

**Proceedings of ASME 2025
Pressure Vessels & Piping
Conference
(PVP2025)**

Volumes 1-6

**July 20–25, 2025
Montreal, Quebec, Canada**

**Conference Sponsor:
Pressure Vessels and Piping Division**

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

© 2025, The American Society of Mechanical Engineers, 290 W. Mount Pleasant Avenue, Suite 1400, Bldg. 4, Livingston, NJ 07039, USA (www.asme.org)

All rights reserved. "ASME" and the above ASME symbols are registered trademarks of the American Society of Mechanical Engineers. No part of this document may be copied, modified, distributed, published, displayed, or otherwise reproduced in any form or by any means, electronic, digital, or mechanical, now known or hereafter invented, without the express written permission of ASME. No works derived from this document or any content therein may be created without the express written permission of ASME. Using this document or any content therein to train, create, or improve any artificial intelligence and/or machine learning platform, system, application, model, or algorithm is strictly prohibited.

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.

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>

VOLUME 1 ISBN: 978-0-7918-8904-6

VOLUME 2 ISBN: 978-0-7918-8905-3

VOLUME 3 ISBN: 978-0-7918-8906-0

VOLUME 4 ISBN: 978-0-7918-8907-7

VOLUME 5A ISBN: 978-0-7918-8908-4

VOLUME 5B ISBN: 978-0-7918-8909-1

VOLUME 6 ISBN: 978-0-7918-8910-7

TABLE OF CONTENTS

Shooting a Water Slug Into an Air Column With and Without Vent.....	1
<i>Zafer Bozkus, Ali Ersin Dincer, Arris S. Tijsseling, Fons van de Ven</i>	
Effects of Cavitation on Vibration of Sleeve Control Valve	8
<i>Kan Sheng, Xuan-jie Gu, Chuang Liu, Shen-zhe Zhang, Long-xiang Wang, Qing-wei He, Weiliang Pan, Jin-yuan Qian</i>	
Thermo-Fluid-Solid Coupling Analysis on Deformation of Steam Isolation Valves During Closing Process.....	17
<i>Fang-na Xiang, Zhi-min Wang, An-qi Guan, Xuan-jie Gu, Cheng-rong Liu, Shi-jian Chen, Zhi-jiang Jin, Jin-yuan Qian</i>	
Aerodynamic Noise Analysis of Cut-Off Valve During Opening Process Under High-Pressure Conditions	25
<i>Zhao-tong Wang, Zhao-nian Zhou, Ting-feng Hua, Jing-xian Kong, Wen-qing Li, Zhi-jiang Jin, Jin-yuan Qian</i>	
Effects of Sleeve Parameters on Flow-Induced Noise in High Pressure Reducing Valve	34
<i>Cheng-rong Liu, Xuan-jie Gu, An-qi Guan, Fang-na Xiang, Zhi-jiang Jin, Jin-yuan Qian</i>	
Local-Scale Numerical Simulation of an Air-Water Flow in a Triangular Tube Bundle in to Predict Force Spectra.....	42
<i>William Benguigui, Fanny Beltran</i>	
Acoustically Induced Vibration Generated by Multi-Hole Restriction Orifices in a Fuel Gas Piping System	48
<i>Itsuro Hayashi, Kazuya Yamaguchi, Shun Maeda, Hisao Izuchi, Wisnu Adilaksana, Abang Daya Wiguna</i>	
Critical Projection Cycle Counting Exploration Method for Fatigue Life Prediction of Small-Bore Connection Due to Multiaxial Piping Vibration	57
<i>Tsunemichi Takahama</i>	
Wind-Induced Vibration of Tall, Slender Process Columns	67
<i>Derek E. Slovenec, Gaurav Mittal</i>	
URANS Simulations of Turbulence-Induced Vibrations of a Cantilevered Rod With Hemispherical Tip in Axial Flow.....	76
<i>Mohammed Muaaz M. D. Hussain, Kevin Zwijsen</i>	
Suppression of Flow Induced Acoustic Resonance in Tube Array	85
<i>Rasha Noufal, Hossam Kishawy, Atef Mohany</i>	
Effect of Flow Approach Angle on Flow Periodicity and Acoustic Resonance in Triangular Tube Bundles.....	93
<i>Rasha Noufal, Timothy Down, Hossam Kishawy, Atef Mohany</i>	
Practical Application and Problems of Acoustic Induced Vibration Assessments.....	103
<i>Noel W. Hart, Brad E. Moulton</i>	
Hydrodynamic Coupling Forces in the ZED-2 Research Reactor	112
<i>Ibrahim Gad-el-Hak, Paul Feenstra, Mohammed Alziadeh, Brendan St. Pierre, Michael Burlock, Salim El Bouzidi</i>	

