

Proceedings of the ASME

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

**VOLUME 6B
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. 978-0-7918-8438-6

© 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

METOCEAN

OMAE2020-18202..... **V06BT06A001**

Effects of Empirical Orthogonal Functions in Simplification of Structural Response of a Deep-Water Offshore System Under Current Profile Loading

Michael Binsar Lubis, Mehrdad Kimiaei, Hongwei An, Reza Azarhoush

OMAE2020-18453..... **V06BT06A002**

Estimating Design Loads for Floating Structures Using Environmental Contours

Yuliang Zhao, Sheng Dong, Zihao Yang, Lance Manuel

OMAE2020-18671..... **V06BT06A003**

Nearshore Wave Modelling in a Norwegian Fjord

Christos N. Stefanakos, Birgitte R. Furevik, Oyvind Knutsen, Konstantinos Christakos

OMAE2020-18906..... **V06BT06A004**

Waves in the Great Pacific Garbage Patch: Cross Validation of Three Measurement Techniques and Two WW3 Models

Hendrik Wrenger, Bruno Sainte-Rose, Ivan Soares

OMAE2020-18989..... **V06BT06A005**

Modeling Spatio-Temporal Characteristics of Metocean Conditions During Hurricanes Using Deep Neural Networks

Chi Qiao, Andrew T. Myers

OMAE2020-19171..... **V06BT06A006**

Stationary Intervals for Random Waves by Functional Clustering of Spectral Densities

Diego Rivera-Garcia, Luis Angel Garcia-Escudero, Agustin Mayo-Isacar, Joaquin Ortega

OMAE2020-19190..... **V06BT06A007**

Spatial Features of Extreme Waves in Gulf of Mexico

Ryota Wada, Philip Jonathan, Takuji Waseda

MODEL TESTS

OMAE2020-18128..... **V06BT06A008**

Cavitation Performance of Low Speed Ice-Classed Propeller

Churui Wan, Zhenghao Liu

OMAE2020-18167..... **V06BT06A009**

Innovative Mooring in the Port of the Future: Scale Model Testing of the ShoreTension System

S. P. Reijmerink, N. Bruinsma, A. J. van der Hout, M. P. C. de Jong, C. Clement

OMAE2020-18309	V06BT06A010
Hybrid DP Simulations <i>Martin Rindaroy, Orjan Selvik, Andrew Ross</i>	
OMAE2020-18343	V06BT06A011
Comparative Study on RAOs of a Ship Under Transient Gaussian Wave Packets by Marginal Hilbert Spectrum and Fourier Spectrum <i>Zhen Liu, Sheming Fan, Longbin Tao</i>	
OMAE2020-18444	V06BT06A012
Model Tests on the Parametric Resonance of the Deep Draft Semi-Submersible Under Regular and Irregular Waves <i>Chenglin Li, Liwei Yu, Shuqing Wang, Zhe Tian, Xujie Wang</i>	
OMAE2020-18461	V06BT06A013
Neural Network-Based Method for Structural Damage and Scour Estimation Using Modal Parameters and Dynamic Responses <i>Shuqing Wang, Yufeng Jiang</i>	
OMAE2020-18471	V06BT06A014
Simulating the Acceleration to Take-Off Phase of a WIG-Craft Using Results of a Constrained Experiment <i>Ombor Pereowei Garrick, Zhiqiang Hu, Lei Song</i>	
OMAE2020-18621	V06BT06A015
Sensitivity Analysis of Parameters for FPSO Model Updating <i>Qihao Wu, Min Zhang, Tian'en Yang, Nuoya Xu, Junrong Wang, Junfeng Du, Nuno Fonseca, Galin Tahchiev</i>	
OMAE2020-18633	V06BT06A016
Design and Fabrication of a Fully Elastic Ship Model <i>Yingying Chen, Shanli Zhang, Wei Kean Chen, Allan Magee</i>	
OMAE2020-18694	V06BT06A017
A Novel Hybrid Method of Pre-Tension Adjustment of Mooring Lines in the Model Test <i>Junfeng Du, Hongchao Wang, Anteng Chang, Mingyuan Sun, Junrong Wang, Min Zhang</i>	
OMAE2020-18814	V06BT06A018
Experimental Study on the Effects of Mooring System on Air Gap Response of Semi-Submersible Platform <i>Xu Li, Longfei Xiao, Handi Wei, Mingyue Liu</i>	
OMAE2020-18967	V06BT06A019
Active Absorption of Random Waves in Wave Flume Using Artificial Neural Networks <i>Aureo I. W. Ramos, Antonio C. Fernandes, Vanessa M. Thomaz</i>	
OMAE2020-19008	V06BT06A020
Detailed Study on the Behavior of Ships in Very Short Waves <i>Saori Yokota, Mariko Kuroda, Ryohei Fukasawa, Hiroki Ohba, Masaru Tsujimoto</i>	

