

Proceedings of the ASME

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

**VOLUME 6A
OCEAN ENGINEERING**

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. 978-0-7918-8437-9

© 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

OCEAN ENGINEERING

COASTAL ENGINEERING

OMAE2020-18499..... V06AT06A001

Numerical Investigation on Wave Transmission by a Submerged Reef Using MIKE 3
WAVE FM

*Rahul Dev Raju, Madasamy Arockiasamy, Ranganathan Sundaravadivelu, Sherlin Prem
Nishold Selvaraj*

OMAE2020-18518..... V06AT06A002

Low-Frequency Oscillations Within the Hambantota Port During the Southwest
Monsoon, 2019

Zhenjun Zheng, Xiaozhou Ma, Xuezhi Huang, Yujin Dong, Guohai Dong

OMAE2020-18789..... V06AT06A003

Numerical Investigation of Scour Beneath a Subsea Piggyback Pipeline

Jun Huang, Guang Yin, Muk Chen Ong, Xu Jia

COASTAL HAZARDS

OMAE2020-18416..... V06AT06A004

The Effect of Storm-Induced Precipitation on Flooding in Macau City

Jie Yang, Jiandong Liu, Dong-Eon Kim, Linlin Li, Kai Meng Mok, Philip L.-F. Liu

OMAE2020-18520..... V06AT06A005

An Improved SPH Model for Simulating Hydrodynamic Consequences Induced by
Reef Degradation

Yinlin Zhao, Hongjie Wen, Bing Ren, Guoyu Wang, Yongxue Wang

COMPUTATIONAL MECHANICS AND DESIGN APPLICATIONS

OMAE2020-19132..... V06AT06A006

A New Higher-Order Euler-Bernoulli Beam Element of Absolute Nodal Coordinate
Formulation

Peng Zhang, Jianmin Ma, Menglan Duan

FLUID-STRUCTURE, MULTI-BODY, AND WAVE-BODY INTERACTION

OMAE2020-18000..... V06AT06A007

A Review of Mooring Analysis Methodologies for Permanent Offshore Installations

Spiro J. Pahlis, Georgina Maldonado, Paul C. Westlake

OMAE2020-18223	V06AT06A008
Ship-Wave Impact Generated Sea Spray: Part 1 -- Formulating Liquid Water Content and Spray Cloud Duration	
<i>Shafiul A. Mintu, David Molyneux, Bruce Colbourne</i>	
OMAE2020-18224	V06AT06A009
Ship-Wave Impact Generated Sea Spray: Part 2 -- Formulating Spray Frequency	
<i>Shafiul A. Mintu, David Molyneux, Bruce Colbourne</i>	
OMAE2020-18272	V06AT06A010
Towing Experiment of a Hydro-Structural Container Ship Model in Bow-Quartering Modulated Wave Trains	
<i>Hidetaka Houtani, Yusuke Komoriyama, Sadaoki Matsui, Masayoshi Oka, Hiroshi Sawada, Yoshiteru Tanaka, Takuji Waseda</i>	
OMAE2020-18423	V06AT06A011
Capturing Wake Stiffness in Wake-Induced Vibration of Tandem Cylinders	
<i>Bruno Soares, Narakorn Srinil</i>	
OMAE2020-18445	V06AT06A012
Transient Response of the Steel Plate to Underwater Explosion Bubble	
<i>Yingyu Chen, Xiongliang Yao, Liangtao Liu, Ning Gan, Xiongwei Cui</i>	
OMAE2020-18588	V06AT06A013
Numerical Modeling of Wave Damping Induced by Emerged Moving Vegetation	
<i>Aditya Gupta, Manasa R. Behera, Amin Heidarpour</i>	
OMAE2020-18750	V06AT06A014
Hydroelastic Analysis of the Bending-Torsional Coupling Vibrations of an Ultra-Large Container Ship	
<i>Hui Li, Lin Lu</i>	
OMAE2020-18797	V06AT06A015
Numerical Wave Tank Including a Fixed Vertical Cylinder Subjected to Waves, Towards the Investigation of Floating Offshore Wind Turbine Hydrodynamics	
<i>Constance Clement, Pauline Bozonnet, Guillaume Vinay, Adria Borrás Nadal, Philippe Pagnier, Julien Reveillon</i>	
OMAE2020-18901	V06AT06A016
Second Order Difference Frequency Wave-Current Loading Using Kelvin-Newman Approximation	
<i>Farid P. Bakti, Moo-Hyun Kim</i>	
OMAE2020-19089	V06AT06A017
Suction Pile Splash Zone Crossing Modelling	
<i>Jean-Luc Pelerin, David Terribile, Emmanuel Sergent, Gerard Fernandez</i>	