In-Reactor Experiments to Enhance Neutron Noise Analysis Techniques for Vibration Monitoring.....	123
<i>Salim El Bouzidi, Bhaskar Sur, Paul Feenstra, Brendan St. Pierre, Mohammed Alziadeh, Ibrahim Gadelhak, Michael Burlock, Julian Atfield, Luke Yaraskavitch</i>	
Methods for Separating Close Natural Frequencies	131
<i>Hugh Goyder</i>	
Numerical Study of Self-Excited Oscillations and Aeroacoustic Sources of Jet Flows in High Temperature Gas Reactor Cores	138
<i>Mohammed Alziadeh, Salim El Bouzidi</i>	
Experimental Study of the Two-Phase Flow and Induced Vibrations in a Square-Pitch Tube Bundle in Air-Water Cross-Flow.....	146
<i>Daniele Vivaldi, Antonio Chahine, Lucas Rotily</i>	
Flow Induced Vibration Generated at a Tee Junction of a Large Diameter Pipe	155
<i>Itsuro Hayashi, Masato Nishiguchi, Takahiro Ishigami, Hisao Izuchi, Noel W. Hart</i>	
Benchmark Study of CFD Prediction Accuracy of Two-Phase Flow Induced Vibration Loading for Engineering Applications	164
<i>Shaoxiang Qian, Shunji Kataoka</i>	
Characterizing Flow Perturbations in Tube Arrays Under Cross-Flow	173
<i>Amro Elhelaly, Hossein Farani Sani, Atef Mohany, Marwan Hassan</i>	
Streamwise Fluidelastic Instability in Rotated Square Array With Loose Supports.....	182
<i>Amro Elhelaly, Joaquin E. Moran, David Dawson, Marwan Hassan</i>	
Validation of Dynamic Simulations of Fluid and Structure Noise and Vibration.....	190
<i>Adin Mann, Itsuro Hayashi, Rob Swindell, Dan Eilers, Gregory Westwater</i>	
Sensitivity Tests of Medium-Resolution Simulations of Tube Bundles Subjected to Turbulent Cross-Flow	199
<i>Kevin Zwijsen, Mohammed Muaaz Mohamed Dilshad Hussain</i>	
Fretting Corrosion Behavior of CrAlN Coatings at Different Temperatures in Lead-Bismuth Eutectic Alloy.....	209
<i>Guangzhao Wang, Hui Chen, Guiyu Mei, Guorui Zhu</i>	
Fretting Wear Between Zirconium Alloy Cladding Tube and Foreign Object in Simulated Primary Water of Pressurized Water Reactor	217
<i>Guiyu Mei, Hui Chen, Guangzhao Wang, Xin Liu, Guorui Zhu</i>	
Investigating the Dynamic Behavior of Loosely Supported Parallel Triangular Arrays Subjected to Two-Phase Flow	225
<i>Amro Elhelaly, Joaquin Moran, Hossein Farani Sani, Jovica Riznic, Marwan Hassan</i>	
Bracing for Acoustic Induced Vibration Applications	233
<i>Adin Mann, Mehdi Sanati, Chris Harper</i>	
Benchmarking EI AVIFF and API 579 Part 15.....	241
<i>Adin Mann, Scot Mcneill, Noel Hart, Ajit Bhuddi</i>	
Dynamics and Stability of a Pipe Conveying Fluid Immersed in a Quiescent Viscous Fluid	251
<i>Mojtaba Kheiri, Mahdi Riazat</i>	

