

June 21–26

Osaka, Japan

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The Nineteenth (2009) International
**Offshore (Ocean) and Polar
Engineering Conference**

AND

**1st ISOPE Sloshing Dynamics & Design
(SDD-2009) Symposium**

**7th ISOPE High-Performance Materials (HPM-2009)
Symposium**

**3rd ISOPE Strain-Based Design
(SBD-2009) Symposium**

ISOPE-2009

**Osaka International Convention Center
Osaka, Japan; June 21–26**

Technical Program

Refereed papers from **50** countries in **121** sessions and
6 plenary sessions

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Index and Program Updates on www.isopec.org**

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TECHNICAL PROGRAM

The Nineteenth (2009) International Offshore and Polar Engineering Conference Osaka, Japan, June 21–26, 2009

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-2009 Technical Program Committee (TPC) received in writing before January 29, 2009 are reflected in this program. Final corrections will be updated in the Conference Proceedings of peer-reviewed papers and the Final Program. Proceedings CD-ROM (ISBN 978-1-880653-53-1; ISSN 1098-6189) will be available as a set of 4 volumes (3,500 pp. est.) from ISOPE during and after the Conference. Proceedings papers are indexed by Engineering Index and Compendex and others.

SUNDAY, June 21

Conference Reception

Sponsored by Tsuneishi Holdings Corporation
17:00 Sakura Room, Rihga Royal Hotel, 2F

MONDAY 09:00

1. Opening General Session:

OFFSHORE AND ARCTIC REVIEW – 2009 (V. 1)

Monday June 22 09:00 Rm 1003, 10F

Chair: Naito, S, Osaka Univ, Japan

Co-Chair: Jiang, X, China National Offshore Oil Corp., CNOOC, China

Conference Opening Address

Knapp, R H, President, ISOPE

Sustainable Development and Marine Transport in the Arctic Ocean -- A Perspective and Cold Regions Technology

Kitagawa, H, Ocean Policy Research Foundation, Japan

Goes Deep, China Oil and Gas Industry

Chen, W, Sr. Vice President, China National Offshore Oil Corp., China

Global Functional Organization - the Key to Successful Materials Technology Implementation

Wright, E J, ExxonMobil Development, USA

Deepwater: Past, Present and Future

Kapusta, S, Chief Scientist, Shell Global Solutions International BV, The Netherlands

2. SLOSHING DYNAMICS: Reviews (V. 3)

Plenary Presentation I (V. 3)

LNG Tank Sloshing Assessment Methodology - The New Generation

Kuo, J F, Hoie, S M, Issa, J A, Rinehart, A J, Sandström, R E, Yung, T W,

ExxonMobil Upstream Research; Bray, W H, Greer, M N, Lokken, R T, Tredennick, O W, Zettlemoyer, N, ExxonMobil Development; Danaczko, M A, ExxonMobil Production, USA

Introduction by Chung, Jin S, ISOPE, USA

Keynote Presentation I (V. 3)

Sloshing in Membrane LNG Carriers and Its Consequences from a Designer's Perspective

Gavory, T, de Sèze, P-E, GazTransport & Technigaz, France

Introduction by Dias, F, Ecole Normale Supérieure de Cachan, France

12. SLOSHING I: - Sloshing Physics1 (V. 3)

To What Extent can CFD be Reliably Used for Determining Impact Pressures Due to Sloshing?

