

**Proceedings of ASME 2023  
42<sup>nd</sup> International Conference on  
Ocean, Offshore & Arctic Engineering**

**(OMAE2023)**

**Volume 9**

**June 11-16, 2023  
Melbourne, Australia**

**Conference Sponsor  
Ocean, Offshore and Arctic  
Engineering Division**

**THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS**

Two Park Avenue \* New York, N.Y. 10016

© 2023 The American Society of Mechanical Engineers, 2 Park Avenue, New York, NY 10016, USA  
([www.asme.org](http://www.asme.org))

All rights reserved. Printed in the United States of America. Except as permitted under the United States Copyright Act of 1976, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of the publisher.

INFORMATION CONTAINED IN THIS WORK HAS BEEN OBTAINED BY THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS 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.

ASME shall not be responsible for statements or opinions advanced in papers or . . . printed in its publications (B7.1.3). Statement from the Bylaws.

For authorization to photocopy material for internal or personal use under those 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, [www.copyright.com](http://www.copyright.com).

Requests for special permission or bulk reproduction should be addressed to the ASME Publishing Department, or submitted online at: <https://www.asme.org/publications-submissions/journals/information-for-authors/journalguidelines/rights-and-permissions>

ISBN: 978-0-7918-8691-5

## TABLE OF CONTENTS

Developing an Optimal Shape for Dynamically Installed Anchor .....	1
<i>Junsik Bae, Youngho Kim, Muhammad Shazzad Hossain</i>	
A Case Study on the Seabed Trenching Assessment and Anchor Design in Clay Based on the Hydrodynamic Calculation of the Floater .....	11
<i>Shengjie Rui, Zefeng Zhou, Baoxuan Wang, Hongyu Wang, Haojie Zhang, Yaru Zhang</i>	
Numerical Investigation of Comprehensive Behaviors of OMNI-Max Anchors in Sand .....	19
<i>Chengyang Zhang, Haixiao Liu, Zhong Xiao, Wei Zhang</i>	
Suction Caisson Anchor and Dynamically Installed Fish Anchor in Calcareous Silt.....	29
<i>Muhammad Shazzad Hossain, Mohammad Arif Mohiuddin, Kuntan Chang, Kaixiang Koh, Youngho Kim</i>	
From Offshore Flexible Flowlines to Dynamically Installed Anchors - A Concept Study .....	36
<i>Yuxia Hu, Minghui Gao, Scott Draper, Muhammad Shazzad Hossain</i>	
Decommissioning Analyses for Suction Caisson Foundations.....	43
<i>Lupamudra Sharma, Julian Bubel</i>	
Numerical Analysis of the Effect of Multidirectional Load on the Bearing Capacity of Suction Bucket Foundation .....	50
<i>Bin Yan, Wenxuan Zhu, Bin Gao, Guanlin Ye, Yinghui Tian</i>	
Friction Weakening Mechanism of Sandy Seabed Around a Suction Pile Under Ocean Wave Loading.....	57
<i>Jingyao Ma, Dong-Sheng Jeng</i>	
Wave-Induced Dynamic Seabed Response Around a Submerged Breakwater With Dynamic Permeability.....	67
<i>Zhengxu Li, Dong-Sheng Jeng</i>	
Coupled Hydrodynamic and Geotechnical Simulation of Floating Offshore Structures .....	75
<i>Ashley P. Dyson, Ali Tolooyan, Gholamreza Kefayati</i>	
Coupled Numerical Model for Residual Liquefaction With Partial Dynamic Approach .....	82
<i>Lin Cui, Zhipeng Wan, Dong-Sheng Jeng</i>	
A Numerical Investigation on the Derivation of p-y Curves for Monopile Foundations Installed in Sand.....	91
<i>Guilherme Kronemberger Lopes, Jose Renato Mendes de Sousa, Maria Cascao Ferreira de Almeida, Marcio de Souza Soares de Almeida</i>	
Relating the Stiffness of Load-Transfer Functions for Monopile Foundations to Elastic Soil Modulus.....	101
<i>James Doherty, Mark Randolph, Xiao Wan</i>	
Miniaturised Testing Device for the Qualitative Analysis of Gas Exsolution in Soil.....	107
<i>Pauline Kaminski, Jurgen Grabe, Zeest Fatima</i>	
SHANSEP-Based Approach to Account for Consolidation Induced Strength Gain in Capacity Assessment of Shallow Foundations .....	116
<i>Hongjie Zhou, Chao Sun, Henry Krisdani, Helena Dias</i>	

