF Wang, DC Wan, Shanghai Jiao Tong Univ, China

**On the Numerical Simulation of a Piston-type Wave-maker**

HB Gu, Manchester Metropolitan Univ, UK/Tianjin Research Inst for Water Transportation Engineering, China; DM Causon, CG Mingham, L Qian, Manchester Metropolitan Univ, UK; HB Chen, Tianjin Research Inst for Water Transportation Engineering, China

**The Applicability of the Particle Level Set Method for the Simulation of Breaking Waves**

PJ Archer, W Bai, National Univ of Singapore, Singapore

**On the Approximate Second-order Coupling Theory of Numerical and Physical Wave Model in Flumes**

ZW Yang, SX Liu, JX Li, ZB Sun, Dalian Univ of Tech, China

**A Nested Domains Technique for a Fully Nonlinear Unsteady Three-Dimensional Boundary Element Method for Free-Surface Flows with Forward Speed**

M Kjellberg, Chalmers Univ of Tech, Sweden; G Contento, Univ of Trieste, Italy; C-E Janson, Chalmers Univ of Tech, Sweden

**Application of Experimental Design and Genetic Algorithms Methods for the Robust Design in 2D Numerical Wave Tank**

TL Liu, SJ Wu, CC Lin, National Defense Univ, Taiwan, China

**A Coupled Navier-Stokes Multi-fluid/Boussinesq Model to Study Tsunami Generation by Subaerial Mass Failure: Application to La Palma's Case Study**

SM Abadie, Univ de Pau et des Pays de l'Adour, France; ST Grilli, J Harris, Univ of Rhode Island, USA

**100. RENEWABLE ENERGY XI: Wave Energy 4 (V. 1)**

**Wednesday June 22 16:20 Room 3**

**Chair:** D Vicinanza, Second Univ of Naples, Italy

**Co-Chair:** Y Peng, Inst of Electrical Engineering, CAS, China

**Hydrodynamic Force of Oscillating Fin in Low KC Region**

Y Imai, S Nagata, K Toyota, T Setoguchi, Saga Univ, Japan

**A Conceptual Model of a Flap Type Wave Energy Converter**

A Henry, Aquamarine Power; M Folley, Queen's Univ, UK

**Investigation on the Efficiency of a Pendulum Wave Energy Converter in Regular Waves**

SQ Qiu, JW Ye, DJ Wang, South Univ of Tech, China

**Numerical and Experimental Analysis of Backward Bent Duct Buoy (BBDB) Wave Energy Converter**

WC Koo, KR Lee, Univ of Ulsan, Korea

**Estimation of Annual Power Production of Point Absorber Wave Energy Converters**

J van den Berg, P Ricci, Tecnalia, Spain

**101. FLOATING STRUCTURES & FPSO/SPAR/TLP II (V. 1)**  
**Wednesday June 22 16:20 Room 4**

**Chair:** J-F Wu, American Bureau of Shipping, Singapore

**Performance and System Identification of Deepwater Offshore Platform during Extreme Events Based on Field-measured Data**

BF Peng, R Newhouse, M Hoerner, J Ray McDermott Engineering; C Edel, Hess Corp; J Kallaby, Offshore Structures, USA

**Measurement on Vibration Characteristics of Existing Floating Structures**

H Eto, S Naruta, H Matsunaga, O Saijo, Nihon Univ, Japan

**Validation of GulfStar Global Responses in Central CoM Irregular SeasL Model Tests vs Analysis**

YC Park, R Converse, William Field Services; J Zou, P Poll, Z Antony, Houston Offshore Engineering, USA

**Nonlinear Analysis of Superstructures on Floating Structures with Semi-rigid Connections**

HC Song, GY Doe, MB Han, MJ Jeong, Korea Maritime Univ, Korea

**A Study on the Preliminary Design of Mooring System for Deep Water Floaters**

JB Rho, WS Sim, WS Lee, HS Shin, Hyundai Heavy Industries; JS Han, HS Choi, Seoul National Univ, Korea

**A Model for Selection of Floating Platforms Based on BP Artificial Neural Networks**

YY Wang, ML Duan, JP Liu, YH Dong, KY Zeng, China Univ of Petroleum, China

**Experimental Study on Acceleration Measurement and Numerical Integral of Ships Wave Movement**

AG Chen, South China Univ of Tech/Guangzhou Maritime College; JW Ye, South China Univ of Tech, China

**102. HPM X: Composites (V. 4)**  
**Wednesday June 22 16:20 Room 5**

**Chair:** HG Wheat, Univ of Texas at Austin, USA

**Co-Chair:** RH Knapp, Univ of Hawaii, USA

**Microstructural Examination and Compressive Properties of Replicated Aluminum Composite Foams**

S Asavavisithchai, E Wichianrat, Y Boonyongmaneera, Chulalongkorn Univ, Thailand

**Tension Softening Behavior Obtained by 4-point Bending Tests on Ductile-Fiber-Reinforced Cementitious Composites Using 3 Kinds of Fine Aggregate**

K Watanabe, M Nakamura, H Kato, M Fujii, Tokai Univ, Japan

**Material Properties of Ductile-Fiber-Reinforced Concrete Using Recycled Aggregate**

M Nakamura, K Watanabe, H Kato, Tokai Univ, Japan

**Fundamental Study on the Pile-tip Protection Using DFRCC**

H Kato, K Watanabe, Tokai Univ; Y Asai, Toyoasano Foundation; M Fujii, M Nakamura, Tokai Univ, Japan

**The Flexural Behavior of Offshore Concrete Structures Reinforced with Anti-corrosive FRP Composites**

YC Wang, National Central Univ, Taiwan, China

**103. COASTAL VII: Seabed & Sediment Transport 2 (V. 3)**  
**Wednesday June 22 16:20 Room 6**

**Chair:** M Teng, Univ of Hawaii, USA

**Co-Chair:** E Loukogeorgaki, Aristotle Univ of Thessaloniki, Greece

**Development of 3D Morphodynamic Model Considering Wave-current Interactions**

A Khaled Seif, M Kuroiwa, M Abualtayef, Y Matsubara, Tottori Univ; H Mase, Kyoto Univ, Japan

**A Quasi-3D Sediment Transport Modelling for Coastal Morphodynamics**

YC Chiang, Tzu-Chi Univ; MC Lin, National Taiwan Univ; SS Hsiao, National Taiwan Ocean Univ, Taiwan, China

**Analysis of Sediment Transport Patterns around Kirinda Fishery Harbour in Sri Lanka Using SWAN**

DPC Laknath, J Sasaki, Yokohama National Univ, Japan

**Characteristics and Resuspension-subsidence Movement of Suspension after Storm in NingJin Shidao Sea Area, China**

CB Xiong, SH Bian, ZJ Hu, YD Jin, First Inst of Oceanography, SOA, China

**Application of Dynamic Crenulate Shaped Beaches behind Detached Breakwaters**

CC Wen, Hungkuang Univ; LH Tsai, Inst of Transportation; CM Chang, National Taiwan Univ; CC Wang, Hungkuang Univ; HH Tai, Aletheia Univ, Taiwan, China

**Feasibility Study of the Sand Deposited by Arc Type Submerged Breakwaters**

WJ Chen, National Chiayi Univ; CT Kuo, National Chung Kung Univ; H Wei, National Chiayi Univ, Taiwan, China

**Study on the Shoreline Changes of Inlan Coast**

WJ Chen, National Chiayi Univ, Taiwan, China

**Experimental Variogram Model for Estimating Coastal Topographic with Remotely Operated Vehicle**

SS Hsiao, CT Lai, HM Fang, SR Kuo, National Taiwan Ocean Univ, Taiwan, China

**Modified SBEACH Model for Predicting Cross-Shore Profile with Sea Dike in Run-up Region**

JM Han, Osaka Univ, Japan; KH Kim, WS Ha, Kwandong Univ, Korea; I Deguchi, Osaka Univ, Japan

**Study on Sudden Sediment Deposition Forecast Based on Simulating Typhoon Process**

B Li, Tianjin Research Inst of Water Transport Engineering; Y Zhang, Tianjin Univ, China

**The Optimal Design for Hybrid Mild-Slope Equation**

CC Wen, Hungkuang Univ, Taiwan, China

**104. PIPELINES & RISERS IV: Riser Design (V. 2)**

**Wednesday June 22 16:20 Room 7**

**Chair:** H-I Park, Korea Maritime Univ, Korea,

**Pipeline Bundle System Design Based on Limit State Method**

ZG Yao, YL Qin, KL Zhao, CNPC Research Inst of Engineering Tech, China

**Research on Hybrid Model Test for Deepwater Riser Installation**

M Ye, ML Duan, N Dong, CW Xu, China Univ of Petroleum, China

**Analysis of Jumpers Subject to Various Loading Conditions**

J Wang, S Sawant, MCS Kenny, USA

**Investigation of Drill Bit Heave Response to Drill Rig Heave Excitation**

LQ Huang, GV Tahchiev, YS Cao, MARINTEK USA, USA

**Riser Recoil in Deepwater and Shallow Water: What do We Know?**

R Kadiyala, D Lang, A Whooley, MCS Kenny, USA

**Critical Apparent Weight and Critical Applied Top Tension of an Extensible Catenary Riser**

S Chucheepsakul, C Athisakul, K Klaycham, T Phanyasahachart, King Mongkut's Univ of Tech, Thailand