Braeunig, J P, INRIA; Brosset, L, GazTransport & Technigaz; Ghidaglia, J-M, Ecole Normale Supérieure de Cachan and CNRS, France

An Experimental Investigation of Hydrodynamic Impact on 2-D LNGC Cargo Tank Models

Kim, H I, Kwon, S H, Park, J S, Lee, K H, Pusan National Univ; Jeon, S S, Jung, J H, Hwang, Y S, Ryu, M C, Daewoo Shipbuilding & Marine Engineering, Korea

Nonlinear Surface Waves in a Nearly Square Liquid Tank under Vertical Excitation

Ikeda, T, Shimane Univ, Japan; Ibrahim, R A, Wayne State Univ, USA

Experimental Investigation of Membrane Corrugation Effect in LNG Tanks

Graczyk, M, MARINTEK, Norway; Allers, J, MARINTEK USA, USA; Berget, K, MARINTEK, Norway

Investigation of Air Cavity Impacts in Sloshing Through Numerical/Analytical Models and Experiments

Abrahamsen, B C, Faltinsen, O M, Norwegian Univ of Science and Tech, Norway

21. SLOSHING II: LNG Sloshing Mechanics (V. 3)

Scaling Law for LNG Tank Sloshing and Characteristics of Impact Pressures

Yung, T W, Ding, Z, He, H, Sandström, R E, ExxonMobil Upstream Research, USA

Coupled Tank Sloshing and LNG Carrier Motions

Huang, Z J, Esenkov, O E, O'Donnell, B J, Yung, T W, ExxonMobil Upstream Research; Martin, C B, ExxonMobil Development; Danaczko, M A, ExxonMobil Production, USA

Influence of Raised Invar Edges on Sloshing Impact Pressures

He, H, Kuo, J F, Rinehart, A J, Yung, T W, ExxonMobil Upstream Research, USA

Structural Capacities of LNG Membrane Containment Systems

Issa, J A, Garza-Rios, L O, Gioielli, P C, Lele, S P, Rinehart, A J, Taylor, R P, ExxonMobil Upstream Research; Bray, W H, Tredennick, O W, ExxonMobil Development, USA; Canler, G, Chapot, K, GazTransport & Technigaz, France

31. SLOSHING III: SLOSHEL JIP (V. 3)

Overview of Sloshel Project

Brosset, L, GazTransport & Technigaz; Mravak, Z, Bureau Veritas, France; Kaminski, M, MARIN, The Netherlands; Collins, S, Shell, UK; Finnigan, T, Chevron, USA

Full Scale Sloshing Impact Tests

Kaminski, M L, Bogaert, MARIN, The Netherlands

Coupled Fluid-Structure FE Analysis of LNG Containment Systems Based on Full-Scale Sloshing Impact Test

Wang, B, Shin, Y S, American Bureau of Shipping, USA

Semi-analytical Approach for Hydro Structure Interactions Analysis during the Sloshing Impacts

Malencia, S, Bureau Veritas, France; Korobkin, A A, Univ of East Anglia, UK; Ten, I, Gazzola, T, Mravak, Z, De-Lauzon, J, Bureau Veritas; Scolan, Y M, Ecole Centrale de Marseille, France

Sloshing Dynamics - Numerical Simulations in Support of the Sloshel Project

Maguire, J R, Whitworth, S, Oguibe, C N, Radosavljevic, D, Carden, E P, Lloyd's Register, UK

41. SLOSHING IV: Sloshing in LNG-Carrier Membrane (V. 3)

Upstream R&D Program in GazTransport & Technigaz (GTT) for a Better Understanding of Sloshing Phenomenon

Brosset, L, de Sèze, P-E, GazTransport & Technigaz, France

Refinements in Sea-Keeping Analysis for Sloshing Investigations

Marès, A, GazTransport & Technigaz, France

Influence of Density Ratio between Liquid and Gas on Sloshing Model Test Results

Maillard, S, Brosset, L, GazTransport & Technigaz, France

Local Influence of NO96 Raised Edges and MarkIII Corrugations on Sloshing Pressures in Tanks of LNG Membrane Vessels

Deschamps, G, Brosset, L, GazTransport & Technigaz, France

Numerical Approach for Structural Assessment of LNG Containment Systems

Pillon, B, Marhem, M, Leclère, G, Canler, G, GazTransport & Technigaz, France

Reliability-Based Methodology for Sloshing Assessment of Membrane LNG Vessels

Gervaise, E, de Sèze, P-E, GazTransport & Technigaz, France

51. SLOSHING V: CFD 1 (V. 3)

A Comparative Study on the Numerical Simulation of 2-D Violent Sloshing Flows by VSIAM3 and SPH