OMAE2020-19103..... **V06BT06A021**
From Soft Mooring System to Active Positioning in Laboratory Experiments
Thomas Sauder, Galin Tahchiev

OCEAN ENGINEERING TECHNOLOGY

OMAE2020-18399..... **V06BT06A022**
A Study of Detecting for Dragging Anchor
Akira Saito

OMAE2020-18882..... **V06BT06A023**
Dynamic Response Comparison of Mono and Dual Submerged Floating Tunnels
Woo Chul Chung, Chungkuk Jin, MooHyun Kim

OMAE2020-18982..... **V06BT06A024**
Design and Testing of AUV Docking Modules for a Renewably Powered Offshore
AUV Servicing Platform
Maha N. Haji, Jimmy Tran, Johannes Norheim, Olivier L. de Weck

OMAE2020-19011..... **V06BT06A025**
Monitoring-System Development of Gillnet Using Artificial Neural Network
Chungkuk Jin, HanSung Kim, JeongYong Park, MooHyun Kim, Kiseon Kim

OMAE2020-19061..... **V06BT06A026**
Research on the Static and Dynamics Characteristics of Soft Yoke Mooring System
Based on Multi-Rigid Body Interaction
Hongwei Wang, Zizhao Zhang, Gang Ma, Rongtai Ma, Jie Yang

OMAE2020-19276..... **V06BT06A027**
Nonlinear and Machine-Learning-Based Station-Keeping Control of an Unmanned
Surface Vehicle
Armando J. Sinisterra, Alexandra Barker, Siddhartha Verma, Manhar R. Dhanak

OCEAN MEASUREMENT AND DATA INTERPRETATION

OMAE2020-18885..... **V06BT06A028**
Monitoring and Performance Evaluation of Plastic Cleanup Systems: Part I --
Description of the Experimental Campaign
Bruno Sainte-Rose, Hendrik Wrenger, Hans Limburg, Arthur Fourny, Arjen Tjallema

OMAE2020-18891..... **V06BT06A029**
Monitoring and Performance Evaluation of Plastic Cleanup Systems: Part II -- Results
and Analysis
*Bruno Sainte-Rose, Hendrik Wrenger, Ivan Soares, Cosme Mosneron-Dupin, Clara Duval,
Alban Planchat*

OFFSHORE INDUSTRY: AQUACULTURE, MINING, ETC.

OMAE2020-18993..... **V06BT06A030**
Analysis of the Motion Characteristics of Large Non-Metallic Composite Cages
Lin Zhao, Fei Pan, Qian Li, Zhen Jiang

OMAE2020-19279..... **V06BT06A031**
Hydrodynamic Analysis of Macroalgae Local Model Using Computational Fluid Dynamics
Ming Chen, Solomon C. Yim, Daniel Cox, Zhaoqing Yang, Thomas Mumford

OFFSHORE INDUSTRY: STRUCTURES AND DESIGN

OMAE2020-18024..... **V06BT06A032**
A 6-DOF Ship-Borne Antenna Platform With Large Orientation Workspace
Yuhang He, Weijia Li, Yaozhong Wu, Jinbo Wu, Zhiyuan Cheng

OMAE2020-18081..... **V06BT06A033**
Performance Analysis of a Three-Axis Gyroscope Composite Anti-Rolling Device
Yuefa Zhou, Tao Li, Zhiyuan Liu, Kexin Zheng

OMAE2020-18634..... **V06BT06A034**
Optimization-Based Multi-Attribute Decision Making for the 7th Generation Semi-Submersible Drilling Unit
Xun Meng, Pin Tang, Dejiang Li, Yu Xu, Qiang Fu

OMAE2020-19160..... **V06BT06A035**
Numerical Investigation on Behaviors of Stiffened Large Suction Cap for Offshore Suction Cofferdam
Jeongsoo Kim, Yeon-Ju Jeong, Min-Su Park, Sunghoon Song

SHIP HYDROMECHANICS

OMAE2020-18067..... **V06BT06A036**
Study on the Parametric Rolling of Medium-Sized Containership Based on Nonlinear Time Domain Analysis
Seung Ho Yang

OMAE2020-18069..... **V06BT06A037**
Black-Box Modeling of Ship Maneuvering Motion Using System Identification Method Based on BP Neural Network
Hong-Wei He, Zao-Jian Zou

OMAE2020-18230..... **V06BT06A038**
Research on Resonant Fluid Behaviors and Induced Violent Slamming Effects in a Stepped Moonpool Under Wave Excitations With Ship Forward Speed
Hongguan Lyu, Jiayang Gu, Yanwu Tao, Zhongyu Zhang

