

Proceedings of the ASME

**39TH INTERNATIONAL CONFERENCE ON OCEAN,
OFFSHORE AND ARCTIC ENGINEERING
- 2020 -**

VOLUME 8

CFD and FSI

presented at

ASME 2020 39TH INTERNATIONAL CONFERENCE ON OCEAN,
OFFSHORE, AND ARCTIC ENGINEERING

AUGUST 3-7, 2020

ONLINE

sponsored by

OCEAN, OFFSHORE AND ARCTIC ENGINEERING DIVISION, ASME

**THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
Two Park Avenue * New York, NY. 10016**

Printed from e-media with permission by:

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



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

Statement from By-Laws: The Society shall not be responsible for statements or opinions
Advanced in papers. . .or printed in its publications (7.1.3)

INFORMATION CONTAINED IN THIS WORK HAS BEEN OBTAINED BY ASME FROM SOURCES BELIEVED TO BE RELIABLE. HOWEVER, NEITHER ASME NOR ITS AUTHORS OR EDITORS GUARANTEE THE ACCURACY OR COMPLETENESS OF ANY INFORMATION PUBLISHED IN THIS WORK. NEITHER ASME NOR ITS AUTHORS AND EDITORS SHALL BE RESPONSIBLE FOR ANY ERRORS, OMISSIONS, OR DAMAGES ARISING OUT OF THE USE OF THIS INFORMATION. THE WORK IS PUBLISHED WITH THE UNDERSTANDING THAT ASME AND ITS AUTHORS AND EDITORS ARE SUPPLYING INFORMATION BUT ARE NOT ATTEMPTING TO RENDER ENGINEERING OR OTHER PROFESSIONAL SERVICES. IF SUCH ENGINEERING OR PROFESSIONAL SERVICES ARE REQUIRED, THE ASSISTANCE OF AN APPROPRIATE PROFESSIONAL SHOULD BE SOUGHT.

For authorization to photocopy material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act, contact the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923, Tel: 978-750-8400

Requests for special permission or bulk reproduction should be addressed to permissions@asme.org.

ISBN NO. 978-0-7918-8440-9

© 2020 ASME

All rights reserved.

Printed in U.S.A with permission by Curran Associates, Inc. (2021)

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

CONTENTS

CFD AND FSI

ADVANCE COMPUTATION

OMAE2020-18083	V008T08A001
Numerical Study on the Resistance and Sinkage of Inland Vessels Passing Through Navigable Tunnel <i>Xuehua Chen, Lizheng Wang, Shunhuai Chen, Aokui Xiong</i>	
OMAE2020-18086	V008T08A002
Numerical Simulation of Multi-Layer-Liquid Sloshing by Multiphase MPS-GPU Method <i>Xiao Wen, Xiang Chen, Decheng Wan</i>	
OMAE2020-18285	V008T08A003
Application of Two Phase Eulerian CFD Model to Simulate High Velocity Jet Induced Scour <i>Nicholas S. Tavouktsoglou, Aggelos Dimakopoulos, Jeremy Spearman, Richard J. S. Whitehouse</i>	
OMAE2020-18431	V008T08A004
Study on Estimation of Flow Around Marine Propeller by Large-Scale LES and Affection of Grid Resolution and Reynolds Number <i>Takeharu Fujisawa, Makoto Tsubokura, Hisao Tanaka</i>	
OMAE2020-18556	V008T08A005
Deep Convolutional Recurrent Autoencoders for Flow Field Prediction <i>Sandeep R. Bukka, Allan Ross Magee, Rajeev K. Jaiman</i>	
OMAE2020-18560	V008T08A006
Vortex-Induced Vibration of a Spherical Body With Free Surface Effects: Application to Tugboats With Low Length-to-Beam Ratio <i>A. Chizfahm, V. Joshi, R. K. Jaiman</i>	
OMAE2020-18752	V008T08A007
Assessing RANS Numerical and Modeling Properties in the Simulation of the Flow Around Captive and Moving Cylinders <i>Rita M. Costa, Luis Eca, Arjen Koop</i>	
OMAE2020-18867	V008T08A008
Laminar and Turbulent Flow Past a Hydrofoil Predicted by a Distributed Vorticity Method <i>Chunlin Wu, Spyros A. Kinnas</i>	
OMAE2020-18970	V008T08A009
Effect of Sinusoidal Oscillatory Flow on a Vertical Wall-Mounted Cylinder <i>HaKun Jang, Celalettin Emre Ozdemir, Mayank Tyagi, Jun-Hong Liang</i>	

OMAE2020-19256..... **V008T08A010**
The Study on Flow Past a Static Hydrofoil Using Deep Neural Network
Xia Wu, Xinliang Tian, Yufeng Kou, Xin Li, Wenyue Lu