Yang, K K, Kim Y G, Seoul National Univ, Korea; Hu, C H, Kyushu Univ, Japan

Experimental and Numerical Study of Sloshing Induced Pressures in a Two-Dimensional Tank

Graczyk, M, Pakozdi, C, MARINTEK, Norway

A Validation Study of Applying the CIP Method and the MPS Method to 2-D Tank Sloshing

Hu, C H, Sueyoshi, M, Kyushu Univ; Miyake, R, Zhu, T Y, Dobashi, H, Nippon Kaiji Kyokai, Japan

SPH Simulation of 2D Sloshing Flow in a Rectangular Tank

Rafiee, A, Thiagarajan, Univ of Western Australia; Monaghan, J J, Monash Univ, Australia

SPH Modelling of Liquid Sloshing in an LNG Tank

Rudman, M, Prakash, M, Cleary, P W, CSIRO Mathematical and Information Sciences, Australia

58. SLOSHING VI: Load & Strength (V. 3)

Sloshing Impact Design Load Assessment

Rognebakke, O, Opedal, J A, Ostvold, T K, Det Norske Veritas, Norway

Sloshing Model Tests and Strength Assessment of No 96 Containment System

Wang, B, American Bureau of Shipping, USA; Han, S K, Kim, Y S, Park, Y I, Daewoo Shipbuilding & Marine Engineering, Korea; Shin, Y, American Bureau of Shipping, USA

Sloshing Load for LNG and FPSO Vessels

Lin, F, Lloyd's Register of Shipping, Canada; Polezhayeva, H A, Lloyd's Register of Shipping, UK; Byers, R, Lloyd's Register of Shipping, Canada

Sloshing Assessment of LNG-FPSOs for Partial Filling Operations

Park, J J, Jeong, K L, Kim, M S, Ha, M K, Samsung Heavy Industries, Korea

Semi-Empirical Methodology for Sloshing Load Assessment

Opedal, J A, Ostvold, T K, Det Norske Veritas, Norway; Le Goff, S, Ratouis, A, GazTransport & Technigaz, France

Sloshing Load Assessment for LNG Offshore Units with a Two-row Tank Arrangement

Ryu, M C, Hwang, Y S, Park, Y I, Jung, J H, Jeon, S S, Han, S K, Kim, S Y, Lee, J H, Daewoo Shipbuilding & Marine Engineering, Korea

68. SLOSHING VII: Sloshing Physics2 (V. 3)

Application of the Seakeeping/Sloshing Coupling for the LNG Terminals

Moirod, N, Diebold, L, Zalar, M, Bureau Veritas, France

Coupling between Ship Motion and Sloshing Using Potential Flow Analysis Compared to Equivalent Pendulum System

Lee, Y, Godderidge, B, Temarel, P, Tan, M, Turnock, S R, Univ of Southampton, UK

Three-Dimensional Sloshing of Liquid in a Rectangular Parallelepiped Container Due to Turning Motions

Chen, J H, Hu, C L, National Taiwan Ocean Univ, Taiwan, China

Numerical Study on Impact Pressure Due to Violent Sloshing Waves

Ma, Q W, City Univ, UK; Dan, Q Y, Harbin Eng Univ, China; Zhou, J, Yan, S, City Univ, UK

A Study on Coupling Effects of 3-D Sloshing in Rectangular Tanks and Ship Motion

Mitra, S, Hai, L V, Khoo, B C, National Univ of Singapore, Singapore

76. SLOSHING VIII CFD 2 (V. 3)

Numerical Simulation of Liquid Sloshing in LNG Tanks Using Compressible Two-fluid Flow Model

