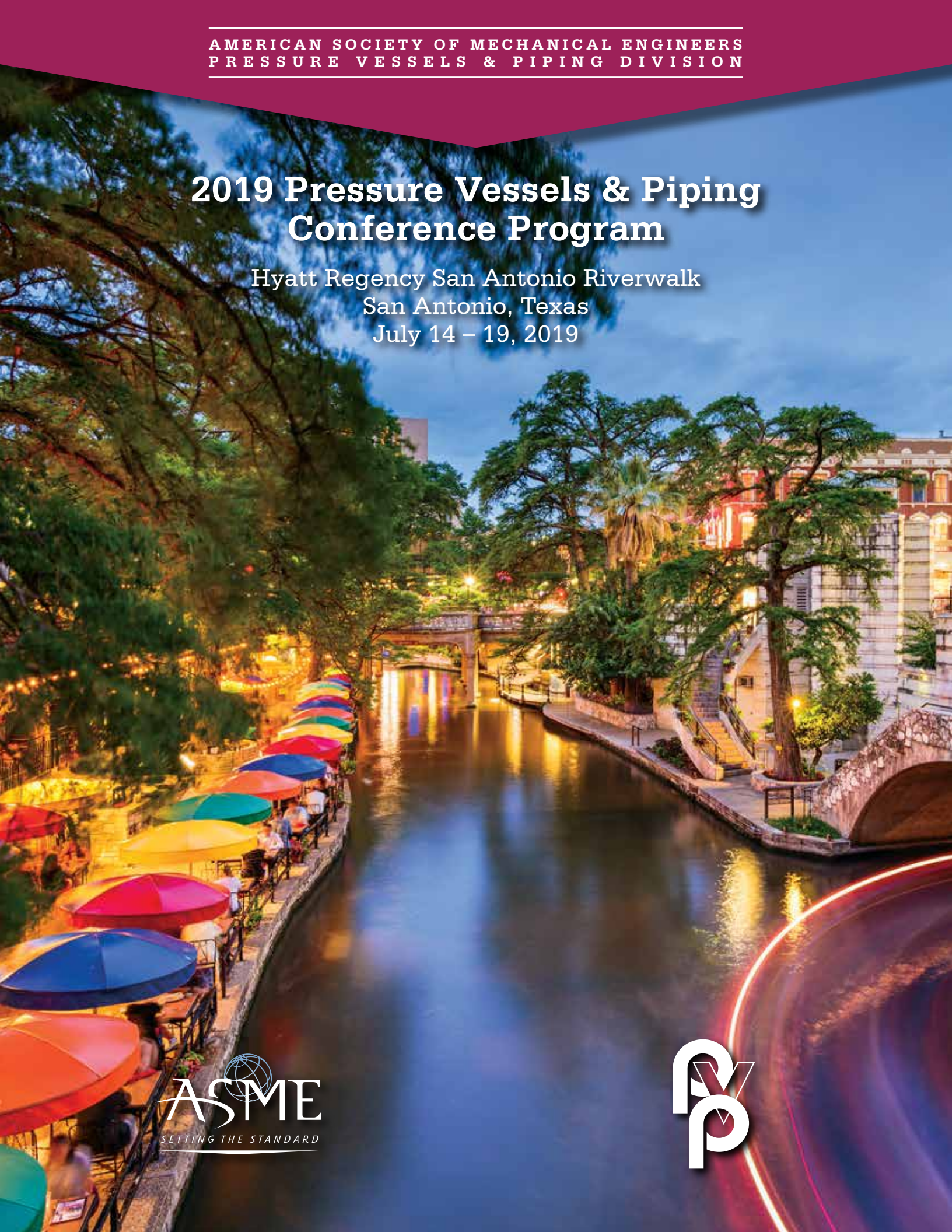
AMERICAN SOCIETY OF MECHANICAL ENGINEERS
PRESSURE VESSELS & PIPING DIVISION

2019 Pressure Vessels & Piping Conference Program

Hyatt Regency San Antonio Riverwalk
San Antonio, Texas
July 14 – 19, 2019



ASME
SETTING THE STANDARD

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Hakim Bouzid
Conference Chair

Welcome from the Chair

Welcome to San Antonio for the 2019 ASME Pressure Vessels & Piping Conference! The PVP Conference is known as an outstanding international technical forum through which participants can exchange opinions and ideas with leading experts from industry and academia, and deepen their knowledge base through exposure to diverse topics. The conference, built with a pioneering spirit, helps disseminate cutting-edge knowledge on Pressure Vessels and Piping Technologies to our global community of practice. Our international experts, from 40 countries in Europe, Africa, the Middle East, Asia, the Americas and the Oceania islands, will present their latest research findings in the area of pressure vessels and piping.

The ASME Pressure Vessels and Piping Division is the primary sponsor of this Conference, with additional participation by the ASME Nondestructive Evaluation, Diagnosis and Prognosis Division (NDPD). This year, under the theme "Future Technology Trends in the Global Pressure Vessel and Piping Industry," the conference has attracted 570+ technical papers and 100+ presentations in 180+ technical and panel sessions. In addition, we are presenting five Technical Tutorials, two Special Tutorials, an EPRI Expert Workshop on Structural Integrity of Components in High Temperature Applications, special events for ASME Code Users, students and Early Career Engineers, and the Rudy Scavuzzo Student Paper Symposium and 27th Annual Student Paper Competition. The Technology Demonstration Forum is also organized as part of our Technical Program. The Opening Ceremony and Plenary Session features keynote presentations by expert speakers Gregory Walz and Narasi Sridhar.

Technical papers and presentations presented at this conference are separated into Tracks according to their technical areas. Since fewer and fewer computers allow for playing CD-ROMs and many companies discourage the use of USB memory sticks, we chose to make technical papers available online to pre-registered attendees in the link sent to their emails or via the Conference App. At the conference, technical papers can also be obtained from our Download Station.

A key component of every PVP Conference is the opportunity to socialize and make new friends, and this year's Conference offers several great opportunities in beautiful San Antonio. Enjoy the Mission San José Tour on Monday — a guided tour of the UNESCO World Heritage Missions on the southern reach of the Riverwalk. We will all meet at the Conference-wide Reception on Monday evening in the Regency Ballroom in our conference venue, the Hyatt Regency San Antonio Riverwalk. On Tuesday, hop aboard one of San Antonio's famous river barges for the River Barge Tour & Lunch. Guests will be wined and dined as they cruise down the San Antonio River. You can also join us for entertainment and great food at the Honors & Awards Gala and Dinner on Wednesday evening. Additional details regarding these activities can be found in this program.

I wish you a wonderful time in San Antonio!

Hakim Bouzid
Conference Chair

PVP 2019 Program Layout

	Sunday 14 July	Monday 15 July	Tuesday 16 July	Wednesday 17 July	Thursday 18 July	Friday 19 July
7:15 am 8:00 am	Arrival, Registration Open (8:00 am – 6:00 pm)	Authors' Breakfast/ Briefing, Registration Open (7:30 am – 4:00 pm)	Authors' Breakfast/ Briefing, Registration Open (7:30 am – 4:00 pm)	Authors' Breakfast/ Briefing, Registration Open (7:30 am – 3:00 pm)	Authors' Breakfast/ Briefing, Registration Open (7:30 am – 3:00 pm)	Open
8:15 am 10:00 am	**Block 0.1** Open	**Block 1.1** Technical Sessions, Technology Demonstration Forum	**Block 2.1** Technical Sessions, Technical Tutorial, Technology Demonstration Forum	**Block 3.1** Technical Sessions, Technical Tutorial, Technology Demonstration Forum	**Block 4.1** Technical Sessions, Workshops	**Block 5.1** Workshops Technical Tour
10:15 am 12:00 pm	**Block 0.2** Open	**Block 1.2** Plenary Session, Technology Demonstration Forum	**Block 2.2** Technical Sessions, Technical Tutorial, Technology Demonstration Forum	**Block 3.2** Technical Sessions, Technical Tutorial, Technology Demonstration Forum	**Block 4.2** Technical Sessions, Workshops	**Block 5.2** Workshop, Technical Tour
12:00 pm 2:15 pm	Open	Open	Technical Committee Meetings	Technical Committee Meetings	Open	Open
2:15 pm 4:00 pm	**Block 0.3** Special Tutorials (1:30 pm – 3:00 pm) Early Career Engineers Forum (3:00 pm – 3:45 pm)	**Block 1.3** Technical Sessions, Technical Tutorial, Technology Demonstration Forum	**Block 2.3** Technical Sessions, Technical Tutorial, Technology Demonstration Forum	**Block 3.3** Technical Sessions, Technical Tutorial	**Block 4.3** Technical Sessions, Workshops	Open
4:15 pm 6:00 pm	**Block 0.4** Student Paper Competition Orientation (3:45 – 4:15 pm), Early Career Engineers / Students Reception (4:15 pm – 5:30 pm)	**Block 1.4** Technical Sessions, Technical Tutorial, Technology Demonstration Forum	**Block 2.4** Technical Sessions, Technical Tutorial, Technology Demonstration Forum	**Block 3.4** PVP Division Honors and Awards Gala & Dinner (5:00 pm - 10:00 pm)	**Block 4.4** Technical Sessions, Conference Evaluation, Workshop	Open
Evening	Open	Conference-Wide Reception (7:00 pm – 9:00 pm)	Networking Reception (5:00 pm – 7:00 pm)		Open	Open

ASME Pressure Vessels & Piping Division

53 Years of Cutting-Edge Research in PVP

The 2019 Pressure Vessels & Piping Conference marks the 53rd Anniversary of the Pressure Vessels & Piping (PVP) Division. The Division's rich history began with the research arm of ASME, the Pressure Vessel Research Committee (PVRC). The PVRC united the most experienced members in the design and manufacture of pressure vessels, valves and pumps; and sponsored research programs on thin and thick shell vessels with the cooperation of the Atomic Energy Commission (AEC) and other organizations as early as 1958. Among a number of institutions that participated in the program, Pennsylvania State University dealt with stress analysis of pressure vessels with nozzle inserts with different types of reinforcement pads under combined loading. D. Hardenberg and S. Zamrik published their results in WRC bulletins of 1963 and 1964. Contributions to this work were also made by C. Taylor at Illinois University using photoelasticity stress analysis, and E.O. Waters at Yale University using computational analysis. In view of the growing interest in pressure vessel technology and research results, F. Williams from Taylor Forge, a very active member, spearheaded an organizational meeting at the 1965 ASME Winter Annual Meeting (WAM) in Chicago to form a division dedicated to all technical aspects of pressure vessels and piping. Recommendations were made by F. Williams and D. Young to create the Pressure Vessels and Piping Division. The recommendation passed unanimously and D. Young was named the first Division Chair on April 13, 1966.

The PVP Division evolved from a small division with four Technical Committees to the robust division it is today with eight committees and a strong, vital and international membership. In the early years, the Division leadership possessed a global vision: To represent an international membership with industry experts involved in division growth. To ensure the achievement of their vision, PVPD leadership established a Mission and Core Values.

- Mission: To provide a forum to the engineering and scientific communities to promote, share and disseminate state-of-the-art pressure technologies, relating to the power, petrochemical, and process industries, and sustainable and alternative energies.
- Core Values:To embrace integrity and ethical conduct and provide a welcoming climate for a diverse global community of students and engineers to foster creativity, innovation and intellectual growth.

To disseminate its mission, global conferences were organized to bring the technical community together and to exchange technology development in the pressure vessels industry. The continued success of PVP Conferences is due to the dedication of our volunteers and the support of their companies.

ASME is truly an international organization and the PVP Division is an appropriate reflection of this worldwide reach. From 1991 to 2000, the number of contributors from outside North America grew from approximately one-third to more than two-thirds. Our annual conferences continually host attendees from 35 to 42 different countries representing all regions of the globe, and the technical content and the quality of PVP Conference sessions have benefited greatly from overseas participation.

To encourage students' active participation in the annual PVP Conference, the Rudy Scavuzzo Student Paper Symposium and Competition is organized each year. The PVP Division encourages students and early-career engineers to get involved with the Conference and the Division. PVP Conference attendees are also encouraged to include their spouses in their conference travel plans. This provides and promotes a welcoming atmosphere that further develops friendship, broadens relationships and extends interaction and networking. Our PVPD Senate Operations Committee (and spouses) actively participate in creating and maintaining the "PVP Family" atmosphere that makes our social events successful. The PVP Division is ever grateful for their unwavering commitment.

PVP 2019 Conference Committee

Hakim A. Bouzid
Conference Chair

Trevor Seipp
Technical Program Chair

Sam Y. Zamrik
Conference Advisor

PVP Technical Program Representatives

Codes & Standards	Kiminobu Hojo Valery Lacroix
Computer Technology & Bolted Joints	Yasumasa Shoj Bhaskar Shitole
Design & Analysis	Alicia Avery Kannan Subramanian
Fluid-Structure Interaction	Daniel Broc Enrico Deri
High-Pressure Technology	Charles Becht V Christopher Tipple
Materials & Fabrication	Mo Uddin Mark Messner
Operations, Applications & Components	Joseph Cluever Mike Weber
Seismic Engineering	Osama Furuya Taichi Matsuoka
Student Paper Competition	Douglas A. Scarth Maher Y.A. Younan
ASME NPDP Division	Sandra Dugan Vivek Agarwal
EPRI Expert Workshop on Structural Integrity of Components in High Temperature Applications	Jonathan Parker Johnna Cortopassi

Student Paper Competition Session Developers

Codes & Standards	Peter James
Computer Technology & Bolted Joints	Yasumasa Shoji Takashi Kobayashi
Design & Analysis	San Iyer Bing Li
Fluid-Structure Interaction	Enrico Deri Daniel Broc
High-Pressure Technology	[None this year]
Materials & Fabrication	Noel P. O'Dowd, Carl Jaske, Haiyang Qian, Catrin Mair Davies Cory Hamelin
Operations, Applications & Components	Yasumasa Shoji
Seismic Engineering	Fabrizio Paolacci, Osamu Furuya Taichi Matsuoka
ASME NPDP Division PVP Senate	Sandra Dugan Douglas A. Scarth Maher Y.A. Younan

PVP Division Management Committee (2018-2019)

Chair	Pierre Mertiny
Vice Chair	Hakim A. Bouzid
Conference Technical Program Chair	Trevor Seipp
Programs Chair	Matthew R. Feldman
Communications Chair	Andrew Duncan
Honors & Awards Chair	Clay Rodery

PVP Senate of Past Division Chairs

Maher Y.A. Younan, Vice Chair	2017-2018
Douglas A. Scarth, Chair	2016-2017
Marina B. Ruggles-Wrenn	2015-2016
Daniel T. Peters	2014-2015
Michael E. Nitzel	2012-2014
Ronald S. Hafner	2011-2012
Young W. Kwon	2010-2011
Luc H. Geraets*	2009-2010
Artin A. Dermenjian	2008-2009
James F. Cory, Jr.	2007-2008
Judith A. Todd	2006-2007
M.K. Au-Yang*	2005-2006
Ismail T. Kisisel	2004-2005
William J. Bees	2003-2004
Howard H. Chung	2002-2003
Joseph Sinnappan	2001-2002
A.G. (Jack) Ware	2000-2001
Robert F. Sammataro*	1999-2000
Thou-Han Liu	1998-1999
William E. Short, II	1997-1998
Richard C. Gwaltney*	1996-1997
Shoei-Sheng Chen*	1995-1996
Greg L. Hollinger	1994-1995
Carl E. Jaske	1993-1994
Rudy J. Scavuzzo*	1992-1993
Sam Y. Zamrik	1991-1992
G.E. Otto Widera	1990-1991
Robert H. Mallett	1989-1990
Robert W. Swinderman	1988-1989
Alexander H.C. Marr	1987-1988
Jeffrey T. Fong	1986-1987
Don B. Van Fossen	1985-1986
James R. Farr*	1984-1985
Charles F. Nash	1983-1984
Donald S. Griffin	1982-1983
Richard H. Gallagher*	1981-1982
L. Eugene Hulbert	1980-1981
Robert E. Nickell*	1979-1980
Roger F. Reedy	1978-1979
David H.C. Pai*	1977-1978
Pedro V. Marcal	1976-1977
Harold H. Waite*	1975-1976
Robert L. Cloud	1974-1975
Charles V. Moore	1973-1974
Irwin Berman*	1972-1973
Danos Kallas*	1971-1972
Robert J. Cepluch*	1970-1971
Charles F. Larson	1969-1970
Gunther P. Eschenbrenner	1968-1969
Vito Salerno*	1967-1968
Dana Young*	1966-1967

** Deceased*

PVP Division Technical Committee Chairs

Codes & Standards	Ryan Crane
Computer Technology & Bolted Joints	Jerry Waterland
Design & Analysis	Ravi Baliga
Fluid-Structure Interaction	Tomoyo Taniguchi
High-Pressure Technology	Karl Simpson
Materials & Fabrication	Michiel Brongers
Operations, Applications & Components	Georges Bezdikian
Seismic Engineering	Fabrizio Paolacci

PVP Division Administrative Committee Chairs

Membership Chair	Bing Li
Website & PVPD Newsletter Editor	Andrew Duncan
International Coordination	Xian-Kui Zhu

ASME Journal of Pressure Vessel Technology

Editor	Young W. Kwon

ASME President

Richard Laudenat	2019-2020

ASME Staff

Senior Manager, Segment Operations	Jamie Hart
Manager, Conferences and Events	Sendy Ontiveros

Opening Ceremony & Plenary Session

Future Technology Trends in the Global Pressure Vessel & Piping Industry

The Conference opens in the Regency Ballroom C&W on Monday, July 15th at 10:15 AM. Representatives of the American Society of Mechanical Engineers will welcome the attendees. The first presentation will be delivered by Gregg Walz, Engineering Technology Manager, Anadarko Petroleum Corporation. The second presentation will be delivered by Dr. Narasi Sridhar, Vice President and Program Director, Materials Technology Development Section, DNV GL, USA.

A Deepwater HPHT Development Program Retrospective - 2014 to Present

Gregg Walz
Engineering Technology Manager
Anadarko Petroleum Corporation

Anadarko Petroleum Corporation formed a project team in 2014 to develop and qualify over 200 deepwater components and assemblies to rated working pressures greater than 15ksi. Temperature requirements ranged from 250°F to 350°F. All well and subsea pressure controlling or containing equipment used in drilling, completion, intervention or production was within the project's scope. The team has used various industry standards and followed rigorous US Government requirements. The project has been at the forefront of integrating API and ASME standards and methodologies. This presentation provides an Operator's view of the challenges and gaps encountered.

Integrity Assessment of Additively Manufactured Metallic Alloys

Dr. Narasi Sridhar
Vice President and Program Director
Materials Technology Development Section
DNV GL, USA

Additive Manufacturing (AM) is gaining increasing interest in many industries because of its ability to manufacture difficult geometries and reduce the time to application. AM is being evaluated for a variety of applications including field repair of parts. Additionally, AM is being considered for making new types of alloy combinations and functionally graded materials. Along with its promise, AM also brings several challenges for safety-critical components. This talk will focus on AM of metallic materials used in structural applications in severe environments. Examples will be provided of the mechanical and corrosion behaviors of some AM alloys in comparison to conventionally manufactured alloys and their relationship to microstructure. Manufacturing of AM parts involves an extended value chain of hardware, software and various material inputs. Some of the process steps are proprietary and the quality of the products are continually evolving. A holistic approach to assessment of AM alloys is presented in this talk.

Honors & Awards Gala

The ASME PVP Division Honors and Awards Gala, during which Division and selected ASME Society awards are presented, will be held on Wednesday, July 17, from 5:00 pm until 10:00 pm, in the Regency Ballroom. The top PVP Division award, the ASME S. Y. Zamrik PVP Medal, will be presented to Dr. Young W. Kwon.

Dr. Young W. Kwon
Naval Postgraduate School in Monterey, California

Dr. Young W. Kwon is Distinguished Professor of the Mechanical & Aerospace Engineering Department at the Naval Postgraduate School in Monterey, California. Dr. Kwon received his bachelor's degree from the Seoul National University in 1981, his master's degree from Oklahoma State University in 1983, and his PhD from Rice University in 1985. All degrees were in mechanical engineering. After spending a short time in industry, he began his teaching career at the Missouri University of Science and Engineering (formerly the University of Missouri at Rolla) in 1987 as an Assistant Professor in the Mechanical & Aeronautical Engineering and Engineering Mechanics Department. In 1990, he moved to the Naval Postgraduate School (NPS), progressing to full Professor and Chair of the Mechanical Engineering Department in 2000. In 2003, he went to Southern Illinois University as Professor and Chair of the Mechanical Engineering and Energy Processes Department. In 2005, he returned to NPS as Professor and was elevated to Distinguished Professor in 2010, his current position. His areas of research interest have been in multiscale and multidisciplinary problems with applications to fluid structure interaction, mechanics of metallic and composite materials and structures, nanotechnology, biomechanics and ship survivability.

While working at the University of Missouri-Rolla, Dr. Kwon received the Cedric K. Ferguson Medal from the Society of Petroleum Engineers in 1989. Upon arriving at NPS, Dr. Kwon quickly earned his reputation as a prolific researcher in conducting multiscale and multiphysics problems. He received a Certificate of Recognition for Outstanding Research in 1992, and in 1995 was awarded the prestigious Menneken Award for Excellence in Scientific Research by a junior NPS faculty member. He also received the Excellence in Research Award from American Orthopaedic Society of Sports Medicine in 1997. Dr. Kwon has contributed to more than 300 technical publications, which include patents, encyclopedia entries, book chapters, journal and conference papers. He authored two books: "Finite Element Method Using MATLAB" (translated into Greek) and "Multiphysics and Multiscale Modeling: Techniques and Applications" (the first book to be published on this topic). In recognition of his expertise in multiscale and multiphysics problems, Dr. Kwon has been invited to deliver keynote lectures in Europe, Asia and the United States. Additionally, he has served on the editorial boards and organizing committees for several international technical conferences and as a reviewer for more than 20 technical journals. He was recently awarded the 2017 Menneken Award for Significant and Sustained Contributions by a senior faculty member.

In addition to his research contributions, Dr. Kwon has been a highly effective and respected educator. He was first recognized in 1993 with a Certificate of Recognition for Outstanding Instruction and is a five-time recipient of a Commendation for Excellence in Teaching, ranked

in the top 5% of NPS faculty by student polling. Dr. Kwon has supervised more than 100 graduate students. One of his students received the first prize award in the Student Paper Competition at the 2008 ASME Pressure Vessels & Piping Conference.

Dr. Kwon has a long and dedicated record of service to the ASME Pressure Vessels and Piping Division. He was first involved in the PVP Division in the early 1990s, predominantly with the Fluid Structure Interaction Technical Committee; first as a member, then as Secretary (1994-98) and later as Chair (1998-2002). In 2003, he became Chair of the PVPD Membership Committee and, in 2005, he joined the PVPD Executive Committee as the Communication Chair. He was Technical Program Chair of the 2009 ASME PVP Conference in Prague, Czech Republic, and Conference Chair of the 2010 ASME PVP Conference in Bellevue, Washington, USA. Upon completion of the 2010 PVP Conference, he assumed the Chair of the PVP Division. In 2011 he was inducted into the PVP Senate as Vice President/Historian and was Senate President from 2012-2014.

Dr. Kwon has also played an important role as Editor-in-Chief of the ASME Journal of Pressure Vessel Technology, which he has served since 2013. He was an Associate Editor from 1996-2002 and 2011-2012 and was the Guest Editor for a Special Issue on Fluid-Solid Interaction Problems in November 2001. Dr. Kwon is a fellow of ASME, and has received the ASME Dedicated Service Award as well as the ASME Board of Governors Award.

Tutorials

Tutorials offer both the experienced and early-career engineers excellent opportunities to refresh their knowledge and to venture into specific technical areas outside their expertise. Admission to the tutorials is free for Conference Registrants.

Special Tutorials and Presentations: These are one-hour or two-hour conference sessions, held on Sunday afternoon. The session leaders will make available the necessary presentation materials.

Technical Tutorials: These tutorials are two to four hours in length. Technical Tutorials fill two consecutive conference session blocks, and are integrated into the conference session schedule. The Technical Tutorial notes will be available in either printed or electronic format.

Each attendee will receive a Certificate of Attendance, as proof of his or her participation in the Special Tutorial or the Technical Tutorial.

The PVP Division will not assign Continuing Education Units (CEUs) on these certificates. However, attendees may negotiate CEU credits with their respective licensing boards.

An outline of the tutorial sessions for the 2019 PVP Conference is presented in the following pages.

Special Tutorial

Navigating Corporate Culture for Professional Advancement

Ike Ezekoye, Ph.D., PE
Sunday, July 14, 1:30 pm – 3:00 pm
Rio Grande W.

The world is a very competitive environment no matter what you do. This is particularly true with regard to employment and professional advancement. Many decisions that affect you are made by your management without your knowledge, for example, who gets what job, who leads what project, who is promoted, who is fired, etc. Additionally, decisions about what happens to you are based on how you are perceived in the organization for which you work. Many engineers (early and mid-career) sometimes feel that they are not going anywhere professionally. Their capabilities and contributions are often not recognized nor adequately compensated. Some, occasionally, wonder whether they are in the right place. Perhaps the grass is greener somewhere else. This tutorial explores the personal and corporate roadblocks that can limit professional advancement of engineers in their chosen fields. It covers the art of belonging and of selling your capabilities to your supervisor or manager. The tutorial will also cover corporate mentoring and other areas such as participation in Codes and Standards like the ASME Boiler and Pressure Vessel Code development and associated technical divisions of the ASME.