Bifurcation Behavior of Flow in a Mixed-Geometry Tube Array	259
<i>Pegah Mehrabian, Njuki Mureithi</i>	
Impact of Simulated Tube Length in FSI Predictions of the GOKSTAD Experiment	271
<i>Trevor C. Franklin, Lane B. Carasik</i>	
Vortex-Induced Vibration of a Rectangular Cross Section With Transverse and Rotational Modes	278
<i>Mahmoud Shaaban, Mostafa R. Rashed, Atef Mohany</i>	
Parsimonious Uncertainty Quantification for Modeling and Simulation of Flow-Induced Vibrations	285
<i>Gregory Banyay, Ashkan Nejad</i>	
Verification and Supplemental Information for the Influence of Tube Frequency Differences on Fluid-Elastic Instability of Tube Arrays In Crossflow	297
<i>Austin Vulcano, Gregory Banyay, Robert Blevins, Pascal Brocheny</i>	
A Semi-Empirical Approach for Modelling the Effect of Tube-Support Preload on Fluidelastic Instability of Tube Arrays	304
<i>Teguewinde Sawadogo, Ibrahim Gad-el-Hak</i>	
A Study on the Fluidelastic Stability of a Hybrid Layout Array in Two-Phase Flow	311
<i>Sameh Darwish, Njuki Mureithi, Abdallah Hadji, Minki Cho</i>	
Blast Adjustment Factors for Elevated Horizontal PVBs	318
<i>Jihui Geng, Kelly Thomas</i>	
Fluid-Structure Interaction Modelling to Predict Rupture of Dense-Phase CO ₂ Pipeline.....	327
<i>Bruce W. Williams, Ifaz Haider, Dean Difiore, C. Hari M. Simha, Su Xu</i>	
Coupled Fluid-Structural Analysis of Explosion Containment Using Crushable Sandwich Structures.....	337
<i>Aditya Narkhede, Shafquat Islam, Kevin Wang</i>	
Advancements in Modeling of Pressurized Thermal Shock Analysis in Reactor Pressure Vessels.....	347
<i>Francesco Paolo Ricci, Fabio Pasti, Francesco Brigante</i>	
Fluid-Structure Interaction Analysis of Running Ductile Fractures in CO ₂ Pipelines With Toroidal Ring Crack Arrestors	355
<i>Jinglue Hu, Wenxing Zhou, Jidong Kang</i>	
A New Continuous Decay/Stribeck Friction Model	365
<i>Abdallah Hadji, Njuki Mureithi</i>	
Evaluation of the Impact Load Acting on a Solid Surface Due to the Collapse of a Laser-Generated Bubble	374
<i>Muhammad Farkhan Abdillah, Kazuaki Inaba, Hiroaki Nakamoto</i>	
State-of-the-Art Review of Using Composite Pipes for Hydrogen Transmission	383
<i>Jeff L. Ellis, Miranda Marcus, Joshua James</i>	
Discussion of Creep Phenomena During Initial Loading of Type 4 Composite Pressure Vessels.....	390
<i>Bartosz Popiela, Stephan Gunzel, Georg W. Mair</i>	
Impact Damage Evolution and Residual Strength Assessment of Composite Hydrogen Storage Cylinder	397
<i>Yu Zhang, Haixiang Wang, Huasheng Hu, Junyang Chen, Mao Deng, Gai Huang, Bo Deng, Cheng Qin, Cong Deng, Haojun Lin, Qunjie Lu, Chilou Zhou</i>	