FREE SURFACE FLOWS

OMAE2020-18160..... **V008T08A011**
Representation of Breaking Wave Kinematics in the Fully Nonlinear Potential Flow Model REEF3D::FNPF
Csaba Pakozdi, Arun Kamath, Weizhi Wang, Hans Bihs

OMAE2020-18359..... **V008T08A012**
Numerical Recreation of the Draupner Wave in Crossing Wave Systems Using Smoothed Particle Hydrodynamics
Taiga Kanehira, Mark L. McAllister, Samuel Draycott, Takuji Nakashima, Naokazu Taniguchi, Yasuaki Doi, David Ingram, Ton S. van den Bremer, Hidemi Mutsuda

OMAE2020-18645..... **V008T08A013**
Free Fall Water Entry of a Two-Dimensional Asymmetric Wedge in Oblique Slamming: A Numerical Study
Saeed Hosseinzadeh, Mohammad Izadi, Kristjan Tabri

OMAE2020-18870..... **V008T08A014**
Local Study of Jet of a Fluid Sloshing Inside a Rolling Tank
Wen-Huai Tsao, Spyros A. Kinnas

OMAE2020-19019..... **V008T08A015**
A Coupled SPH-FEM Solver for Modeling Surface Effect Ship (SES) Bow Seal Dynamics
John Gilbert, Leigh McCue

OMAE2020-19305..... **V008T08A016**
A Coupled Harmonic Polynomial Cell and Higher-Order Spectral Method for Nonlinear Wave Propagation
Finn-Christian W. Hanssen, Jens B. Helmers, Marilena Greco

INTERNAL FLOWS

OMAE2020-18034..... **V008T08A017**
Experiment on the Effect of Superficial Gas-Liquid Velocities on Slug Flow-Induced Vibration in an Inclined Sagged Riser
Bowen Ma, Narakorn Srinil, Hongjun Zhu, Yue Gao

OMAE2020-18162..... **V008T08A018**
Experimental Investigation of Flow-Induced Vibration in Gas/Shear-Thinning Liquid Flows in Vertical Pipe
Ruinan Lin, Ke Wang, Qing Li, Narakorn Srinil, Fangjun Shi

OMAE2020-18620..... **V008T08A019**
Experimental and Numerical Assessment of Both Slug and Vortex Induced Vibrations
on a Spool Model
Matthieu Minguez, Kevin Le Prin, Alain Line, Vincent Lafon, Francois Petrie, Thierry Rippol

OMAE2020-18684..... **V008T08A020**
Numerical Simulations of Turbulent Flow Through an Orifice Plate in a Pipe
Guang Yin, Bjornar Nitter, Muk Chen Ong

OMAE2020-18760..... **V008T08A021**
Flow Induced Vibration Analysis of Topside Piping at High Pressure
Paul R. Emmerson, Mike J. Lewis, Neil A. Barton, Steinar Orre, Knud Lunde

RISERS, PIPELINES, AND VIV

OMAE2020-18085..... **V008T08A022**
Thick Strip Model for Vortex-Induced Vibration of Two Flexible Cylinders in Tandem
Arrangements
Di Deng, Decheng Wan

OMAE2020-18161..... **V008T08A023**
Laboratory Experiment of Two-Degree-of-Freedom Vortex-Induced Vibrations of
Circular Cylinder in Regular Waves
Pierre-Adrien Opinel, Narakorn Srinil

OMAE2020-18180..... **V008T08A024**
Flow-Induced Vibration Screening of a Thermoplastic Composite Pipe Water Injection
Jumper
Juan P. Pontaza, Varadarajan Nadathur, John L. Rosche

OMAE2020-18329..... **V008T08A025**
Fluid Drag With and Without Vortex-Induced Vibrations
Robert F. Zueck

OMAE2020-18378..... **V008T08A026**
Study on the Suppression of Vortex Induced Oscillation of Cylinder by Forward Jets
S. S. Dai, D. Tang, B. A. Younis, G. Q. Fu

OMAE2020-18402..... **V008T08A027**
Experimental Investigation on Vortex-Induced Vibration of Dual Pipes With Unequal
Diameters in Tandem
Mengmeng Zhang, Shixiao Fu, Zhiqi Zhang, Haojie Ren, Yuwang Xu

OMAE2020-18583..... **V008T08A028**
Direct Numerical Simulations on the Flow Normal to a Plate With Transit Shape From
Circular Disk to Triangle
Huaicheng Wang, Xinliang Tian, Yakun Zhao, Jun Li, Xin Li, Wenyue Lu