Special Presentation for Early Career Engineers

Work Place Habits and Behavior

Artin Dermenjian, AAD Independent Operations (PVPD Senator)
Sunday, July 14, 3:00 pm – 3:45 pm
Rio Grande W.

This presentation will provide a quick look at some of the "Work-Related Actions" that may or may not influence your career. This presentation will also help early career engineers understand how involvement in ASME will facilitate their networking and identify paths for future leadership opportunities.

Technical Tutorials

An Overview of the Proposed Updates to the 2020 Edition of API 579-1/ASME FFS-1, Fitness-For-Service

Phillip E. Prueter, PE and David A. Osage, PE
E2G – The Equity Engineering Group, Inc.
Part 1: Monday, July 15, 2:15 pm – 4:00 pm
Part 2: Monday, July 15, 4:15 pm – 6:00 pm
Rio Grande W.

This tutorial is intended to offer an overview of the proposed updates and enhancements to the 2020 Edition of API 579-1/ASME FFS-1, Fitness-For-Service. Planned major updates to this new edition of the document include a rewrite of Part 3, Assessment of Existing Equipment for Brittle Fracture Screening, where recommended Level 1 and Level 2 procedures are provided, and impact test exemption curves are generated for as-welded and post-weld heat-treated (PWHT) components based on modern fracture mechanics principles and the Fracture Toughness Master Curve. Furthermore, suggested temperature reduction curves that are provided as a function of stress ratio and thickness limits for Level 1 and Level 2 assessment approaches are explained. These updated screening rules are consistent with the elastic-plastic fracture mechanics methods outlined in Part 9, Assessment of Crack-like Flaws. Supplemental guidance for Minimum Pressurization Temperature (MPT) assessments of heavy-walled reactors operating in high-pressure hydrogen environments is also summarized. Several practical examples that utilize the updated guidance in Part 14, Assessment of Fatigue Damage, (that first appeared in the 2016 Edition of the document) are given. Additionally, an overview of the framework for proposed Part 15 that provides guidance for evaluating components susceptible to high-temperature hydrogen attack (HTHA) damage is provided. Lastly, a summary of the proposed Part 16 that is intended to provide a comprehensive piping vibration screening criterion is offered. The technical justification and background information supporting these proposed major updates and other changes throughout the document will be discussed, and example problems will be presented in the tutorial to highlight these innovative technology developments. Attendees of this tutorial will gain an understanding of how API 579-1/ASME FFS-1 is structured, what industry initiatives are underway to generate new technology, and how to effectively apply the updated assessment procedures that will be incorporated in the upcoming 2020 Edition of API 579-1/ASME FFS-1, Fitness-For-Service.

Construction of Pressure Vessels to ASME Section VIII, Division 3

J. Robert (Bob) Sims
Part 1: Tuesday, July 16, 8:15 am – 10:00 am
Part 2: Tuesday, July 16, 10:15 am – 12:00 pm
Rio Grande W.

The ASME Boiler and Pressure Vessel Code, Section VIII Division 3 was first published in 1997and has been regularly updated since that time. Although the rules were initially developed for vessels with design pressures of 70 MPa (10,000 psi) or higher, Division 3 can be used for any design pressure. Applications of Division 3 have grown steadily since publication, and include:

- Hot and cold isostatic pressing
- Quartz crystal growing
- Food processing at pressures up to 660 MPa (96,000 psi)
- High-pressure equipment for oil and gas drilling and production
- Hydrogen and natural gas transport and storage
- Polyethylene production

This tutorial covers requirements for materials, design, fabrication, examination and testing, with special emphasis on methods of elastic-plastic analysis, methods for calculation of residual stresses due to autofrettage, methods for fracture mechanics analysis to determine the design fatigue life and fracture toughness testing requirements, including in high-pressure hydrogen environments. Composite (fiber-wrapped) vessels and impulse-loaded vessels for containing explosions are also covered.

Bolted Joint Design, Analysis, and Code Compliance

Sayed Nassar, Oakland University
Warren Brown, Integrity Engineering Solutions Pty. Ltd.
Part 1: Tuesday, July 16, 2:15 pm – 4:00 pm
Part 2: Tuesday, July 16, 4:15 pm – 6:00 pm
Rio Grande W.

This tutorial provides the design engineer with the necessary background for the design, analysis, assembly, and ASME Code compliance of bolted joint systems. The first half of the tutorial reviews and examines the basic principles of bolted joint systems used in structural, mechanical or pressure boundary applications. This part will emphasize a systems approach to the design, analysis and assembly of bolted joint systems. Topics include torque-tension relationship, role of friction and tightening strategies including torque-only control, torque-turn, torque-to-yield and other direct control methods. The design principles examined will include joint loading during assembly (including selection of bolt preload and elastic interaction) and subsequent joint behavior under service loads (fatigue, vibration loosening and corrosion). The second half of the tutorial will examine how pressure boundary bolted joints are addressed in ASME codes. The purpose and background of each of the different standards will be examined. Some comparison with other methods, such as CEN, will be given.

The material presented will cover design aspects of the code, focusing on post-construction operation. Particular emphasis will be placed on the new guidance and calculations provided in ASME PCC-1-2010 and the upcoming changes in ASME PCC-1-2013. The focus of the second half of the tutorial will be on practical application with examples of the methods available within ASME for addressing new designs and problematic pressure boundary bolted joints.

Additive Manufacturing – Overview of Processes, Qualification, Testing and Future Prospects

Paul Korinko, PhD, Savannah River National Laboratory
Part 1: Wednesday, July 17, 8:15 am – 10:00 am
Part 2: Wednesday, July 17, 10:15 am – 12:00 pm
Rio Grande W.

This tutorial will provide an overview of the Additive Manufacturing (AM) processes for metals. The history of AM from rapid prototyping to the state of the art will be covered. The different systems, heat sources, and benefits will be discussed. The starting materials and their characterization will be described with an emphasis on evaluating the critical aspects for each. The characterization tools for AM manufactured materials will also be described and discussed. The degrees of freedom for design and complexity will also be examined. Finally, some case studies will be presented and discussed.

Flow-Induced Vibration

Benjamin A. White, PE, Southwest Research Institute
Wednesday, July 17, 2:15 pm – 4:00 pm
Rio Grande W.

Flow-induced vibrations (FIV) account for the majority of noise and vibration problems in piping systems that are not machinery related. For most piping geometries, FIV is analyzed and prevented in the design phase. For some flow disturbances however, such as valves or certain types of heat exchanger tubes, FIV is analyzed on-site after a problem occurs. Many different methodologies exist for evaluating and eliminating flow-induced problems, but these can quickly result in over-designing a piping system. This tutorial will cover the following topics:

- Piping geometries and disturbances that are common sources of FIV: closed stubs, thermowells, gate and flow control valve internals, HRSGs/coolers
- When to evaluate FIV in the design stage and when to use it as a problem solving technique
- A variety of case studies showing noise, vibrations and valve chatter from FIV excitation with field data and solutions

Technology Demonstration Forum

Monday, July 15, 8:15 am – 6:00 pm;
Tuesday, July 16, 8:15 am – 6:00 pm;
Wednesday, July 17, 8:15 am – 12:00 pm
Regency Ballroom E & Foyer

The Technology Demonstration Forum will be held from Monday, July 15th to Wednesday, July 17th. Vendors and Sponsors will present and discuss their capabilities, equipment and services in the Regency Ballroom E & Foyer.

EPRI Expert Workshop on Structural Integrity of Components in High Temperature Applications

Thursday, July 18, 8:15 am – 6:00 pm
Friday, July 19, 8:15 am – 12:00 pm
Rio Grande W.

EPRI has been providing technical support to key global stakeholders in the Electricity Supply Industry for more than 40 years. In the Generation Sector, a key research imperative is knowledge creation and technology transfer linked to reliable, safe and economically flexible operation of power plants. EPRI collaboration has included contributions to development of databases containing key properties for high temperature alloys, contributions to methods of Design and Fabrication as well as compiling case studies of in-service issues and facilitating root cause assessment.

Technology transfer has been an important aspect of this work so that lessons learned can be used to establish best practice. These activities have included annual workshops, publication of summary documents and additional research. Excellence in science and engineering is necessary to underpin technology, which will help meet challenges associated with safe and reliable operation of plants.

Prevention of catastrophic structural failure requires the application of an integrated approach, which includes informed engineering analysis, quality assurance, plant monitoring and in-service inspection. In many applications, the challenge is to establish the correct balance between the different factors to ensure safety and still derive value for the invested resource. Applying published rules for making structural integrity assessments through application of published and/or recognized fitness for service approaches still necessitates the use of expert technical judgement. The current Workshop will provide an inclusive forum for consideration of all fitness for service issues relating to the evaluation of performance of components operating at high temperatures.

Workshop Technical Areas
This Workshop will be held over a day and a half from Thursday morning to mid-day on Friday. The technical sessions will involve presentations and discussion of the following topics:

- Component Design and Fabrication
- Materials Properties, covering both strength and ductility of steels
- High Temperature Crack Growth
- Fracture Toughness
- Aging Effects and Embrittlement
- Structural Integrity Methods and Applications
- Illustration through consideration of case studies

Each technical session will be led by a designated expert. Following the success of the Workshop at the 2018 PVP Conference, each session will provide for appropriate periods of discussion so that all delegates have the opportunity to raise questions / issues.

International Collaboration
The success of EPRI events is, in part, a consequence of the fact that delegates provide input, which is representative of stakeholders involved in engineering decisions linked to the design, fabrication and use of high energy components and systems. Participants from suppliers, designers, research organizations and service providers, as well as end users and individuals from all parts of the world, are welcome to join us and to participate in the Workshop.

Code Users Event

ASME Code Users will gather this year for the first time during a PVP conference to discuss common interest on Code-related research and applications activities. A one-day program full of various activities is planned on Monday, July 15. Interested individuals are welcome to participate at this event. The program is as follows:

Sunday, July 14	
4:15 pm – 5:30 pm	Joint Welcome Reception with Early Career Engineers, Students and Code Users (Rio Grande W)
Monday, July 15	
7:15 am – 8:00 am	Breakfast (Regency Ballroom)
8:15 am – 10:00 am	Social Breakfast and Welcome (Rio Grande Ctr.)
10:15 am – 12:00 pm	General Conference Plenary Session (Regency Ballroom)
12:15 pm – 2:00 pm	Social Lunch with Invited Code volunteers attending PVP (Navaro)
2:15 pm – 4:00 pm	Panel Session: Standards & Certification Activites, PVP and Standards & Certification – past and present/future (Navaro)
4:15 pm – 6:00 pm	Q&A Session – Code Certificate Holder Feedback (Navaro)
7:00pm - 9:00pm	Conference Opening Reception (Regency Ballroom and Hall Foyer)

Networking Reception

Tuesday, July 16, 5:30 pm – 7:00 pm
Navaro

This year, the PVP Division is organizing a Networking Reception from 5:30 to 7:00 pm on Tuesday, July 16. This event brings together industry and academia to discuss possible future collaboration on potential projects. Snacks and a cash bar will be served.

Technical Tour

BakerRisk's Wilfred E. Baker Test Facility: State of the Art Industrial Hazards Testing

Friday, July 19, 8:30 am – 1:15 pm
BakerRisk WEB Test Facility, La Vernia, Texas

Baker Engineering and Risk Consultants, Inc. (BakerRisk®) invites attendees of the ASME Pressure Vessels and Piping (PVP) Conference to join a Special Presentation and participate in a technical site tour to learn about BakerRisk's state-of-the-art Wilfred E. Baker (WEB) Test Facility. BakerRisk developed the WEB test facility to provide the most advanced technologies for conducting experimental testing and R&D of various industrial hazards.

A Special Presentation during the PVP Conference on Tuesday July 16th at 8:15 am in Navaro at the Hotel Conference center will introduce attendees to the BakerRisk WEB Test Facility and our testing capabilities. This session is open to all ASME PVP Conference attendees. The technical tour of the facility will be hosted by BakerRisk on Friday July 19th for 50 guests. Please refer to the ASME PVP website to register for the tour in advance. Registration will also be available at the Conference if there are any remaining tickets.

Social Programs and Tours

Reception for Early Career Engineers, Students and Code Users

Sunday, July 14, 4:15 pm – 5:30 pm
Rio Grande W.

A special combined reception will be held on Sunday, July 14 for early career engineers (ten years or less from time of graduation), students and Code Users. This event is an opportunity for early career engineers and students to meet the PVP Division Leadership Team and Code Users to learn how to get more involved in activities of the PVP Conference and other parts of ASME. It is also an event to show our appreciation to the ASME Code Users and Certificate Holders. The PVP Division Leadership Team will be pleased to answer any questions you may have regarding the Conference, and provide guidance on how to navigate through the Conference Program during the week. All early career engineers, students and Code Users are welcome and encouraged to attend this event.

Conference-Wide Reception

Monday, July 15, 7:00 pm – 9:00 pm
Regency Ballroom and Hall Foyer

All registered attendees and their guests are invited to attend the Conference Wide Reception. Meet with your colleagues, many of whom you may not have seen for a while. Join with the registrants and guests for a relaxing evening. We will have displays of student paper posters at the Reception in Regency Ballroom and Hall Foyer. All student authors who participate in the 27th Rudy Scavuzzo Student Paper Symposium and Competition are invited to present their posters.

No charge for registered conference participants and guests.

Tour 1: Mission San Jose

Monday, July 15, 10:00 am – 2:30 pm (lunch on your own)
Departure at front lobby

Guests will start their day with a guided tour of the UNESCO World Heritage Missions on the southern reach of the Riverwalk, Mission San Jose. Known as the "Queen of the Missions," this is the largest of the missions and was almost fully restored to its original design in the 1930s by the WPA (Works Projects Administration). Spanish missions were not churches, but communities with the church as the focus. Mission San José captures a transitional moment in history, frozen in time.

10:00 am – Departure for Mission San Jose
10:15 am -11:15 am – Private Tour of Mission San Jose
11:30 am – Arrive at The Pearl for Lunch and Leisure (on your own)
2:30 pm – Return to the Hyatt Regency San Antonio Riverwalk

Registration: $40 USD per person. Register online at https://event.asme.org/PVP/Registration

Tour 2: River Barge Tour & Lunch

Tuesday, July 16, 9:00 am – 2:00 pm
Departure at front lobby

All aboard! Guests will hop aboard San Antonio' s famous river barges. Guests will be wined and dined as they cruise down the San Antonio River. We invite you to relax and take in the picturesque surroundings while learning about San Antonio River Walk culture and history. Lunch will feature one of the largest and most innovative contemporary Mexican restaurants and bars on the River Walk, Ácenar. Guests will enjoy a modern take on Texas regional Mexican dishes inspired by the history and heritage of these two cultures.

10:00 am – Depart Hyatt Riverwalk
11:30 am - 12:30 pm – Private River Barge Tour & Lunch
12:30 pm - 1:30 pm – Leisure Time at Riverwalk
2:00 pm – Return to Hyatt Regency San Antonio Riverwalk

Registration: $92 per person, ($15.00 for Children under 12).
Register online at https://event.asme.org/PVP/Registration

Conference Information

Technical Sessions and Programs
All technical sessions will be held in the meeting areas on the Ballroom Level (2nd floor) and Hill County Level (3rd floor) of the Hyatt Regency San Antonio Riverwalk Hotel and its Losaya Conference Center across the street. Each room will be equipped with an LCD projector that can be connected to a personal computer for electronic presentations (e.g., Microsoft PowerPoint). Please note that ASME will not provide personal computers. Personal computers are the responsibility of the session developer or presenter. It is strongly recommended that authors provide their presentation materials to the session developer at or before the Authors' Breakfast, so that all the papers in a session can be loaded onto a single computer. Authors are recommended to have their presentations on a USB flash (pen) drive, in the event that compatibility problems occur between their computers and the LCD projector.

The location of the session rooms is shown in the hotel floor plan on the Sessions-At-A-Glance sheet that is provided with the registration package.

Rudy Scavuzzo Student Paper Symposium and 27th Annual Student Paper Competition

Monday, July 15	**8:15 am – 10:00 am**
	2:15 pm – 4:00 pm
	4:15 pm – 6:00 pm
Tuesday, July 16	**8:15 am – 10:00 am**
	10:15 am – 12:00 pm
	2:15 pm – 4:00 pm

Bowie A

The 2019 Rudy Scavuzzo Student Paper Symposium and 27th Annual Student Paper Competition is sponsored by the PVPD Senate. Douglas A. Scarth, Chair of the PVP Senate Operations Committee, and Maher Y. A. Younan, Vice Chair, will conduct the sessions, together with the Student Symposium and Competition representatives from the PVP Technical Committees. The Review Committee will identify the outstanding finalist undergraduate and graduate student papers in two categories: the BS/MS level and the PhD level. Finalist papers will be judged on written technical content (70%) and presentation effectiveness (30%). In each category (i.e., BS/MS and PhD), $1,200 will be awarded to the presenting author of the Outstanding Student Paper; $1,000 will be awarded to the presenting author of the First Runner-Up Student Paper, and $800 will be awarded to the presenting author of the Second Runner-Up Student Paper. Students must attend the Conference and must present their papers to be eligible for an award. The winners will be announced at the Honors and Awards Gala and Dinner. A special orientation session is scheduled on Sunday 14th, from 3:45 pm to 4:15 pm at Rio Grande W. for all students taking part in the completion.

Technical Committee Meetings

Tuesday, July 16	**12:15 pm – 2:15 pm**
Wednesday, July 17	**12:15 pm – 2:15 pm**

The Pressure Vessels & Piping Division Technical Committees will meet during the noon breaks on Tuesday, July 16, and Wednesday, July 17. Visitors are encouraged to attend and take an active part in PVP committee activities. All committee meetings, schedules and rooms are listed under PVP 2019 Committee Meetings.

PVP Division Honors and Awards Gala and Dinner

Wednesday, July 17 **5:00 pm – 10:00 pm**
Regency Ballroom

The Honors and Awards Gala, honoring all Division Award Recipients and the 2019 ASME S.Y. Zamrik PVP Medalist, Young W. Kwon, will be held on Wednesday, July 17, from 5:00 pm until 10:00 pm in the Regency Ballroom. Entertainment will be provided throughout the evening. One ticket is included in the full Conference registration fee. Additional tickets may be purchased at the Conference Registration desk.

Authors' Breakfast/Briefing

Monday, July 15 – Thursday, July 18
7:15 am – 8:00 am
Regency Ballroom W. & Ctr.

Authors, Panelists, Session Developers, and Chairs and Co-Chairs are required to attend a breakfast briefing in the Regency Ballroom W. & Ctr. on Monday through Thursday, at 7:15 am on the morning of their sessions. Session protocol will be discussed, and the participants will have the opportunity to become better acquainted with one another before their scheduled sessions. Authors are encouraged to place all the presentation files for their session on a single computer either before or at the Authors' Breakfast.

Registration Hours
Los Rios Foyer

Located on the Ballroom level, the ASME Registration Desk is at Los Rio Foyer and will be open during the following hours, to provide advance registrants with their materials, to process on-site registrations, and to provide additional Conference information:

Sunday, July 14	**8:00 am – 6:00 pm**
Monday, July 15	**7:30 am – 4:00 pm**
Tuesday, July 16	**7:30 am – 4:00 pm**
Wednesday, July 17	**7:30 am – 3:00 pm**
Thursday, July 18	**7:30 am – 3:00 pm**

On-Site Registration Fees

For those not registered in advance, the On-Site Registration Fees (USD) are as follows:

	Full Registration*	One Day Registration**
ASME Member	$ 1,050	$ 750
Author/Panelist	$ 1,050	$ 870
Session Chair	$ 1,050	$ 870
Session Co-Chair	$ 1,050	$ 870
Coop. Soc. Member***	$ 1,050	$ 870
Non-Member****	$ 1,250	$ 870
ASME Life Member †	$ 350	$ 350
ASME Member Student (Author or Non-Author)‡	$ 350	$ 350
Student (Author) ‡	$ 350	$ 350
Student Non-Member (Author or Non-Author)‡	$ 450	$ 450
Guest/Spouse ‡‡	N/C	N/C
EPRI Workshop Only	$ 375	-
Full Conference Registration EPRI Workshop Add-on	$ 100	-
Extra Ticket Awards Dinner (Wednesday Night)	$ 75	-

* Full Registration fees include admission to all technical sessions, coffee breaks, Conference-Wide Reception, one (1) ticket for the Honors and Awards Gala and Dinner, and online access to the Conference Technical Papers.
** One Day Registration fees include admission to all technical sessions, and coffee breaks for one day.
*** To qualify for discounted registration fees, you must be a member of ASME, or one of the Cooperating Societies. Please fill in your society affiliation and membership number on the registration form.
**** Anyone paying the non-member fee is eligible to receive one year's membership to ASME as part of their registration fee.
† Registration under this category includes admission to all technical sessions, coffee breaks, Conference-Wide Reception, one (1) ticket for the Honors and Awards Gala and Dinner, and online access to the Conference Technical Papers.
‡ Student Registration Fees include admission to all technical sessions, coffee breaks, Conference-Wide Reception, and online access to the Conference Technical Papers. Students not in the Student Paper Competition and Symposium will be required to purchase a ticket to attend the Honors and Awards Gala and Dinner.
‡‡ Guests wishing to attend the Honors and Awards Gala and Dinner will be required to purchase a ticket.

Cooperating Societies

If you are a member of a Cooperating Society, you may register at the ASME member rate.

CrowdCompass App

The CrowdCompass app will be the digital hub for PVP-2019. It will allow you to access technical papers and explore the conference program. To download the app, access the App Store on iOS devices and the Play Store on Android. If you are using a Blackberry or Windows phone, skip these steps. You will need to use the web version of the app. Install the app by searching for CrowdCompass AttendeeHub. Once you have found the app, tap either Download or Install. After installing, a new icon will appear on the home screen. Once downloaded, open the AttendeeHub app, then search and tap "ASMEPVP2019" to access the Conference information and activate usage.

Conference Publications

Information on paper titles and authors are included in the Final Program. All attendees registered for the entire Conference (i.e., Full Registration) will receive online access to the Conference Technical Papers presented at the Conference. If you pre-register to the Conference

prior to July 14, 2019 you will be able to download the Conference proceedings online at the link that will be sent to you by email. As CD-ROMs will be available upon request for delivery post conference, it is recommended to download the batch file before coming to the conference.

A Download Station will be available at the Registration Desk for Conference Registrants who wish to copy the Conference Technical Papers to a digital device. It is recommended that attendees supply their own USB memory stick (4GB). The Conference Organizers ask Conference Registrants to be mindful of their time using the Download Station so that other users can access this service in a timely manner.

Papers presented at the Conference will be available post-conference in printed bound volumes of the Official Conference Proceedings. Printed proceedings can be ordered through ASME Customer Service approximately three to four months after the Conference. A complete set of the volumes may be purchased as a package at a 10% discount. The Official Conference Proceedings will also be published post-conference as part of the ASME Digital Collection at http://asmedigitalcollection.asme.org. All ASME Conference Proceedings are submitted to be indexed in Scopus, Compendex, ISI Conference Proceedings Citations Index, and in multiple other indexing publishers.

Disabled Registrants

Whenever possible, arrangements can be made for disabled registrants, if advance notice is given. Please indicate any special needs on the registration form, or contact Sendy Ontiveros at ontiveross@asme.org to process your request.

Tax Deductibility

Expenses of attending professional meetings have been held to be tax deductible as ordinary business expenses for U.S. citizens. Please verify the tax regulations in your country to determine whether Conference expenses are tax deductible.

Guest/Family Programs

Guests and family members of registrants are welcome to the Guest Programs that include the Mission San Jose tour (Monday), the Conference Wide Reception in the Regency Ballroom and Hall Foyer of the Hyatt Regency San Antonio Riverwalk (Monday evening), and the River Barge Tour & Lunch (Tuesday). Tickets are required for admission to all events. Please also note that the tours have an associated fee for participants. Early registration is strongly recommended for the events that require fees, as they are available only on a first-come, first-served basis.

Breakfast for guests is served at the Garden Terrace of the Hyatt Regency San Antonio Riverwalk.

Professional Development Hours Available

Professional Development Hours are available for your attendance at the PVP Conference. Simply stop by the Registration Desk and fill out a certificate request form with the sessions that you have attended. The certificates will be sent to the email addresses specified on the forms.

Publishing Conference Papers in the ASME Journal of Pressure Vessel Technology

Technical papers presented at the ASME PVP 2019 Conference are published in the form of the ASME Conference Proceedings. Publication of papers in these proceedings does not preclude authors from publishing their papers in ASME archival journals, such as the ASME Journal of Pressure Vessel Technology (JPVT), which is the technical voice of the Pressure Vessels & Piping Division.