**Top Tensioned Riser Layout Optimization**

YJ Chen, SBM Atlantia, USA

**105. GEOTECH VII: Modeling & Simulation (V. 1)**

**Wednesday June 20 16:20 Room 8**

**Chair:** K Uchida, Kobe Univ, Japan

**Stochastic Modeling for Buoyant Solute Transport in the Seabed**

CK Lin, CECI Engineering Consultants; JG Lin, WK Weng, National Taiwan Ocean Univ, Taiwan, China

**The Behaviour of Natural Clays Simulated via Structured Cam Clay**

S Horpibulsuk, J Suebsuk, MD Liu, Suranaree Univ of Tech, Thailand

**Application of Digital Image Correlation Technique for Measuring Deformations in Tunnel Models**

M Ahmed, New York State Dept of Transportation; M Iskander, Polytechnic Inst of New York Univ, USA

**Probabilistic Evaluation of Secondary Compression by Using Kriging Estimates of Geo-layers**

WJ Lee, DH Kim, YH Chae, Korea Univ; SK Ko, Posco E&C, Korea

**A Study on the Frost Penetration Depth using Measured Value from Pavement in Korea**

YS Kim, GJ Bae, SS Hong, JG Lee, HS Kim, Korea Inst of Construction & Tech, Korea

**Numerical Study of the Combined Load Capacity of a Hybrid Foundation**

B Bienen, Univ of Western Australia, Australia; L Rausch, Univ of Applied Sciences, Germany; C Gaudin, MJ Cassidy, Univ of Western Australia; OA Purwana, Keppel Offshore & Marine, Singapore

**3D Numerical Simulation of Seismic Soil-Pile Interaction in Centrifuge Tests**

SY Kwon, SH Kim, MT Yoo, MM Kim, Seoul National Univ, Korea

**Numerical Simulation on Dynamics of Suction Piles during Lowering Operations**

LQ Huang, J Zhang, RE Randall, Texas A&M Univ; B Wilde, InterMoor, USA

**Soil Response in Frequency Dependent Equivalent Linear Analysis**

DH Park, HK Kim, Hanyang Univ; KK Kim, Samsung C&T; CG Jung, Hanyang Univ, Korea

**106. OCEAN MINING V: Systems & Tech 2 (V. 1)**

**Wednesday June 22 16:20 Room 9**

**Chair:** CH Yoon, Korea Inst of Geoscience & Mineral Resources, Korea

**Co-Chair:** P Vlasak, Inst of Hydrodynamics, Czech Republic

**Establishment of a New Improved Dynamic Model of the Total Deep Ocean Mining System and Its Integrated Operation Process Simulation**

Y Dai, SJ Liu, Y Li, Central South Univ/Changsha Research Inst of Mining & Metallurgy, China

**The Preliminary Front-End Engineering and Design of Manganese Nodules Mining Support Vessel [Oral presentation]**

DH Kang, HD Kang, JH Han, KM Lee, YT Oh, SG Lee, Daewoo Shipbuilding & Marine Engineering; SH Park, Korea Ocean Research & Development Inst, Korea

**Study on Active Heave Compensation System of Deep-sea Mining Based on Dynamic Vibration Absorber and Its Feedback Control**

LJ Li, SJ Liu, Central South Univ/Changsha Research Inst of Mining & Metallurgy, China

**Hardware-in-the-loop Simulation System and Its Visual Monitoring of Heave Compensation**

H Zheng, SJ Liu, N Yang, Q Hu, Central South Univ/Changsha Research Inst of Mining & Metallurgy, China

**Model Test of Heave Compensation System of Deep-ocean Mining**

Q Hu, SJ Liu, H Zheng, Central South Univ/Changsha Research Inst of Mining & Metallurgy, China

**Dynamic Analysis of Seabed-mining Machine-flexible Hose Coupling in Deep Sea Mining**

Z Wang, QH Rao, Central South Univ, China

**Shallow Lifting Test for the Development of Deep Ocean Mineral Resources in Korea**

CH Yoon, JM Park, JS Kang, YJ Kim, YC Park, SG Park, CR Kim, SS Kang, SB Kim, WT Kim, SK Kwon, BS Ahn, Korea Inst of Geoscience & Mineral Resources, Korea

**Swimming Behavior of Single Particle and Group Particles in Vertical Lifting Pipe**

N Yang, GG Chen, DS Tang, X Jin, H Xiao, Changsha Research Inst of Mining & Metallurgy, China

**Flow Behaviour of Coarse-grained Slurries in Pipe**

P Vlasak, Z Chara, Inst of Hydrodynamics, Czech Republic; J Sobota, Univ of Environmental & Life Sciences, Poland

**Two-phase Vertically Upward Transport of Silica Sands (Mesh 8-10 and 30-40) in Dilute Polymer Solution: Drag Reduction and Effects of Concentration**

K Lee, Kiewit Southern; JS Chung, ISOPE, USA

**107. ARCTIC IV: Ice-Structure Interactions 2 (V. 2)**

**Wednesday          June 22          16:20          Room 10**

**Chair:** RMW Frederking, National Research Council, Canada

**Direct Ice Force Measurement of Cylindrical Structure**

YL Wang, QJ Yue, XJ Bi, Dalian Univ of Tech, China

**The Effects of Non-simultaneous Failure, Pressure Correlation, and Probabilistic Averaging on Global Ice Load Estimates**

RS Taylor, IJ Jordaan, C-CORE, Canada

**Concept of Ice Abrasion Calculation [Oral presentation]**

AT Bekker, TE Uvarova, EE Pomnikov, Far-Eastern National Tech Univ, Russia

**Experimental Research of Concrete Resistance to Ice Abrasion**

AT Bekker, TE Uvarova, EE Pomnikov, Far-Eastern National Tech Univ, Russia

**Comparison of Pressure-Area Effects for Various Ice and Steel Indenters**

CA Ulan-Kvitberg, CG Daley, HW Kim, Memorial Univ of Newfoundland, Canada

**Crushing Characteristics of Dry, Wetted and Submerged Ice**

HW Kim, CG Daley, CA Ulan-Kvitberg, Memorial Univ of Newfoundland, Canada

**Response of Confederation Bridge to Ice Forces: Winter 2008-2010**

R Frederking, National Research Council; LF Li, Memorial Univ of Newfoundland; I Kubat, National Research Council, Canada

**The Arctic Sea Ice Surface Roughness Estimation and Application**

XY Wen, CJ Xue, Q Dong, Center for Earth Observation & Digital Earth, CAS, China

**Getting a Grip on Ice Friction**

L Poirier, RI Thompson, Univ of Calgary; EP Lozowski, Univ of Alberta; S

Maw, Mount Royal Univ; DJ Stefanyshyn, Univ of Calgary, Canana

<b>19:00</b>	<b>Grand Ballroom</b>
<b>Annual Conference Banquet</b>	
<b>Cultural Event, Best Paper, Best Student Paper, Scholarship and 2011 Session Organizer Awards</b>	
<i>Don't forget the banquet ticket.</i>	

## THURSDAY 08:00

**108. ENVIRONMENT III: Oil Pollution & Water Quality 2 (V. 1)**  
**Thursday June 23 08:00 Room 1**

**Chair:** T Fukushima, Univ of Tokyo, Japan

**Phase Behavior and Guest Distribution of Ternary CH<sub>4</sub>-N<sub>2</sub>-CO<sub>2</sub> Mixed Hydrates [Oral presentation]**

H Lee, MC Kwon, KAIST; JH Lee, Inst of Geoscience & Marine Resources, Korea

**A Retrospective Analysis of the Waste-water-flow Pollutants on the Yangtze River Water Quality**

Y Wang, X Li, B Li, Tianjin Research Inst for Water Transport Engineering, China

**Influence of Kuroshio Meandering on the Nutrient Transport to Osaka Bay**

Y Nakatani, S Nishida, M Irie, Osaka Univ, Japan

**The Preliminary Study on the Feasibility of Water Purification, CO<sub>2</sub> Storage and Coastal Erosion Prevention by Cultured Oyster**

Y Chang, National Taiwan Univ; AL Huang, TH Lee, National Cheng Kung Univ; HC Li, National Taiwan Univ; RY Yang, JY Liou, HH Hwung, National Cheng Kung Univ, Taiwan, China