OMAE2020-18591..... **V008T08A029**
Experimental and Numerical Investigations on VIV Response of a Pipe in Shear Flow
Dipanjan Karanjai, S. Nallayarasu, S. K. Bhattacharya

OMAE2020-18596..... **V008T08A030**
Experimental Investigation of Vortex Induced Vibration of Cross Flow Response for a Flexible Cable Under Uniform Current
Prethiv Kumar R, S. Nallayarasu

OMAE2020-18759..... **V008T08A031**
Time Domain VIV Analysis Tool VIVANA-TD: Validations and Improvements
Jie Wu, Jingzhe Jin, Decao Yin, Halvor Lie, Elizabeth Passano, Svein Saevik, Michael A. Tognarelli, Guttorm Grytoyr, Torgrim Andersen, Daniel Karunakaran, Ragnar Igland

OMAE2020-18915..... **V008T08A032**
Using Kriging Surrogate Models to Predict the Vibration Responses of a Submerged Riser
Marcelo Damasceno, Helio Ribeiro Neto, Tatiane Costa, Aldemir Cavalini Junior, Ludimar Aguiar, Marcos Martins

OMAE2020-19142..... **V008T08A033**
Numerical Simulation and Experiments of Flow-Induced Oscillations of Single-Cylinder With Large Passive Turbulence Control
Ningyu Li, Hongrae Park, Hai Sun, Michael M. Bernitsas

OMAE2020-19310..... **V008T08A034**
Numerical Modeling of Turbulent Wall-Bounded Oscillatory Flow and its Effect on Small-Diameter Pipelines
Hongyi Jiang, Liang Cheng

OMAE2020-18607..... **V008T08A034**
Numerical Simulation of Vortex-Induced Vibration of Two Tandem Cylinders With Different Diameters Under Uniform Flow
Xuepeng Fu, Yuwang Xu, Mengmeng Zhang, Haojie Ren, Bing Zhao, Shixiao Fu

SHIP AND FLOATING SYSTEMS

OMAE2020-18009..... **V008T08A035**
Experimental Study of the Effect of the Pontoon Dimensions on the Flow-Induced Motions (FIM) of a Semi-Submersible Platform With Four Square Columns
Rodolfo T. Goncalves, Hideyuki Suzuki, Matheus A. Marques, Leandro S. P. Silva, Chenling Tian, Shinichiro Hirabayashi

OMAE2020-18030..... **V008T08A036**
Analysis of Open-Source CFD Tools for Simulating Complex Hydrodynamic Problems
Mohd Atif Siddiqui, Hui-li Xu, Marilena Greco, Giuseppina Colicchio

- OMAE2020-18236**..... **V008T08A037**
RANS Simulation of the Flow Around a Ship Advancing in Shallow Water
Yan-Yun Zhang, Zao-Jian Zou, Jian-Xi Yao
- OMAE2020-18412**..... **V008T08A038**
Numerical Study on the Hydrodynamic Performance of the DARPA Suboff Submarine for Steady Translation
Kenshiro Takahashi, Prasanta K. Sahoo
- OMAE2020-18511**..... **V008T08A039**
Column Interference Effect of Multi-Column Floating Structures on Vortex-Induced Motion Using Numerical Prediction Model
Yosuke Toyoda, Shinichiro Hirabayashi, Rodolfo T. Goncalves, Hideyuki Suzuki
- OMAE2020-18619**..... **V008T08A040**
Benchmark Case Study of Scale Effect in Self-Propelled Container Ship Squat
Zhen Kok, Jonathan Duffy, Shuhong Chai, Yuting Jin
- OMAE2020-18693**..... **V008T08A041**
Numerical Investigation of Heaving Hydrodynamic Behavior of a Single Cylinder and a Dual Coaxial-Cylinder System Using CFD
Pengfei Zhi, Xinshu Zhang, Ke Chen, Ronald W. Yeung
- OMAE2020-18755**..... **V008T08A042**
An Uncertainty Evaluation of Different Fidelity Methods to Predict Ship Motions and Structural Loading in Waves
Nicholas Husser, Stefano Brizzolara
- OMAE2020-19014**..... **V008T08A043**
An Investigation Into KCS Parametric Rolling Through Coupling Different DOFs
Shuang Wang
- OMAE2020-19093**..... **V008T08A044**
Verification and Validation of CFD Uncertainty Analysis Based on SST K-[omega] Model
Li Zhang, Weimin Chen, Jianting Chen, Chuanming Zhou
- OMAE2020-19338**..... **V008T08A045**
Roll Damping Simulations of an Offshore Heavy Lift DP3 Installation Vessel Using the CFD Toolbox OpenFOAM
Brecht Devolder, Florian Stempinski, Arjan Mol, Pieter Rauwoens