OMAE2020-19133..... V06AT06A018
Experimental Investigation of Tip Vortex Influence on VIV of a Circular Cylinder at High Reynolds Numbers
M. Youssef, Simon Todter, Jens Neugebauer, Ould el Moctar, Thomas E. Schellin

OMAE2020-19253..... V06AT06A019
Design, Analysis, and Development of a Wave-Current Laboratory
Nhu Nguyen, Jacob Davis, Ahmed Alshuwaykh, Krish Thiagarajan Sharman

OMAE2020-19350..... V06AT06A020
Unsteady Wave-Making Resistance of an Accelerating Ship
Mingxin Li, Zhi-Ming Yuan, Ronald W. Yeung

MARINE ENGINEERING AND TECHNOLOGY

OMAE2020-18093..... V06AT06A021
Study on the Architecture of a Zero Emission Hydrogen Fuel Cell Vessel Power Generating Unit
Lorenzo Balestra, Ingrid Schjolberg

OMAE2020-18135..... V06AT06A022
An Ontology-Based Approach for Simplified FMU Variable Connections With Automatic Verification of Semantically Correct Configuration
Havard Nordahl, Martin Rindaroy, Stian Skjong, Lars T. Kyllingstad, Dirk Walther, Tore Brekke

OMAE2020-18267..... V06AT06A023
An Optimized Thrust Allocation Algorithm for Dynamic Positioning System Based on RBF Neural Network
Ziying Tang, Lei Wang, Fan Yi, Huacheng He

OMAE2020-18281..... V06AT06A024
Unsupervised Trajectory Anomaly Detection for Situation Awareness in Maritime Navigation
Brian Murray, Lokukaluge P. Perera

OMAE2020-18302..... V06AT06A025
A New Type of Device Used on Submarine Landslides Monitoring
Yongqiang Ge, Jiawang Chen, Chen Cao, Qiaoling Gao, Peihao Zhang, Jiamin He

OMAE2020-18368..... V06AT06A026
A Decision Support Framework for Cost-Effective and Energy-Efficient Shipping
Khanh Q. Bui, Lokukaluge P. Perera

OMAE2020-18401..... V06AT06A027
A New Type of Robot Used for Deep Stratum Drilling in Seabed
Peihao Zhang, Jiawang Chen, Zhenwei Tian, ZiQiang Ren, Yongqiang Ge, Qiaoling Gao, Feng Gao