Chen, Y G, Temarel, P, Price, W G, Univ of Southampton, UK

Simulation of Sloshing Dynamics in a Tank by an Improved Volume of Fluid Method

Wemmenhov, R, Iwanowski, B, Lefranc, M, FORCE Technology, Norway; Veldman, A E P, Luppens, R, Univ of Groningen; Bunnik, T, MARIN, The Netherlands

Sloshing Comparative Study: Simulation of Lateral Sloshing with Multiphase CFD

Godderidge, B, Turnock, S, Univ of Southampton; Cowlan, N, BMT SeaTech; Tan, M Y, Univ of Southampton, UK

LNG Sloshing Simulations with a Volume of Fluid Method

Iwanowski, B, FORCE Technology; Bunnik, T, MARIN; Wemmenhove, R, FORCE Technology; Veldman, A, Rijksuniversiteit Groningen; Huijsmans, R, Delft Univ, The Netherlands

Modelling 3D Fluid Sloshing Using a Semi-Lagrangian Level Set Method

Gu, H B, Causon, D M, Mingham, C G, Qian, L, Manchester Metropolitan Univ, UK

85. SLOSHING IX: Hydroelasticity (V. 3)

Experimental Investigations into the Hydroelasticity and Three-Dimensional Flow Effects on the Determination of Sloshing Loads for Membrane LNG Carriers

Choi, J H, Park, T H, Lee H H, Lee, Y W, Hyundai Heavy Industries, Korea

Numerical Simulation of Tank Sloshing with Thin Plate Structures by Using a Particle Method

Sueyoshi, M, Kyushu Univ, Japan

Fluid Structure Interactions Occurring at a Flexible Vertical Wall Impacted by a Breaking Wave

Kimmoun, O, École Centrale Marseille; Malencia, S, Bureau Veritas; Scolan, Y-M, École Centrale Marseille, France

Simulations of Hydro-Elastic Impacts Using a Parallel SPH Model

Oger, G, HydrOcean; Deuff, J-B, École Centrale de Nantes; Brosset, L, GazTransport & Technigaz, France

Application of Hamilton-Dirichlet's Principle to Analysis of Hydroelastic Behavior of a Floating Plate in Waves

Nizato, H, Hitachi Zosen; Nagata, S, Toyota, K, Saga Univ; Shimazaki, K, Universal Shipbuilding, Japan

93. SLOSHING X: Cargo Design (V. 3)

Analysis of LNG Containment System under Pressure Loads

Arswendy, A, Moan, T, NTNU, Norway

Optimization of LNG Tank Shape in Terms of Sloshing Impact Pressure

Baeten, A, MBDA Missile Systems, Germany

A Numerical Simulation Method for Sloshing Phenomena in a SPB Type LNG Cargo Tank

Jeong, K L, Park, J J, Kim, B W, Ha, M K, Samsung Heavy Industries, Korea

A Numerical Study on Sloshing Inside Tanks with Non-conventional Geometry

Cheng, L Y, Univ of Sao Paulo, Brazil; Makoto, A, Yokohama National Univ, Japan

TLD Vibration Reduction Analysis of Offshore Platform with Oil Storage Tank Including Fluid-Structure Interaction

Jin, Q, Wang, H P, Li, X, Zhou, J, Dalian Univ of Tech, China

Experimental Investigation on Transient Flooding and Sloshing in Internal Compartments of an ITTC Damaged Ro-Ro-Passenger Ferry

Khaddaj-Mallat, C, Rousset, J-M, Alessandrini, B, Ferrant, P, École Centrale de Nantes, France

103. SLOSHING XI: - Panel Sloshing Dynamics – State of Industry, Research and Future

Comparative Study [Oral Presentation]

Kim, Y H, Seoul National Univ, Korea

Sloshing Dynamics Panelists

Brosset, L, Gaztransport & Technigaz, France

Maguire, J, Lloyd's Register of Shipping, UK

Shin, Y, American Bureau of Shipping, USA

Valsgard, S, Det Norske Veritas, Norway

Yung, T W, ExxonMobil Upstream Research Co., USA