

www.isopec.org; www.isopec2011.org

June 19–24, Maui, Hawaii, USA

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

Including ISOPE symposia:

- 1st Arctic Science & Technology
- 1st Arctic Materials
- 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)

ISOPE-2011

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

Technical Program

Refereed papers from **51** countries in **149** technical general
and keynote presentations

General Information, Reservations, Publications and Program Updates on
www.isopec.org www.isopec2011.org

Forms for Advance Registration and Venue Hotel:
Inside this program and on www.isopec.org

Organized by:

Technical Program Committee, ISOPE

Sponsored by:

International Society of Offshore and Polar Engineers (ISOPE)
with cooperating organizations (listed inside)



ISOPE, P.O. Box 189
Cupertino, CA 95015-0189, USA
Fax: +1-650-254-2038 : meetings@isopec.org; www.isopec.org

ISOPE-2011 Maui Conference

This 21st annual conference features **149** technical and opening general sessions, and **6** keynote presentations with top experts from industry, academia and government. After peer review of the manuscripts selected from 1,350 abstracts, some **750** papers will be presented and discussed by researchers, engineers and managers from more than **51** countries.

The conference proceedings of peer-reviewed papers in PDF files will be available in a set of 4 volumes on CD-ROM (4,200 pp. est.) — paginated within each volume — during the conference and later for worldwide post-conference mail order from ISOPE: ISBN 978-1-880653-96-8; ISSN 1098-6189 and separately (deep) ocean mining symposium proceedings ISBN 978-1-880653-95-1; ISSN 1946-0066.

All indexed by Engineering Index (EI).

* Continue to next session.

To view the **full ISOPE-2011 Maui conference and symposia program**, click on www.isopec.org >meetings or www.isopec2011.org

ISOPE SLOSHING DYNAMICS SYMPOSIUM

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

Simulations of Breaking Wave Impacts on a Mark III Containment System for LNG Carriers with a Two-phase Fluid-structure SPH Model
P-M Guilcher, HydrOcean; L Brosset, C Cohe, GTT; E Jacquin, HydrOcean; D Le Touzé, Ecole Centrale Nantes, France

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
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

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

Experimental Study of Impact Pressure on Large Baffles Fitted on the Top of a Partially-filled Tank
M Sun, Harbin Engineering Univ, China; QW Ma, City Univ, UK/Harbin Engineering Univ, China; LP
Sun, Harbin Engineering Univ, China

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
KH Kim, SY 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

Seismic Response Analysis of Liquid Storage Tanks Isolated with Friction Pendulum System
K Tochiki, IHI Corp. Japan

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
KH Kim, SY Kim, Y 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

31. LNG SLOSHING IV: SlosheI (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 SlosheI 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 SlosheI Project

H Bogaert, MARIN, Netherlands; L Brosset, Gaztransport & Technigaz, France; ML Kaminski, MARIN, Netherlands

Modal Testing and Model Reconciliation of the SlosheI MkIII Test Panel

EP Caren, JR Maguire, Lloyd's Register, UK

Fully Coupled Modelling of Full Scale Wave Impacts on the SlosheI MkIII Test Panel

EP Carden, C Zegos, S Whitworth, D Radosavljevic, JR Maguire, Lloyd's Register, UK

Using SlosheI 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

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

Tuesday June 21 10:30 Room 1

Chair: L Brosset, Gaztransport & Technigaz, France

Co-Chair: MC Ryu, 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

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

Model Test and Statistical Analysis of Impact Loads

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

Strength Assessment and CCS Design