Deep Learning Applied to Fracture Mechanics Boundary Pressure Vessel and Support.....	408
<i>Abdelhak Benrhabia, Pascal Duranton, Olivier Vernhet, Amro El Betepasawy, Remi Bessonies</i>	
Enhancing Thread Load Distribution Methodology	417
<i>Erick R. Ritter, Thomas R. Draper</i>	
Proposal of New Fatigue Evaluation Method in KD-3 of ASME Section VIII Division 3	421
<i>Susumu Terada</i>	
The Analysis of Transient Stress Conditions Developed in a Target Confining Structure of a Projectile Launching System	431
<i>Robert Valdiviez, Robert Zill</i>	
Elastic-Plastic Behavior of Metal Rings During High-Speed Electromagnetic Compression.....	441
<i>Niels van de Meulenhof, Fons van de Ven, Jean-Sebastien Dick, Arris Tijsseling</i>	
Life Analysis and Structural Optimization of the Oil Distribution Plate in Ultra-High Pressure Diaphragm Compressors	452
<i>Yaomei Long, Yuan Lv, Yun Li</i>	
Stress Tensor-Based Assessment of Sectional Behavior in Containment Wall Under Increasing Internal Pressure	461
<i>Hye-Min Shin, Tae-Hyun Kwon</i>	
Impact of Initiators on Polyethylene Synthesis in a High-Pressure Multizone Autoclave	468
<i>Christoph Weigel, Markus Busch</i>	
Modeling Low-Density Polyethylene Polymerization in a Multizone-Autoclave Using Coupled Computational Fluid Dynamics and Monte-Carlo Simulation	476
<i>Emil Schwarz, Christoph Weigel, Markus Busch</i>	
Investigation and Modeling of the Single- and Two-Phase Flow in High-Pressure Relief Systems	482
<i>Daniel Dyck, Markus Busch</i>	
Application of Damage-Based Localized Exhaustion Limits for Impulsively Loaded Vessels.....	490
<i>Joshem Gibson, Dmitriy Kats, Kevin Fehlmann</i>	
Analysis of the Influence of Submarine Pipelines Under the Action of Multiple Factors by Anchor Dragging.....	501
<i>Wei Gao, Yi Shuai, Junjie Zhang, Ye Tian</i>	
Experimental Research on Leakage and Diffusion Characteristics of Hydrogen-Blended Natural Gas Pipeline.....	508
<i>Zicong Han, Shaohua Dong, Meng Sun, Boxing Han, Lin Chen</i>	
Crack Growth of Asymmetric Geometries and Non-Uniform Wall Thickness in Pressure- Containing Bodies Under Cyclic Loadings	517
<i>Brian Skeels, Sam (Kwok Lun) Lee, Grzegorz Widlak</i>	
Flange Connections Design Resistances in Light of the LRFD Methodology Presented by DNV ST- F101 Standard.....	528
<i>Przemyslaw Lutkiewicz</i>	
Analytical Study of Torsional Capacity in API 6BX Type Flange Design and Comparison With FEA	536
<i>Sam (Kwok Lun) Lee, Ramu Valliappan Manickam</i>	

Environmentally Assisted Cracking Assessment of HPHT Products Under Cathodic Protection and Seawater Environment.....	543
<i>Fabio Alves, Barry Stewart, Sam (Kwok Lun) Lee, Thiago Daflon, Marcella Lage, Mateus Porto</i>	
Fatigue Analysis of a Hydrogen Pressure Vessel Using ASME BPVC VIII-3 KD-10 and Comparing With the Results of VIII-3 KD-322 Using Degraded S-N Curves.....	550
<i>Mohamadreza Nourani</i>	
Effect of Gaseous Hydrogen on Strain Gage Based Instrumentation	560
<i>Yunior Hioe, Takahiro Hara</i>	

Author Index