**Impact of Water Quality Variation on Mussel (*Mytilus galloprovincialis*) Biomass in Semi-enclosed Ports**

F Nogami, Y Kozuki, R Yamanaka, Univ of Tokushima; M Miyoshi, Tokushima Bunri Univ; T Ishida, Univ of Tokushima, Japan

**109. HYDRODYNAMICS XII: CFD Cylinders & Flows (V. 3)**  
**Thursday June 23 08:00 Room 2**

**Chair:** T-C Su, Florida Atlantic Univ, USA

**Numerical Simulation of Wave Run-up around a Vertical Cylinder**

HJ Cao, JJ Zha, DC Wan, Shanghai Jiao Tong Univ, China

**Study on 2-D Numerical Simulation of Tidal Current Influenced by Piles and Pile Group Resistance**

JN Wang, Tianjin Research Inst for Water Transport Engineering; SF Tang, Bureau of Shanghai World Expo Coordination, China

**Numerical Investigation of Local Scour around a Vertical Circular Cylinder**

F Gao, CG Mingham, DM Causon, HB Gu, Manchester Metropolitan Univ, UK

**Frequency Response between Focusing Waves and a Vertical Cylinder**

YY Sun, Chinese Academy of Fishery Sciences; SX Liu, JX Li, Dalian Univ of Technology; JQ Zhang, Chinese Academy of Fishery Sciences, China

**Nonlinear Free Surface Bow and Stern Flows Past a Circular Cylinder**

BS Yoon, Y Semenov, Univ of Ulsan, Korea

**A CUDA-Enabled 2D-Lattice Boltzmann Model to Simulate Flow around Three Equilateral Circular Cylinders**

MS Alam, L Cheng, Univ of Western Australia, Australia

**Direct Numerical Simulation of Effects of Small Angle of Incidence on Honji Instability**

K Yang, L Cheng, HW An, M Zhao, Univ of Western Australia, Australia

**110. RENEWABLE ENERGY XII: Wave Energy 5 (V. 1)**  
**Thursday June 23 08:00 Room 3**

**Chair:** S Grilli, Univ of Rhode Island, USA

**Keynote, Oral presentation**

**International Vision for Ocean Energy**

J Huckerby, Ocean Energy Systems Implementing Agreement, New Zealand

**A Novel Direct Drive Turbine for Wave Energy Conversion**

MA Zullah, CG Kim, YH Lee, Korea Maritime Univ, Korea

**Motion and Performance of Floating Wave Energy Converter System with Multiple OWC Columns**

Y Yasuzawa, Y Okumura, T Nagashima, Kyushu Univ, Japan

**Numerical Simulation of an Oscillating Water Column Wave Energy Converter: Comparison of Two Numerical Codes**

JMP Conde, Univ Nova de Lisboa, Portugal; E Didier, LNEC, Portugal; PRF Teixeira, Univ Federal do Rio Grande, Brazil

**Energy Conversion Characteristics on Floating Type Pendulum Wave Energy Converter in Regular Waves**

K Toyota, S Nagata, Y Imai, T Setoguchi, K Ono, Saga Univ, Japan

**Methodology for an Economic Assessment of a Wave Energy Farm**

BF Teillant, NUI Maynooth; F Mouwen, J Weber, Wavebob; J Ringwood, NUI Maynooth, Ireland

**111. FLOATING STRUCTURES & FPSO/SPAR/TLP III (V. 1)**  
**Thursday June 22 08:00 Room 4**

**Chair:** B-F Peng, J Ray McDermott, USA

**Development of Compact Cryogenic Heat Exchanger for LNG-FPSO**  
JH Kim, SK Jeong, SW Baek, KAIST, Korea

**Model Experiments on Heading Control of FSRU Using Resolved Motion and Acceleration Controller**

YS Kim, HG Sung, JH Kim, SY Hong, Maritime & Ocean Engineering Research Inst, Korea

**Offset Performance Assessment to Embedding of Moorings in an Offshore Floating Production Unit**

R Taghipour, AMOG Consulting, Australia

**Prediction of Floating Platform Mooring Responses in South China Sea**

JH Liu, YF Zhang, WJ Zhong, Offshore Oil Engineering, China

**Investigation of a Four-cage Grid Mooring System in Waves**

TJ Xu, GH Dong, YP Zhao, YC Li, Dalian Univ of Tech; FK Gui, Zhejiang Ocean Univ, China

**112. FSW I: Process Application (V. 4)**  
**Thursday June 23 08:00 Room 5**

**Chair:** TW Nelson, Brigham Young Univ, USA

**Evaluation of Economic Incentives and Weld Properties for Welding Steel Pipelines Using Friction Stir Welding**



A Kumar, DP Fairchild, ML Macia, TD Anderson, ExxonMobil Upstream Research; HW Jin, R Ayer, N Ma, A Ozekcin, RR Mueller, ExxonMobil Research & Engineering, USA

**Friction Stir Welding /Processing for Hardbanding in Oil and Gas Applications**

S Sanderson, RJ Steel, K Keshevan, C Roth, S Packer, P Higgins, MegaStir Technologies, USA

**Friction Stir Processing of 4140 Steel for Friction and Wear Performance Enhancement**

CB Smith, Friction Stir Link; O Ajayi, C Lorenzo-Martin, Argonne National Lab; SJ Krol, Friction Stir Link, USA

**FSW Tool Designs for High Melting Temperature Materials**

RJ Steel, J Peterson, S Packer, M Mahoney, MegaStir Technologies, USA

**Challenges of FSW Thick Section Steel**

JM Seaman, EWI, USA

**113. COASTAL VIII: Coastal Structures 1 (V. 3)**

**Thursday June 23 08:00 Room 6**

**Chair:** S Araki, Osaka Univ, Japan

**Coastal Structures Study Using SPH**

E Didier, MG Neves, Laboratorio Nacional De Engenharia, Portugal

**Development of a Highly Dissipative Floating Breakwater and its Application to the Fishing Port**

T Nakamura, Ehime Univ, Japan; DS Kim, Korea Maritime Univ, Korea

**Interactions of Water Waves with a Bottom-mounted Liquid-filled Flexible Container: Breakwater Purpose and Wave Energy Application**

N Choplain, Univ of Southampton, UK

**2-D Physical Modeling for Measuring the Efficiency of Perforated Skirt Breakwater (PSB)**

H Ajiwibowo, A Wurjanto, A Hendrian, Bandung Inst of Tech, Indonesia

**Experimental Investigation on Adaptive Countermeasure Using Floating Panel for Wave Overtopping Reduction**

K Kawasaki, HD Ut, T Funahashi, Nagoya Univ; T Fukumoto, Nishimatsu Construction, Japan

**Interaction of Wave with an Array of Porous Circular Cylinders**

MS Park, YR Choi, WC Koo, Univ of Ulsan, Korea; K Kawano, Kagoshima Univ, Japan

**Time-evolution of Risk for an Array of Moored Floating Breakwaters Using Stochastic Simulation**

I Diamantoulaki, D Angelides, Aristotle Univ of Thessaloniki, Greece

**Response Analysis of the Slit Type Coastal Structures under Waves and Currents**

JW Lee, KK Kim, Korea Maritime Univ, Korea; KF Cheung, Univ of Hawaii at Monoa, USA; JS Kim, Korea Maritime Univ; SM Kim, Buman Construction, Korea

**Numerical Simulation of Waves and Currents near L-shaped Breakwater**

YP Chen, Hohai Univ, China; SQ Pan, Univ of Plymouth, UK; CK Zhang, Hohai Univ, China

**Study on Stability of Breakwater Structure in Tianjin Port East Coast**

LC Sun, C Chun, LZ Ge, Tianjin Research Inst of Water Transport Engineering, China

**114. PIPELINES & RISERS V: Pipeline Flow (V. 2)**

**Thursday June 23 08:00 Room 7**

**Chair:** WC Kan, ExxonMobil Development Co., USA

**Co-Chair:** CAD Lemos, Petrobras, Brazil

**Experimental Study on the Loading and Vibration of Suspended Marine Pipeline**

HH Chen, RY Yang, WP Jiang, HH Hwung, National Cheng Kung Univ, Taiwan, China

**Investigation of Flow Past a Circular Cylinder near Plane Boundary**  
B Chen, Dalian Univ of Tech, China; T-C J Su, Florida Atlantic Univ, USA

**115. GEOTECH VIII: Slope Stability (V. 1)**

**Thursday June 23 08:00 Room 8**

**Chair:** LK Chien, National Taiwan Ocean Univ, Taiwan, China

**Analysis of Geometries of Landslide Dams in Taiwan**

YS Kuo, KT Chen, YC Tsang, CL Shieh, National Cheng Kung Univ, Taiwan, China

**Estimation of Undrained Shear Strength Using Swedish Weight Sounding**

M Fujii, Y Kamiya, K Watanabe, Tokai Univ; K Matsushita, Misawa Homes Inst R&D, Japan