OMAE2020-18659..... **V06BT06A039**
Horizontal and Torsional Modes of an Ultra Large Container Ship (ULCS)
P. P. Vijith, Suresh Rajendran

OMAE2020-18860..... **V06BT06A040**
Instantaneous Center of Rotation of a Vessel Submitted to Oblique Waves
Daniel de Oliveira Costa, Joel Sena Sales Junior, Antonio Carlos Fernandes

OMAE2020-19289..... **V06BT06A041**
Numerical Simulation on Oblique Towing Tests and Pure Yaw Tests of a
Containership in Surf-Riding Condition
Chengqian Ma, Ning Ma, Xiechong Gu

TOWED AND UNDERSEA CABLES AND PIPES, MOORING, AND BUOY TECHNOLOGY

OMAE2020-18134..... **V06BT06A042**
Dynamic Simulation of a Mooring Catenary Based on the Lumped-Mass Approach:
OpenModelica and Python Implementations
Savin Viswanathan, Christian Holden

OMAE2020-18788..... **V06BT06A043**
3-D Simulation of Iceberg Towing Operations: Cable Modeling and Frictional Contact
Formulation Using Finite Element Analysis
Brian J. O'Rourke, Mark K. Fuglem, Tony King

OMAE2020-19319..... **V06BT06A044**
Development of Strong Mooring Rope With Embedded Electric Cable
Ikuo Yamamoto, Toshiyuki Kosaka, Hirofumi Nakatsuka, Peter Halswell, Lars Johanning, Sam Weller

UNDERWATER VEHICLES AND DESIGN TECHNOLOGY

OMAE2020-18147..... **V06BT06A045**
Measurement for the Hydrodynamic Coefficients of the Model of an Ultra-Deep Water
Work-Class ROV in the O-Tube Facility
Qingrui Meng, Hongwei An, Mehrdad Kimiaei, Reza Azarhoush

OMAE2020-18241..... **V06BT06A046**
Path Following Control of Autonomous Underwater Vehicle Using Nonlinear Model
Predictive Control
Tomoki Taniguchi, Jun Umeda, Toshifumi Fujiwara, Kangsoo Kim, Takumi Sato, Shogo Inaba

OMAE2020-18253..... **V06BT06A047**
Numerical Simulations and Sea Trial for Leader Follower Formation Control of
Cruising-Type AUVs
Jun Umeda, Kangsoo Kim, Takumi Sato, Shogo Inaba, Toshifumi Fujiwara

OMAE2020-18400..... **V06BT06A048**
On the Role That the End Shape of an Underwater Vehicle Plays on Wave-Induced Vertical Forces
Kristia M. Suriben, Joseph T. Klamo, Kathryn I. Yeager, Young W. Kwon

OMAE2020-18446..... **V06BT06A049**
Research on the Obstacle Avoidance Strategy for the Wave Glider in the Maritime Environment Containing Dynamic Obstacles Based on the Improved Artificial Potential Field Method
Daoyong Wang, Xinliang Tian, Xiantao Zhang, Xiaoxian Guo, Peng Wang

OMAE2020-18655..... **V06BT06A050**
Deep Sea Mining: Towards Conceptual Design for Underwater Transportation
Astrid Vamrak Solheim, Maxime Lesage, Bjorn Egil Asbjornsett, Stein Ove Erikstad

OMAE2020-18699..... **V06BT06A051**
Experimental Study on Cavitation Motion of Underwater Vehicle With Protrusions
Zhaoyu Qu, Ning Gan, Yingyu Chen, Nana Yang

OMAE2020-19280..... **V06BT06A052**
CFD Investigation on the Hydrodynamic Characteristics of Blended Wing Unmanned Underwater Gliders With Emphasis on the Control Surfaces
Mukesh Guggilla, Vijayakumar Rajagopalan

UNSTEADY HYDRODYNAMICS, VIBRATIONS, ACOUSTICS, AND PROPULSION

OMAE2020-18535..... **V06BT06A053**
Numerical Design Study of Duct and Stator for a Pump-Jet Propulsor
Xue-Qin Ji, Chen-Jun Yang, Xiao-Qian Dong

OMAE2020-18548..... **V06BT06A054**
Numerical Prediction of Cavitation Performance of Controllable Pitch Propellers With Different Pitch Adjustment Velocities
Ying Xue, Xiao-Qian Dong, Chen-Jun Yang

OMAE2020-18999..... **V06BT06A055**
Prediction of Performance of Tip Loaded Propeller and its Induced Pressures on the Hull
Seungham Kim, Spyros A. Kinnas