Authors are encouraged to submit their papers to the Journal. The Journal is edited by Dr. Young W. Kwon (contact information below), and manuscripts should be submitted to him through the URL address https://journaltool.asme.org/home/JournalDescriptions.cfm?JournalID=14&Journal=PVT. Manuscripts should be prepared according to the ASME Journals author resources, which can be found in the link https://journaltool.asme.org/home/AuthorResources.cfm

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PVP 2019 Committee Meetings

Date/Time	Meeting	Room	Responsible Person
Sunday, July 14			
8:30 am – 1:00 pm	PVP Division Leadership Team	Rio Grande Ctr	P. Mertiny
1:30 pm – 3:00 pm	PVP Division Senate Operating Committee	Rio Grande Ctr	D. Scarth
Monday, July 15			
8:15 am – 10:00 am	PVPD Professional Development	Mesquite	P. Mertiny
8:15 am – 6:00 pm	Code Certificate Holders	Rio Grande Ctr / Navaro	T. Seipp/ D. Scarth
2:15 pm – 6:00 pm	NDPD Executive Committee	Rio Grande Ctr	V. Agarwal
Tuesday, July 16			
8:15 am – 10:00 am	PVPD Communications Committee	Rio Grande Ctr	A. Duncan
10:15 am – 12:00 pm	2020 Program Committee	Rio Grande Ctr	T. Seipp
2:15 pm – 6:00 pm	BPVC VIII-3 Taskgroup on Subsea Applications	Mesquite	D. Peters/ A. Maslowski
12:15 pm – 2:00 pm	PVPD Codes and Standards Technical Committee	Rio Grande W	R. Crane
12:15 pm – 2:00 pm	PVPD Fluid-Structure Interaction Technical Committee	Mesquite	T. Taniguchi
12:15 pm – 2:00 pm	PVPD Operations, Applications and Components Technical Committee	Directors	G. Bezdikian
12:15 pm – 2:00 pm	PVPD Design and Analysis Technical Committee	Rio Grande Ctr	R. Baliga
2:15 pm – 4:00 pm	PVPD International Coordination Committee	Rio Grande Ctr	X.-K. Zhu
4:15 pm – 6:00 pm	PVPD Honors and Awards Committee	Rio Grande Ctr	C. Rodery
Wednesday, July 17			
8:15 am – 10:00 am	Student Paper Competition Judging	Rio Grande Ctr	D. Scarth
10:15 am – 12:00 pm	JPVT Editors	Rio Grande Ctr	Y. Kwon
12:15 pm – 2:00 pm	PVPD Materials and Fabrication Technical Committee	Rio Grande W	M. Brongers
12:15 pm – 2:00 pm	PVPD Seismic Engineering Technical Committee	Directors	F. Paolacci
12:15 pm – 2:00 pm	PVPD High Pressure Technology Technical Committee	Mesquite	K. Simpson
12:15 pm – 2:00 pm	PVPD Computer Technology and Bolted Joints Technical Committee	Rio Grande Ctr	J. Waterland
2:15 pm – 4:00 pm	PVPD Early Career Engineers Committee	Rio Grande Ctr	K. Karpanan
Thursday, July 18			
8:15 am – 12:00 pm	PVP Division Leadership Team	Rio Grande Ctr	H. Bouzid
8:15 am – 6:00 pm	BPVC VIII-3 Subgroup on High Pressure Vessels	Mesquite	D. Peters/ A. Maslowski
12:15 pm – 4:00 pm	PVPD General Committee	Rio Grande Ctr	H. Bouzid
4:15 pm – 6:00 pm	PVPD Conference Evaluation	Rio Grande Ctr	M. Feldman
Friday, July 19			
7:45 am – 12:30 pm	PVP Division Leadership Engagement Forum	Rio Grande Ctr	P. Mertiny
8:30 am – 5:00 pm	Study Group on Materials Testing and Qualification for Hydrogen Service	Rio Grande E	C. San Marchi

CALL FOR PAPERS

2020 ASME Pressure Vessels & Piping Conference
Abstracts Due — November 5, 2019

A MODEL OF COLLABORATION: INDUSTRY, ACADEMIA & GOVERNMENT/REGULATORY

Join us in beautiful Minneapolis, Minnesota, for the 2020 ASME Pressure Vessels & Piping Conference. This year we will celebrate and demonstrate the technical collaboration between Industry, Academia and Government/Regulatory Authorities in the global Pressure Vessels & Piping community. The PVP Conference is the ideal platform for keeping up with new technologies, networking and interacting with experts, practitioners and your peers in the Pressure Vessels and Piping area. The PVP Conference is a recognized international forum with participants from more than 40 countries in Europe, Africa, the Middle East, Asia, the Americas and the Oceania islands. The ASME Pressure Vessels & Piping Division sponsors the PVP2020 Conference with participation by the ASME NDPD Division.

PAPER & PANEL SESSIONS

More than 180 paper and panel sessions are planned, including tutorials and workshops, a Technical Demonstration Forum and Exhibition, and the 28th Rudy Scavuzzo Student Paper Symposium and Competition.

General topics will include:

- Codes & Standards
- Computer Technology & Bolted Joints
- Design & Analysis
- Fluid Structure Interaction
- High Pressure Technology
- Materials & Fabrication
- Operations, Applications & Components
- Seismic Engineering
- Non-Destructive Examination
- 27th Rudy Scavuzzo Student Paper Symposium & Competition

Technical areas will also include developments in design methodologies including elastic-plastic analysis, non-destructive examination, fitness-for-service, operation & maintenance, creep, fatigue, stress corrosion cracking, residual stresses, fracture toughness, elevated temperature components, non-metallic components, dynamically loaded structures, flow-induced vibration and risk-based assessments.

SCHEDULE FOR SUBMISSION*

• **November 5, 2019**	**Abstracts are due**
• November 25, 2019	Abstract acceptance notification
• January 20, 2020	Draft papers due
• February 24, 2020	Peer review comments returned to authors
• March 23, 2020	Copyright Agreement Form due (for each paper)
• March 30, 2020	Final manuscripts* due for publication

** All final manuscripts must be submitted in the standard ASMA format for publication. All presented technical papers will be published as citable documents available post-conference.*

FOR MORE INFORMATION

Please visit the 2020 PVP Conference website at http://www.asmeconferences.org/PVP2020/ for additional information. Technical paper abstracts must be submitted electronically via the website.

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ASME SETTING THE STANDARD

Session Titles by Session Blocks

Sessions are arranged in Session Blocks in the format X.YZ(....), where: X indicates the Day number, Y indicates the Session Block number, and Z indicates the Conference Session Room letter. The parenthetical designations are the Technical Committee session references.

Day numbers are as follows:

0	Sunday
1	Monday
2	Tuesday
3	Wednesday
4	Thursday
5	Friday

Session Block numbers are as follows:

1	from 8:15 am to 10:00 am
2	from 10:15 am to 12:00 pm
3	from 2:15 pm to 4:00 pm
4	from 4:15 pm to 6:00 pm

Conference Session Rooms are as follows:

A	Bowie C (Losaya Conference Center)
B	Maverick B (Losaya Conference Center)
C	Maverick A (Losaya Conference Center)
D	Seguin (Losaya Conference Center)
E	Bowie A (Losaya Conference Center)
F	Bowie B (Losaya Conference Center)
G	Rio Grande E (Ballroom Level - 2nd floor)
H	Llano (Hill County Level - 3rd floor)
I	Live Oak (Hill County Level - 3rd floor)
J	Blanco (Hill County Level - 3rd floor)
K	Nueces (Hill County Level - 3rd floor)
L	Pecan (Hill County Level - 3rd floor)
M	Pecos (Hill County Level - 3rd floor)
N	Frio (Hill County Level - 3rd floor)
O	Navaro (Losaya Conference Center)
Q	Rio Grande W (Ballroom Level - 2nd floor)
R	Regency Ballroom W & Ctr. (Ballroom Level - 2nd floor)
S	Regency Ballroom E & Foyer (Ballroom Level - 2nd floor)

Acronyms used for the Technical Committees and sponsoring organizations are shown below:

CS	Codes & Standards
CT	Computer Technology & Bolted Joints
DA	Design & Analysis
FSI	Fluid-Structure Interaction
HPT	High-Pressure Technology
MF	Materials & Fabrication
NDPD	ASME Nondestructive Evaluation, Diagnosis & Prognosis Divison
OAC	Operations, Applications & Components
SE	Seismic Engineering
SPC	Rudy Scavuzzo Student Paper Symposium & Student Paper Competition
EPRI	Electric Power Research Institute
TW	Technical Tutorials & Workshops
PS	Plenary session
TDF	Technical Demonstration Forum

Note: Unless specifically listed in the individual sessions below, all sessions are sponsored by the indicated Technical Committee.

Sunday, July 14 Block 0.3 1:30PM – 3:00PM

0.3Q (TW-1-1) Navigating Corporate Culture for Professional Advancement

Sunday, July 14 Block 0.4 3:00PM – 3:45PM

0.4Q (TW-1-2) Work Place Habits and Behavior

Monday, July 15 Block 1.1 8:15AM – 10:00AM

1.1A (MF-16-1) Creep and Creep-Fatigue Interaction - I
1.1B (MF-1-1) Application of Fracture Mechanics in Failure Assessment - I
1.1C (MF-6-1) Materials and Technologies for Nuclear Power Plants - I
1.1D (CS-7-1) Everett C. Rodabaugh Memorial Session on Recent Developments in ASME Codes and Standards – I
1.1E (SPC-1-1) Student Paper Competition - BS/MS - I
1.1F (SE-1-1) Earthquake Resistance and Seismic Margin - I: Rocking and Sliding during Seismic Events
1.1G (DA-10-1) Design of Bolted Joints
1.1H (CS-19-1) Integrity of Cast Stainless Steel Pipe
1.1I (MF-4-1) European Programs in Structural Integrity - I
1.1J (HPT-6-1) Computational Methods and Validation in High Pressure and High Temperature Applications
1.1K (OAC-1-1) Safety, Reliability and Risk Management of Tank Farms and Storage Facilities
1.1L (FSI-2-1) Samir Ziada Memorial Session on Flow-Excited Acoustics and Flow-Induced Vibrations
1.1M (DA-19-1) Special Considerations in the Design and Analysis of Supports, Restraints, and Welded Attachments
1.1N (DA-20-1) Additive Manufacturing and Rapid Reuse
1.1S (TDF-1-1) Technology Demonstration Forum - I

Monday, July 15 Block 1.2 10:15AM – 12:00PM

1.2R (PS-1-2) Opening Ceremony and Plenary Lectures
1.2S (TDF-1-2) Technology Demonstration Forum - II

Monday, July 15 Block 1.3 2:15AM – 4:00PM

1.3A (MF-16-2) Creep and Creep-Fatigue Interaction - II
1.3B (MF-1-2) Application of Fracture Mechanics in Failure Assessment - II
1.3C (MF-6-2) Materials and Technologies for Nuclear Power Plants - II
1.3D (CS-7-2) Recent Developments in ASME Codes and Standards - II
1.3E (SPC-1-2) Student Paper Competition - BS/MS - II
1.3F (SE-1-2) Earthquake Resistance and Seismic Margin - II: Earthquake Resistance for Various Seismic Responses
1.3G (DA-10-4) International Liaison Session on Bolted Joint Design and Assembly - I
1.3H (CS-37-1) Improvement of Flaw Characterization Rules for FFS - I
1.3I (MF-4-2) European Programs in Structural Integrity - II
1.3J (HPT-6-2) Design Margins Determination Methods for HPHT Applications
1.3K (OAC-1-2) Safety, Reliability and Risk Management of Process and Power Systems
1.3L (FSI-2-2) Piping Vibration and Acoustics
1.3M (CT-8-1) New and Emerging Methods of Analysis and Applications - I
1.3N (DA-1-1) Design of Pressure Vessels, Heat Exchangers, and Components - I
1.3Q (TW-2-1) An Overview of the Proposed Updates to the 2020 Edition of API 579-1/ASME FFS-1, Fitness-For-Service - Part 1
1.3S (TDF-1-3) Technology Demonstration Forum - III

Monday, July 15 Block 1.4 4:15AM – 6:00PM

1.4A (MF-16-3) Creep and Creep-Fatigue Interaction - III
1.4B (MF-1-3) Application of Fracture Mechanics in Failure Assessment - III
1.4C (MF-6-3) Materials and Technologies for Nuclear Power Plants - III
1.4D (CS-7-3) ASME PCC-2
1.4E (SPC-1-3) Student Paper Competition - PhD - I
1.4F (SE-2-1) Seismic Isolation
1.4G (DA-10-5) International Liaison Session on Bolted Joint Design and Assembly - II
1.4H (CS-37-2) Improvement of Flaw Characterization Rules for FFS - II
1.4I (MF-4-3) European Programs in Structural Integrity - III
1.4J (HPT-6-5) HPHT Equipment Design for Oil and Gas Applications
1.4K (OAC-2-1) Non-Destructive Testing and Evaluation
1.4L (FSI-2-3) Turbulence-Induced Excitation Forces and Vibrations
1.4M (CT-8-2) New and Emerging Methods of Analysis and Applications - II

1.4N (DA-1-2) Design of Pressure Vessels, Heat Exchangers, and Components - II
1.4Q (TW-2-2) An Overview of the Proposed Updates to the 2020 Edition of API 579-1/ASME FFS-1, Fitness-For-Service - Part 2
1.4S (TDF-1-4) Technology Demonstration Forum - IV

Tuesday, July 16 Block 2.1 8:15AM – 10:00AM

2.1A (MF-15-1) Fatigue and Fracture of Welds and Heat Affected Zones - I
2.1B (MF-1-4) Application of Fracture Mechanics in Failure Assessment - VI
2.1C (MF-6-4) Materials and Technologies for Nuclear Power Plants - IV
2.1D (CS-11-1) Extreme Pressure Equipment - I
2.1E (SPC-1-4) Student Paper Competition - PhD - II
2.1F (SE-3-1) Vibration and Control - I
2.1G (DA-10-3) Assembly of Bolted Joints
2.1H (DA-8-3) FFS Involving Fracture Mechanics
2.1I (CS-1-1) Structural Integrity of Pressure Components - I
2.1J (HPT-6-6) HPHT Equipment Design for Subsea Oil and Gas Applications/Industry Lessons Learned
2.1K (OAC-3-1) Monitoring, Diagnostics and Inspection
2.1L (FSI-2-4) FIV in Heat Exchanger Tube Arrays - I
2.1M (NDE-1-1) Non-Destructive Evaluation (NDE) Research - I
2.1N (DA-1-5) Design of Compact Heat Exchangers for Nuclear Power Applications - I
2.1Q (TW-2-3) Construction of Pressure Vessels to ASME Section VIII, Division 3 - Part 1
2.1S (TDF-2-1) Technology Demonstration Forum - V

Tuesday, July 16 Block 2.2 10:15AM – 12:00PM

2.2A (MF-15-2) Fatigue and Fracture of Welds and Heat Affected Zones - II
2.2B (MF-1-5) Application of Fracture Mechanics in Failure Assessment - V
2.2C (MF-6-5) Materials and Technologies for Nuclear Power Plants - V
2.2D (CS-11-2) Integrity Management
2.2E (SPC-2-1) Student Paper Symposium - PhD - I
2.2F (SE-3-2) Vibration and Control - II
2.2G (CT-1-1) Design and Analysis of Bolted Flange Joints - I
2.2H (DA-8-2) FFS for High Temperature Applications
2.2I (CS-1-2) Structural Integrity of Pressure Components - II
2.2J (HPT-6-7) HPHT Equipment Design - Standards and Certification/Discussion on Application of API 17TR8
2.2K (OAC-5-1) Design, Testing, Qualification and Failure of Valves
2.2L (FSI-2-5) Axial-Flow-Induced Vibrations and Damping
2.2M (NDE-1-2) Non-Destructive Evaluation (NDE) Research - II
2.2N (DA-1-6) Design of Compact Heat Exchangers for Nuclear Power Applications - II
2.2Q (TW-2-4) Construction of Pressure Vessels to ASME Section VIII, Division 3 - Part 2
2.2S (TDF-2-2) Technology Demonstration Forum - VI

Tuesday, July 16 Block 2.3 2:15PM – 4:00PM

2.3A (CT-7-1) Computational Applications in Fatigue and Fracture Assesments
2.3B (MF-1-6) Round-Robin Analyses of Constraint Effects on Fracture Initiation Toughness f or Specimens and Surface-Cracked Pipe - I
2.3C (MF-6-6) Materials and Technologies for Nuclear Power Plants - VI
2.3D (CS-11-3) Engineering Failure Analysis
2.3E (SPC-2-2) Student Paper Symposium - PhD - II
2.3F (SE-4-1) Resilience and Metamaterials
2.3G (CT-1-2) Design and Analysis of Bolted Flange Joints - II
2.3H (DA-8-1) Joint FFS Symposium with Codes & Standards
2.3I (CS-1-3) Structural Integrity of Pressure Components - III
2.3J (HPT-4-1) Equipment for the High Pressure Polyethylene Industry
2.3K (OAC-4-1) Thermal and Structural Analysis and Testing
2.3L (FSI-2-6) Vortex-Induced Vibrations and Periodic Wake Dynamics
2.3N (DA-2-3) Design and Analysis of Piping and Piping Components: Nuclear Service
2.3Q (TW-2-5) Bolted Joint Design, Analysis, and Code Compliance - Part 1
2.3S (TDF-2-3) Technology Demonstration Forum - VII

Tuesday, July 16 Block 2.4 4:15PM – 6:00PM

2.4A (CT-7-2) Computational Applications in Elastic-Plastic Analysis and Fitness for Service Assessment

2.4B (MF-1-7) Round-Robin Analyses of Constraint ffects on Fracture Initiation Toughness for Specimens and Surface-Cracked Pipe -II
2.4C (MF-18-1) Additive Manufacturing and Materials
2.4D (CS-11-4) Extreme Pressure Equipment - II
2.4E (FSI-4-1) Transient-Dynamic Effects and Failure Modes
2.4F (SE-5-1) Structural Dynamics
2.4G (CT-3-1) Leak Tightness and Fugitive Emissions - I
2.4H (DA-8-5) FFS - General Topics
2.4I (CS-15-1) Probabilistic and Risk-Informed Methods f or Structural Integrity Assessment
2.4J (HPT-4-2) High Pressure Compressor Pulsation/ Vibration Tuning and Pressure Relieving Components
2.4K (OAC-4-2) Shipping Package Design and Radioactive Material Containment
2.4L (FSI-2-7) FIV in Heat Exchanger Tube Arrays - II
2.4M (DA-7-1) Thermal Stresses and Elevated Temperature Design
2.4N (DA-2-4) Design and Analysis of Piping and Piping Components: Branch Connection & SIFs
2.4Q (TW-2-6) Bolted Joint Design, Analysis, and Code Compliance - Part 2
2.4S (TDF-2-4) Technology Demonstration Forum - VIII

Wednesday, July 17 Block 3.1 8:15AM – 10:00AM

3.1A (CS-21-1) Fatigue Monitoring and Related Assessment Method
3.1B (DA-12-1) Fracture - I
3.1C (MF-18-2) Advanced Manufacturing Techniques
3.1D (CS-11-5) Integrity Assessment
3.1E (FSI-4-2) Flow-Induced Effects
3.1F (SE-6-1) Seismic Analysis and Design of Piping Systems - I
3.1G (CT-3-2) Leak Tightness and Fugitive Emissions - II
3.1H (CS-14-1) Repair and Mitigation of Degraded Components in Nuclear Power Plants
3.1I (MF-27-1) Structural Integrity Assessment and Chloride Induced Stress Corrosion Cracking in Spent Nuclear Fuel Canisters
3.1J (HPT-3-1) Fitness for Service and NDE of High Pressure Vessels and Piping
3.1K (OAC-6-1) Mitigating Flange Leaks - Practical Field Experience
3.1L (CS-3-1) EAF European Projects (INCEFA-PLUS, Finland & Germany)
3.1M (DA-17-1) Composite Materials and Structures
3.1N (DA-2-2) Design and Analysis of Piping and Piping Components: Vibration Topics
3.1O (DA-15-1) Coke Drum Skirts and Other Components
3.1Q (TW-2-7) Additive Manufacturing - Overview of Processes, Qualification, Testing and Future Prospects - Part 1
3.1S (TDF-3-1) Technology Demonstration Forum - IX

Wednesday, July 17 Block 3.2 10:15AM – 12:00PM

3.2A (CS-30-1) Fatigue Assessment & Management - A Probabilistic Perspective
3.2B (DA-12-2) Fracture - II
3.2C (MF-2-1) Materials for Hydrogen Service I: Deformation and Fracture
3.2D (CS-13-1) High Temperature Codes and Standards
3.2E (FSI-1-1) Friction, Drag and Two-Fluid Flow
3.2F (SE-6-2) Seismic Analysis and Design of Piping Systems - II
3.2G (CT-4-1) Assembly of Bolted Joints
3.2H (CS-14-2) Research Activities Supporting Guidelines for Repair of Irradiated Materials
3.2I (MF-21-1) Asian Programs in Structural Integrity
3.2J (HPT-1-1) Fatigue Performance for High Pressure Equipment
3.2K (OAC-6-2) Continued Safe Operation of Piping and Pipeline Systems
3.2L (CS-3-2) EAF Low Cycle Fatigue Testing
3.2M (DA-17-2) Composite Materials and Pipes
3.2N (DA-9-1) Piping and Equipment Dynamics
3.2O (DA-15-2) Assessment of Bulges in Coke Drums
3.2Q (TW-2-8) Additive Manufacturing - Overview of Processes, Qualification, Testing and Future Prospects - Part 2
3.2S (TDF-3-2) Technology Demonstration Forum - X

Wednesday, July 17 Block 3.3 2:15PM – 4:00PM

3.3A (DA-3-1) Development of New Design Fatigue Curves in Japan
3.3B (MF-9-1) Mechanistic Modelling of Deformation and Fracture
3.3C (MF-2-2) Materials for Hydrogen Service II: Methods and Microstructure
3.3D (CS-18-1) Development in HDPE and Non-metallic Pipe Codes and Standards
3.3E (FSI-1-2) CFD and Two-Phase Flow
3.3F (SE-7-1) Seismic Evaluation of Systems, structures and Components
3.3G (CT-9-1) Special Applications of Bolted Flanged Joints
3.3H (CS-14-3) New Developments and Applications for Repair and Replacement Activities
3.3I (MF-10-1) Pipeline Integrity

3.3J (HPT-1-4) Joint Symposium with Codes & Standards
3.3K (OAC-6-4) Fitness for Service and Damage Mechanisms
3.3L (CS-3-3) EAF Low Cycle Fatigue Evaluation
3.3M (MF-13-1) Composite and Non-Metallic Systems for Pressure Vessels and Piping
3.3N (DA-2-5) Design and Analysis of Piping and Piping Components: Supports, Relief Devices and Pulsation
3.3O (DA-15-4) Closing Session: What's Next for the Industry?
3.3Q (TW-2-9) Flow Induced Vibration

Thursday, July 18 Block 4.1 8:15AM – 10:00AM

4.1A (DA-3-2) Variable Amplitude Fatigue Loading
4.1B (CS-22-1) Fracture Toughness and Other Small Specimen Mechanical Properties
4.1C (MF-2-3) Materials for Hydrogen Service III: Non-Ferrous Materials
4.1D (CS-12-1) Recent Developments in European Codes and Standards - I
4.1E (DA-14-1) Evaluation and Countermeasure for BDBE
4.1F (SE-8-1) Multi-Hazards and Margins
4.1G (CT-5-1) Threaded Fasteners - I
4.1H (MF-5-1) Fitness for Service and Failure Assessment - I
4.1I (MF-14-1) Probabilistic Assessment of Failure
4.1J (HPT-2-1) Impulsively Loaded Vessels
4.1K (OAC-7-1) Aging and Life Management and Extension
4.1L (CS-3-4) EAF Fatigue Crack Growth
4.1M (MF-3-1) Welding Residual Stress and Distortion - I
4.1N (DA-2-6) Design and Analysis of Piping and Piping Components: Design Optimization
4.1O (MF-28-1) Materials and Fabrication for Refining - I
4.1Q (EPRI-1) Component Design Approaches

Thursday, July 18 Block 4.2 10:15AM – 12:00PM

4.2A (DA-3-3 Fatigue Life Assessment
4.2B (MF-11-1) Small Scale and Miniature Mechanical Testing
4.2C (MF-2-4) Materials for Hydrogen Service IV: Fatigue in Hydrogen Environments
4.2D (CS-12-2) Recent Developments in European Codes and Standards - II
4.2E (MF-29-1) Rotating Equipment
4.2F (SE-9-1) Advanced Seismic Evaluation and Code
4.2G (CT-5-2) Threaded Fasteners - II
4.2H (MF-5-2) Fitness for Service and Failure Assessment - II
4.2I (MF-12-1) Leak before Break
4.2J (HPT-2-2) Impact and Blast Loadings
4.2K (DA-11-1) CFD in Design and Analysis
4.2L (CS-3-5) EAF Fatigue Analysis
4.2M (MF-3-2) Welding Residual Stress and Distortion - II
4.2N (DA-4-1) Inelastic, Nonlinear and Limit Load Analysis for Design by Analysis - I
4.2O (MF-28-2) Materials and Fabrication for Refining - II
4.2Q (EPRI-2) Factors Affecting High Temperature Strength & Ductility of Steels (Including Influence of Aging)

Thursday, July 18 Block 4.3 2:15PM – 4:00PM

4.3A (DA-3-4) Fatigue Design
4.3B (CS-36-1) Master Curve Methods and Applications - I
4.3C (CS-8-1) Hydrogen Effects on Materials Behavior
4.3D (CS-9-1) ASME Code Section XI Activities - I
4.3F (SE-10-1) Ratcheting Deformation of Materials and Piping
4.3J (FSI-3-1) Impact and Blast Loadings
4.3L (CS-2-1) Fatigue and Ratcheting Issues in Pressure Vessel and Piping Design
4.3M (MF-3-3) Welding Residual Stress and Distortion - III
4.3N (DA-4-2) Inelastic, Nonlinear and Limit Load Analysis for Design by Analysis - II
4.3Q (EPRI-3 High Temperature Crack Growth