**Primary Judgment of Liquefaction Possibility Based on Groundwater Level for Detached Houses**

CH Kim, M Ogawa, Hokoku Engineering; K Tei, Crea-Tec Corp; M Fujii, Tokai Univ, Japan

**Effect of Foundation Excavation on Metro-shield Tunnel at Ching-Mei Gravel Stratum**

LK Chien, CC Lee, TS Feng, National Taiwan Ocean Univ, Taiwan, China

**Development of a New Operation System for Screwdriver Sounding Test**

T Tanaka, N Suemasa, A Ikegame, Tokyo City Univ; S Yamato, Inspection Organization Co, Japan

**Analysis Method of Measuring Data to Detect Abnormal Event in Slope**

SJ Jung, TH Kim, Korea Maritime Univ, Korea

**Case Study on the Reinforcement and Management System for Large Scale Landslide Occurred in Cut Slope in Korea**

HY Shin, WK Kim, KO Kim, YJ Kim, Daewoo E&C, Korea

**Thermal Analysis of Soil Surrounding the Screw Piles Using the Infrared Camera**

MJ Arai, System Measure; M Fujii, K Watanabe, Tokai Univ; Y Kanehira, System Measure, Japan

**116. OCEAN MINING VI: Deep-Ocean Minerals 1 (V. 1)**

**Thursday June 23 08:00 Room 9**

**Chair:** GS Roonwal, Inter University Accelerator Centre, India

**Co-Chair:** SJ Liu, Central South Univ, China

**Activities of the Interoceanmetal Joint Organization, Problems of the Application of the United Nations International Framework Classification for Reserves/Resources**

J Franzen, Interoceanmetal Joint Organization, Poland

**Current Status of Manganese Nodule Exploration in the German License Area**

C Rühlemann, T Kuhn, M Wiedicke, Federal Inst for Geosciences & Natural Resources; S Kasten, K Mewes, Alfred Wegener Inst for Polar & Marine Research; A Picard, MARUM/Max Planck Inst for Marine Microbiology, Germany

**Development of Methods and Equipment for the Exploration of Manganese Nodules in the German License Area in the Central Equatorial Pacific**

T Kuhn, C Rühlemann, M Wiedicke-Hombach, Federal Inst for Geosciences & Natural Resources, Germany

**A Study on the Relationship of Manganese Nodule Distribution and Characteristic of Deep-sea Sediments on the Northeastern Pacific**

SB Chi, CM Yoo, YT Ko, SJ Ju, KORDI, Korea

**Physical Properties of Polymetallic Nodules and Deep Sea Sediments**

I Dreiseitl, Interoceanmetal Joint Organization; R Bednarek, West Pomeranian Univ of Tech, Poland

**117. ARCTIC V: Ice-Ocean-Ship Interaction & Performance (V<sup>2</sup>)**

Thursday June 23 08:00 Room 10

**Chair:** JM Hamilton, ExxonMobil Upstream Research Co, USA

**Co-Chair:** Y Gudoshnikov, AARI, Russia

**Experimental Study on Ice-Breaking Capacity of Flexural-Gravity Waves Caused by Motion of Submarine Vessel**

VM Kozin, Inst of Machine Sci & Metallurgy, FEB-RAS; VL Zemlyak, Amur State Univ of Humanities & Pedagogy, Russia

**Fatigue Design Assessment of Ship Structures Induced by Ice Loading—An Introduction to the ShipRight FDA ICE Procedure**

SM Zhang, R Bridges, J Tong, Lloyd's Register, UK

**Forces on Ships Transiting Pressured Ice Covers**

M Sayed, I Kubat, National Research Council, Canada

**Experimental Investigation of Local Ice Loads Onboard Nuclear Icebreaker "Yamal" During Expedition "Arctica-2009"**

NA Krupina, AV Chernov, AV Savitskaya, Arctic & Antarctic Research Inst, Russia

**The Icebreaking Performance of SHIRASE in the Maiden Arctic Voyage**

Y Yamauchi, S Mizuno, H Tsukuda, Universal Shipbuilding, Japan

**Marine Icing: Sea Spray Measurements on Board a Supply Vessel; Instrumentation and Data Results**

G Eidnes, SINTEF, O-C Ekeberg, Det Norske Veritas; A Kulyakhtin, NTNU, Norway

**118. ENVIRONMENT IV: Monitoring (V. 1)**

Thursday June 23 10:30 Room 1

**Chair:** NM Patrikalakis, MIT, USA

**High Sensitive Raman Sensor for Continuous In-Situ Detection of PAHs in Sea-Water Adapting on a Mooring**

A Kolomijeca, YH Kwon, R Sowoidnich, Tech Univ Berlin; RD Prien, DE Shulz-Bull, Leibniz Inst for Baltic Sea Research; HD Kronfeldt, Tech Univ of Berlin, Germany

**Spatial and Temporal Fluctuation of Nutrients in the Estuarine Ecosystem**

R Arai, K Kuroda, K Akita, N Nakatani, K Otsuka, Osaka Prefecture Univ, Japan

**Monitoring of Marine Bottom Ecosystems Using Underwater Robot**

NN Lelyukh, Inst of Marine Tech Problems, FEB-RAS, Russia

**Real-Time Visualizations of Ocean Data Collected by the NORUS Glider in Svalbard, Norway**

ZJ Wood, M Moline, C Clark, D Medina, Cal Poly San Luis Obispo, USA

**Driftwood after Typhoon Morakot Attacked Taiwan in 2009**

HC Chuang, DJ Doong, National Taiwan Ocean Univ, Taiwan, China

**Study on the Sodagarami for Tidal Flat Environments**

H Yamanishi, Saga Univ, Japan

**119. HYDRODYNAMICS XIII: CFD Floating Body (V. 3)**

Thursday June 23 10:30 Room 2

Chair: J Zang, Univ of Bath, UK

**Numerical Study on Viscous Flow and Hydrodynamic Forces Acting on a Berthing KVLCC2 Model**

HM Wang, Zhejiang Ocean Univ; ZJ Zou, Shanghai Jiao Tong Univ, China

**FSFR - Flat Buoy Stability Model Tests Versus CFD/FSI Method**

M Minguez, A Luppi, Centre ATRIA; R Maloberti, R Vivet, TECHNIP, France

**Numerical Study on Nonlinear Hydroelastic and Hydrodynamic Effects on Floating Body Using Eulerian Scheme with Lagrangian Particles**

S Baso, H Mutsuda, K Kawakami, K Hashihara, Y Doi, Hiroshima Univ, Japan

**Two-Dimensional Flooding Simulation of a Damaged Ship**

H Hashimoto, T Sugimoto, Osaka Univ; M Sueyoshi, Kyushu Univ, Japan

**Efficient Numerical Simulation of Wave-Body Interaction Problem Using Hybrid CFD scheme**

BW Nam, SY Hong, Maritime & Ocean Engineering Research Inst; YH Kim, KK Yan, Seoul National Univ, Korea

**Prediction of Radiation Forces by Means of a CIP-based Cartesian Grid Method**

GH He, T Isshiki, M Kashiwagi, Oskaa Univ; CH Hu, Kyushu Univ, Japan

**120. RENEWABLE ENERGY XIII: Wave Energy 6 (V. 1)**

Thursday June 23 10:30 Room 3

Chair: RL Waid, Marine Development Associates, USA

**A Critical Assessment of Latching as Control Strategy for Wave-Energy Point Absorbers**

JAM Cretel, GP Thomas, G Lightbody, AW Lewis, Univ College Cork, Ireland

**Suboptimal and Causal Reactive Control of Wave Energy Converters through Second Order Model Reduction**

F Fusco, JV Ringwood, National Univ of Ireland Maynooth, Ireland

**Hydrodynamic Modelling of Heaving Buoy Wave Energy Conversion System with Liquid Metal Magneto-hydrodynamic Generator Wave Energy Conversion**

BL Liu, Y Peng, LZ Zhao, J Li, R Li, YY Xu, CW Sha, Inst of Electrical Engineering, CAS, China

**Numerical Analysis of Liquid Metal Magneto-hydrodynamic Generator for Wave Energy Conversion**

T Xiao, Y Peng, LZ Zhao, YY Xu, BL Liu, J Li, R Li, Inst of Electrical Engineering, CAS, China