Experimental Evaluation of Supercritical CO <sub>2</sub> Enhanced Oil Recovery and Storage Capacity Using Dual-Core Core Flooding Technology for Carbonate Reservoirs.....	124
<i>Xianmin Zhou, Wei Yu, Muhammad Shahzad Kamal, Yu-Shu Wu, Sarmad Zafar Khan, Ridha Al-Abdrabalnabi</i>	
Integrated Optimization of Hybrid Steam-Solvent Injection in Post-CHOPS Reservoirs Under Uncertainty .....	133
<i>Senhan Hou, Shikai Yang, Liwu Jiang, Daoyong Yang</i>	
Dissociation Pressures of CO <sub>2</sub> Hydrate in Sulfate Solutions .....	146
<i>Ying Zhou, Nobuo Maeda, Huazhou Li</i>	
Early Stuck Pipe Detection Using Graph Attention Machine Learning .....	153
<i>Tomoya Inoue, Yujin Nakagawa, Tatsuya Kaneko, Ryota Wada, Keisuke Miyoshi, Shungo Abe</i>	
Exploration of Strategies to Improve Continual Learning From Irregular Sequential Drilling Data .....	160
<i>Felix James Pacis, Tomasz Wiktorski, Adrian Ambrus, Sergey Alyaev</i>	
Research on Lost Circulation Diagnosis Model Based on SMOTE-Tomek and Stacking Ensemble Learning .....	168
<i>Liang Han, Xianzhi Song, Haolin Zhang, Zehao Lv, Detao Zhou, Zhaopeng Zhu, Xuezhe Yao, Rui Zhang</i>	
Real-Time Automatic Prediction, Detection, and Mitigation of Fluid Loss During Drilling Operation Employing Along String Measurement (ASM) Data Along Wired Drill Pipes by Using Digital Twin in Norwegian Continental Shelf .....	177
<i>Mostafa Gomar, Behzad Elahifar</i>	
Machine Learning Models for Predicting Cuttings Concentration in Annulus Based on Flowloop Experimental Data .....	188
<i>Sartika Dwi Purwandari, Bjornar Lund, Sigve Hovda</i>	
A Hybrid Approach to Detect Bad Hole Cleaning.....	196
<i>Mandar V. Tabib, Philippe Nivlet, Jan Ole Skogestad, Roar Nybo, Adil Rasheed</i>	
Cross-Domain Knowledge Discovery and Sharing in Digital Subsurface Based on Federated Learning .....	205
<i>Nan Zhang, Ye Liu, Jiahui Geng, Boyu Cui, Jungwon Seo, Jie Cao, Chunming Rong</i>	
Transient Temperature and Machine Learning Modeling for Wellbore Drilling .....	215
<i>Juan Camilo Gonzalez Angarita, Mesfin Belayneh, Bernt Aadnoy</i>	
Investigation of the Microstructure of Bismuth Alloy and its Interaction With Cement and Steel Casing.....	226
<i>Andriani Manataki, Paraskevas Kontis, Sigbjorn Sangesland</i>	
The Sealing Behavior of Bismuth-Based Metal Plugs .....	235
<i>Lewaa Hmadeh, Behzad Elahifar, Sigbjorn Sangesland</i>	
Investigation of the Formation and Detection of Casing-Cement Debonding in Small Scale Samples .....	243
<i>Blandine Feneuil, Elie N'gouamba, Idar Larsen, Ragnhild Skorpa</i>	
Laboratory-Scale Experiments to Predict Barite Sedimentation in Drilling Fluids in Wells.....	253
<i>Blandine Feneuil, Bjornar Lund, Ragnhild Skorpa</i>	
Cementitious Composites for Supercritical Geothermal Well Applications .....	263
<i>Ragnhild Skorpa, Blandine Feneuil, Toshi Sugama, Tatiana Pyatina</i>	