Thursday, July 18 Block 4.4 4:15PM – 6:00PM

4.4B (CS-36-2) Master Curve Methods and Applications - II
4.4D (CS-9-2) ASME Code Section XI Activities - II
4.4J (HPT-2-3) Preventing and Investigating High-Energy Releases and Explosions of Pressure Vessels
4.4Q (EPRI-4) Assessment of Toughness and Fracture

Friday, July 19 Block 5.1 8:15AM – 10:00AM

5.1Q (EPRI-5) Structural Integrity Assessment using Fitness for Service Methods

Friday, July 19 Block 5.2 10:15AM – 12:00PM

5.2.Q (EPRI-6) Structural Integrity Assessment using Fitness for Service Methods

Daily Sessions

Block 0 Sunday, July 14 1:30PM – 3:45PM

SPECIAL TUTORIAL SESSION 0.3Q (TW-1-1)

Navigating Corporate Culture for Professional Advancement
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande W.
1:30pm - 3:00pm

Session Developer/Session Chair:
Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*

Presented by:
L. Ike Ezekoye, *Ezekoye Engineering Services LLC, Pittsburgh, PA, USA*

SPECIAL TUTORIAL SESSION 0.4Q (TW-1-2)

Work Place Habits and Behavior
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande W.
3:00pm - 3:45pm

Session Developer/Session Chair:
Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*

Presented by:
Artin Demejian, *AAD Independent Operations, Arlington Heights, XX, USA*

Block 1.1 Monday, July 15 8:15AM – 10:00AM

TECHNICAL SESSION 1.1A (MF-16-1)

Creep and Creep-Fatigue Interaction - I
Losaya Conference Center, Bowie C 8:15am - 10:00am

Session Developer/Session Chair:
Catrin Mair Davies, *Imperial College London, London, UK*

Session Co-Developers:
Rita Kirchhofer, *Exponent, Menlo Park, CA, USA*
Frederick (Bud) Brust, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*
Roger Dennis, *Frazer-Nash Consultancy, Avon, UK*
Haiyang Qian, *GE Power, Avon, CT, USA*

Session Co-Chair:
Daniel Hughes, *EDF Energy, Gloucester, UK*

Modification of the MPC Omega Model to Predict Primary and Tertiary Creep
Technical Paper Publication: PVP2019-93100

Mohammad Shafinul Haque, *Angelo State University, San Angelo, Texas, USA*

Creep-Cyclic Plasticity Analysis of Welded Joint with Welding Residual Stress Using the Direct Method
Technical Paper Publication: PVP2019-93228

Manu Puliyaneth & Haofeng Chen, *University of Strathclyde, Glasgow, Scotland, UK*
Weiling Luan, *East China University of Science & Tech, Shanghai, China*

Microstructure Evolution and Creep Rupture Behavior of Modified 9Cr-1Mo Steel Welded Joint
Technical Paper Publication: PVP2019-93420

Facai Ren, Xiaoying Tang & Yiwen Yuan, *Shanghai Institute of Special Equipment Inspection and Technical Research, Shanghai, China*

CCG of PE100 and Life Prediction of PE Pipe with Axial Semi-Elliptical Crack
Technical Paper Publication: PVP2019-93556

Lei Zhang & Bingjun Gao, *Hebei University of Technology, Tianjin, China*
Kaiming Lin &Yang Fu, *The Special Equipment Inspection Institute of Zhongshan City, Zhongshan, Guangdong, China*

TECHNICAL SESSION 1.1B (MF-1-1)

Application of Fracture Mechanics in Failure Assessment - I
Losaya Conference Center, Maverick B 8:15am - 10:00am

Session Developer/Session Chair:
Poh-Sang Lam, *Savannah River National Lab, Aiken, SC, USA*

Session Co-Chair:
Preeti Doddihal, *Kinectrics Inc., Toronto, ON, Canada*

Session Co-Developer:
Gustavo Donato, *FEI University, Sao Paulo, Brazil*

Effects of In-Plane and Out-of-Plane Constraint on Fracture Toughness in Austenitic Stainless Steel
Technical Paper Publication: PVP2019-93660

Iain Palmer & Andrew Moffat, *Frazer-Nash Consultancy, Bristol, UK*
Mehdi Mokhtarishirazabad & Mahmoud Mostafavi, *University of Bristol, Bristol, UK*

Constraint Effects of Surface Crack Depth on Toughness - Experimental and Numerical Assessments
Technical Paper Publication: PVP2019-93713

Gery Wilkowski, Sureshkumar Kalyanam, Yunior Hioe, Frederick (Bud) Brust, Sushma Pothana, Mo Uddin & Fabian Orth, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Direct-Current Electric Potential (D-C EP) Technique Validation through an Experimental and Computational Study on Pipe and Elbow with Surface Crack
Technical Paper Publication: PVP2019-93771

Yunior Hioe, Sureshkumar Kalyanam, Gery Wilkowski, Frederick (Bud) Brust, Edward Punch, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Fracture Mechanics Analysis of a PWR under PTS Using XFEM and Input from TRACE
Technical Paper Publication:PVP2019-94019

Diego F. Mora, Roman Mukin, Oriol Costa Garrido & Markus Niffenegger, *Paul Scherrer Institute, Villigen, Switzerland*

TECHNICAL SESSION 1.1C (MF-6-1)

Materials and Technologies for Nuclear Power Plants - I
Losaya Conference Center, Maverick A 8:15am - 10:00am

Session Developer/Session Chair:
Weiju Ren, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*

Session Developer/Session Co-Chair:
Randy K. Nanstad, *R&S Consultants, LLC, Oak Ridge, TN, USA*

Fabrication and Mechanical Aspects of Using FeCrAl for Light Water Reactor Fuel Cladding
Technical Paper Publication:PVP2019-93128

Raul B. Rebak, Shenyan Huang, Michael Schuster, Steve J. Buresh & Evan J. Dolley, *GE Global Research, Schenectady, NY, USA*

Using Additive Manufacturing for Making Light Water Reactor Components.
Technical Paper Publication: PVP2019-93129

Raul B. Rebak, *GE Global Research, Schenectady, NY, USA*
Xiaoyuan Lou, *Auburn University, Auburn, AL, USA*

Improvement of High Temperature Creep Strength of Conventional Grade 91 Steel by Thermomechanical Treatments
Technical Paper Publication: PVP2019-93148

Rebeca Hernandez, Marta Serrano & Elvira Oñorbe, *Ciemat, Madrid, Spain*
Andrea Garcia-Junceda, *Imdea Materials Institute, Getafe, Spain*
Javier Vivas, *Cenim-Csic, Madrid, Spain*

Evaluation of Creep Properties of Alloy 690 Steam Generator Tubes at High Temperature
Technical Paper Publication: PVP2019-93498

Jongmin Kim, Woogon Kim, Min-Chul Kim, *Korea Atomic Energy Research Institute, Daejeon, Korea (Republic)*

TECHNICAL SESSION 1.1D (CS-7-1)

Everett C. Rodabaugh Memorial Session on Recent Developments in ASME Codes and Standards - I
Losaya Conference Center, Seguin 8:15am - 10:00am

Session Developer/Session Chair:
Ting-Leung Sham, *Argonne National Laboratory, Lemont, IL, USA*

Session Co-Chair:
Mark Messner, *Argonne National Laboratory, Plainfield, IL, USA*

Session Co-Developer:
Michael McMurtrey, *Idaho National Laboratory, Idaho Falls, ID, USA*

Technical Basis and Strategy for Consolidation of ASME Boiler and Pressure Vessel Code, Section III, Subsection NC (Class 2) and Subsection ND (Class 3) into a Single Subsection
Technical Paper Publication: PVP2019-93115

Jie Wen & Timothy Adams, Jensen Hughes, *Independence, OH, USA*
Robert Keating, *MPR Associates, Inc., Alexandria, VA, USA*

Technical Basis of a Code Case to Provide a Strain-Based Acceptance Limits for Service Level D Evaluation of Piping Systems Under Section III of ASME Boiler and Pressure Vessel Code
Technical Paper Publication: PVP2019-93119

Jie Wen & Timothy Adams, *Jensen Hughes, Independence, OH, USA*

Isochronous Stress-Strain Curves for Alloy 617
Technical Paper Publication: PVP2019-93642

Mark Messner, *Argonne National Laboratory, Plainfield, IL, USA*
Ting-Leung Sham, *Argonne National Laboratory, Lemont, IL, USA*

Effect of Internal Pressurization on the Creep Fatigue Performance of Alloy 617 Based on Simplified Model Test Method
Technical Paper Publication: PVP2019-93650

Yanli Wang, *Oak Ridge National Laboratory, Oak Ridge, TN, USA,*
Bob Jetter, *R I Jetter Consulting, Pebble Beach, CA, USA,*
Ting-Leung Sham, *Argonne National Laboratory, Lemont, IL, USA*

TECHNICAL SESSION 1.1E (SPC-1-1)

Student Paper Competition - BS/MS - I
Losaya Conference Center, Bowie A 8:15am - 10:00am

Session Developer:
Peter James, *Wood, Warrington, Cheshire, UK*

Session Co-Developer:
Sandra Dugan, *Swiss Federal Nuclear Safety Inspectorate ENSI, Brugg, AG, Switzerland*

Session Chair:
Maher Younan, *American University in Cairo, New Cairo, Egypt*

Session Co-Chair:
Bing Li, *Kinectrics NSS, Toronto, ON, Canada*

Burst Pressure of Glass Fiber Reinforced Polyethylene Pipes with Delamination Defect
Technical Paper Publication: PVP2019-93042

Zhenlei Ni, Jianfeng Shi & Jinyang Zheng, *Zhejiang University, Hangzhou, China*

The Effect of Pedicle Screw Thread Design on the Stress Concentration under Lateral Bending
Technical Paper Publication: PVP2019-93162

Yucheng Yang & Qin Ma, *Walla Walla University, College Place, WA, USA*

Study on External Limit Load and Instability Characteristics of C-shaped Bellows
Technical Paper Publication: PVP2019-93255

Qing-Dong Gao, Cheng-Hong Duan & Xiangpeng Luo, *Beijing University of Chemical Technology, Beijing, Beijing, China*

TECHNICAL SESSION 1.1F (SE-1-1)

Earthquake Resistance and Seismic Margin - I: Rocking and Sliding during Seismic Events
Losaya Conference Center, Bowie B 8:15am - 10:00am

Session Developer:
Tomoyo Taniguchi, *Tottori University, Tottori, Japan*

Session Co-Developer:
Akira Maekawa, *The Kansai Electric Power Co., Inc., Fukui, Japan*

Session Co-Developer/Session Chair:
Izumi Nakamura, *National Research Institute of Earth Sciences/Disaster Prevention, Hyogo, Japan*

Session Co-Chair:
Nobuo Kojima, *Toshiba Energy Systems & Solutions Corporation, Yokohama, Japan*

Mitigation of Rocking and Sliding Motion of a Free-Standing Structure Subjected to Base Excitation Using Coaxial Circular Cylinder Containing Highly Viscous Liquid in Annular Spaces
Technical Paper Publication: PVP2019-93205

Atsuhiko Shintani & Chihiro Nakagawa, *Osaka Prefecture University, Osaka, Japan*
Tomohiro Ito, *Independent Author, Kobe City, Hyogo Prefecture, Japan*

Forensic Estimation of Uplift of an Anchored Tank during the 2011 Earthquake off the Pacific Coast of Tohoku
Technical Paper Publication: PVP2019-93251

Yuichi Yoshida, *Kawasaki Heavy Industries, Ltd., Kobe, Japan*
Tomoyo Taniguchi, *Tottori University, Tottori, Japan*
Teruhiro Nakashima, *Jip Techno-science, Yao, Japan*
Ken Hatayama, *National Research Institute of Fire and Disaster, Chofu, Japan*

Low-Cycle Fatigue of Base-Plate-to-Shell Connection in Uplifting Liquid Storage Tanks under Seismic Loading
Technical Paper Publication: PVP2019-93419

Giannoula Chatzopoulou & Spyros A. Karamanos, *University of Thessaly, Volos, Greece*

TECHNICAL SESSION 1.1G (DA-10-1)

Design of Bolted Joints
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande E.
8:15am - 10:00am

Session Developer/Session Co-Chair:
Warren Brown, *Integrity Engineering Solutions, Dunsborough, WA, Australia*

Session Co-Developer:
Gys Van Zyl, Sabic, *Jubail, Saudi Arabia*

Session Co-Developer/Session Chair:
Clay Rodery, *C&S Technology, LLC, League City, TX, USA*

Analysis of a Flanged and Dished Head Assembly Used in a Horizontal Storage Tank
Technical Paper Publication: PVP2019-93221

Mingxin Zhao, *Enterprise Products, Houston, TX, USA*

Impact of Including Spiral Wound Bead Width in Gasket Area
Technical Paper Publication: PVP2019-93657

Kathryn Worden, *Flexitallic LP, Deer Park, TX, USA*
Mark Ruffin, *Chevron, El Segundo, CA, USA*

Spiral Winding Technology for PTFE Gaskets
Technical Paper Publication: PVP2019-93710

Carlos D. Girão, *Teadit, Rio De Janeiro, Brazil*
Jose Veiga, *Teadit Industria e Comercio Ltda, Rio De Janeiro/RJ, Brazil*
Andre C. Valle & André Garcia, *Teadit Group, Rio de Janeiro, Brazil*

An Update on Quantifying Bolt Relaxation during High Temperature Operation
Technical Paper Publication: PVP2019-93872

Warren Brown & Nathan Knight, *Integrity Engineering Solutions, Dunsborough, Western Australia, Australia*

TECHNICAL SESSION 1.1H (CS-19-1)

Integrity of Cast Stainless Steel Pipe
Hill County Level (3rd floor), Hyatt Regency, Llano
8:15am - 10:00am

Session Developer/Session Chair:
Do-Jun Shim, *Structural Integrity Associates, Inc., San Jose, CA, USA*

Session Developer/Session Co-Chair:
Kiminobu Hojo, *Mitsubishi Heavy Industries Ltd, Kobe, Hyogo, Japan*

Recent Improvements in Toughness Prediction of Cast Duplex Stainless Steel Components
Technical Paper Publication: PVP2019-93114

Patrick Le Delliou & Sebastian Saillet, *EDF - Electricite De France, Moret Sur Loing, France*

Flaw Evaluation Procedure for Cast Austenitic Stainless Steel Materials Using a Newly Developed Statistical Thermal Aging Model
Technical Paper Publication: PVP2019-93711

Mo Uddin, Cedric Sallaberry & Gery Wilkowski, *Engineering Mechanics Corporation Columbus, Upper Arlington, OH, USA*

Introduction of CASS Pipe Flaw Evaluation of JSME Rules on FFS
Technical Paper Publication: PVP2019-93933

Kiminobu Hojo, *Mitsubishi Heavy Industries Ltd, Kobe, Hyogo, Japan*

TECHNICAL SESSION 1.1I (MF-4-1)

European Programs in Structural Integrity - I
Hill County Level (3rd floor), Hyatt Regency, Live Oak
8:15am - 10:00am

Session Developer/Session Chair:
Tomas Nicak, *Framatome GmbH, Erlangen, Germany*

Session Developer/Session Co-Chair:
Stéphane Marie, *Framatome GmbH, Courbevoie, France*

Session Co-Developer: A
Antoine Andrieu, *EDF, Moret Sur Loing, France*
European Project ATLAS+: Small and Large Scale Ductile Tearing Experiments on Ferritic Steel WB36 to Study Transferability of Material Ductile Properties
Technical Paper Publication: PVP2019-93070

Anna Dahl & Willy Vincent, *EDF Lab Les Renardières, Moret-sur-Loing, France*
Dominique Moinereau & Patrick Le Delliou, *EDF, Moret-sur-Loing, France*

European Project ATLAS+: Status of the WP1 Relative to the Experimental Program on Pipes and Specimens
Technical Paper Publication: PVP2019-93505

Patrick Le Delliou & Dominique Moinereau, *EDF, Moret-sur-Loing, France*
Myriam Bourgeois, *French Alternative Energies and Atomic Energy Commission, Gif Sur Yvette, France*
Szabolcs Szavai, *Bay Zoltan Non Profit KFT, Miskolc, Hungary*

Ductile Tearing Simulations to Support Design of Large Scale Tests on Ferritic Pipes to Be Performed within the European Project ATLAS+
Technical Paper Publication: PVP2019-93569

Tomas Nicak, *Framatome GmbH, Erlangen, Germany*

Advanced Structural Integrity Assessment Tools for Safe Long Term Operation - ATLAS+ project: Status of the Activities of the WP3 on Modelling
Technical Paper Publication: PVP2019-93580

Stephane Marie & Arnaud Blouin, *Framatome, Paris La Defense, France,*
Tomas Nicak, *Framatome GmbH, Erlangen, Germany,*
Dominique Moinereau, Anna Dahl & Patrick Le Delliou, *EDF, Moret Sur Loing, France,*
Myriam Bourgeois, *French Alternative Energies and Atomic Energy Commission, Gif Sur Yvette, France*

TECHNICAL SESSION 1.1J (HPT-6-1)

Computational Methods and Validation in High Pressure and High Temperature Applications
Hill County Level (3rd floor), Hyatt Regency, Blanco
8:15am - 10:00am

Session Developer/Session Chair:
Young-Hoon Han, *Cameron - a Schlumberger Company, Houston, TX, USA*

Session Co-Developer:
Ali Sepehri, *Schlumberger, Houston, TX, USA*

Session Developer/Session Co-Chair:
Matteo Loffredo, *Università di Pisa, Miami, FL, USA*

A Novel Model for Prediction of the Residual Stress Field in Autofrettaged Cylinders, Including Bauschinger Effect.
Technical Presentation. PVP2019-93432

Matteo Loffredo, *Università di Pisa, Miami, FL, USA*
Marco Beghini, Francesco Aiello & Bernardo D. Monelli, *Università di Pisa, Pisa, Italy,*
Andrea Bagattini, *Baker Hughes - a GE company, Firenze, Italy*

Optimizing Analysis Methodology for High-Pressure, High-Temperature (HPHT) Equipment for Offshore Oil and Gas Exploration and Production
Technical Paper Publication: PVP2019-93901

J Robert Sims, Jay Lefkowitz & Charles Becht V, *Becht Engineering Co., Inc., Liberty Corner, NJ, USA*
Dave Dewees, *Becht Engineering Co., Inc., Medina, OH, USA*

HPHT Equipment Stress Intensity Calculation Based upon the API 579/ASME FFS and ABAQUS J-integral Fracture Mechanics Basis
Technical Paper Publication: PVP2019-93924

Jong Lim, Young-Hoon Han, *Cameron - a Schlumberger Company, Houston, TX, USA*

Experimental Evaluation of the Bauschinger Effect on AISI 4140 and Interpretation of Results through a Novel Plasticity Model
Technical Presentation. PVP2019-93993

Francesco Aiello, Matteo Loffredo, Bernardo D. Monelli & Marco Beghini, *Università di Pisa, Pisa, Italy*
Andrea Bagattini, *Baker Hughes – a GE company, Firenze, Italy*

TECHNICAL SESSION 1.1K (OAC-1-1)

Safety, Reliability and Risk Management of Tank Farms and Storage Facilities
Hill County Level (3rd floor), Hyatt Regency, Nueces
8:15am - 10:00am

Session Developer/Session Chair:
Alton Reich, *Streamline Automation LLC, Huntsville, AL, USA*

Session Developer/Session Co-Chair:
Joseph Cluever, *LPI, Inc., Richland, WA, USA*

Identification of Key Factors of Fire Risk of Oil Depot Based on Fuzzy Clustering Algorithm
Technical Paper Publication: PVP2019-93125

Shuyi Xie, Shaohua Dong & Guangyu Zhang, *China University of Petroleum, Beijing, China*

Quantitative Analysis of the Cause-effect Relationship of Incidents Occurred in Tank Farm Based on the Method of Logistic Regression
Technical Paper Publication: PVP2019-93328

Xingguang Wu, Lei Hou, Zhuang Wu, *China University of Petroleum, Beijing, Beijing, China*

A Reliability Assessment Framework for Underground Gas Storage System Considering Components Repairable ans Functional Failure
Technical Paper Publication: PVP2019-93066

Lei He, Kai Wen, Jing Gong, Chang Chun Wu, *China University Of Petroleum, Beijing, China*

Heat Exchanger Sealing Safety, a Refinery Case Study
Technical Presentation. PVP2019-93208

James Drago, *Garlock Sealing Technologies, Palmyra, NY, USA*

TECHNICAL SESSION 1.1L (FSI-2-1)

Samir Ziada Memorial Session on Flow-Excited Acoustics and Flow-Induced Vibrations
Hill County Level (3rd floor), Hyatt Regency, Pecan
8:15am - 10:00am

Session Developer/Session Chair:
David Weaver, *McMaster University, Ayr, ON, Canada*

Session Co-Developer:
Atef Mohany, *University of Ontario Institute of Technology, Whitby, ON, Canada*

Session Developer/Session Co-Chair:
Marwan Hassan, *University of Guelph, Guelph, ON, Canada*

Pitch and Pattern Effects on Streamwise Fluidelastic Instability in Tube Arrays
Technical Paper Publication: PVP2019-93327

Marwan Hassan, *University of Guelph, Guelph, ON, Canada*
David Weaver, *McMaster University, Ayr, ON, Canada*

Effect of Flow Approach Angle on Acoustic Resonance Excitation of Tube Bundles in Cross-Flow
Technical Paper Publication: PVP2019-93445

Mohammed Alziadeh & Atef Mohany, *University of Ontario Institute of Technology, Whitby, ON, Canada*
Marwan Hassan, *University of Guelph, Guelph, ON, Canada*

Dynamics of a Pipe Subjected to Internal and Confined External Flow
Technical Paper Publication: PVP2019-93227

Michael Paidoussis, Ahmed R. Abdelbaki, Muhammad Faisal Butt, Kyriakos Moditis, Arun Misra & Meyer Nahon, *McGill University, Montreal, QC, Canada*

Fluid-Elastic Coefficients in Single Phase Cross Flow: Dimensional Analysis, Direct and Indirect Experimental Methods
Technical Paper Publication: PVP2019-93984

Romain Lagrange & Xavier Delaune, *CEA, Gif-sur-Yvette, France*
Philippe Piteau, *CEA, Viry Chatillon, France*
Jose Antunes, *Instituto Superior Tecnico, Bobadela, Lisbon, Portugal*

TECHNICAL SESSION 1.1M (DA-19-1)

Special Considerations in the Design and Analysis of Supports, Restraints and Welded Attachments
Hill County Level (3rd floor), Hyatt Regency, Pecos
8:15am - 10:00am

Session Developer:
Phillip Wiseman, *Lisega Inc., Kodak, TN, USA*

Session Chair:
K.P. Gawande, *Lisega Inc., Kodak, TN, USA*

Session Co-Chair:
Alex Mayes, *Lisega, Inc., Kodak, TN, USA*

Decay of Excitation Load from Heat Recovery Steam Generators (HRSG) to Attached Piping System As a Function of Pipe Supports Locations
Technical Paper Publication: PVP2019-93157

Emmanuel Appiah & K.P. Gawande, *Lisega Inc. Kodak, TN, USA*

Study of Thermal Distribution in the Shock Suppressors (Snubbers) Due to Heat Induced by High Frequency Vibrations
Technical Paper Publication: PVP2019-93159

Alex Mayes & K.P. Gawande, *Lisega, Inc., Kodak, TN, USA*

Case Study of Pipe Support and Restraint Stiffness Technical Paper Publication: PVP2019-93275

Phillip Wiseman, Alex Mayes & Emmanuel Appiah, *Lisega Inc., Kodak, TN, USA*

Application of Gaussian Process Regression for the accuracy assessment of a Three-dimensional strain-based model
Technical Paper Publication: PVP2019-94039

Yueying Li, Yong Li, *Chike Okoloekwe & Samer Adeeb, University of Alberta, Edmonton, AB, Canada*
Sherif Hassanien, *Enbridge Pipeline Inc., Edmonton, AB, Canada*

TECHNICAL SESSION 1.1N (DA-20-1)

Additive Manufacturing and Rapid Reuse
Hill County Level (3rd floor), Hyatt Regency, Frio
8:15am - 10:00am

Session Developer/Session Chair:
Brendan McNelly, *JHU/APL, Laurel, MD, USA*

Session Co-Chair:
Alicia Avery PE, *A.C. Avery Projects Inc., Calgary, AB, Canada*

Additive Manufactured Pressure Vessel Development, an Update
Technical Paper Publication: PVP2019-94033

Walter Tam, Kamil Wlodarczyk & Joe Hudak, *Northrop Grumman, Commerce, CA, USA*

3D Sand-Printing for Metal Casting
Technical Presentation. PVP2019-94034

Guha Manogharan, *Pennsylvania State university, University Park, PA, USA*
Jonathan Marshall, *Johns Hopkins University Applied Physics Laboratory, Laurel, MD, USA*

Pressure Vessel for Combustion on a Reusable Hybrid Rocket
Technical Presentation. PVP2019-94032

Sarah Popkin & Justin Smith, *Johns Hopkins University Applied Physics Laboratory, Laurel, MD, USA*
Marcus Musser, *Johns Hopkins University Applied Physics Laboratory, Ellicott City, MD, USA*

Block 1.2 Monday, July 15 10:15AM - 12:00PM

PLENARY SESSION 1.2R (PS-1-1)

Ballroom Level (2nd floor), Hyatt Regency,
Ballroom W & Ctr. 2:15pm - 4:00pm

Session Developer/Session Chair:
Abdel-Hakim Bouzid, *Ecole Technologie Superieure, Montreal, QC, Canada*