**Float-counterweight Type Wave Power Generation SystemL Experiments in Open Sea**

K Taneura, CIT Engineering; K Hadano, P Koirala, Yamaguchi Univ, Japan

**121. FLOATING STRUCTURES & FPSO/SPAR/TLP IV (V. 1)**

Thursday June 23 10:30 Room 4

Chair: C-Y Chen, J. Ray McDermott, USA

**A Time Domain Analysis on the Hydrodynamic of a Truss Spar**

BL Geng, Tianjin Research Inst for Water Transportation Engineering; B Teng, Dalian Univ of Tech, China

**Estimate of Used Fatigue Life of Mooring Lines of a GOM Truss Spar Based on Field Measurements**

AF Kiecke, J Zhang, Texas A&M; J Tule, Anadarko Petroleum, USA

**Nonlinear Analysis of Fully Coupled Integrated Spar-Mooring Line**

**System**

M Jameel, Univ of Malaya, Malaysia; S Ahmad, Indian Inst of Tech, India;  
ABM Saiful Islam, MZ Jumaat, Univ of Malaya, Malaysia

**Investigation on the Global Performance of a VLFOB Concept**

LF Xiao, YF Kou, LJ Yang, X Li, Shanghai Jiao Tong Univ, China

**Development of a Design Chart for a Preliminary Design of Very Large Floating Structures**

GS Zi, Korea Univ; JY Kim, PS Lee, KAIST, Korea

**Mooring Analysis of Ultra Large Floating System in South China Sea**

JH Liu, WJ Zhong, Offshore Oil Engineering, China

**122. FSW II: Microstructure & Properties: Ferrous (V. 4)**

**Thursday**                      **June 23**                      **10:30**                      **Room 5**

**Chair:** E. Almanza-Casas, Instituto Tecnológico de Saltillo, Mexico

**Effect of Heat Input on Post-Weld Microstructure and Mechanical Properties in FSW HSLA-65**

TW Nelson, Brigham Young Univ; LY Wei, Welding Alloys; M Abbasi, Brigham Young Univ, USA

**Microstructure and Mechanical Properties of Friction Stir Welded High-strength Steel for Drilling Pipe**

YS Sato, SCK Lee, H Kokawa, Tohoku Univ; JS Lee, WB Lee, MH Cho, POSCO, Korea

**The Effect of Process Parameters on Thermal Cycles and Microstructure Development on Friction Stir Welds in Shipbuilding Steel Grades**

JF dos Santos, GKSS Forschungszentrum, Germany

**Microstructure and Toughness of Friction Stir Weld of 12mm Thick Structural Steel**

M Matsushita, Y Kitani, R Ikeda, S Endo, JFE Steel, Japan

**Friction Stir Welding of Highly Alloyed (Cr-Mo) Steels**

AJ Ramirez, ADS Bruno Costa, TFA Santos, Brazilian Synchrotron Light Lab; HFG Abreu, Univ of Ceara, Brazil

**123. COASTAL IX: Coastal Structures 2 (V. 3)**

**Thursday**                      **June 23**                      **10:30**                      **Room 6**

**Chair:** DC Angelides, Aristotle Univ of Thessaloniki, Greece

**Co-Chair:** JW Lee, Korea Maritime Univ, Korea

**Study of the Destruction Mechanism of Concrete-Coated Coastal Levees by Waves**

Y Yamamoto, K Nariyoshi, R Higa, Tokai Univ, Japan

**Effectiveness of Seafloor Mounted Structures for Upwelling in Deep Seas**

I Deguchi, Osaka Univ; H Kida, Nippon Steel Engineering; N Takayuki, I Kunimitsu, Ehime Univ, Japan

**Experimental Study on Counter-weight Blocks for Breakwater Stability**

T Hiraishi, J Mase, T Kawata, Kyoto Univ; T Yukimoto, Nikken Kogaku; T Tokunaga, H Matsushita, Environment & Marine Engineering Inst, Japan

**Numerical Simulation on Displacement of Armor Block on Submerged Breakwater with 3-Dimensional DEM**

S Araki, I Deguchi, Osaka Univ, Japan

**Numerical Research on Scouring and Silting of Seabed in Front of Breakwaters**

HD Shi, Q Zhang, Ocean Univ of China; CL Li, China Univ of Petroleum; BC Liang, Ocean Univ of China, China

**Research on Armor Units Stability in 3D and 2D Physical Model**

CH Zhang, Tianjin Research Inst of Water Transportation Engineering, China; L Ziauddin Abd, Department of Irrigation & Drainage, Malaysia; HB Chen, Tianjin Research Inst for Water Transportation Eng, China

**124. PIPELINES & RISERS VI: Pipe-Soil Interactions (V. 2)**  
Thursday June 23 10:30 Room 7

Chair: BM Sumer, Technical Univ of Denmark, Denmark

**Uplift Resistance of Buried Pipelines in Frozen and Thawing Backfill Conditions**

JK Wang, SK Haigh, Univ of Cambridge; I Thusyanthan, KW Ltd, UK

**Laboratory Modelling of Pipe-clay Seabed Interaction in Axial Direction**

S Muthukrishnan, K Jayantha, Monash Univ, Australia

**Cyclic Movement Behavior of Shallowly-embedded Offshore Pipeline on Carbonate Seabed**

T Takatani, Maizuru National College of Tech, Japan

**Characterization of Pipe Soil Interaction and Influence on HPHT Pipeline Design**

F Casola, AR El-Chayeb, A Carlucci, S Greco, SAIPEM, France

**125. GEOTECH IX: Geoenvironment (V. 1)**  
Thursday June 23 10:30 Room 8

Chair: K Fakharian, Amirkabir Univ of Technology, Iran

**The Study of Establishment of Planning and Management for Marine Area in Taiwan**

LK Chien, WC Tseng, CH Chang, National Taiwan Ocean Univ; CH Hsu, National Cheng Kung Univ, Taiwan, China

**The Establishment and Application of Coastal Vulnerability Index in Taiwan Nearshore Area**

TS Feng, LK Chien, JF Xu, SY Chiu, National Taiwan Ocean Univ, Taiwan, China

**The Stability of RC Revetments for Protecting the Riverbank Subjected to Heavy Rainfall**

CC Fan, YC Liu, Kaohsiung First Univ of Sci & Tech, Taiwan, China

**An Integrated Methodology for Modeling Regional Geohazards due to Extreme Climate Condition**

CY Ku, National Taiwan Ocean Univ, Taiwan, China

**Geotechnical and Environmental Characteristics of Recycling Materials for Utilization as a Lightweight Fill Material on Soft Ground**

SJ Lee, MH Shin, Korea Railroad Research Inst; TY Lee, Pukyong Univ; SK Hwang, SH Lee, Korea Railroad Research Inst, Korea

**Geohazards and Seafloor Stability of Australia's North West Shelf**

JV Hengesh, Univ of Western Australia, Australia

**Limit Analysis of Mechanism of Low-angle Submarine Landslide Based on Upper Bound Energy Method**

M Zhou, Z Zhu, CG An, JH Zhang, Tsinghua Univ, China

**Stability of Unsaturated Infinite Slope under Rainfall-Induced Infiltration**

WK Hwang, TH Kim, Korea Maritime Univ, Korea

**Particle and Mechanical Characteristics of Clinker Ash**

Y Wakatsuki, Fukken Co; I Yoshioka, Chugoku Electric Power; A Nakashita, Energia Eco Materia; M Hyodo, N Yoshimoto, Yamaguchi Univ, Japan

**126. OCEAN MINING VII: Deep-Ocean Minerals 2 (V. 1)**  
Thursday June 23 10:30 Room 9

**Chair:** C Rühlemann, Federal Inst for Geosciences & Natural Resources, Germany

**Keynote Presentation**

**Status of India's Deep Sea Mining Program [Oral presentation]**  
MA Atmanand, NIOT, India

**Exploration and Exploitation of Minerals in Papua New Guinea - An Overview [Oral presentation]**  
M Singh, Mineral Resources Authority, Papua New Guinea

**Strategic and Economic Metals for Emerging Technologies Found in Marine Ferromanganese Nodules and Crusts [Oral presentation]**  
J Hein, US Geological Survey, USA; A Koschinsky, Jacobs Univ Bremen, Germany; K Schmidt, Jacobs Univ Bremen/GeoForschungsZentrum, Germany; T Conrad, US Geological Survey, USA; B Alexander, M Bau, Jacobs Univ Bremen, Germany

**Experimental Studies on Rare Metal Collection from Seawater**  
N Nakazawa, Systems Engineering Associates; M Tamada, N Seko, Japan Atomic Energy Agency; K Ooi, National Inst of Advanced Industrial Sci & Tech; S Akagawa, Systems Engineering Associates, Japan

**UV-fluorescence Sensing System for Seafloor Massive Sulfides**  
H Nagano, D Okanishi, N Nakatami, R Arai, T Yamazaki, Osaka Prefecture Univ, Japan