OMAE2020-19067..... **V06BT06A056**
Thruster Performance of an Azimuth Stern Drive Tug
Lucas J. Yiew, Yuting Jin, Yingying Zheng, Allan R. Magee

OMAE2020-19121..... **V06BT06A057**
Numerical Simulation and Experimental Research of Hydrophone Flow Noise
Mingyuan Li, Jianzhang Liu, Yan Wei, Fengzhong Qu, Minhao Zhang, Zairan Ding

WAVE MECHANICS AND WAVE EFFECTS

- OMAE2020-18262**..... **V06BT06A058**
High-Fidelity Representation of Three-Hour Offshore Short-Crested Wave Field in the Fully Nonlinear Potential Flow Model REEF3D::FNPF
Weizhi Wang, Csaba Pakozdi, Arun Kamath, Hans Bihs
- OMAE2020-18474**..... **V06BT06A059**
Experimental Study of Wave Loading by Internal Solitary Waves on a Submerged Slender Body
Meng Ji, Ke Chen, Yunxiang You, Ruirui Zhang
- OMAE2020-18522**..... **V06BT06A060**
Characteristic Analysis for Spectrum of Swell Dominated Seas With In-Situ Measurements
Xiang Gao, Xiaozhou Ma, Yuxiang Ma, Guohai Dong, Junliang Gao
- OMAE2020-18727**..... **V06BT06A061**
Estimating Wave Induced Kinematics Underneath Measured Time Histories of Surface Elevation
Thomas B. Johannessen
- OMAE2020-18779**..... **V06BT06A062**
A Numerical Study on the Evolution of Random Seas With the Occurrence of Rogue Waves
Zhuowei Zhou, Ningchuan Zhang, Guoxing Huang
- OMAE2020-18919**..... **V06BT06A063**
Comparison of Two Versions of the MNLS With the Full Water Wave Equations
Tianning Tang, Ye Li, Harry B. Bingham, Thomas A. A. Adcock
- OMAE2020-18930**..... **V06BT06A064**
Generation of 3-hr Long-Crested Waves of Extreme Sea States With HOS-NWT Solver
Maxime Canard, Guillaume Ducrozet, Benjamin Bouscasse
- OMAE2020-19268**..... **V06BT06A065**
Comparison of the CFD Results to PIV Measurements in Kinematics of Spilling and Plunging Breakers
Bulent Duz, Jule Scharnke, Rink Hallmann, Jan Tukker, Siddhant Khurana, Kevin Blanchard
- OMAE2020-19357**..... **V06BT06A066**
Nonlinear Laser-Like Ocean Waves Radiation Orthogonal to the Wind
Andrei Pushkarev, Vladimir Zakharov
- OMAE2020-19359**..... **V06BT06A067**
A General Nonlinear Wavemaker Theory for Intermediate- to Deep-Water Waves Using Inverse Scattering Transform
Ali Mohtat, Solomon C. Yim, Nasim Adami, Pedro Lomonaco

WAVE THEORIES

OMAE2020-18537..... **V06BT06A068**

A New Methodology for Generation of Solitary Water Waves in Laboratory
Xiao Liu, Yong Liu

OMAE2020-18672..... **V06BT06A069**

Numerical Investigation of the Physics of Higher Order Effects Generated by Wave Paddles
Yun Zhi Law, Hui Liang, Harrif Santo, Kian Yew Lim, Eng Soon Chan

OMAE2020-18676..... **V06BT06A070**

Nonlinear Fourier Analysis of Free-Surface Buoy Data Using the Software Library FNFT
Sander Wahls, Markus Bruehl, Yang-Ming Fan, Ching-Jer Huang

OMAE2020-18724..... **V06BT06A071**

Data Assimilation for Phase-Resolved Ocean Wave Forecast
Guangyao Wang, Yulin Pan

OMAE2020-19074..... **V06BT06A072**

Analysis of Bore Characteristics Using KdV-Based Nonlinear Fourier Transform
Markus Bruehl, Sander Wahls, Ignacio Barranco Granged, Philipp L.-F. Liu

OMAE2020-19352..... **V06BT06A073**

Acoustic Study of Wave-Breaking to Enhance the Understanding of Wave Physics
Michael Odzer, Kristina Francke

WAVE-STRUCTURE INTERACTIONS

OMAE2020-18214..... **V06BT06A074**

On the Effect of Non-Linear Boundary Conditions on the Wave Disturbance and Hydrodynamic Forces of Underwater Vehicles Travelling Near the Free-Surface
William Lambert, Stefano Brizzolara

OMAE2020-18438..... **V06BT06A075**

Water Wave Diffraction and Radiation by a Submerged Horizontal Circular Cylinder in Front a Vertical Wall
Ai-jun Li, Yong Liu