Session Co-Developer:
Trevor Seipp, *Becht Engineering Canada, Ltd., Calgary, AB, Canada*

Block 1.3 Monday, July 15 2:15PM - 4:00PM

TECHNICAL SESSION 1.3A (MF-16-2)

Creep and Creep-Fatigue Interaction - II
Losaya Conference Center, Bowie C 2:15pm - 4:00pm

Session Developer/Session Co-Chair:
Catrin Mair Davies, *Imperial College London, London, UK*

Session Co-Developer/Session Chair:
Frederick (Bud) Brust, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Session Co-Developers:
Rita Kirchhofer, *Exponent, Menlo Park, CA, USA*
Roger Dennis, *Frazer-Nash Consultancy, Avon, UK*
Haiyang Qian, *GE Power, Avon, CT, USA*

Effect of Plasticity on Creep Deformation in Type 316H Stainless Steel
Technical Paper Publication: PVP2019-93587

Abdullah al Mamun, Chris Simpson, Tomiwa Erinosho, Dylan Agius, Mahmoud Mostafavi & D. Knowles, *University of Bristol, Bristol, Gloucestershire, UK,*
Christina Reinhard, *Diamond Light Source, Didcot, UK,*

Damage Evaluation of Grade 91 Thick Cylinder under Variable Thermal Cyclic Loading using Continuum Damage Coupled Viscoplastic Models
Technical Paper Publication: PVP2019-93634

Nazrul Islam, *Bangladesh University of Engineering and Technology, Dhaka, Bangladesh*
Tasnim Hassan, *NC State University, Raleigh, NC, USA*

TDFAD Analysis of Creep Crack Initiation in 0.5CMV/2.25CrMo Steel Weldments
Technical Paper Publication: PVP2019-93658

Muneeb Ejaz, Catrin Mair Davies, *Imperial College London, London, UK*

Reliability Prediction of 304 Stainless Steel Using Sine-Hyperbolic Creep-Damage Model with Monte Carlo Simulation Method
Technical Paper Publication: PVP2019-93712

Md Abir Hossain, Calvin Maurice Stewart, *The University of Texas at El Paso, El Paso, TX, USA*

Failure Analysis of Low Carbon Steel Pipe Clamp of Pressure Pipe
Technical Paper Publication: PVP2019-94040

Liuyi Huang, Fang Zhang, Fengping Zhong, Meng Yuan & Weican Guo, *Zhejiang Provincial Special Equipment Inspection and Research Institute, HangZhou, China*

A Residual Lifetime Prediction Method of In-Service Polyethylene Gas Pipes
Technical Paper Publication: PVP2019-93140

Yang Wang, Hui-qing Lan, Hao Zhang, *Beijing Jiaotong University, Beijing, Beijing, China*

TECHNICAL SESSION 1.3B (MF-1-2)

Application of Fracture Mechanics in Failure Assessment - II
Losaya Conference Center, Maverick B 2:15pm - 4:00pm

Session Developer/Session Chair:
Abdel-Hamid Ismail Mourad, *United Arab Emirates University, Al Ain 15551, UAE*

Session Developer/Session Co-Chair:
Jessica Lam, *Ontario Power Generation (OPG), Pickering, ON, Canada*

Mechanical and Tribological Evaluation of Aluminum Metal Matrix Composite Fabricated by Gravity and Squeeze Stir Casting
Technical Paper Publication: PVP2019-93857

John Christy & Abdel-Hamid Ismail Mourad, *United Arab Emirates University, Al Ain 15551, UAE*
Ramanathan Arunachalam, *SQ university, Muscat, Oman*

Impact of the Harsh Environment on E-Glass Epoxy Composite
Technical Paper Publication: PVP2019-93858

Amir Hussain Idrisi, Abdel-Hamid Ismail Mourad, Mohammad Mozumder &Yaser Afifi, *United Arab Emirates University, Al Ain 15551, UAE*
Beckry Abdel Magid, *Winona State University, Winona, MN, USA*

TECHNICAL SESSION 1.3C (MF-6-2)

Materials and Technologies for Nuclear Power Plants - II
Losaya Conference Center, Maverick A 2:15pm - 4:00pm

Session Developer/Session Chair:
Weiju Ren, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*

Session Developer/Session Co-Chair:
Randy K. Nanstad, *R&S Consultants, LLC, oak ridge, TN, USA*

Effects of Welding Processes and Techniques on Mechanical and Metallurgical Properties of Dissimilar Metal Weld
Technical Paper Publication: PVP2019-93277

Donna (Dongmei) Sun, *Liburdi GAPCO, Dundas, ON, Canada*
Xinjian Duan, *Candu Energy, Mississauga, ON, Canada*

Interface Microstructure and Thermal Expansion Mismatch in Alloy N/316h Bimetallic Plates
Technical Paper Publication: PVP2019-93585

Zhijun Li, Jia Xiao, Kun Yu, Jianping Liang, Linfeng Ye, Li Jiang & Shuangjian Chen, *Shanghai Institute of Applied Physics, Shanghai, China*
Zezhong Chen, *University of Shanghai for Science and Technology, Shanghai, China*

Study on Inner Bore Welding Technology of Nickel Based Alloy Small Diameter Tube and Its Application in the Heat Exchanger of Molten Salt Reactor
Technical Presentation. PVP2019-93418

Chen Shuang Jian, Zhijun Li, Chaowen Li & Kun Yu, *Shanghai Institute of Applied Physics, Shanghai, China*
Ting Yang, *Shanghai Power Station Auxiliaries Factory Co. Ltd., Shanghai, China*

Effect of Pre-Weld Heat Treatment on Microstructure and Creep Strength of ICHAZ in Grade 91 Steel
Technical Paper Publication: PVP2019-93315

Yiyu Wang, Wei Zhang & Zhili Feng, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*

TECHNICAL SESSION 1.3D (CS-7-2)

Recent Developments in ASME Codes and Standards - II
Losaya Conference Center, Seguin 2:15pm - 4:00pm

Session Developer/Session Chair:
Ting-Leung Sham, *Argonne National Laboratory, Lemont, IL, USA*

Session Co-Chair:
Mark Messner, *Argonne National Laboratory, Plainfield, IL, USA*

Session Co-Developer:
Michael McMurtrey, *Idaho National Laboratory, Idaho Falls, ID, USA*

Design Methodologies for High Temperature Reactor Structural Components Cladded with Noncompliant Materials
Technical Paper Publication: PVP2019-93643

Bipul Barua, V.-T. Phan & Ting-Leung Sham, *Argonne National Laboratory, Lemont, IL, USA*
Mark Messner, *Argonne National Laboratory, Plainfield, IL, USA*
Bob Jetter, *R I Jetter Consulting, Pebble Beach, CA, USA*
Yanli Wang, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*

A Method for Directly Assessing Elastic Follow up in 3D Finite Element Calculations
Technical Paper Publication: PVP2019-93644

Mark Messner, *Argonne National Laboratory, Plainfield, IL, USA*
Bob Jetter, *R I Jetter Consulting, Pebble Beach, CA, USA*
Ting-Leung Sham, *Argonne National Laboratory, Lemont, IL, USA*

Development of Simplified Model Test Methods for Creep Fatigue Evaluation
Technical Paper Publication: PVP2019-93648

Yanli Wang, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*
Bob Jetter, *R I Jetter Consulting, Pebble Beach, CA, USA*
Mark Messner, *Argonne National Laboratory, Plainfield, IL, USA*
Ting-Leung Sham, *Argonne National Laboratory, Lemont, IL, USA*

Engineer and Designer Qualifications for ASME Section VIII, Division 2
Technical Presentation. PVP2019-93072

Steven Roberts, *Shell, Houston, TX, USA*

TECHNICAL SESSION 1.3E (SPC-1-2)

Student Paper Competition - BS/MS - II
Losaya Conference Center, Bowie A 2:15pm - 4:00pm

Session Developer:
Haiyang Qian, *GE Power, Avon, CT, USA*

Session Co-Developer:
Taichi Matsuoka, *Meiji University, Kawasaki, Kanagawa, Japan*

Session Chair:
Daniel BROC, *CEA Saclay, Gif-sur-Yvette, France*

Session Co-Chair:
Preeti Doddihal, *Kinectrics Inc., Toronto, ON, Canada*

Three-dimensional Liquid Sloshing Numerical Analysis on a New Designed Tank Container
Technical Paper Publication: PVP2019-93455

Wenjun Yue, Xu Chen, *Tianjin University, Tianjin, China*

Integrity Assessment of Cables under Postulated Electrical Fire Accidents in a Zero-power Research Reactor
Technical Paper Publication: PVP2019-93340

Jae-Min Jyung, Yoon-Suk Chang, *Kyung Hee University, Gyeonggi-do, Korea (Republic)*

TECHNICAL SESSION 1.3F (SE-1-2)

Earthquake Resistance and Seismic Margin - II: Earthquake Resistance for Various Seismic Responses
Losaya Conference Center, Bowie B 2:15pm - 4:00pm

Session Developer:
Tomoyo Taniguchi, *Tottori University, Tottori, Japan*

Session Co-Developers:
Akira Maekawa, *The Kansai Electric Power Co., Inc., Fukui, Japan*
Izumi Nakamura, *National Research Institute of Earth Sciences/Disaster Prevention, Hyogo, Japan*

Session Chair:
Spyros A. Karamanos, *University of Thessaly, Volos, Greece*

Session Co-Chair:
Akihito Otani, *IHI Corporation, Yokahoma, Kanagawa, Japan*

Enhancement of Uplift Displacement of Tanks Due to Out-of-Round Deformation of Cylindrical Shell
Technical Paper Publication: PVP2019-93254

Yoshiyuki Miyauchi, Tomoyo Taniguchi & Junichi Hongu, *Tottori University, Tottori, Japan*
Teruhiro Nakashima, *Jip Techno-Science, Yao, Japan*
Daisuke Okui, *Kawasaki Heavy Industries, Ltd., Kobe, Japan*

Retrofitting Non-ductile RC Frames for Seismic Resistance Using Post-Installed Shear Walls
Technical Paper Publication: PVP2019-93399

Chien-Kuo Chiu & Chin-En Ho, *National Taiwan University of Science and Technology, Taipei, Taiwan*
Fu-Pei Hsiao, *National Center for Research on Earthquake Engineering, Taipei, Taiwan*
Wen-I Liao, Samuel Jonathan Quac & Zi-En Gu, *National Taipei University of Technology, Taipei, Taiwan*

Effect of Soil-Structure Interaction on Open-Top Storage Tanks Subjected to Seismic Excitation
Technical Presentation. PVP2019-93436

Harsh Bohra, Sukru Guzey, *Purdue University, West Lafayette, IN, USA*

PANEL SESSION 1.3G (DA-10-4)

International Liaison Session on Bolted Joint Design and Assembly - I
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande E.
2:15pm - 4:00pm

Session Developer/Session Chair:
Warren Brown, *Integrity Engineering Solutions, Dunsborough, WA, Australia*

Session Co-Developers:
Gys Van Zyl, *Sabic, Jubail, Saudi Arabia*
Clay Rodery, C&S Technology, LLC, League City, TX, USA

Session Co-Chair:
Scott Hamilton, *Hex Technology, Austin, TX, USA*

Activities and Future Development on Researches of Bolted Flange Joints in JPVRC
Technical Presentation: PVP2019-93892

Toshiyuki Sawa, *Hiroshima University, Koto-city, Japan*

Update on Pressure Boundary Bolted Joint Activity from Brazil
Technical Presentation: PVP2019-93894

Jose Veiga, *Teadit Industria e Comercio Ltda, Rio De Janeiro/RJ, Brazil*

Update on Pressure Boundary Bolted Joint Activity from the USA
Technical Presentation: PVP2019-93906

Clay Rodery, *C&S Technology LLC, League City, TX, USA*

TECHNICAL SESSION 1.3H (CS-37-1)

Improvement of Flaw Characterization Rules for FFS - I
Hill County Level (3rd floor), Hyatt Regency, Llano
2:15pm - 4:00pm

Session Developer/Session Chair:
Valery Lacroix, *Tractebel Engineering, Brussels, Belgium*

Session Developer/Session Co-Chair:
Kunio Hasegawa, *Japan Atomic Energy Agency, Tokai mura, Ibaraki-ken, Japan*

Size Effects on the Interaction Between Multiple Surface Cracks in a Finite Plate
Technical Presentation: PVP2019-93448

Kisaburo Azuma, *Nuclear Regulation Authority, Japan, Tokyo, Japan*
Yinsheng Li & Kunio Hasegawa, *Japan Atomic Energy Agency, Tokai Mura, Ibaraki-ken, Japan*

Plastic Collapse Stresses for Thick Wall Pipes with Outer Cracks
Technical Paper Publication: PVP2019-93482

Kunio Hasegawa & Yinsheng Li, *Japan Atomic Energy Agency, Ibaraki-Ken, Japan*
Valery Lacroix, *Tractebel Engineering, Brussels, Belgium*
Vratislav Mares, *Technical University of Ostrava, Ostrava, Ostrava, Czech Republic*

A Comparison of Proximity Rules for Surface Planar Flaws
Technical Paper Publication: PVP2019-93513

Afaf Bouydo, *Tractebel Engineering, Woluwé Saint Lambert, Belgium*
Pierre Dulieu & Valery Lacroix, *Tractebel Engineering, Brussels, Belgium*
Kunio Hasegawa, *Japan Atomic Energy Agency, Ibaraki-ken, Japan*
Vratislav Mares, *Technical University of Ostrava, Ostrava, Ostrava, Czech Republic*

Practical Application of Three-Dimensional FE Based Crack Propagation Life Assessment in Piping and Pressure Vessel Industry
Technical Presentation. PVP2019-93278

Adrian Loghin, *Simmetrix Inc., Clifton Park, NY, USA*
Shakhrukh Ismonov, *Jacobs Tech, INC, Houston, TX, USA*

TECHNICAL SESSION 1.3I (MF-4-2)

European Programs in Structural Integrity - II
Hill County Level (3rd floor), Hyatt Regency, Live Oak
2:15pm - 4:00pm

Session Co-Developer/Session Co-Chair:
Antoine Andrieu, *EDF, Moret Sur Loing, France*

Session Co-Developer/Session Chair:
Stéphane Marie, *Framatome, Courbevoie, France*

Session Co-Developer:
Tomas Nicak, *Framatome GmbH, Erlangen, Germany*

European Project ATLAS+: Evaluation of a Shear Modified Gurson Model by Comparison to Experimental Fracture Tests on SENT Fracture Specimens
Technical Paper Publication: PVP2019-93620

Tobias Bolinder, *Kiwa Inspecta Technology AB, Stockholm, Stockholm, Sweden*
Dominique Moinereau, Patrick Le Delliou, *EDF, Moret Sur Loing, France*
Anna Dahl, *EDF Lab Les Renardières, Moret Sur Loing, France*
Jacques Besson, *Mines Paris Tech Centre des Matériaux, Evry, France*

Leak Rates through Complex Crack Paths: Update on the Latest Developments from the European Project ATLAS+
Technical Paper Publication: PVP2019-93944

Peter J Gill & Brian Daniels, *Wood, Warrington, UK*
Tomas Nicak & Florian Obermeier, Framatome GmbH, Erlangen, Germany

ATLAS+ European Project - Prediction of Large Ductile Tearing in Piping Using Local Approach
Technical Paper Publication: PVP2019-93586

Arnaud Blouin, Stephane Marie, *Framatome, Paris La Defense, France*
Al Mahdi Remmal, *Framatome / Sorbonne Université - Université Pierre et Marie Curie, La Defense, Ile De France, France*

TECHNICAL SESSION 1.3J (HPT-6-2)

Design Margins Determination Methods for HPHT Applications
Hill County Level (3rd floor), Hyatt Regency, Blanco
2:15pm - 4:00pm

Session Developer/Session Chair:
Jim Kaculi, *Dril-Quip Inc., Houston, TX, USA*

Session Co-Developer:
Man Pham, *Total, The Woodlands, TX, USA*

Session Developer/Session Co-Chair:
Finn Kirkemo, *Equinor, Tranby, Norway*

A Case Study - A Systems Approach for 20ksi Equipment Qualification
Technical Paper Publication: PVP2019-93750

James Raney, Gregory Walz & Dennis Kaminski, *Anadarko, Woodlands, TX, USA*

Subsea Intervention System Connector Capacities per the Elastic-Plastic Analysis Methodology
Technical Paper Publication: PVP2019-93798

Ali Sepehri, Gaurav Bansal, Mangesh Edke, *Schlumberger, Houston, TX, USA*

Validation for External Tieback Connector Bending Capacity by Strain Measurement
Technical Paper Publication: PVP2019-93925

Adam Christopherson, Young-Hoon Han, *Cameron - a Schlumberger Company, Houston, TX, USA*

TECHNICAL SESSION 1.3K (OAC-1-2)

Safety, Reliability and Risk Management of Process and Power Systems
Hill County Level (3rd floor), Hyatt Regency, Nueces
2:15pm - 4:00pm

Session Developer/Session Chair:
Alton Reich, *Streamline Automation, LLC, Huntsville, AL, USA*

Session Developer/Session Co-Chair:
Joseph Cluever, *LPI, Inc., Richland, WA, USA*

Safety and Risk Management Analysis of Accidents Related to Pressure Vessels and Piping in Alberta Petrochemical Industry from 2008 to 2017
Technical Paper Publication: PVP2019-93010

Mohamed Esouilem, Abdel-Hakim Bouzid & Sylvie Nadeau, *Ecole Technologie Superieure, Montreal, QC, Canada*

Managing Asset Integrity and Safe Operations at the Bahrain Petroleum Company - Operational Assets in Unfenced/ Unmanned Areas
Technical Paper Publication: PVP2019-93190

Aby Thomas, *The Bahrain Petroleum Co, Awali, Bahrain, Bahrain*

Study on Hydrate Formation and Dissociation in the Presence of Fine Sand
Technical Paper Publication: PVP2019-93200

Yuchuan Chen, Bohui Shi, Wenping Lan, Shunkang Fu & Jing Gong, *China University of Petroleum, Beijing, China*
Fangfei Huang, *Guangzhou Marine Geological Survey, Guangzhou, China*
Haiyuan Yao, *CNOOC Research Institute, Beijing*

Integrity Mitigation Prioritization Using Multi-Criteria Decision-Making
Technical Paper Publication: PVP2019-93621

Mahsa Mehranfar, Juan Mejia, Sherif Hassanien & James Martin, *Enbridge, Edmonton, AB, Canada*

TECHNICAL SESSION 1.3L (FSI-2-2)

Piping Vibration and Acoustics
Hill County Level (3rd floor), Hyatt Regency, Pecan
2:15pm - 4:00pm

Session Developer:
Hugh Goyder, *Cranfield University, Shrivenham Sn6 8la, UK*

Session Co-Developer:
Atef Mohany, *University of Ontario Institute of Technology, Whitby, ON, Canada*

Session Chair:
Pierre Moussou, *Electricite de France / Research and Development, Palaiseau, France*

Session Co-Chair:
Stefan Belfroid, *TNO, Delft, Netherlands*

Sweeplus ®: An Integrated Solution to Pipe Vibration Failures
Technical Paper Publication: PVP2019-93023

Yuqing Liu, Philip Diwakar, Ismat El Jaouhari & Dan Lin, *Bechtel, Houston, TX, USA*

Flow-Excited Acoustic Resonance Vibration Mitigation of Reactor Inlet Piping by a Perforated Annulus
Technical Paper Publication: PVP2019-93428

Juan Pontaza & Wesley Pudwill, *Shell, Houston, TX, USA*

Phase Relation of Forces between Multiple Bends
Technical Paper Publication: PVP2019-93543

Stefan Belfroid, Hajo Pereboom & Arjun Anantharaman, *TNO, Delft, Netherlands*
Nestor Gonzalez Diez, *TNO, The Hague, Netherlands*

Vibration of a High Energy Power Piping System Due to Vibro-Acoustic
Technical Paper Publication: PVP2019-93594

Gregory Meyer, Timothy Meneely, Jeremy Koether, Stephen Smith & David Dibasilio, *Westinghouse Electric Company, Cranberry Towship, PA, USA*

TECHNICAL SESSION 1.3M (CT-8-1)

New and Emerging Methods of Analysis and Applications - I
Hill County Level (3rd floor), Hyatt Regency, Pecos
2:15pm - 4:00pm

Session Developer/Session Chair:
Iyad Hijazi, *Marshall University, Huntington, WV, USA*

Session Developer/Session Co-Chair:
Youngho Park, *New Mexico State University, Las Cruces, NM, USA*

Probabilistic Methods: Risk-Based Design and Assessment
Technical Paper Publication: PVP2019-93557

Henry Cathcart, Joshua Parkinson & Mark Joyce, *Frazer-Nash Consultancy, Warrington, Cheshire, UK*
Graeme Horne, *Frazer-Nash Consultancy, Bristol, UK*
Andrew Moffat, *Frazer-Nash Consultancy, Dorking, UK*

Application of Machine Learning in Pipeline Integrity Reliability
Technical Paper Publication: PVP2019-93623

Eunice Yin, Phil Fernandes, Janine W. Doug Langer & Sherif Hassanien, *Enbridge Pipeline Inc., Edmonton, AB, Canada*

Saddle Design of a Pressure Vessel Using Machine Learning
Technical Presentation. PVP2019-93321

Ming-Che Lin, *National Kaohsiung University of Science and Technology, Kaohsiung, Taiwan*

Characterization of Piezoelectric Material Properties Using Atomistic Simualtions
Technical Paper Publication: PVP2019-93814

Youngho Park, *New Mexico State University, Las Cruces, NM, USA*
Iyad Hijazi, *Marshall University, Huntington, WV, USA*

TECHNICAL SESSION 1.3N (DA-1-1)

Design of Pressure Vessels, Heat Exchangers, and Components - I
Hill County Level (3rd floor), Hyatt Regency, Frio
2:15pm - 4:00pm

Session Developer/Session Chair:
Nathan Barkley, *Becht Engineering, Medina, OH, USA*

Session Co-Chair:
Jaan Taagepera, *Chevron ETC, Richmond, CA, USA*

Session Co-Developer:
Clay Rodery, *C&S Technology, LLC, League City, TX, USA*

Study on Buckling Strength Reduction Factor for Vertical Vessel Skirts with Access Opening by Elastic-Plastic Analysis
Technical Paper Publication: PVP2019-93517

Takuma Takahashi, Shunji Kataoka, Yoshiaki Uno & Toshikazu Miyashita, *JGC Corporation, Yokohama, Kanagawa, Japan*

Elastoplastic Solution and Limit Load Analysis of Orthotropic Cylindrical Shell Subjected to Internal Pressure
Technical Paper Publication: PVP2019-93382

Yujie Zhao, Min Xu, Chunxiao Li, Binbin Zhou, Xiaohua He & Changyu Zhou, *Nanjing Technilogie University, Nanjing, China*

Design Equation for Minimum Required Thickness of a Cylindrical Shell Subject to Internal Pressure Based on Von Mises Criterion
Technical Paper Publication: PVP2019-93155

James Lu, Barry Millet, Kenneth Kirkpatrick & Bryan Mosher, *Fluor Enterprises, Inc, Sugar Land, TX, USA*

A Study of the Conservatism in ASME BPV Section VIII Division 2 Opening Design for External Pressure
Technical Paper Publication: PVP2019-93565

Barry Millet, James Lu, Kenneth Kirkpatrick & Bryan Mosher, *Fluor Enterprises, Inc, Sugar Land, TX, USA*
Kaveh Ebrahimi, Fluor Ltd, Farnborough, UK

TUTORIAL SESSION 1.3Q (TW-2-1)

An Overview of the Proposed Updates to the 2020 Edition of API 579-1/ASME FFS-1, Fitness-For-Service - Part 1
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande W.
2:15pm - 4:00pm

Session Developer/Session Chair:
Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*

Presented by:
Phillip E. Prueter & David A. Osage, *E2G, The Equity Engineering Group, Inc., Shaker Heights, OH, USA*

Block 1.4 Monday, July 15 4:15PM - 6:00PM

TECHNICAL SESSION 1.4A (MF-16-3)

Creep and Creep-Fatigue Interaction - III
Losaya Conference Center, Bowie C 4:15pm - 6:00pm

Session Developer:
Catrin Mair Davies, *Imperial College London, London, UK*

Session Co-Developer/Session Chair:
Rita Kirchhofer, *Exponent, Menlo Park, CA, USA*

Session Co-Developers:
Frederick (Bud) Brust, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA,*
Roger Dennis, *Frazer-Nash Consultancy, Avon, UK*

Session Co-Chair:
Abdullah al Mamun, *University of Bristol, Bristol, Gloucestershire, UK*

Session Co-Developer:
Haiyang Qian, *GE Power, Avon, CT, USA*

Recent Developments in the R5 Procedures for Assessing the High Temperature Response of Structures
Technical Paper Publication: PVP2019-93838

Daniel Hughes, Marc Chevalier, David Dean, *EDF Energy, Gloucester, UK*

Correlation of Plain and Notched Bar Creep Behavior in Grade 91 Steel
Technical Paper Publication: PVP2019-94007

Yukio Takahashi & Haruhisa Shigeyama, *Central Research Institute of Electric Power Industry, Yokosuka, Japan*
John Siefert, *Electric Power Research Institute, Charlotte, NC, USA*

The Effects of Carburisation on Creep Response of Stainless Steel Components
Technical Paper Publication: PVP2019-93189

Janis Cakstins, Robert A. Ainsworth, Meini Su, *University of Manchester, Manchester, UK*