- OMAE2020-18550**..... **V06AT06A028**
 Research on Position Keeping and Path Following Strategy for the Under-Actuated
 Waved Glider
Peng Wang, Xinliang Tian, Xiantao Zhang, Daoyong Wang, Xiaoxian Guo
- OMAE2020-18651**..... **V06AT06A029**
 A Modelling System for Power Consumption of Marine Traffic
Hans Anton Tvete, Bingjie Guo, Qin Liang, Hendrik Brinks
- OMAE2020-18715**..... **V06AT06A030**
 Analysing Supply Chain Phases for Design of Effective Autonomous Ship Technology
 in New Transport System Solutions
*Lars Andreas Lien Wennersberg, Havard Nordahl, Ornulf Jan Rodseth, Victor Bolbot,
 Gerasimos Theotokatos*
- OMAE2020-18726**..... **V06AT06A031**
 A Numerical Study of TAD and TLP Platforms Operating Side by Side
Bo Tong, Rui Chang, Zhuang Kang, Haibo Sui, Shaojie Li
- OMAE2020-18764**..... **V06AT06A032**
 CFD-Based Operation Optimization of Hybrid Ships
Bingjie Guo, Bjorn-Johan Vartdal, Oystein Asheim Alnes
- OMAE2020-18776**..... **V06AT06A033**
 An Optimization Method for Economical Ship-Routing and Ship Operation
 Considering the Effect of Wind-Assisted Rotors
Wenyu Sun, Xiyang Liu, Li Yang
- OMAE2020-18787**..... **V06AT06A034**
 Basic Research on the Influence of Descent Flow From Small Unmanned Aerial
 Vehicle (Quadcopter) on a Small Floating Body
Mingyao Ji, Sharath Srinivasamurthy, Yasunori Nihei
- OMAE2020-18924**..... **V06AT06A035**
 Safety Analysis of Liquefied Natural Gas Bunkering and Simultaneous Port
 Operations for Passenger Ships
Tommaso Iannaccone, Byongug Jeong, Valerio Cozzani, Peilin Zhou
- OMAE2020-19078**..... **V06AT06A036**
 The Course Control of Air Cushion Vehicle With Uncertainties and Input Saturation
Yuanhui Wang, Xiyun Jiang, Mingyu Fu
- OMAE2020-19079**..... **V06AT06A037**
 Numerical Simulation of Motion Response of Multi-Floating Body System Considering
 Different Gap Between TLP and TAD
Zhigang Zhang, Shanjun Bao, Zhaogang Ding, Zhiyuan Wei, Haibo Sui, Zhuang Kang

OMAE2020-19153..... **V06AT06A038**
Study on Data Analysis of On-Board Measurement Data for Ship's Speed Power Performance
Sang-Yeob Kim, Min-Su Kim, Ki-Min Han, Joon-gyu Kim, Dae-Won Seo

MARINE HYDRODYNAMICS

OMAE2020-18137..... **V06AT06A039**
Study on 2nd-Order Wave Loads With Forward Speed Through Aranha's Formula and Neumann-Kelvin Linearization
Zhitian Xie, Jeffery Falzarano

OMAE2020-18144..... **V06AT06A040**
Experimental Study on the Behavior of a Bubble in the Vicinity of an Air Bubble Attached to a Fixed Structure
Jia-xia Wang, Kun Liu

OMAE2020-18226..... **V06AT06A041**
Design and CFD Self-Propulsion Analysis of a Ducted Propeller for a DARPA SUBOFF Hull Autonomous Underwater Vehicle
Ricardo Sbragio, Alceu Jose dos Santos Moura, Rubens Cavalcante da Silva

OMAE2020-18327..... **V06AT06A042**
Experimental Study of Slam Forces on External Turrets With Different Top Angles
Yuki Ishihara, Motohiko Murai, So Nakanishi, Shunji Kato, Yasuharu Nakajima

OMAE2020-18352..... **V06AT06A043**
Stability and Chaos Analysis of Nonlinear Roll Motion of Trimaran Ship With Variable Lay-Out Under Wind and Waves
Yihan Zhang

OMAE2020-18356..... **V06AT06A044**
Nonlinear Roll Damping and Roll Motion Study of Asymmetric Catamaran With Variable Layouts
Yihan Zhang, Jingfeng Hu

OMAE2020-18447..... **V06AT06A045**
Investigation on Heave Motion and Load Response of a FPSO in Regular Waves by Fully Nonlinear Method
Jia-Le Wang, Shi-Li Sun, Hui-Long Ren

OMAE2020-18466..... **V06AT06A046**
Experimental and Numerical Study of an Obliquely Towed Ship Model in Confined Waters
Momchil Terziev, Khaled Elsherbiny, Tahsin Tezdogan, Atilla Incecik