**127. ARCTIC VI: Navigation and Ice Management (V. 2)**

**Thursday June 23 10:30 Room 10**

**Chair:** H Kitagawa, Ocean Policy Research Foundation, Japan

**Simulation of Ice Management Fleet Operations Using Two Decades of Beaufort Sea Ice Drift and Thickness Time Histories**  
JM Hamilton, C Holub, J Blunt, ExxonMobil Upstream Research, USA

**AIS-satellite Data Used for Arctic Trafficability Studies in the NE-Passage**  
N Kjerstad, Aalesund Univ College, Norway

**Comparison of Passage Time with Climate Index -Great Circle Route on the North Pacific-**  
Y Shimada, Kobe Univ; K Takahashi, JAMSTEC; S Shiotani, Kobe Univ, Japan

**Ice Observer System for Ice Management Operations**  
J Haugen, L Imsland, S Løset, R Skjetne, NTNU, Norway

**Numerical Experiments of Arctic Sea Ice Forecasting During CHINARE 2010**  
QH Yang, National Marine Environmental Forecasting Center; LP Liu, Inst of Atmospheric Physics, CAS; ZH Zhang, Q Li, Polar Research Inst of China; CJ Sui, CH Li, HD Wu, National Marine Environmental Forecasting Center, China

**LNGC Collision with Iceberg Considering Surrounding Sea Water**  
SG Lee, BHA Nguyen, Korea Maritime Univ, Korea

**Prospects of the Russian Arctic Transport System Development**  
VI Pavlenko, Arctic Research Center; EK Glukhareva, SY Kutsenko, Oil & Gas Research Inst, RAS, Russia

**Lightweight Structures under Extreme Conditions: Case Studies from Antarctica**  
J Fernandoy, Univ of Bath, UK/Univ of Magallanes, Chile; P Shepherd, P Richens, Univ of Bath, UK

## THURSDAY 14:00

### 128. ENVIRONMENT V: Sediment & Debris (V. 1)

Thursday June 23 14:00 Room 1

Chair: M Irie, Osaka Univ, Japan

#### **Laboratory Investigation into the Effect of Buoyant Layer Velocity on Mixing in a Stratified Co-flow System**

CL Rogan, GA Hamill, HT Johnston, Queen's Univ, UK

#### **Engineering Development of Ballast Water Treatment by Filtration Technology for International Convention on IMO**

T Shinoda, Kyushu Univ, Japan

#### **Study on New Ocean Contamination Derived from Marine Debris Plastics -Investigations of the West Pacific Ocean-**

H Sato, K Saido, Nihon Univ, Japan; CM Ou, Lan Yang Inst of Tech, Taiwan, China; BA Lejano, De La Salle Univ, Philippines

#### **Development of Seawater Scrubber for Reduction of SOx and DPM Exhausted from Ship**

MS Jang, DG Kim, JW Shin, Simulation Tech, Korea

#### **A Study of Gravity Currents Supplied with Constant Volume Fluxes**

T Katsuragi, N Baba, Osaka Prefecture Univ, Japan

### 129. HYDRODYNAMICS XIV: CFD Flows (V. 3)

Thursday June 23 14:00 Room 2

Chair: F Lalli, ISPRA, Italy

#### **Study of Fluid Dynamics around Cylinder and Tube Array by Means of CFD Simulation on Experimental Tests**

B Collard, S Delafontaine, CEA, France

#### **Detection of Turbulence Structures and their Interactions with a Flat Gas-Liquid Interface in Fully-developed Turbulent Flow**

R Nagaosa, AIST, Japan

#### **Manifold Design for Uniform Flow Distribution in Microchannel Devices**

DJ Kim, CH Yu, SH Yoon, JS Choi, Korea Inst of Machinery and Materials, Korea

#### **A Numerical Study on the Performance of 2 Stage Mixed Flow Pump for Seawater Lifting**

YJ Kim, NS Woo, JK Kwon, SK Chung, Park, CH Yoon, Korea Inst of Geoscience & Mineral Resources, Korea

#### **A Study on the Solid-liquid Rotating Flow for Cuttings Transport in Inclined Annulus**

NS Woo, YJ Kim, JK Kwon, SK Chung, ES Park, CH Yoon, Korea Inst of Geoscience & Mineral Resources, Korea

### 130. RENEWABLE ENERGY XIV: Wave Energy Resources (V. 1)

Thursday June 23 14:00 Room 3

Chair: AJNA Sarmento, Technical Univ of Lisbon, Portugal

#### **Strategic Environmental Assessment to Evaluate WEC Projects in the Perspective of the Environmental Cost-Benefit Analysis**

A Azzellino, Politecnico di Milano; V Ferrante, P Contestabile, Seconda Univ di Napoli; C Lanfredi, Politecnico di Milano; D Vicinanza, Seconda Univ di Napoli, Italy

#### **Factors Affecting the Unsteadiness of the Power Density of Ocean Waves**



RL Waid, Marine Development Associates, USA

**Wave Resources of the Pacific Region for Small-scale Developments**  
J Huckerby, Power Projects; P McComb, MetOcean Solutions, New Zealand

**Assessment of Nearshore Wave Energy Resource Using Offshore Hindcast Data**  
GW Kim, WM Jeong, KW Lee, GC Jun, KORDI, Korea

**131. Jacket & Jackup (V. 1)**  
**Thursday June 23 14:00 Room 4**

**Chair:** L Boswell, The City Univ, London, UK

**Developing a Robust Structural Health Monitoring Method for Offshore Jacket Platform Using Modified AIS Algorithm**  
A Mojtahedi, Osaka Univ, Japan; F Abbasidoust, MA Lotfollahi Yaghin, MH Etefagh, Univ of Tabriz, Iran

**Dynamic Model Analysis of Degraded STS Type Offshore Structure by Means of Fluid Structure Interaction**  
A Haris, A Nasution, S Darmawan, RL Tawakal, Bandung Inst of Tech, Indonesia

**Boundary Updating of Offshore Jacket Structures Considering Seabed Scour**  
YC Li, HJ Li, Ocean Univ of China, China; S-L J Hu, Univ of Rhode Island, USA

**Resistance Parameters Statistics for Jacket Platforms in Offshore Malaysia**  
NS Potty, BI Arazi, Universiti Teknologi PETRONAS; MAH Foad, Universiti Teknologi Malaysia; Z Nizamani, NJ Cossa, Universiti Teknologi PETRONAS, Malaysia

**Structural Modification by Reassigning Natural Frequencies of Offshore Jacket Platforms**  
M Zhang, HJ Li, Ocean Univ of China, China; SLJ Hu, Univ of Rhode Island, USA

**A Gap underneath the Spudcan During the Initial Extraction**  
ML Duan, J Zhao, China Univ of Petroleum; SJ Cao, LS Song, China Oil Services, China

**Damage Evaluation on a Jacket Platform Structure using Modal Properties**  
SY Park, DC Park, EH Kim, HS Kim, Korea Maritime Univ, Korea

**Scour Experiment and Analysis of Offshore Submersible Platform**  
SP Wang, YL Qin, CNPC Research Inst of Eng Tech; LH Zhang, X Qi, CNPC Offshore Eng, China

**Continue 16:20**

**132. FSW III: FSW of Stainless & Dissimilar Metals (V. 4)**  
**Thursday June 23 14:00 Room 5**

**Chair:** A Kumar, ExxonMobil Upstream Research Co., USA

**Material Flow in Aluminum Friction Stir Welds**  
RW Fonda, AP Reynolds, CR Feng, DJ Rowenhorst, Naval Research Lab, USA

**Application of Diffusional Models to Predict Tool Wear**  
BT Thompson, Edison Welding Inst; SS Babu, Ohio State Univ, USA

**Characterization of Friction Stir Spot Welding of Aluminum Alloys Using Acoustic Emissions**  
JW Park, YW Lee, ST Hong, YJ Yum, KY Park, Univ of Ulsan, Korea

**Evaluation of Mechanical Properties of 304L and 316L Stainless Steels Friction Stir Welded**  
E Almanza-Casas, MJ Perez-López, Inst Tecnológico de Saltillo, Mexico; R

Steel, Sii Megadiamond; S Packer, Advanced Metal Products, USA

**Effect of Grain Boundary Character Distribution on the Mechanical Properties and Corrosion Resistance of Superduplex Stainless Steel Friction Stir Welds**

AJ Ramirez, TFA Santos, Brazilian Synchrotron Light Lab, Brazil

**133. COASTAL X: Tide & Estuary 1 (V. 3)**

**Thursday June 23 14:00 Room 6**

**Chair:** T Hiraishi, Kyoto Univ, Japan

**Co-Chair:** JZ Yim, National Taiwan Ocean Univ, Taiwan, China

**Study on the Selection of the Appropriate Area to Create Zostera Marina Beds Using Numerical Model**

H Komatsu, M Fujiwara, T Ueda, Kagawa Univ; M Miyagawa, Kagawa Prefectural Fisheries Experimental Station; H Kakegawa, Y Suenaga, Kagawa Univ, Japan