Creep Life Prediction Based on a Direct Stress Evaluation from Small Punch Creep Test
Technical Presentation. PVP2019-93481

Jeong Hwan Kim & Moon Ki Kim, *Sungkyunkwan University, Suwon, Korea (Republic)*
Bum Joon Kim, *Osan University, Osan-si, Korea (Republic)*

TECHNICAL SESSION 1.4B (MF-1-3)

Application of Fracture Mechanics in Failure Assessment - III
Losaya Conference Center, Maverick B 4:15pm - 6:00pm

Session Developer:
Abilio Jesus, *Faculty of Engineering - University of Porto, Porto, Portugal*

Session Chair:
Grzegorz Lesiuk, *Wroclaw University of Science and Technology, Wroclaw, Poland*

Session Co-Chair:
Poh-Sang Lam, *Savannah River National Lab, Aiken, SC, USA*

Multi-Scale Damage Analysis on Fatigue-Creep Process in Industrial Steel Structures
Technical Paper Publication: PVP2019-93982

Huajing Guo, Zhaoxia Li, *Southeast University, Nanjing, China*

Does the Biaxial Loading Affect the Apparent Fracture Toughness (Kc)?
Technical Paper Publication: PVP2019-94002

Chentong Chen, Hanbin Xiao, *Wuhan University of Technology, Wuhan, China*
Yuh Chao, *University of South Carolina, Columbia, SC, USA*
Poh-Sang Lam, *Savannah River National Lab, Aiken, SC, USA*

Calculation of Stress Intensity Factors for Layered Pressure Vessel Inner Layer Through Cracks
Technical Paper Publication: PVP2019-94061

Joel Hobbs, *NASA Marshall Space Flight Center, Huntsville, AL, USA*

Fractography Study of the Mixed Mode Fatigue Crack Growth Process in Pressure Vessel P355NL1 Steel
Technical Paper Publication: PVP2019-94062

Grzegorz Lesiuk, Michal Smolnicki & Wojciech Blazejewski, *Wroclaw University of Science and Technology, Wroclaw, Poland*
Jose A.F.O. Correia, *Institute of Science and Innovation in Mechanical and Industrial Engineering, Porto, Portugal,*
Mohamed El Amine Ben Seghier, *Laboratory of Petroleum Equipment's Reliability and Materials, Boumerdes, Algeria*
Abilio Jesus & Rui A.B. Calcada, *Faculty of Engineering - University of Porto, Porto, Portugal*

TECHNICAL SESSION 1.4C (MF-6-3)

Materials and Technologies for Nuclear Power Plants - III
Losaya Conference Center, Maverick A 4:15pm - 6:00pm

Session Developer/Session Chair:
Weiju Ren, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*

Session Developer/Session Co-Chair:
Randy K. Nanstad, *R&S Consultants, LLC, Oak Ridge, TN, USA*

Thermal Aging Assessment and Microstructural Investigations of Alloy 52 Dissimilar Metal Welds for Nuclear Components
Technical Paper Publication: PVP2019-93120

Miguel Yescas, Pierre Joly & Francois Roch, *Framatome, Courbevoie, France*

Consideration of Thermal Embrittlement in Alloy 316H for Advanced Non-Light Water Reactor Applications
Technical Paper Publication: PVP2019-93431

Weiju Ren, Lianshan Lin, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*

Re-evaluation of Stress Rupture Factors for Grade 91 Weldments Based on the Extended Database with the Data Collected in Japan
Technical Paper Publication: PVP2019-93331

Kazuhiro Kimura, *National Institute for Materials Science, Tsukuba, Ibaraki, Japan*
Masatsugu Yaguchi, *CRIEPI, Yokosuka-Shi, Japan*

Preliminary Characterization of RPV Materials Harvested from the Decommissioned Zion Unit 1 Nuclear Power Plant
Technical Presentation. PVP2019-93801

Mikhail Sokolov, Thomas M. Rosseel, Philip D. Edmonson & Xiang Chen, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*
Randy K. Nanstad, *R&S Consultants, LLC, Oak Ridge, TN, USA*

TECHNICAL SESSION 1.4D (CS-7-3)

ASME PCC-2
Losaya Conference Center, Seguin 4:15pm - 6:00pm

Session Developer/Session Chair:
Jaan Taagepera, *Chevron ETC, Richmond, CA, USA*

Session Co-Chair:
Clay Rodery, *C&S Technology LLC, League City, TX, USA*

What's New in PCC-2 Part 2
Technical Presentation. PVP2019-93974

Matt Boring, *Kiefner & Associates, Inc., Columbus, OH, USA*
Jaan Taagepera, *Chevron ETC, Richmond, CA, USA*

What's New in PCC-2 Part 3
Technical Presentation. PVP2019-93975

Adam Thistlethwaite, *Team Industrial Services, Inc., Kenda, LA9 7LT, Cumbria, UK*
Jaan Taagepera, *Chevron ETC, Richmond, CA, USA*

What's New in PCC-2 Part 4
Technical Presentation. PVP2019-93976

Hector Rojas, *Chevron, Houston, TX, USA*
Jaan Taagepera, *Chevron ETC, Richmond, CA, USA*

What's New in PCC-2 Part 5
Technical Presentation. PVP2019-93977

Steven Roberts, *Shell, Houston, TX, USA*
Jaan Taagepera, *Chevron ETC, Richmond, CA, USA*

TECHNICAL SESSION 1.4E (SPC-1-3)

Student Paper Competition - PhD - I
Losaya Conference Center, Bowie A 4:15pm - 6:00pm

Session Developer:
San Iyer, *Candu Energy Inc., Mississauga, ON, Canada*

Session Co-Developer/Session Chair:
Bing Li, *Kinectrics NSS, Toronto, ON, Canada*

Session Co-Chair:
Haiyang Qian, *GE Power, Avon, CT, USA*

The Effect of Ageing on Residual Stresses within a Girth Welded Stainless Steel 316 L Pipe
Technical Paper Publication: PVP2019-93289

Ryan J. Coulthard, Mahmoud Mostafavi & C.E. Truman, *University of Bristol, Bristol, UK*

Experimental Determination of the Ratcheting of the Porosity for the Study of Ductile Rupture under Cyclic Loading Conditions
Technical Paper Publication: PVP2019-93831

Al Mahdi Remmal, *Framatome / Sorbonne Université - Université Pierre et Marie Curie, La Defense, Ile De France, France*
Stéphane Marie, *Framatome, Courbevoie, France*
Jean-Baptiste Leblond, *Laboratoire d'Alembert - Sorbonne Université, Université Pierre et Marie Curie, Paris, France*

Shakedown and Limit Analysis of 45-Degree Piping Elbows under Internal Pressure and Cyclic In-Plane Bending
Technical Paper Publication: PVP2019-93263

Heng Peng & Yinghua Liu, *Tsinghua University, Beijing, China*

Simulation of Piping Ratcheting Experiments Using Advanced Plane-Stress Cyclic Elastoplasticity Models
Technical Paper Publication: PVP2019-93507

Konstantinos Chatziioannou, Yuner Huang & Spyros A. Karamanos, *The University of Edinburgh, Edinburgh, East Lothian, UK*

TECHNICAL SESSION 1.4F (SE-2-1)

Seismic Isolation
Losaya Conference Center, Bowie B 4:15pm - 6:00pm

Session Developer/Session Chair:
Osamu Furuya, *Tokyo Denki University, Saitama, Japan*

Session Developer/Session Co-Chair:
Taichi Matsuoka, *Meiji University, Kawasaki, Kanagawa 214-8571, Japan*

Variable Inertia Damper Using a Flywheel Filled by MR Fluid
Technical Paper Publication: PVP2019-93093

Taichi Matsuoka, *Meiji University, Kawasaki, Kanagawa 214-8571, Japan*

Research and Development of Three-Dimensional Isolation System for Sodium-Cooled Fast Reactor Part 3: Characteristics for Elements on Basis of Half-Scale Loading Tests
Technical Paper Publication: PVP2019-93475

Takahiro Somaki, *Obayashi Corporation, Tokyo, Japan*
Tsuyoshi Fukasawa, *Mitsubishi FBR Systemes, Tokyo, Japan*
Shigeki Okamura, *Toyama Prefectural University, Toyama, Japan*
Takayuki Miyagawa & Masato Uchita, *The Japan Atomic Power Company, Tokyo, Japan*
Tomohiko Yamamoto & Tomoyoshi Watakabe, *Japan Atomic Energy Agency, Ibaraki, Japan*
Satoshi Fujita, *Tokyo Denki University, Tokyo, Japan*

Research and Development of Three-Dimensional Isolation System for Sodium-Cooled Fast Reactor Part 4: Proposal of Optimal Combination Method for Disc Spring Units and Newly Friction Model for Sliding Elements
Technical Paper Publication: PVP2019-93480

Tsuyoshi Fukasawa, *Mitsubishi FBR Systemes, Tokyo, Japan*
Shigeki Okamura, *Toyama Prefectural University, Toyama, Japan*
Takahiro Somaki, *Obayashi Corporation, Tokyo, Japan*
Takayuki Miyagawa & Masato Uchita, *The Japan Atomic Power Company, Tokyo, Japan*
Tomohiko Yamamoto & Tomoyoshi Watakabe, *Japan Atomic Energy Agency, Ibaraki, Japan*
Satoshi Fujita, *Tokyo Denki University, Tokyo, Japan*

Study on Base-Isolation System using Air-Floating Technique
Technical Presentation. PVP2019-93518

Osamu Furuya, *Tokyo Denki University, Saitama, Japan*
Hiroshi Kurabayashi, *Vibro-System, Tokyo, Japan*
Kunio Sanpei, *Sansei AIR Danshin System, Tokyo, Japan*
Manabu Muto, Nihon Boushin, *Tokyo, Japan*

PANEL SESSION 1.4G (DA-10-5)

International Liaison Session on Bolted Joint Design and Assembly - 2
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande E.
4:15pm - 6:00pm

Session Developer/Session Chair:
Warren Brown, *Integrity Engineering Solutions, Dunsborough, WA, Australia*

Session Co-Developers:
Gys Van Zyl, *Sabic, Jubail, Saudi Arabia*
Clay Rodery, *C&S Technology, LLC, League City, TX, USA*

Session Co-Chair:
Scott Hamilton, *Hex Technology, Austin, TX, USA*

Update from Europe and France on Bolted Joints
Technical Presentation. PVP2019-93942

Hubert Lejeune, *CETIM, Nantes, France*

Update on Pressure Boundary Bolted Joint Activity from Japan
Technical Presentation. PVP2019-93963

Takashi Kobayashi, *National Institute of Technology, Numazu College, Numazu, Shizuoka, Japan*

TECHNICAL SESSION 1.4H (CS-37-2)

Improvement of Flaw Characterization Rules for FFS - II
Hill County Level (3rd floor), Hyatt Regency, Llano
4:15pm - 6:00pm

Session Developer/Session Chair:
Kunio Hasegawa, *Japan Atomic Energy Agency, Tokai mura, Ibaraki-ken, Japan*

Session Developer/Session Co-Chair:
Valery Lacroix, *Tractebel Engineering, Brussels, Belgium*

Comparison of Allowable Bending Moments for Circumferentially Flawed Pipes in ASME Boiler and Pressure Vessel Code Section XI Nonmandatory Appendix C and H
Technical Paper Publication: PVP2019-93553

Hune Tae Kim, Ji-Su Kim, Jun-Min Seo & Yun-Jae Kim, *Korea University, Seong-buk Gu, Seoul, Korea (Republic)*
Kuk-Hee Lee, *Central Research Institute, Korea Hydro & Nuclear Power, Yuseong-gu, Daejeon, Korea (Republic)*
Nam-Su Huh, *Seoul National University of Science and Technology, Seoul 139743, Korea (Republic)*

Generic Proximity Rules for Multiple Radially Oriented Planar Flaws : Technical Basis of Code Case N-877 Revision 1
Technical Paper Publication: PVP2019-93578

Pierre Dulieu & Valery Lacroix, *Tractebel Engineering, Brussels, Belgium*
Kunio Hasegawa, *Japan Atomic Energy Agency, Tokai mura, Ibaraki-ken, Japan*

Numerical Analysis of the Interaction Behaviors of Multiple Through-thickness Cracks using a Modified Fracture Strain Model
Technical Presentation. PVP2019-93609

Jian-Feng Wen, Xue-Wei Zhang, Fuzhen Xuan & Shan-Tung Tu, *East China University of Science and Technology, Shanghai, China*

Defect Interaction during Brittle Fracture
Technical Presentation. PVP2019-93602

Afaf Bouydo & Robert Gerard, *Tractebel Engineering, Woluwé Saint Lambert, Belgium*
Valery Lacroix, *Tractebel Engineering, Brussels, Belgium*
Rachid Chaouadi, *Sck.Cen, Mol, Belgium*

TECHNICAL SESSION 1.4I (MF-4-3)

European Programs in Structural Integrity - III
Hill County Level (3rd floor), Hyatt Regency, Live Oak
4:15pm - 6:00pm

Session Developer/Session Chair:
Tomas Nicak, *Framatome GmbH, Erlangen, Germany*

Session Developer/Session Co-Chair:
Antoine Andrieu, *EDF, Moret Sur Loing, France*

Session Co-Developer:
Stéphane Marie, *Framatome, Courbevoie, France*

XFEM and Standard Fracture-Mechanics Analyses of the Reactor Pressure Vessel Goesgen Based on Thermal-Hydraulics Input Data from KWU-MIX and CFD Analyses
Technical Paper Publication: PVP2019-93564

Alexander Mutz, *Kernkraftwerk Gösgen-Däniken AG, Däniken, Switzerland*
Tomas Nicak, Richard Trewin & Ingo Cremer, *Framatome GmbH, Erlangen, Germany*

European Pressure Equipment Research Council-EPERC General Presentation and First Results
Technical Presentation. PVP2019-93859

Claude Faidy, *CF Integrity Engineering, Tassin, France*

MC Procedure Accounting for the Combined, Constraint, Ductile Tearing and Loading Rate Effects
Technical Paper Publication: PVP2019-93844

Sebastian Lindqvist, *VTT Technical Research Centre of Finland Ltd, Finland*
Kim Wallin, *VTT Mfg Tec Hn, Finland*

TECHNICAL SESSION 1.4J (HPT-6-5)

HPHT Equipment Design for Oil and Gas Applications
Hill County Level (3rd floor), Hyatt Regency, Blanco
4:15pm - 6:00pm

Session Developer/Session Chair:
Kumarswamy Karpanan, *TechnipFMC, Houston, TX, USA*

Session Co-Chair:
Melanie Sarzynski, Wiss, Janney, *Elstner Associates, Inc., Houston, TX, USA*

An Update on a Case Study on Verification and Validation of API 17TR8
Technical Presentation. PVP2019-93842

Daniel Peters, *Structural Integrity Associates, Edinboro, PA, USA*
Man Pham, *Total, The Woodlands, TX, USA*
Christopher Tipple, *Structural Integrity Associates, Centennial, CO, USA*
Joseph Gomes, *OOC / DeepStar, Houston, TX, USA*

Evaluation of the Effect of Internal Pressure and Flaw Size on the Tensile Strain Capacity of X42 Vintage Pipeline using Damage Plasticity Model in XFEM
Technical Paper Publication: PVP2019-94005

Sylvester Agbo, Meng Lin, Iman Ameli, Ali Imanpour, J. J. Roger Cheng & Samer Adeeb, *University of Alberta Canada, Edmonton, AB, Canada*
Da-Ming Duan, *TransCanada Pipeline, Calgary, AB, Canada*

Probabilistic Fatigue Crack Growth Analysis of Cladded Pressure Containing Components
Technical Presentation. PVP2019-94006

Kumarswamy Karpanan, *TechnipFMC, Houston, TX, USA*
Brian Skeels, *TechnipFMC, Kingwood, TX, USA*

Fracture Mechanics Fatigue Evaluation of a Flowline Clamp Connector Using Finite Element Modeling of a Crack
Technical Paper Publication: PVP2019-94077

Curtis Sifford, Ali Shirani, *OneSubsea, Houston, TX, USA*

TECHNICAL SESSION (OAC-2-1)1.4K

Non-Destructive Testing and Evaluation
Hill County Level (3rd floor), Hyatt Regency, Nueces
4:15pm - 6:00pm

Session Co-Developer/Session Co-Chair:
Georges Bezdikian, *Georges Bezdikian Consulting, Le Vesinet, France*

Session Co-Developer/Session Chair:
Garry Young, *Entergy Services Inc, Russellville, AR, USA*

Preparation and Properties of Au/SnO2 Thermocouples for Material Testing Apparatus of Pressure Equipment
Technical Paper Publication: PVP2019-93346

Liu Xiaoliang, Xuedong Chen, Zhichao Fan & Jiang Huifeng, *Hefei General Machinery Research Institute Co. Ltd, Hefei, China*

Testing of a Non-Cylindrical Vacuum Vessel
Technical Paper Publication: PVP2019-93412

Alton Reich, Geoffrey Chew & Douglas May, *Streamline Automation LLC, Huntsville, AL, USA*

Non-Destructive Evaluation of Toughness using Instrumented Indentation Technique
Technical Presentation. PVP2019-94044

Seunghun Choi, Woojoo Kim & Dongil Kwon, *Seoul National University, Seoul, Korea (Republic)*

A Multi-factor Comprehensive Evaluation Method for Pipeline Integrity
Technical Paper Publication: PVP2019-93257

Jing Yang, Xiaolin Wang, *Dalian Research Institute of Petroleum and Petrochemicals, SINOPEC, Dalian, China*

TECHNICAL SESSION 1.4L (FSI-2-3)

Turbulence-Induced Excitation Forces and Vibrations
Hill County Level (3rd floor), Hyatt Regency, Pecan
4:15pm - 6:00pm

Session Developer/Session Chair:
Njuki Mureithi, *Ecole Polytechnique, Montreal, QC, Canada*

Session Developer/Session Co-Chair:
Daniel BROC, *CEA Saclay, Gif-sur-Yvette, France*

Random Excitation PSD Model Acting on Heat Exchanger Tube Bundle under Two Phase Flow Condition
Technical Paper Publication: PVP2019-93458

Shingo Nishida, Kazuo Hirota, Hideyuki Morita, Seinosuke Azuma, Yoshiyuki Kondo & Yoshiteru Komuro, *Mitsubishi Heavy Industries, Takasago, Hyogo, Japan*
Ryoichi Kawakami, *Mitsubishi Heavy Industries, Kobe, Hyogo, Japan*

Towards Understanding Two-Phase Flow Induced Vibration of Piping Structure with a U-bend
Technical Paper Publication: PVP2019-93686

Olufemi Bamidele, Wael Ahmed & Marwan Hassan, *University of Guelph, Guelph, ON, Canada*

Simulations of Fully-Flexible Fuel Bundle Response Due to Turbulence Excitation
Technical Paper Publication: PVP2019-93790

Osama Elbanhawy, Marwan Hassan, *University of Guelph, Guelph, ON, Canada*
Atef Mohany, *University of Ontario Institute of Technology, Whitby, ON, Canada*

A Design Guideline for Random Excitation Forces due to Two-Phase Cross Flow in Tube Bundles
Technical Paper Publication: PVP2019-94065

Colette Taylor, *Canadian Nuclear Laboratories, Petawawa, ON, Canada*
Michel Pettigrew, *CNL AECL Chalk River, Deep River, ON, Canada*

TECHNICAL SESSION 1.4M (CT-8-2)

New and Emerging Methods of Analysis and Applications - II
Hill County Level (3rd floor), Hyatt Regency, Pecos
4:15pm - 6:00pm

Session Developer/Session Chair:
Youngho Park, *New Mexico State University, Las Cruces, NM, USA*

Session Developer/Session Co-Chair:
Iyad Hijazi, *Marshall University, Huntington, WV, USA*

Optimum Design of Composite Pressure Vessel Based on a 3-Dimensional Failure Criteria
Technical Paper Publication: PVP2019-93816

James Sakai & Youngho Park, *New Mexico State University, Las Cruces, NM, USA*

How to Select the Optimized Time Step and Mesh Size for FEM Thermal Transients Simulations of PWR Vessels and Nozzles by Means of Artificial Neural Networks
Technical Paper Publication: PVP2019-93199

Nicolas Santucho, Martin Chimenti & Jose Duo, *IMPSA, Mendoza, Mendoza, Argentina*

Estimating Collapse Pressure of Centralizer Subs from Machine Learning Models
Technical Paper Publication: PVP2019-93638

Ishita Chakraborty, *Stress Engineering Services, Houston, TX, USA*

Simple Pd-Ag-H EAM Potentials for Hydrogen Storage Applications
Technical Paper Publication: PVP2019-93094

Robert Fuller, Iyad Hijazi, *Marshall University, Huntington, WV, USA*

TECHNICAL SESSION 1.4N (DA-1-2)

Design of Pressure Vessels, Heat Exchangers, and Components - II
Hill County Level (3rd floor), Hyatt Regency, Frio
4:15pm - 6:00pm

Session Developer/Session Chair:
Jaan Taagepera, *Chevron ETC, Richmond, CA, USA*

Session Developer/Session Co-Chair:
Nathan Barkley, *Becht Engineering, Medina, OH, USA*

Session Co-Developer:
Clay Rodery, *C&S Technology, LLC, League City, TX, USA*

Experimental Study on Characteristics of Condensation and Flow Resistance inside Horizontal Corrugated Low Finned Tubes
Technical Paper Publication: PVP2019-93522

Bin Ren, Xiaoying Tang, Yuqing Yang, Hongliang Lu, JieLu Wang & Jun Si, *Shanghai Institute of Special Equipment Inspection and Technical Research, Shanghai, China*

Use of Stainless Steel Tubing in Boiling Applications for Shell and Tube Heat Exchangers
Technical Paper Publication: PVP2019-93739

Sarah Radovcich, *Fluor, Santa Ana, CA, USA*
Cathleen Shargay, *Fluor, Irvine, CA, USA*
Kuntak Daru, *Fluor, Sugar Land, TX, USA*

On Design and Analysis of Fastener Locking Tabs in Highly Chaotic Flow of Primary Side of Steam Generator
Technical Paper Publication: PVP2019-93986

Reza Ghafouri-Azar, Mike Stojakovic, *Ontario Power Generation, Pickering, ON, Canada*

Methodology and Optimisation of Weight Sizing of Pressure Vessel During Pre-Project Conceptual Design
Technical Presentation. PVP2019-93408

Irawan Josodipuro, *PT Pertamina Hulu Mahakam, Balikpapan, Indonesia*

TUTORIAL SESSION 1.4Q (TW-2-2)

An Overview of the Proposed Updates to the 2020 Edition of API 579-1/ASME FFS-1, Fitness-For-Service - Part 2
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande W.
4:15pm - 6:00pm

Session Developer/Session Chair:
Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*

Presented by:
Phillip E. Prueter & David A. Osage, *E2G, The Equity Engineering Group, Inc., Shaker Heights, OH, USA*

Block 2.1 Tuesday, July 16 8:15AM - 10:00AM

TECHNICAL SESSION 2.1A (MF-15-1)

Fatigue and Fracture of Welds and Heat Affected Zones - I
Losaya Conference Center, Bowie C 8:15am - 10:00am

Session Developer:
David Rudland, *US NRC, Frederick, MD, USA*

Session Co-Developer/Session Chair:
Do-Jun Shim, *Structural Integrity Associates, San Jose, CA, USA*

Session Developer/Session Co-Chair:
Mo Uddin, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Effect of Welding Conditions on Sheets Interface Properties in Friction Stir Spot Welding of Copper
Technical Paper Publication: PVP2019-93635

Ahmed Mahgoub, Necar Merah & Abdelaziz Bazoune, *King Fahd University of Petroluem and Minerals, Dhahran, Saudi Arabia*

Study of the Fracture Toughness in Electron Beam Welds
Technical Paper Publication: PVP2019-93655

Mehdi Mokhtarishirazabad, Chris Simpson, C.E. Truman & Mahmoud Mostafavi, *University of Bristol, Bristol, UK*
Graeme Horne, *Frazer-Nash Consultancy, Bristol, UK*
Saurabh Kabra, *UKRI, Didcot, Oxfordshire, UK*
Andrew Moffat, *Frazer-Nash Consultancy, Dorking, UK*

Development of Optimized Welding Consumable for Joining Type 410 Martensitic Stainless Steel
Technical Paper Publication: PVP2019-93682

Benjamin J. Lawson, *Ohio State University, Powell, OH, USA*
Boian Alexandrov, *Ohio State University, Columbus, OH, USA*
Joseph C. Bundy, *David Benson, Hobart Brothers LLC, Troy, OH, USA*
Jorge Penso, *Shell Projects and Technology, Houston, TX, USA*

Stress Corrosion Cracking in Low Temperature Carbon Steel
Technical Paper Publication: PVP2019-93091

Sultan G Al-Harthi, Mohammad Obaid & Mohammad Sameer, *SAFCO, a SABIC Affiliate, Jubail Industrail, Eastern region, Saudi Arabia*

TECHNICAL SESSION 2.1B (MF-1-4)

Application of Fracture Mechanics in Failure Assessment - IV
Losaya Conference Center, Maverick B 8:15am - 10:00am

Session Developer/Session Chair:
Harry Coules, *University of Bristol, Bristol, UK*

Session Developer/Session Co-Chair:
Nicolas Larrosa, *University of Bristol, Bristol, UK*

Assessing Low-Constraint Fracture Toughness Test Methods Using Clamped Sent Specimens
Technical Paper Publication: PVP2019-93088