Ultrasonic Well Integrity Logging Using Phased Array Technology.....	269
<i>Tonni Franke Johansen, Philip Erik Buschmann, Knut Marius Rosberg, Anja Diez, Erlend Magnus Viggen</i>	
Well Integrity Operations Experience Transfer Using Long Short-Term Memory (LSTM) Recurrent Neural Network .....	278
<i>David Semwogerere, Alexey Pavlov, Sigbjorn Sangesland</i>	
Study on Influencing Factors of Deep-Water Shallow Gas Jet Height via Numerical Simulation .....	285
<i>Yang Long, Jin Yang, Qishuai Yin, Li Li, Qianling Xue</i>	
Application of Drilling Fluid Circulation Technology to Lifting System for Deep-Sea Mineral Resources .....	293
<i>Ryuta Kitago, Shigemi Naganawa, Elvar Karl Bjarkason</i>	
Multiphase Seepage Flow Characteristics of Micro-Fractures in Subsurface Reservoirs Using the Lattice Boltzmann Method .....	302
<i>Dan Pu, Linfang Shen, Zhiliang Wang, Miao Li, Zhenquan Li, Pengyu Wang</i>	
Classification of Sensor Measurements From Non-Newtonian Fluids Using Batch and Online Analysis of Data .....	312
<i>M. Ziyen Sheriff, Mohamed N. Nounou, Mohammad A. Rahman, Ibrahim Hassan, Hazem N. Nounou</i>	
The Dynamic Optimization of Lower Completion Configurations Based on the Liquid/Gas Flow Streamline in a Middle East Oilfield .....	318
<i>Shuzhe Shi, Bohong Wu, Zhen Nie, Yong Li, Xin Li, Lufeng Zhang</i>	
Maintaining Constant Export Oil and Gas Rates in Offshore Installations Powered by Fluctuating Wind Energy .....	323
<i>Leila Eyni, Milan Stanko, Heiner Schumann</i>	
Development of an IPM Tool for Subsea System Design Considering Lifetime Production/Injection Performance.....	333
<i>Yuxi Wang, Cheng Hong, Segen F. Estefen</i>	
A Dynamics Experiment With a Submerged and Suspended Vertical Riser Pipe Small Scale Model Undergoing Forced Motions at the Top .....	341
<i>Caio Cesar de Oliveira Trigo, Sergio Nascimento Bordalo, Celso Kazuyuki Morooka</i>	
Scale Modelling, Prediction and Management Strategy in High-Temperature High Salinity Reservoir in Middle East.....	347
<i>Bohong Wu, Jingyao Wang, Shuzhe Shi, Yanna Zhang, Zhen Nie, Yong Li</i>	
Hydrodynamic Mechanism of Bottom Water Invasion Into Oil Storage Within Strategic Petroleum Reserve - Weeks Island SPR Case.....	355
<i>Andrew K. Wojtanowicz, Adam T. Bourgoyne Jr.</i>	
Viscous Fluid Injections in an Inclined Closed-End Pipe With Applications in the Dump Bailing Method .....	367
<i>Soheil Akbari, Hossein Hassanzadeh, Seyed Mohammad Taghavi</i>	
Buoyant Miscible Jets in a Viscoplastic Medium With Applications in Plug and Abandonment of Oil and Gas Wells.....	378
<i>Hossein Hassanzadeh, Saptarshi Joshi, Soheil Akbari, Seyed Mohammad Taghavi</i>	