**Research on the Seaweed Rootage by Current Control Structure**

T Kameyama, M Fujiwara, Kagawa Univ; K Yasuoka, Nittoc Constuction; M Miyagawa, Kagawa Prefectural Fisheries Experimental Station; Y Matsuuchi, Y Suenaga, Kagawa Univ, Japan

**Evaluation of the Annual Variation of Vegetation Area with Spatio-temporal Variation in Coastal Sandbar**

SH Ryu, IC Lee, Pukyung National Univ, Korea

**Effect of Coastal Prevention by Beach and Serious Problems in Some Coasts of the Gulf of Thailand**

N Charusrojthanadech, King Mongkut's Inst of Tech, Thailand; Y Yamamoto, Tokai Univ, Japan; U Sirikaew, King Mongkut's Inst of Tech, Thailand

**Temporal and Spatial Variations of Suspended Sediment Concentration in the Yanshan Port Sea Area, China**

SH Zuo, B Li, Tianjin Research Inst of Water Transport Engineering, China

**134. PIPELINES & RISERS VII: Pipeline Integrity (V. 2)**

**Thursday June 23 14:00 Room 7**

**Chair:** H Moshagen, BHM Engineering Services, Norway

**Co-Chair:** TD Anderson, ExxonMobil Upstream Research Co, USA

**Offshore Pipeline Shore Approach Design - Case Study**

SY McMaster, DR Campbell, Atteris Pty, Australia

**AC Current Loads on Anodes and Steel Flowline due to Direct Electrical Heating Systems - A Finite Element Study**

M Høyer-Hansen, A Pedersen, SINTEF, Norway

**Data-Driven Maintenance Optimization of Petroleum Pipelines subject to Corrosion**

AW Dawotola, Delft Univ of Tech, Netherlands; T Trafalis, Univ of Oklahoma, USA; Z Mustafa, P van Gelder, H Vrijling, Delft Univ of Tech, Netherlands

**Optimised Design of Pipelines Exposed to Trawl Pullover**

S Roneid, L Amdal, E Birger, Det Norske Veritas, Norway

**Pipeline Integrity and Rehabilitation Technology: An Operator's Perspective**

TD Anderson, A Kumar, M Macia, D Fairchild, F Bardi, M Kulkarni, ExxonMobil Upstream Research, USA

**A Study on 3D Design Model Based-Visualization System to Support Pipe Maintenance**

JH Kim, KY Lee, JM Lee, G Lee, Inha Univ, Korea

**Pipeline Bundle System Design Based on Limit State Method**

ZG Yao, YL Qin, KL Zhao, CNPC Research Inst of Engineering Tech, China

**135. GEOTECH X: Marine Geotechnology (V. 1)**  
**Thursday June 23 14:00 Room 8**

**Chair:** T. Matsui, Ritsumeikan Univ, Kusatsu, Japan

**The Required Embedded Length of Monopole Foundation with Respect to Scour**

YS Kuo, WC Tseng, JW Chen, National Cheng Kung Univ, Taiwan, China

**Development of Bender-Cone Penetration Probe for Stiffness Measurements of Marine Clay**

YH Jung, YJ Mok, HS Kim, Kyunghee Univ, Korea

**Mathematical Model Description of Characteristic Curves of Super-length Piles on Sea**

JP Jiang, Z Lu, Shanghai Maritime Univ, China

**Caspian Sea Southern Coasts Seismic Vulnerability**

H Khoshnavan, National Research Center of Caspian Sea; H Berimani, Irvan Univ, Iran

**Estimation of Self-weight Consolidation for Dredged Soil by Density Distribution**

MS Lee, K Oda, K Tokida, Osaka Univ, Japan

**Numerical Analysis of Drain Characteristics in Reclamation Site According to the Configuration of Reactive Drain Pile**

MH Oh, KORDI; CY Yune, HW Kang, Gangneung-Wonju National Univ, Korea

**Hazard-consistent Fragility Curves of Soil Liquefaction for Suao Harbor in Taiwan**

FK Huang, Tamkang Univ; GS Wang, Chaoyang Univ of Tech, Taiwan, China

**Stone Column Remediation of Liquefiable Silty Marine Foundation Deposits [Proceedings only]**

K Adalier, Florida State Univ Panama City; A Elgamal, Univ of California San Diego, USA

**136. OCEAN MINING VIII: Environment & Technology (V. 1)**  
**Thursday June 23 14:00 Room 9**

**Chair:** Y Nakajima, National Maritime Research Inst, Japan

**Experimental Study on Vortex-induced Vibrations of a Long Flexible Pipe in Sheared Flows**

S Hong, JS Choi, HW Kim, TK Yeu, Maritime & Ocean Engineering Research Inst, Korea

**Application of Shifted Excitation Rama Difference Spectroscopy (SERDS) for In-situ Investigations in the Deep Sea**

H Ahmad, A Kolomijeca, K Sowoidnich, Tech Univ Berlin, Germany

**A Trial of Ecological Risk Assessment for Development of Seafloor Massive Sulfides**

Y Nakajima, NMRI; R Arai, N Nakatani, T Yamazaki, K Otsuka, Osaka Prefecture Univ, Japan

**Fate of Bacterial Mat in Anoxic Environment for Development of Prediction Model for Seafloor Environmental Assessment: Second Report**

Y Nakajima, J Yamamoto, National Maritime Research Inst; M Ikemoto, R Arai, N Nakatani, T Yamazaki, K Otsuka, Osaka Prefecture Univ, Japan

**137. ARCTIC VII: Exploration and New Instrumentation (V. 2)**  
**Thursday June 23 14:00 Room 10**

**Chair:** SJ Prinsenber, Bedford Inst of Oceanography, Canada

**Co-Chair:** V Pavlenko, Arctic Research Centre, RAS, Russia

**Actual Problems of the Environment Protection and Natural Resources Development on the Arctic Shelf**

VI Pavlenko, Arctic Research Center; EK Glukhareva, SY Kutsenko, Oil & Gas Inst, RAS, Russia

**Influence of Carbonation Reaction to Nondestructive Tests for Frost Damage Diagnosis**

M Suto, H Ogata, Tottori Univ; D Yamazaki, Sho-Bond Corp; Panganayi, Tottori Univ; R Takata, Matsue College of Tech; K Hattori, Tottori Univ, Japan

**Investigation of Hybrid Solar-Wind Power Generation Systems for the Polar Expedition Robot**

JH Liang, QL Zhong, TM Wang, MM Sun, Beihang Univ, China

**Optimization Analysis of Propulsion System for a Polar Scientific Icebreaker**

Y Yong, M Jie, TW Yong, Shanghai Jiao Tong Univ, China

**The Latest Developments in the Materials, Corrosion and Cathodic Protection of Arctic Pipelines**

P Jukes, MCS Kenny; B Singh, B Jamrok, Wood Group Integrity Management; A Eltaher, MCS Kenny, USA

**138. ENVIRONMENT VI: Modeling & Restoration (V. 1)**

**Thursday June 23 16:20 Room 1**

**Chair:** M Sayed, National Research Council, Canada

**Modeling of Anoxic Mineralization Processes in the Sediments of Eutrophic Littoral Regions of Osaka Bay**

M Irie, S Nishida, Osaka Univ; K Teranaka, General Environmental Technos; Y Tsuji, Y Nakatani, Osaka Univ, Japan

**A Study on Estimation of Seaweed Bed Restoration Using Deep Ocean Water Discharge with an Enclosed Structure**

A Matsui, K Otsuka, N Nakatani, Osaka Prefecture Univ, Japan

**Experiments on Purification of Ocean Sludge by Activating the Microorganism**

K Okamoto, T Toyama, H Kohno, K Hotta, Nihon Univ, Japan

**Comparison of Beach Profile Change and Migration of Vegetation Belts at Sand Barrier in Nakdong River Estuary, Korea**

CI Yoo, HS Yoon, Pukyong National Univ, Korea

**139. RENEWABLE ENERGY XV: Tidal & Current Energy 1 (V. 1)**

**Thursday June 23 16:20 Room 3**

**Chair:** AJNA Sarmiento, Technical Univ of Lisbon, Portugal

**Kuroshio Current Measurement around the Miyake Island, a Potential Site for the Ocean Current Power Generation**

T Kodaira, T Waseda, Univ of Tokyo, Japan

**Numerical Prediction of the Straight-bladed Water Turbine's Hydrodynamic Characteristics**

HN Wu, LJ Chen, BF Chen, National Sun Yat-sen Univ; CH Tai, National Pingtung Univ of Sci & Tech; HH Pan, MH Yu, National Sun Yat-sen Univ, Taiwan, China