Xian-Kui Zhu & Tom McGaughy, *EWI, Columbus, OH, USA*

Analysis of Defect Interaction in Inelastic Materials
Technical Paper Publication: PVP2019-93219

Harry Coules, *University of Bristol, Bristol, UK*
Bostjan Bezensek, *Shell Global Solutions (UK) ltd., Aberdeen, UK*

The Effect of Crack Growth History on Fracture Toughness
Technical Paper Publication: PVP2019-93307

M.A. Probert, Harry Coules & C.E. Truman, *University of Bristol, Bristol, UK*
M. Hofmann, *Forschungsneutronenquelle Heinz Maier-Leibnitz (FRM II), München, Germany*

Flaw Acceptance Evaluation for the Final Disposal Canister under Earthquake Induced Rock Shear
Technical Paper Publication: PVP2019-93165

Hsoung-Wei Chou & Szu-Ying Wu, *Institute of Nuclear Energy Research, Taoyuan City, Taiwan*

TECHNICAL SESSION 2.1C (MF-6-4)

Materials and Technologies for Nuclear Power Plants - IV
Losaya Conference Center, Maverick A 8:15am - 10:00am

Session Developer/Session Chair:
Weiju Ren, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*

Session Developer/Session Co-Chair:
Randy K. Nanstad, *R&S Consultants, LLC, Oak Ridge, TN, USA*

Material Properties of Non-Irradiated Zircaloy 4 in Support of ASME Code Acceptance for Pressure Vessel Design
Technical Paper Publication: PVP2019-93654

Randy K Nanstad, *R&S Consultants LLC, Oak Ridge, TN, USA*
William L. Server, *ATI Consulting, Black Mountain, NC, USA*
Boopathy Kombaiah, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*
J. W. Geringer, *ORNL, Knoxville, TN, USA*

Impact of Carbon Macrosegregation on the Mechanical Properties of Low-Alloy Steel Forgings
Technical Paper Publication: PVP2019-94059

Remi Coppard & Pascal Coulon, *Westinghouse Electric France, Marseille, France*
Yoichi Koyama & Masaki Endo, *The Japan Steel Works, Ltd, Muroran, Hokkaido, Japan*

Isothermal Oxidation Behavior of Hastelloy N Superalloy at 650-980ºC in Air
Technical Paper Publication: PVP2019-93075

Yanling Lu & Songlin Wang, *Shanghai Institute of Applied Physics, Chinese Academy of Sciences, Shanghai, China*
Anping Dong, *Shanghai Jiaotong University, Shanghai, China*
Xingtai Zhou, *Shanghai Institute of Applied Physics, Shanghai, China*

TECHNICAL SESSION 2.1D (CS-11-1)

Extreme Pressure Equipment - I
Losaya Conference Center, Seguin 8:15am - 10:00am

Session Developer/Session Co-Chair:
Jinyang Zheng, *Zhejiang University, Hangzhou*

Session Co-Developer/Session Chair:
Jianfeng Shi, *Zhejiang University, Hangzhou, Zhejiang, China*

Effect of Plastic Deformation on Hydrogen Embrittlement Sensitivity and Strength of 2.25Cr1Mo0.25V Steel by Synchronous Hydrogen Charging Method
Technical Paper Publication: PVP2019-93510

Qing Li, Yuqi Hu, Guangxu Cheng & Zaoxiao Zhang, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*
Xiaowu Liang, *Lanzhou LS Heavy Equipment CO., Ltd, Lanzhou, Gansu, China*

Investigation of Hydrogen Diffusion Characteristics of the Heat Affected Zone of 2.25Cr-1Mo-0.25V Steel by an Electrochemical Permeation Method
Technical Paper Publication: PVP2019-93568

Xin Song, Zelin Han, Mu Qin, Yan Song & Guangxu Cheng, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*
Bin Liu, *Sinopec Shengli Oilfield, Dongying, Shandong, China*
Mu Qin, Yan Song & Guangxu Cheng, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*
Yuancai Duo, *Lanzhou LS Heavy Equipment CO., Ltd, Lanzhou, Gansu, China*

An Introduction to China National Standard for On-board High-pressure Hydrogen Storage Cylinders
Technical Paper Publication: PVP2019-93917

Gai Huang, Jinyang Zheng, Zhengli Hua & Binbin Liao, *Zhejiang University, Hangzhou, China*

Analysis on Engineering Calculations for Connected Double Tubesheets
Technical Paper Publication: PVP2019-93414

Guodong Zhu, Binan Shou, Guoshan Xie & Zhiyuan Han, *China Special Equipment Inspection and Research Institute, Beijing, China*
Caifu Qian, *Beijing University of Chemical Technology, Beijing, China*

TECHNICAL SESSION 2.1E (SPC-1-4)

Student Paper Competition - PhD - II
Losaya Conference Center, Bowie A 8:15am - 10:00am

Session Developer:
Fabrizio Paolacci, *Department of Engineering - University of Roma Tre, Rome, Italy*

Session Co-Developer:
Enrico Deri, *EDF, Chatou, France*

Session Chair:
Yasumasa Shoji, *YS Corporation LLC, Tokyo, Japan*

Session Co-Chair:
Douglas Scarth, *Kinectrics, Toronto, ON, Canada*

Finite Element Analysis of Printed Circuit Heat Exchanger Core for Creep and Creep-Fatigue Responses
Technical Paper Publication: PVP2019-93416

Heramb Mahajan & Tasnim Hassan, *North Carolina State University, Raleigh, NC, USA*

Mechanical Enhancement and Strain Sensing of Electrofusion Joint with Carbon-Fiber-Reinforced Polyethylene
Technical Paper Publication: PVP2019-93347

Riwu Yao, Jianfeng Shi & Jinyang Zheng, *Zhejiang University, Hangzhou, China*

CFD Analysis and Structural Safety Assessment of a Bypass Mitigation Device Used During an Ti-Sgtr Accidental Release From a MSSV
Technical Paper Publication: PVP2019-93511

Wung Jae Wang & Man Sung Yim, *KAIST, Daejeon, Korea (Republic)*

Investigation of the Seismic Risk of Industrial Pipe Rack and Piping Systems Accounting for Soil-Structure Interaction
Technical Paper Publication: PVP2019-93601

Georgios Karagiannakis, *University of Sannio, Benevento, Campania, Italy*
Luigi Di Sarno, *University of Sannio, Naples, Campania, Italy*

TECHNICAL SESSION 2.1F (SE-3-1)

Vibration and Control - I
Losaya Conference Center, Bowie B 8:15am - 10:00am

Session Developer/Session Chair:
Fabrizio Paolacci, *Department of Engineering - University of Roma Tre, Rome, Italy*

Session Developer/Session Co-Chair:
Keisuke Minagawa, *Saitama Institute of Technology, Saitama, Japan*

Research and Development of Viscous Fluid Dampers for Improvement of Seismic Resistance of Thermal Power Plants Part 7 Evaluation of Lifetime Using Experimental Design Method
Technical Paper Publication: PVP2019-93534

Kiyoshi Aida, *Mitsubishi Hitachi Power Systems, Ltd., Kure-Shi, Japan*
Keisuke Minagawa, *Saitama Institute of Technology, Saitama, Japan*
Go Tanaka, *Oiles Corp, Tochigi, Japan*
Satoshi Fujita, *Tokyo Denki University, Tokyo, Japan*

Research and Development of Viscous Fluid Dampers for Improvement of Seismic Resistance of Thermal Power Plants Part 8 Evaluation of Vibration Control Performance Using Experimental Design Method
Technical Paper Publication: PVP2019-93535

Keisuke Minagawa, *Saitama Institute of Technology, Saitama, Japan*
Kiyoshi Aida, *Mitsubishi Hitachi Power Systems, Ltd., Kure-Shi, Japan*
Go Tanaka, *Oiles Corp, Tochigi, Japan*
Satoshi Fujita, *Tokyo Denki University, Tokyo, Japan*

Vibration Control of Buildings Using Series Rolling-Pendulum Tuned Mass Dampers
Technical Paper Publication: PVP2019-93968

Jer-Fu Wang & Chun-Hung Chen, *National United University, Maili, Taiwan*
Chang-Ching Chang, *National Center for Research on Earthquake Engineering, Taipei, Taiwan*
Chi-chang Lin, *Nat'l Chung-hsing University, Taichang, Taiwan*

TECHNICAL SESSION 2.1G (DA-10-3)

Assembly of Bolted Joints
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande E.
8:15am - 10:00am

Session Developer/Session Chair:
Warren Brown, *Integrity Engineering Solutions, Dunsborough, WA, Australia*

Session Co-Developer:
Gys Van Zyl, *Sabic, Jubail, Saudi Arabia*

Session Co-Chair:
Clay Rodery, *C&S Technology, LLC, League City, TX, USA*

A Proposed Framework for the Training and Qualification of Personnel Involved in Field Machining of Bolted Flanged Joints
Technical Paper Publication: PVP2019-93427

Clay Rodery, *C&S Technology, LLC, League City, TX, USA*
Scott Hamilton, *Hex Technology, Austin, TX, USA*
Neil Ferguson, *Team Industrial Services, Inc., Alvin, TX, USA*

A Study on the Reuse of Xylan 1424 Studs
Technical Paper Publication: PVP2019-93628

Mark Ruffin, *Chevron, El Segundo, CA, USA*

Defining the How and When to Execute Single Stud Replacement (SSR) of Bolted Flanged Joints
Technical Paper Publication: PVP2019-93687

Clay Rodery, *C&S Technology, LLC, League City, TX, USA*
Scott Hamilton, *Hex Technology, Austin, TX, USA*
Neil Ferguson, *Team Industrial Services, Inc., Alvin, TX, USA*
Gonghyun Jung, *Shell Global Solutions, Houston, TX, USA*

Further Work on Analyzing Accuracy and Overall Performance of Torque Tools for Assembling Bolted Flanged Joints
Technical Paper Publication: PVP2019-93691

Clay Rodery, *C&S Technology, LLC, League City, TX, USA*
Scott Hamilton, *Hex Technology, Austin, TX, USA*
Neil Ferguson, *Team Industrial Services, Inc., Alvin, TX, USA*

TECHNICAL SESSION 2.1H (DA-8-3)

FFS involving Fracture Mechanics
Hill County Level (3rd floor), Hyatt Regency, Llano
8:15am - 10:00am

Session Developer/Session Chair:
Jan Keltjens, *SABIC, Geleen, Netherlands*

Session Co-Chair:
Kannan Subramanian, *Stress Engineering Services, Metairie, LA, USA*

Repair of High Temperature Flue Gas Line in Fluid Catalytic Cracking (FCC) Service
Technical Paper Publication: PVP2019-93539

Siva Kumar Chiluvuri, *Shell Japan Ltd, Yokohama, Japan*
Jorge Penso, *Shell Projects and Technology, Houston, TX, USA*
Yeswanth Kumar Adusumilli, *Shell Eatern Petroleum (Pte) Ltd, Singapore, Singapore*

Engineering Critical Assessment for Post Weld Heat Treatment for Full-Encirclement Tees Greater than 1.25 Inches Thick
Technical Paper Publication: PVP2019-93571

Kolton Landreth & Qi Li, Raghav Marwaha, *T. D. Williamson, Tulsa, OK, USA*

Hydrogen Induced Cracking Damage Estimation and Evaluation
Technical Presentation: PVP2019-93735

Kannan Subramanian, *Stress Engineering Services, Metairie, LA, USA*
James Johnson, *Stress Engineering Services, Houston, TX, USA*
Jorge Penso, *Shell Projects and Technology, Houston, TX, USA*

Reduced Toughness Fittings and Potential Effect on Low-Temperature Fitness for Service
Technical Presentation: PVP2019-93749

Kannan Subramanian, *Stress Engineering Services, Metairie, LA, USA,*
Ralph King & Daniel Ayewah, *Stress Engineering Services, Houston, TX, USA*

TECHNICAL SESSION 2.1I (CS-1-1)

Structural Integrity of Pressure Components - I
Hill County Level (3rd floor), Hyatt Regency, Live Oak
8:15am - 10:00am

Session Developer:
Michael Benson, *U. S. Nuclear Regulatory Commission, Washington, DC, DC, USA*

Session Co-Developer:
Steven Xu, *Kinectrics, Toronto, ON, Canada*

Session Chair:
Giovanni Facco, *U.S. Nuclear Regulatory Commission, Washington, D.C., DC, USA*

Session Co-Chair:
Blair Carroll, *Canadian Nuclear Safety Commission, Ottawa, ON, Canada*

Review of Pressure Vessel Code rules on Cold Forming Limits and Heat Treatment Requirements
Technical Paper Publication: PVP2019-93113

Kang Xu & James White, *Praxair, Tonawanda, NY, USA*
Mahendra Rana, Praxair, NIANTIC, CT, USA

HRSG-Piping Weld Residual-stress Measurement to Assess Influence over Creep-analysis Results from Italian Code, American Standard
Technical Paper Publication: PVP2019-93429

Ottaviano Grisolia, *INAIL, Central Research Dir., Technology Dept., Rome, Italy*
Lorenzo Scano & Francesco Piccini, *Studio Scano Associato, Safety & Integrity, Udine, Italy*
Antonietta Lo Conte, *Politecnico Di Milano, Department of Mechanical Engineering, Milan, Italy*
Massimiliano De Agostinis & Stefano Fini, *University of Bologna, Bologna, Italy*

Heat Treatment of Fabricated Components and the Effect on Properties of Materials
Technical Paper Publication: PVP2019-93616

Shyam Gopalakrishnan, *Lloyd's Register Asia, Thane-West, India*
Ameya Mathkar, *Lloyd's Register Asia, Thane, Maharashtra, India*

Production Impact Testing Exemption for Round Seams (Category B Welds) of Welded Pressure Vessel in ASME Section VIII Division 1
Technical Paper Publication: PVP2019-93759

Sreelatha Kilambi, *GasTech Engineering LLC, Broken Arrow, OK, USA*

PANEL SESSION 2.1J (HPT-6-6)

HPHT Equipment Design for Subsea Oil and Gas Applications - Industry Lessons Learned
Hill County Level (3rd floor), Hyatt Regency, Blanco
8:15am - 10:00am

Session Developer/Session Chair:
Man Pham, *Total, The Woodlands, TX, USA*

Session Developer/Session Co-Chair:
Christopher Tipple, *Structural Integrity Associates, Centennial, CO, USA*

Panelists:
Jim Kaculi, *Dril-Quip, The Woodlands, TX, USA*
Matt Vlacavik, *Chevron, City, State, Country*
Jim Raney, *Anadarko, City, State, Country*
Mohsen Shavandi, *DNVGL, City, State, Country*

HPHT Equipment Design for Subsea Oil and Gas Applications
Technical Presentation: PVP2019-94083

Jim Kaculi, *Dril-Quip Inc., Houston, TX, USA*

TECHNICAL SESSION 2.1K (OAC-3-1)

Monitoring, Diagnostics and Inspection
Hill County Level (3rd floor), Hyatt Regency, Nueces
8:15am - 10:00am

Session Developer/Session Chair:
Milan Brumovsky, *UJV Rez Plc, Husinec-Rez, Czech Republic*

Session Developer/Session Co-Chair:
L. Ike Ezekoye, *Ezekoye Engineering Services, LLC, Pittsburgh, PA, USA*

Application of Transient Electromagnetic Method in Urban Buried Gas Pipeline Detection
Technical Paper Publication: PVP2019-93212

Pan Song, Xiaoying Tang, Zhe Pu, Bin Ren, JieLu Wang & Shaojun Wang, *Shanghai Institute of Special Equipment Inspection and Technical Research, Shanghai, China*

Prediction of Flow-Accelerated Corrosion/ Erosion in High-Speed Ejectors Using a CFD Model
Technical Paper Publication: PVP2019-93668

Saurish Das, *Shell Technology Center, Bangalore, India*
Suranjan Sarkar, *Shell Technology Center, Bengaluru, India*
Gary Lee, Junxiong Ong, *Royal Dutch Shell, Kuala Lumpur, Malaysia*

A Wax Deposition Program in Two Phase Oil-Gas Tubing
Technical Presentation: PVP2019-93469

Shengnan Zhang, Di Fan, Wei Wang & Jing Gong, *China University of Petroleum, Beijing, China*

Data-Driven Soft-Sensor Modelling for the Prediction of Flow-Accelerated Corrosion of Air Cooler Based on Neural Network Optimized by PSO Algorithm
Technical Paper Publication: PVP2019-93231

Yong Gu, Haozhe Jin & Guofu Ou, *Zhejiang Sci-Tec University, Hangzhou, Zhejiang, China*

TECHNICAL SESSION 2.1L (FSI-2-4)

FIV in Heat Exchanger Tube Arrays - I
Hill County Level (3rd floor), Hyatt Regency, Pecan
8:15am - 10:00am

Session Developer:
Michel Pettigrew, *CNL AECL Chalk River, Deep River, ON, Canada*

Session Co-Developer:
Wei Tan, *Tianjin University, Tianjin, China*

Session Co-Chair:
Victor Janzen, *Victorpjanzen.com, Pembroke, ON, Canada*

Session Chair:
Atef Mohany, *University of Ontario Institute of Technology, Whitby, ON, Canada*

Influence of the Pitch-to-Diameter Ratio on Two-Phase Flow-Induced Forces across a Tube Bundle
Technical Paper Publication: PVP2019-93319

Enrico Deri, *EDF, Chatou, France*

Investigation on Fluidelastic Instability Accompanied by Wake Shedding with a Time-domain Model
Technical Paper Publication: PVP2019-93339

Kai Guo, Yipeng Wang, Tong Su, Liyan Liu, Zhanbin Jia & Wei Tan, *Tianjin University, Tianjin, Tianjin, China*

Experimental Investigation of Fluid Elastic Vibration of Square Array Tube Bundle in Two Phase Flow
Technical Paper Publication: PVP2019-93473

Ryoichi Kawakami & Toshifumi Nariai, *Mitsubishi Heavy Industries, Kobe, Hyogo, Japan*
Seinosuke Azuma, Kazuo Hirota, Hideyuki Morita, Yoshiyuki Kondo & Yoshiteru Komuro, *Mitsubishi Heavy Industries, Takasago, Hyogo, Japan*

Unsteady Fluid Force and Random Excitation Force Measurement of Triangular Array Tube Bundle in Steam-Water Two Phase Flow
Technical Paper Publication: PVP2019-93246

Shingo Nishida, Kazuo Hirota, Hideyuki Morita, Yoshiyuki Kondo & Seiho Utsumi, *Mitsubishi Heavy Industries, Takasago, Hyogo, Japan*
Ryoichi Kawakami, *Mitsubishi Heavy Industries, Kobe, Hyogo, Japan*

TECHNICAL SESSION 2.1M (NDPD-1-1)

Non-Destructive Evaluation (NDE) Research - I
Hill County Level (3rd floor), Hyatt Regency, Pecos
8:15am - 10:00am

Session Developer/Session Chair:
Min Zhang, *Praxair, Tonawanda, NY, USA*

Session Co-Chair:
Vivek Agarwal, *Idaho National Laboratory, Idaho Falls, ID, USA*

Civa Simulation and Experiment Verification for Thin-Walled Small-Diameter Pipes Used Phased Array Ultrasonic Testing
Technical Paper Publication: PVP2019-93308

Jun Si, Daoxiang Wei, Yuqing Yang & Xiaoying Tang, *Shanghai Institute of Special Equipment Inspection and Technical Research, Shanghai, China*

Towards a Viable Field Deployable Ultrasonic Technique for Detection of Type IV Creep Damage in CSEF Steels at an Early Stage
Technical Paper Publication: PVP2019-93692

Harendra Kumar, *National Structural Integrity Research Centre, Cambridge, UK*
Jack Lambert & Channa Nageswaran, *TWI Ltd, Cambridge, UK*
Hari-Babu Nadendla & Tat-Hean Gan, *Brunel University London, London, UK*

Concrete Structural Health Monitoring in Nuclear Power Plants
Technical Presentation: PVP2019-93595

Vivek Agarwal, *Idaho National Laboratory, Idaho Falls, ID, USA*

Proving Pipelines Safety through Integration of non-ILI to ILI Integrity Programs
Technical Paper Publication: PVP2019-93716

Mahmoud Ibrahim, Sherif Hassanien, Lyndon Lamborn & Yvan Hubert, *Enbridge Pipeline, Inc., Edmonton, AB, Canada*

TECHNICAL 2.1N SESSION (DA-1-5)

Design of Compact Heat Exchangers for Nuclear Power Applications - I
Hill County Level (3rd floor), Hyatt Regency, Frio 8:15am - 10:00am

Session Developer/Session Chair:
Tasnim Hassan, *NC State University, Raleigh, NC, USA*

Session Co-Developer:
Nathan Barkley, *Becht Engineering, Medina, OH, USA*

Session Co-Chair:
Mohamed Elbakhshwan, *University of Wisconsin Madison, Madison, WI, USA*

A Flexible Tool for Modeling Thermal Loading in Printed Circuit Heat Exchangers
Technical Paper Publication: PVP2019-93773

Ian Jentz, *University of Wisconsin, Department of Engineering Physics, Madison, WI, USA,*
Mark Anderson, *University of Wisconsin, Madison, WI, USA*

Thermo-Mechanical Simulation and Burst Test Experiments of Printed Circuit Heat Exchangers for High-Temperature Applications
Technical Presentation: PVP2019-93121

Xiaodong Sun, Xiaoqin Zhang & Minghui Chen, *University of Michigan, Ann Arbor, MI, USA*

Advances towards Elastic-Perfectly Plastic Simulation of the Core of Printed Circuit Heat Exchangers
Technical Paper Publication: PVP2019-93807

Alon Katz & Devesh Ranjan, *Georgia Institute of Technology, Atlanta, GA, USA*

Evaluation of Printed Circuit Heat Exchanger Core Based on Simplified Elastic-Perfectly Plastic Analysis Methodology for High Temperature Nuclear Service
Technical Paper Publication: PVP2019-93468

Urmi Devi, Machel Morrison & Tasnim Hassan, *North Carolina State University, Raleigh, NC, USA*

TUTORIAL SESSION 2.1Q (TW-2-3)

Construction of Pressure Vessels to ASME Section VIII, Division 3 - Part 1
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande W.
8:15am - 10:00am

Session Developer/Session Chair:
Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*

Presented by:
J. Robert (Bob) Sims, *Becht Engineering Co., Inc.*

Block 2.2 Tuesday, July 16 10:15AM - 12:00PM

TECHNICAL SESSION 2.2A (MF-15-2)

Fatigue and Fracture of Welds and Heat Affected Zones - II
Losaya Conference Center, Bowie C
10:15am - 12:00pm

Session Developer/Session Chair:
Mo Uddin, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Session Developer/Session Co-Chair:
Do-Jun Shim, *Structural Integrity Associates, San Jose, CA, USA*

Session Co-Developer:
David Rudland, *US NRC, Frederick, MD, USA*

A Novel Approach to Account for Weld Residual Stresses in Pressure Vessel Flaw Assessments
Technical Paper Publication: PVP2019-94022

Frederick (Bud) Brust, Lance Hill, Gery Wilkowski & Yunior Hioe, *Engineerng Mechanics Corporation of Columbus, Upper Arlington, OH, USA*
Kenneth Bagnoli, *ExxonMobil Research and Engineering, Spring, TX, USA*

Effect of Residual Stress on High Temperature Hydrogen Attack for Pressure Vessels of Carbon Steel
Technical Paper Publication: PVP2019-94058

Yuta Honma & Kunihiko Hashi, *The Japan Steel Works, Ltd., Muroran-shi, Hokkaido, Japan*

Activated Flux - Gas Tungsten Arc Welding of P92-304H Dissimilar Steels for Improved Weld Bead Geometry
Technical Paper Publication: PVP2019-94025

Pratishtha Sharma & Dheerendra Kumar Dwivedi, *IIT, Roorkee, Uttarakhand, India*

TECHNICAL SESSION 2.2B (MF-1-5)

Application of Fracture Mechanics in Failure Assessment - V
Losaya Conference Center, Maverick B 10:15am - 12:00pm

Session Developer/Session Chair:
Preeti Doddihal, *Kinectrics Inc., Toronto, ON, Canada*

Session Co-Developer:
Douglas Scarth, *Kinectrics, Toronto, ON, Canada*

Session Co-Chair:
Jessica Lam, *Ontario Power Generation (OPG), Pickering, ON, Canada*

Finite Element Verification of Engineering Equations for Prediction of Structural Strength of Annulus Spacers in CANDU Nuclear Reactors
Technical Paper Publication: PVP2019-93671

Preeti Doddihal, Douglas Scarth & Yu Chen, *Kinectrics Inc., Toronto, ON, Canada*
Dennis Kawa, *Kedward, Kawa and Associates Ltd, Winnipeg, MB, Canada*

Specimen Curvature and Size Effects on Crack Growth Resistance from Compact Tension Specimens of CANDU Pressure Tubes
Technical Paper Publication: PVP2019-93318

Bruce Williams & William R. Tyson, *CanmetMaterials, Hamilton, ON, Canada*
C. Hari M. Simha, *University of Guelph, Guelph, ON, Canada*
Bogdan Wasiluk, *Canadian Nuclear Safety Commission, Ottawa, ON, Canada*

A Simplified Large Thin Plate Model for Modeling Fracture Behavior of a Hydrided Irradiated Zr-2.5Nb Pressure Tube Specimen with an Axial Crack
Technical Paper Publication: PVP2019-93762

Shin-Jang Sung & Jwo Pan, *University of Michigan, Ann Arbor, MI, USA*
Cheng Liu & Douglas Scarth, *Kinectrics, Toronto, ON, Canada*