Experimental Investigation of Annular Displacement With Fluids of Different Density .....	388
<i>Bjornar Lund, Jan David Ytrehus, Ali Taghipour, Arild Saasen</i>	
Placing Off-Bottom Cement Plugs: Effects of Density Difference .....	396
<i>Abdallah Ghazal, Ida Karimfazli</i>	
Predicting the Rate of Cement Plug Failure .....	405
<i>Scott Charabin, Ian A. Frigaard</i>	
Squeeze Cementing, a Mathematical Model and Parametric Investigation.....	414
<i>Mahdi Izadi, Ian A. Frigaard, Seyed Mohammad Taghavi</i>	
Effect of Polymer Latex and Cement Density in Wellbore Integrity .....	424
<i>Abdullah S. Al-Yami, Hussam Al-Qahtani, Nizar Jaber, Majad Khan, Vikrant Wagle</i>	
Dynamic Filtration Loss Control Through Optimization of Drilling Fluid Rheological Properties: A Comparative Study of the Fluid Viscoelasticity Versus Shear Viscosity Effects .....	430
<i>Hongbo Chen, Ergun Kuru</i>	
Application of the Yield Stress Concept in Drilling Fluid Engineering .....	445
<i>Arild Saasen, Jan David Ytrehus, Bjornar Lund</i>	
Cuttings Bed Creation and Removal When Circulating Field Applied Oil-Based Drilling Fluids.....	450
<i>Jan David Ytrehus, Bjornar Lund, Ali Taghipour, Arild Saasen</i>	
Cuttings-Bed Erosion in Horizontal Wells: Biopolymers Impact and its Rheological Dependence.....	456
<i>Camilo Pedrosa, Mohsen Baynabaj, Kristofer Paso, Arild Saasen</i>	
A Coupled Fluid-Structure Model for Estimation of Hydraulic Forces on the Tool-Joints .....	464
<i>Lucas P. Volpi, Eric Cayeux, Rune Wiggo Time</i>	
Dynamic Torque and Drag Model Coupled With Transient Hydraulic .....	474
<i>Eric Cayeux, Espen Jettestuen, Adrian Ambrus</i>	
Application of Insulated Drill Pipe to Supercritical/Super-Hot Geothermal Well Drilling .....	486
<i>Ajima Kohei, Shigemi Naganawa, Elvar Karl Bjarkason</i>	
Dual Shear Gun for Efficient Drilling Fluid Shearing - Laboratory Experiments.....	495
<i>Ali Taghipour, Bjornar Lund, Jan David Ytrehus, Arild Saasen, Geir Olav Anesbug, Jan Egil Pallin</i>	
Preparation of a Synthetic Geo-Polymer Based LCM Utilizing Saudi Arabian Volcanic Ash for a Sustainable Development: Method, Lab Testing and Applications .....	500
<i>Khawlah Alanqari, Abdullah Al-Yami, Vikrant Wagle</i>	
Critical Review of the Literature on Curing Losses and Long-Term Shale Inhibition .....	505
<i>Abdullah S. Al-Yami, Muhammad Tahir, Majad Khan, Vikrant Wagle</i>	
Impact of Cleaning Efficiency on Disc Cutter Drilling Performance.....	513
<i>Oluwatimilehin Mary Akindele, Judith Onyedikachi George, Abdelsalam Abugharara, Stephen D. Butt</i>	
Analytical, Numerical, and Field Data Investigation for Deriving the Condition of Stick-Slip Drill String Vibration .....	519
<i>Tatsuya Kaneko, Tomoya Inoue, Ryota Wada, Tokihiro Katsui, Hiroyoshi Suzuki</i>	

A Novel Hybrid Transfer Learning Method for Bottom Hole Pressure Prediction .....	525
<i>Rui Zhang, Xianzhi Song, Gensheng Li, Zehao Lv, Zhaopeng Zhu, Chengkai Zhang, Chenxing Gong</i>	
Evaluation of Wear and Damage on Large-Diameter Disc Cutters .....	533
<i>Oluwafemi Tytler, Zijian Li, Judith George, Stephen Butt</i>	
Evaluation of Granite Deformation Through Non-Compliant Versus Compliant Indirect Tensile Strength Application.....	541
<i>Abdelsalam Abugharara, Stephen Butt</i>	
Study of the Influence of Microwave Irradiation on Hard Formation Property Alteration Through Nondestructive/Destructive Tests and Drilling/Coring Operations .....	549
<i>Abdelsalam Abugharara, Salum Mafazy, Stephen Butt</i>	
Relating Stress-Overshoot Measurements of Drilling Fluids to Rheological Properties by Utilizing Inertia Calculations, Oscillatory Tests and Modelling.....	557
<i>Kristian Gjerstad</i>	
Investigation of the Relation Between Coring Parameters and Formation Representation .....	571
<i>Abdelsalam Abugharara, Stephen Butt</i>	
The Sidetracking Configuration Optimization and Detailed Scheme Design in a Oilfield Middle East .....	577
<i>Zhen Nie, Shuzhe Shi, Zhengxue Du, Xueqin Huang, Bohong Wu, Chunpeng Wang, Yanna Zhang</i>	

**Author Index**