OMAE2020-18538..... **V06AT06A047**
Numerical Study on the Performance Analysis and Vibration Characteristics of Flexible Marine Propeller
Kumar S. Ashok, Subramanian V. Anantha, R. Vijayakumar

OMAE2020-18614..... **V06AT06A048**
Prediction of Wave-Induced Motions and Loads of Ships With Forward Speed by Matching Method
Hui Li, Baoli Deng, Chunlei Liu, Jian Zou, Huilong Ren

OMAE2020-18624..... **V06AT06A049**
Maneuvering and Seakeeping Performance of a Generic Tug Based on Numerical Simulations
Yingying Zheng, Yuting Jin, Lucas J. Yiew, Allan R. Magee

OMAE2020-18625..... **V06AT06A050**
System-Based Modelling of KCS Manoeuvring in Calm Water, Current and Waves
Yuting Jin, Lucas J. Yiew, Allan R. Magee, Yingying Zheng

OMAE2020-18673..... **V06AT06A051**
The Effects of Hydrodynamic Forces on Maneuvrability Coefficients for Wind-Assisted Ships
L. Marimon Giovannetti, F. Olsson, M. Alexandersson, S. Werner, C. Finnsgard

OMAE2020-19285..... **V06AT06A052**
Improved ITTC Uncertainty Analysis Method of Ship Model Self-Propulsion Tests
Li Zhang, Jianting Chen, Chuanming Zhou, Weimin Chen

MARINE TECHNOLOGY, OPERATIONS, AND SUBSEA ENGINEERING

OMAE2020-18171..... **V06AT06A053**
Effect of a Passive Tuned Mass Damper on Offshore Installation of a Wind Turbine Nacelle
Zhiyu Jiang, Trond Kvia Skrudland, Madjid Karimirad, Constatine Machiladies, Wei Shi

OMAE2020-18209..... **V06AT06A054**
Research on Intelligent Loading of Bulk Carriers
Sheng Fang, Shunhuai Chen

OMAE2020-18311..... **V06AT06A055**
Time-Domain Simulation of Subsea Equipments Installation Using Hydrodynamic Derivatives
Emerson M. de Andrade, Joel S. Sales Jr, Antonio C. Fernandes, Mario L. Ribeiro, Pedro V. Teixeira

- OMAE2020-18631**..... **V06AT06A056**
 Experiment-Scale Multi-Vessel Dynamic Positioning System for the Twin-Lift
 Decommissioning Operation
*Zhenqiu Fu, Wei Li, Hao Sun, Meng Yuan, Xin Li, Liancai Cai, Andy Wang, Xiaoxian Guo,
 Handi Wei, Xinliang Tian*
- OMAE2020-18756**..... **V06AT06A057**
 Hydrodynamic Analysis of Floating Docks With Alternative Geometries for Floating
 Wind Turbine Installation
Viktor A. Gran, Zhiyu Jiang, Zhiyuan Pan
- OMAE2020-18857**..... **V06AT06A058**
 Vessel/Stinger/Pipeline Fully Coupled Analysis for Pipelaying Operation
Bonjun Koo, Qin Tu, Jiaqi Wang, Sachin Mathakari
- OMAE2020-18862**..... **V06AT06A059**
 Stinger Structural Analysis Using Fully Coupled Model for Pipelay Operations
Anupam Gupta, Sudhakar Tallavajhula, Sachin Mathakari
- OMAE2020-19118**..... **V06AT06A060**
 Numerical Investigation of Water Entry of a Subsea Module With Deflated Cavity
 Shells
Yingfei Zan, Ruinan Guo, Lihao Yuan, Fuxiang Huang, Dongchun Kang
- OMAE2020-19291**..... **V06AT06A061**
 HSE Consequences of FPSO Mooring Lines Pretension Uncertainty in Deep Waters
 Applications
Jairo B. Araujo, Joel S. Sales Jr., Antonio C. Fernandes, Ana C. S. Thurler