**Incorporating Turbulent Inflow Conditions in a Blade Element Momentum Model of Tidal Stream Turbines**

M Togneri, I Masters, Swansea Univ, UK

**Turbulence Correction Terms for Representing Tidal Current Turbines in a Regional Ocean Model for Array Planning and Impact Assessment**

T Roc, DC Conley, D Greaves, Univ of Plymouth, UK

**PIV Analysis of the Near Wake of HA Tidal Turbines at Laboratory Scale**

AR Good, GA Hamill, TJT Whittaker, Queen's Univ, UK

**Study of Seiche Oscillations in the Vityaz Bay**

SG Dolgikh, GI Dolgikh, VI Il'ichev Pacific Oceanological Inst, Russia

**140. FSW IV: FSW Stainless & Non-Ferrous Alloys (V. 4)**

**Thursday June 23 16:20 Room 5**

**Chair:** R Steel, Megastir, USA

**The Effects of Tool Features on Texture, Macrostructure, and Extended Plasticity Mechanisms in 304L Stainless Steel**

CD Sorenson, Brigham Young Univ; BD Nelson, Manufacturing Technology; TW Nelson, Brigham Young Univ, USA

**The Examination of Nugget Formations for Friction Stir Lap Welding of Dissimilar Al Alloys Using 3-D Exit Hole Observation Technique**

TJ Yoon, SJ Kim, Pusan National Univ; NK Kim, SW Song, Korea Inst of Materials Science; CY Kang, Pusan National Univ, Korea

**Effect of Tool Offset on Dissimilar Cooper-Stainless Steel Friction Stir Welding**

AJ Ramirez, Brazilian Synchrotron Light Lab, Brazil; HC Fals, Univ of Oriente, Cuba; DM Benati, Brazilian Synchrotron Light Lab, Brazil

**Advances in Solid State Joining of High Temperature Alloys**

J Ding, NASA; J Schneider, Mississippi State Univ, USA

**Image-Based Finite Element Simulation of Mechanical Response of AA 5456 Friction Stir Welds**

AC Lewis, RW Fonda, HN Jones, Naval Research Lab, USA

**141. COASTAL XI: Tide & Estuary 2 (V. 3)**

**Thursday June 23 16:20 Room 6**

**Chair:** D-S Jeng, Univ of Dundee, UK

**Co-Chair:** E Yauchi, Chiba Inst of Technology, Japan

**Numerical and Experimental Study on Reducing Long Wave Run-up by Beach Vegetation**

R Mohandie, Cornell Univ; MH Teng, Univ of Hawaii at Mona, USA

**Application of Time-frequency Analysis to the Tidal Data of Kaohsiung Port**

CM Hsieh, National Kaohsiung Marine Univ; WC Yang, Taiwan Ocean Research Inst; YF Peng, National Chi-Nan Univ; RR Hwang, Inst of Physics, Academia Sinica, Taiwan, China

**The Graph Model of the Ship Shifting and Berthing Operation at the Dockyard and the Dijkstra Algorithm**

JP Chen, JW Ye, South China Univ of Technology, China

**Development of Mooring System to Reduce Long-period Motions of a Large Ship**

D Yasuda, H Ikeda, H Yoneyama, Ministry of Land, Infrastructure, Transport & Tourism; Y Otake, MOL Marine Consulting; T Hiraishi, Kyoto Univ, Japan

**Velocity Factor Determination Test of Pneumatic Fenders**

S Sakakibara, S Yamada, Yohomama Rubber, Japan

**Research on Recent Topography Evolution of Nanhui Tidal Flat in Yangtze Estuary**

LQ Shi, XM Xia, Second Inst of Oceanography; G Hu, Ministry of Land & Resources, JJ Jia, Second Inst of Oceanography; WH Li, Estuarine and Coastal Science Research Center; G Fu, Yangtze Estuary Waterway Administration Bureau; China

**142. PIPELINES & RISERS VIII: Pipeline Design (V. 2)**

**Thursday June 23 16:20 Room 7**

**Chair:** AM Gresnigt, Delft Univ. of Technology, Netherlands

**Mechanical Behavior of Submarine Pipeline for Deepwater S-lay Operation**

SF Gong, K Chen, XB Dang, WL Jin, Zhejiang Univ, China

**Pipeline Expansion and Contraction Engineering**

NY Kershenbaum, SUBSEA 7, USA

**A Finite Element Method Approach on Liner Wrinkling of Snug Fit Lined Pipe**

A Hilberink, Heerema Martine Contractors; AM Gresnigt, LJ Sluys, Delft Univ. of Tech, Netherlands

**Improved Direct Electrical Heating Method for Flow Assurance**

JK Lervik, SINTEF; A Nysveen, NTNU; A Bruaset, SINTEF, Norway

**A Fluid-Pipe-Soil Approach for Stability Design of Submarine Pipelines**

JR Ryan, DR Campbell, Atteris Pty, Australia

**Initial As-Laid Embedment of Deepwater Seabed Pipelines**

MK Hossain, A Eltahir, P Jukes, MCS Kenny, USA

**143. OCEAN MINING IX: Mineral Processing (V. 1)**

**Thursday June 23 16:20 Room 9**

**Chair:** KH Park, Korea Inst of Geoscience & Mineral Resources, Korea

**Co-Chair:** IZ Bunin, Research Inst of Comprehensive Exploitation of Mineral Resources, RAS, Russia

**Structural and Chemical Transformations of Pyrrhotite and Pentlandite: On the Possibility of Application of High-power Nanosecond Pulses to Flotation Separation of Sulfide Minerals**

IZ Bunin, VA Chanturiya, AT Kovalev, IA Khabarova, EV Koporulina, Research Inst of Comprehensive Exploitation of Mineral Resources, RAS, Russia

**Treatment of Metal Wastes with Deep Sea Manganese Nodules**

CW Nam, KH Park, Korea Inst of Geoscience & Mineral Resources, Korea

**Recovery of Molybdenum from the Deep Sea Manganese Nodules**

KH Park, PK Parhi, CW Nam, Korea Inst of Geosciences & Mineral Resources, Korea

**The Significance of the Price of Nickel in the Determination of the Economic Equilibrium between the Marine Mineral Resources of Manganese Nodules and Cobalt Crusts in a Mutually Exclusive Scenario**

S Martino, LM Parson, National Oceanography Centre, UK

**144. ARCTIC VIII: Ship Design & Navigation Requirement**

(V. 2)

**Thursday June 23 16:20 Room 10**

**Chair:** KA Willemse, Delft Univ. of Technology, Netherlands

**Co-Chair:** VM Kozin, Inst of Machine Sci & Metallurgy, Russia

**The Arctic Sea Ice Surface Roughness Estimation and Application**

XY Wen, CJ Xue, Q Dong, Center for Earth Obs & Digital Earth, CAS, China

**Ice Detection for Under Ice AUV Navigation**

CM Clark, M Maxson, S Layton, M Moline, Cal Poly San Luis Obispo, USA; J Geir, NTNU, Norway; B Jorgen, Univ Center in Svalbard, Norway

**Fuzzy Power Management for Automatic Monitoring Stations in the Arctic**

P Musilek, D Pimentel, Univ of Alberta, Canada

**A Study on Freezing Characteristics of Terra Nova Bay Soil in East Antarctica**

YS Kim, SS Hong, GJ Bae, JG Lee, Korea Inst of Construction & Tech,

Korea

**Design and Application of Slots Used for Marginal Field Development in Heavy Ice Conditions in Bohai**

Y Wang, ML Duan, China Univ of Petroleum; JL Hou, X Jia, XZ Li, CNOOC, China

**Permafrost Characteristics of Northern Alaska**

M Kanevskiy, Y Shur, Univ of Alaska Fairbanks; MT Jorgenson, Alaska Ecoscience/Univ of Alaska Fairbanks; C-L Ping, Univ of Alaska Fairbanks, USA

**Some Aspects of Gate-ports in Asia to Arctic Shipping**

H Kitagawa, Ocean Policy Research Foundation, Japan

**Evaluation of Methods for Estimating Thermal Conductivity of Saturated Unfrozen Clay**

GJ Bae, JG Lee, YS Kim, JM Kang, HS Kim, Korea Inst of Construction & Tech, Korea



**FRIDAY 09:00**

Friday                      **145. IEA Wind Task 30 OC4 Project**  
June 24                      09:00-5:00                      Maui Suite 4

**Chair:** F Vorpahl, Fraunhofer, Germany

**Co-Chair:** J Jonkman, NREL, USA

***For OC4 task members only***

Members of the IEA Wind Task 30 Offshore Code Collaboration Project (OC4) will meet to review the current work being performed on the analysis of an offshore wind turbine placed on a jacket support-structure, and will discuss the next step of the project, the analysis of a semisubmersible structure.