Deformation Behavior and J-integral of Macroscopic Hydride Platelet Clusters in Hydrided Zr-2.5Nb Pressure Tube Materials under Plane Strain Conditions
Technical Paper Publication: PVP2019-93763

Shengjia Wu & Jwo Pan, *University of Michigan, Ann Arbor, MI, USA*
Douglas Scarth, *Kinectrics, Toronto, ON, Canada*
Sterling St Lawrence, *Canadian Nuclear Laboratories, Chalk River, ON, Canada*

TECHNICAL SESSION 2.2C (MF-6-5)

Materials and Technologies for Nuclear Power Plants - V
Losaya Conference Center, Maverick A
10:15am - 12:00pm

Session Developer/Session Chair:
Weiju Ren, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*

Session Developer/Session Co-Chair:
Randy K. Nanstad, *R&S Consultants, LLC, oak ridge, TN, USA*

Irradiation Embrittlement Behavior and Prediction Model of Chinese Reactor Pressure Vessel Steel A508-3
Technical Paper Publication: PVP2019-93570

Wei H. Zhong, Zhen F. Tong, Guang S. Ning, Hu Lin, Chang Y. Zhang & Wen Yang, *China Institute of Atomic Energy, Beijing, China*

Assessment of Structural Integrity on Irradiated Steel Structure: Focusing On Long Column Type Reactor Pressure Vessel Supports
Technical Paper Publication: PVP2019-93640

Goeun Han, *Korea Hydro & Nuclear Power Co., Gyeongju, Gyeongsangbuk-do, Korea (Republic)*
Sukru Guzey, *Purdue University, West Lafayette, IN, USA*

Fracture Toughness Criteria of Irradiated Austenitic Stainless Steels for Structural Integrity Evaluation of BWR Internal Components
Technical Paper Publication: PVP2019-93441

Takahiro Hayashi, Shigeaki Tanaka & Tomonori Abe, *Toshiba Energy Systems & Solutions Corporation, Yokohama, Kanakaga, Japan*
Seiji Sakuraya, *Nippon Nuclear Fuel Development, Higashi-ibaraki-gun, Ibaraki-ken, Japan*
Suguru Ooki & Takayuki Kaminaga, *Tokyo Electric Power Company Holdings, Tokyo, Japan*

Susceptibility to Neutron Irradiation Embrittlement of Heat Affected Zone of Reactor Pressure Vessel Steels
Technical Paper Publication: PVP2019-94011

Hisashi Takamizawa, Tohru Tobita & Yutaka Nishiyama, *Japan Atomic Energy Agency, Tokai-Mura, Ibaraki-Ken, Japan,*
Jinya Katsuyama, Yoosung Ha, & Kunio Onizawa, *Japan Atomic Energy Agency, Ibaraki, Japan*

TECHNICAL SESSION 2.2D (CS-11-2)

Integrity Management
Losaya Conference Center, Seguin
10:15am - 12:00pm

Session Developer/Session Chair:
Guodong Jia, *State Administration for Market Regulation of People's Republic of China, Beijing, China*

Session Co-Chair:
Guide Deng, *China Special Equipment Inspection Research Institute, Beijing, China*

Analysis of the Gasket Damage and Sealing Performance for the Thread Ring Block Heat Exchanger
Technical Paper Publication: PVP2019-93055

Fakun Zhuang, Wen Liu, Guoshan Xie, Shanshan Shao & Zhiyuan Han, *China Special Equipment Inspection and Research Institute, Beijing, China*
Wen Sui, *North Huajin Chemical Industries Group Corporation, Panjin, China*

Comparison and Analysis of Effective Guided Wave Standards between GB and ASTM
Technical Paper Publication: PVP2019-93106

Ju Ding, ShuHong Liu, Chenhuai Tang, XuChen Zhu & Yuqing Yang, *Shanghai Institute of Special Equipment Inspection and Technical Research, Shanghai, China*
Min Zhang, *Praxair, Tonawanda, NY, USA*
Dengchao Tang, *Xi'an Jiaotong Univercity, Xi'an, China*

Similarity Aggregation Method Based Fuzzy Fault Tree Analysis Approach and Its Application
Technical Paper Publication: PVP2019-93109

Wei Wu, Changhua Liu, Ke Song & Yong Dan, *Northwest University, Xi'an, China*
Hailong Yin, Haijun Hu, *Xi'an Jiaotong University, Xi'an, China*

Analysis of Detection Quality for Ultrasonic Guided Wave with L (0,2) and T(0,1) in the Pressure Pipe
Technical Paper Publication: PVP2019-93203

Shuhong Liu, Ju Ding, Chenhuai Tang, Pan Song, Ye Zhang & Yuqing Yang, *Shanghai Institute of Special Equipment Inspection and Technical Research, Shanghai, China,*
Dengchao Tang, *Xi'an Jiaotong University, Xi'an, China,*

TECHNICAL SESSION 2.2E (SPC-2-1)

Student Paper Symposium - PhD - I
Losaya Conference Center, Bowie A
10:15am - 12:00pm

Session Developer:
Noel P. O`Dowd, *University of Limerick, Limerick, Ireland*

Session Co-Developer:
Yasumasa Shoji, *YS Corporation LLC, Tokyo, Japan*

Session Chair:
Haiyang Qian, GE Power, Avon, CT, USA

Session Co-Chair:
Daniel Hughes, *EDF Energy, Gloucester, UK*

Study on Fatigue Crack Growth Behavior of Zr702/TA2/Q345R Composite Plate with a Through-Wall Crack and a Crack Normal To Interface for SENT Specimen
Technical Paper Publication: PVP2019-93325

Binbin Zhou, Changyu Zhou & Xiaohua He, *Nanjing Tech University, Nanjing, China*

Model and Experimental Analysis of the Fiber-reinforced Pultrusion Composites under Tension and Shear
Technical Paper Publication: PVP2019-93286

Qian Zhang, Yanting Zhang & Wenchun Jiang, *China University of Petroleum, Qingdao, China*

Resilience Calculation of Process Plants Under Seismic Loading: A Case Study
Technical Paper Publication: PVP2019-93311

Bledar Kalemi, Antonio Caputo & Fabrizio Paolacci, *University of Roma Tre, Rome, Italy*

TECHNICAL SESSION 2.2F (SE-3-2)

Vibration and Control - II
Losaya Conference Center, Bowie B
10:15am - 12:00pm

Session Developer/Session Chair:
Keisuke Minagawa, *Saitama Institute of Technology, Saitama, Japan*

Session Developer/Session Co-Chair:
Fabrizio Paolacci, *University of Roma Tre, Rome, Italy*

High Performance Structural Vibration Control by a Preview of the Future Seismic Waveform Generated with a Wave Transmission Network and an AI-based Estimation System
Technical Paper Publication: PVP2019-93184

Kazuhiko Hiramoto, *Niigata University, Niigata, Japan*
Taichi Matsuoka, *Meiji University, Kawasaki, Kanagawa 214-8571, Japan*
Katsuaki Sunakoda, *Akita University, Saitama, Japan*

Study on Active Vibration Control of Seismic Isolation Structure with Variable Gain using Spectrum Monitoring
Technical Paper Publication: PVP2019-93603

Ukyo Fujiwara, Nanako Miura, Akira Sone, *Kyoto Institute of Technology, Kyoto, Japan*

Development of Active Vibration Damping Device Adjusting TMD to Various Periodic Bands of Seismic Waves
Technical Paper Publication: PVP2019-93780

Kota Watanabe, Nanako Miura, Akira Sone, *Kyoto Institute of Technology, Kyoto, Japan*

Optimal Design of Tuned Mass Dampers with Variable Inerter and Damping
Technical Paper Publication: PVP2019-93966

Chang-Ching Chang, *National Center for Research on Earthquake Engineering, Taipei, Taiwan*
Jer-Fu Wang, *National United University, Miaoli, Taiwan*
Chi-Chang Lin & Tzu-Ting Lin, *National Chung Hsing University, Taichung, Taiwan*
Chih-Shiuan Lin, *National Rail Transit Electrification and Automation Engineering Technology Research Center, Hong Kong, China*

TECHNICAL SESSION 2.2G (CT-1-1)

Design and Analysis of Bolted Flanged Joints - I
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande E.
10:15am - 12:00pm

Session Developer/Session Chair:
Toshiyuki Sawa, *Hiroshima University, Koto-city, Japan*

Session Developer/Session Co-Chair:
Manfred Schaaf, *AMTEC Gmbh, Lauffen, Germany*

Effect of Tightening Procedure on the Sealing Performance of Bolted Gasketed Pipe Flange Connections
Technical Paper Publication: PVP2019-93497

Xing Zheng, *Valqua Seal Products Co. Ltd, Shanghai, China*
Koji Sato, *Nippon Valqua Industries Ltd., Gojo, Japan*
Takahiro Fujihara, Yoshiko Akamtsu, *Valqua Ltd., Gojo, Japan*
Toshiyuki Sawa, *Hiroshima University, Koto, Japan*

The Effects of Bolt Tightening Sequences on the Mechanical Behaviors of Gasketed Flange Joint
Technical Paper Publication: PVP2019-93239

Chia-Lung Chang & Jung Xian Huang, *National Yunlin University of Science & Technology, Douliu, Yunlin, Taiwan*

New Developments in PTFE Sheet Gaskets with Engineered Surface Profile
Technical Paper Publication: PVP2019-93206

James Drago, *Garlock Sealing Technologies, Palmyra, NY, USA*

Optimization of Valves Packings through Characterization and Calculation
Technical Paper Publication: PVP2019-93045

Hubert Lejeune & Frederic Joulain, *CETIM, Nantes, France*

TECHNICAL SESSION 2.2H (DA-8-2)

FFS for High Temperature Applications
Hill County Level (3rd floor), Hyatt Regency, Llano
10:15am - 12:00pm

Session Developer/Session Chair:
James Johnson, *Stress Engineering Services, Houston, TX, USA*

Session Co-Chair:
Kannan Subramanian, *Stress Engineering Services, Metairie, LA, USA*

Property Degradation and Residual Life Assessment of Service Exposed Reformer Tubes
Technical Paper Publication: PVP2019-93348

Zhiyuan Han, Guoshan Xie & Luowei Cao, *China Special Equipment Inspection and Research Institute, Beijing, China*
Likun Wang & Guohao Sun, *The Research Institute of Dushanzi Petrochemical Company, Dushanzi, China*

High Temperature Hydrogen Attack Life Assessment
Technical Presentation: PVP2019-93320

James Johnson, *Stress Engineering Services, Houston, TX, USA*
Brian Olson, *Stress Engineering Services, The Woodlands, TX, USA*
Mike Swindeman, *Stress Engineering Services, Inc, Mason, OH, USA*

Use of CFD to Improve Control Valve Effectiveness
Technical Paper Publication: PVP2019-93417

Alton Reich, *Streamline Automation, LLC, Huntsville, AL, USA*

TECHNICAL SESSION 2.2I (CS-1-2)

Structural Integrity of Pressure Components - II
Hill County Level (3rd floor), Hyatt Regency, Live Oak
10:15am - 12:00pm

Session Developer:
Michael Benson, *U. S. Nuclear Regulatory Commission, Washington, DC, USA*

Session Chair:
Blair Carroll, *Canadian Nuclear Safety Commission, Ottawa, ON, Canada*

Session Co-Chair:
Steven Xu, *Kinectrics, Toronto, ON, Canada*

Proposed Modifications to API 579 Part 3 Brittle Fracture Screening Procedures
Technical Paper Publication: PVP2019-93207

Brian Macejko, Seetha Ramudu Kummari & Phillip Prueter, *The Equity Engineering Group, Inc., Shaker Heights, OH, USA*

Stress Intensity Factors for an Edge Crack Interacting with an Embedded Parallel Crack for a Finite Plate under Pure Bending
Technical Paper Publication: PVP2019-93248

Qin Ma, *Walla Walla University, College Place, WA, USA*
Mordechai Perl, *Ben Gurion University of The Negev, Beer Sheva, Beer Sheva, Israel*
Cesar Levy, *Florida International University, Miami, FL, USA*

Application of Weibull Stress to Investigate the Interaction of Coplanar Cracks
Technical Paper Publication: PVP2019-93577

Linyi Zhu, Yuebing Li & Zengliang Gao, *Zhejiang University of Technology, Hangzhou, China*
Yuebao Lei, *EDF Energy, Gloucester, UK,*

Inclusion of Thin Wall Constraint Effects in Fracture Mechanics Evaluations
Technical Presentation: PVP2019-93747

Kannan Subramanian, *Stress Engineering Services, Metairie, LA, USA*
Mahendra Rana, *Praxair, Niantic, CT, USA*

PANEL SESSION 2.2J (HPT-6-7)

HPHT Equipment Design - Standards and Certification - Discussion on Application of API 17TR8
Hill County Level (3rd floor), Hyatt Regency, Blanco
10:15am - 12:00pm

Session Developer/Session Chair:
Jim Kaculi, *Dril-Quip Inc., Houston, TX, USA*

Session Developer/Session Co-Chair:
Kumarswamy Karpanan, *TechnipFMC, Houston, TX, USA*

Panelists:
David Miller, *API Standards Development, Global Industry Services*
Ben Hantz, *ASME VIII-2 Design by Analysis*
Dan Peters, *ASME VIII-3*
Russel Hoshman, *BSEE*

TECHNICAL SESSION 2.2K (OAC-5-1)

Design, Testing, Qualification and Failure of Valves
Hill County Level (3rd floor), Hyatt Regency, Nueces
10:15am - 12:00pm

Session Developer/Session Chair:
L. Ike Ezekoye, *Ezekoye Engineering Services, LLC, Pittsburgh, PA, USA*

Session Developer/Session Co-Chair:
Milan Brumovsky, *UJV Rez Plc, Husinec-Rez, Czech Republic*

Valve Modeling Methods for Modal Analysis
Technical Paper Publication: PVP2019-93904

Ronald Farrell, *Flowserve Corporation, Raleigh, NC, USA*
L. Ike Ezekoye, *Ezekoye Engineering Services, LLC, Pittsburgh, PA, USA*

Use of Engineered Materials to Reduce Both Strainer Head Loss and Fiber By-Pass for Emergency Core Cooling Systems
Technical Paper Publication: PVP2019-93681

Alan J. Bilanin, Andrew Kaufman & Warren Bilanin, *Continuum Dynamics, Inc., Ewing, NJ, USA*

Development of Valve Performance Qualification Methodology and Testing
Technical Presentation: PVP2019-93342

Irawan Josodipuro, *PT Pertamina Hulu Mahakam, Balikpapan, Indonesia*

The Design and Analysis of a Containment Vacuum and Pressure Vessel System
Technical Paper Publication: PVP2019-93757

John Bernardin, David Hathcoat, David Sattler, Dusan Spernjak, Erik Swensen & Anna Llobet Megias, *Los Alamos National Laboratory, Los Alamos, NM, USA*

TECHNICAL SESSION 2.2L (FSI-2-5)

Axial-Flow-Induced Vibrations and Damping
Hill County Level (3rd floor), Hyatt Regency, Pecan
10:15am - 12:00pm

Session Developer:
Heung Seok Kang, *Korea Atomic Energy Research Institute, Daejeon, Korea (Republic)*

Session Developer/Session Co-Chair:
Kensuke Hara, *Tokyo Institute of Technoloby, Tokyo, Japan*

Session Chair:
Michael Paidoussis, *Mcgill University, Montreal, QC, Canada*

Experimental Investigation of the Flow-Induced Vibrations of a Rod Cluster Control Assembly inside Guides with Enlarged Gaps
Technical Paper Publication: PVP2019-93143

Pierre Moussou, *EDF / Research and Development, Palaiseau, France*
Vincent Fichet, *Framatome, Le Creusot, France*
Luc Pastur, *ENSTA Paristech, Palaiseau, France*
Constance Duhamel, *EDF Lab Paris Saclay, Palaiseau, France*
Yannick Tampango, *EDF Lab / Ermes Dpt, Palaiseau, France*

A Fluidelastic Model for the Nonlinear Dynamics of Two-Dimensional Inverted Flags
Technical Paper Publication: PVP2019-93576

Mohammad Tavallaeinejad, Michael Paidoussis & Mathias Legrand, *McGill University, Montreal, QC, Canada*
Mojtaba Kheiri, *Concordia University, Montreal, QC, Canada*

Addressing Shell Mode Vibration in Ducts in Refinery with Computational Models and Field Data
Technical Paper Publication: PVP2019-93613

Ishita Chakraborty, *Stress Engineering Services, Houston, TX, USA*
Gyorgy Szasz, *Stress Engineering Serv Inc, Metairie, LA, USA*
Anup Paul, *Stress Engineering Services, Mason, OH, USA*

Effect of the Phase Velocities Prediction on Fluidelastic Instability of a Cantilever Pipe Subjected to Gas-Liquid Flow
Technical Paper Publication: PVP2019-94063

L. Enrique Ortiz-Vidal, *University of O'Higgins (UOH), Chile, Rancagua, Chile*

TECHNICAL SESSION 2.2M (NDPD-1-2)

Non-Destructive Evaluation (NDE) Research - II
Hill County Level (3rd floor), Hyatt Regency, Pecos
10:15am - 12:00pm

Session Developer/Session Chair:
Min Zhang, *Praxair, Tonawanda, NY, USA*

Session Co-Developer:
Anne Jüngert, *MPA University of Stuttgart, Stuttgart, Germany*

Session Co-Chair:
Xiaochen Hu, Oregon State University, Corvallis, OR, USA

Session Chair:
Vivek Agarwal, *Idaho National Laboratory, Idaho Falls, ID, USA*

Fatigue Crack Growth Assessment Using Acoustic Emission Monitoring in 2.25Cr1Mo0.25V Steel: A Combined Qualitative and Quantitative Approach
Technical Paper Publication: PVP2019-93483

Mengyu Chai, Zaoxiao Zhang & Quan Duan, *Xi'an Jiaotong University, Xi'an, China*

New Magnetostrictive Transducer and Applications for SHM of Pipes and Vessels
Technical Paper Publication: PVP2019-94078

Sergey Vinogradov & Jay Fisher, *Southwest Research Institute, San Antonio, TX, USA*

Magnetic Barkhausen Noise Method for Characterisation of Low Alloy Steel
Technical Paper Publication: PVP2019-94073

Gokulnath Kadavath, Jino Mathew, James Griffin, David Parfitt & Michael Fitzpatrick, *Coventry University, Coventry, UK*

Strain Sensing for Crack Detection in Compact Heat Exchanger
Technical Paper Publication: PVP2019-93727

Xiaochen Hu, Zhaoyan Fan & Brian Paul, *Oregon State University, Corvallis, OR, USA*

TECHNICAL SESSION 2.2N (DA-1-6)

Design of Compact Heat Exchangers for Nuclear Power Applications - II
Hill County Level (3rd floor), Hyatt Regency, Frio
10:15am - 12:00pm

Session Developer/Session Chair:
Tasnim Hassan, *NC State University, Raleigh, NC, USA*

Session Co-Developer:
Nathan Barkley, *Becht Engineering, Medina, OH, USA*

Session Co-Chair:
Alon Katz, *Georgia Institute of Technology, Atlanta, GA, USA*

Diffusion Bonding of 800H Alloys for Compact Heat Exchanger Applications
Technical Presentation: PVP2019-93826

Mohamed Elbakhshwan, Mark Anderson & Todd Allen, *University of Wisconsin Madison, Madison, WI, USA*

Potential ASME Code Case for Construction of Compact Heat Exchangers in High Temperature Reactors
Technical Presentation: PVP2019-93013

Robert Keating & Suzanne McKillop, *MPR Associates, Alexandria, VA, USA*

Strategies for Inservice Inspection of Compact Heat Exchangers in High Temperature Reactors
Technical Presentation: PVP2019-93014

Robert Keating & Suzanne McKillop, *MPR Associates, Alexandria, VA, USA*

Limit Load Solutions of Orthotropic Thick-Walled Pipes Subjected to Internal Pressure, Bending Moment and Torque Moment
Technical Paper Publication: PVP2019-93377

Min Xu, Yujie Zhao, Binbin Zhou, Xiaohua He & Changyu Zhou, *Nanjing Tech University, Nanjing, China*

TUTORIAL SESSION 2.2Q (TW-2-4)

Construction of Pressure Vessels to ASME Section VIII, Division 3 - Part 2
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande W.
10:15am - 12:00pm

Session Developer/Session Chair:
Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*

Presented by:
J. Robert (Bob) Sims, *Becht Engineering Co., Inc.*

Block 2.3 Tuesday, July 16 2:15PM – 4:00PM

TECHNICAL SESSION 2.3A (CT-7-1)

Computational Applications in Fatigue and Fracture Assessments
Losaya Conference Center, Bowie C 2:15pm - 4:00pm

Session Developer:
Wolf Reinhardt, *Candu Energy Inc, Mississauga, ON, Canada*

Session Developer/Session Co-Chair:
Reza Adibi-Asl, *Kinectrics, Toronto, ON, Canada*

Session Chair:
Youngho Park, *New Mexico State University, Las Cruces, NM, USA*

Augmenting Generic Fatigue Crack Growth Models Using 3D Finite Element Simulations and Gaussian Process Modeling
Technical Paper Publication: PVP2019-93153

Adrian Loghin, *Simmetrix Inc., Clifton Park, NY, USA*
Shakhrukh Ismonov, *Jacobs Tech, INC, Houston, TX, USA*

Simplified SCC Simulation Considering Growth Arrest at Fusion Line of Weld
Technical Paper Publication: PVP2019-93516

Hiroshi Okada & Yasunori Yusa *Tokyo University of Science, Noda, Chiba, Japan,*
Masayuki Kamaya, *Institute of Nuclear Safety System, Mikata-gun Fukui 919-1205, Japan*

Predicting Crack Velocity and Fracture Arrest Pressure from Simulations of Dynamic Pipe Rupture
Technical Paper Publication: PVP2019-93723

Bruce Williams, *Su Xu & William R. Tyson, CanmetMaterials, Hamilton, ON, Canada*

Lifetime Prediction and Type IV Failure of Creep-resistant Ferritic Steel Weldment
Technical Presentation: PVP2019-93754

Wei Zhang, Yiyu Wang & Zhili Feng, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*
Yanfei Gao, *University of Tennessee, Knoxville, TN, USA*

PANEL SESSION 2.3B (MF-1-6)

Round-Robin Analyses of Constraint Effects on Fracture Initiation Toughness for Specimens and Surface-Cracked Pipe - I

Losaya Conference Center, Maverick B 2:15pm - 4:00pm

Session Developer/Session Chair:
Gery Wilkowski, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Session Co-Developer:
Sureshkumar Kalyanam, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Session Co-Chair:
Frederick (Bud) Brust, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Panelists:

- ***Gery Wilkowski,*** *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*
- ***Suresh Kalyanam,*** *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*
- ***Greg Thorwald,*** *Quest Integrity Group, Boulder, CO, USA*
- ***Steven Xu,*** *Kinectrics, Toronto, ON, Canada*
- ***D.-J. Shim,*** *COMPANY/UNIVERSITY, CITY, STATE, COUNTRY*
- ***Giovanni Facco,*** *U.S. Nuclear Regulatory Commission, Washington, DC, USA*
- ***Steve Smith,*** *COMPANY/UNIVERSITY, CITY, STATE, COUNTRY*
- ***Bill Y.J. Chao,*** *COMPANY/UNIVERSITY, CITY, STATE, COUNTRY*
- ***P.S. Lam,*** *COMPANY/UNIVERSITY, CITY, STATE, COUNTRY*
- ***Yun-Jae Kim,*** *Korea University, Seoul 136-701, Korea (Republic)*
- ***Bruce Williams,*** *CanmetMaterials, Natural Resources Canada, Hamilton, ON, Canada*
- ***Jack Beswick,*** *COMPANY/UNIVERSITY, CITY, STATE, COUNTRY*
- ***Yifan Huang,*** *COMPANY/UNIVERSITY, CITY, STATE, COUNTRY*
- ***Frederick (Bud) Brust,*** *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

TECHNICAL SESSION 2.3C (MF-6-6)

Materials and Technologies for Nuclear Power Plants - VI

Losaya Conference Center, Maverick A 2:15pm - 4:00pm

Session Developer/Session Chair:
Weiju Ren, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*

Session Developer/Session Co-Chair:
Randy K. Nanstad, *R&S Consultants, LLC, Oak Ridge, TN, USA*

An Update on the Investigation of Fracture Toughness Properties of the High Flux Reactor Vessel from Surveillance Test Campaign in 2017

Technical Paper Publication: PVP2019-93043

M. Kolluri, F.H.E De Haan-de Wilde, H.S. Nolles & A.J.M. de Jong, *NRG, Petten, Netherlands*

Determination of the Biaxial Strength of Grade NBG-18 Graphite

Technical Presentation: PVP2019-93752

Timothy Burchell, *Oak Ridge National Lab, Oak Ridge, TN, USA*

TECHNICAL SESSION 2.3D (CS-11-3)

Engineering Failure Analysis

Losaya Conference Center, Seguin 2:15pm - 4:00pm

Session Developer/Session Chair:
Xuedong Chen, *Hefei General Machinery Research Institute, Hefei, Anhui, China*

Session Co-Chair:
Zhichao Fan, *Hefei General Machinery Research Institute Co. Ltd., Hefei, China*

Major Hazards Modelling of Pressurized Special Equipment in Chemical Industry Parks Based on FCBPSS Method

Technical Paper Publication: PVP2019-93214

Pan Song, Xiaoying Tang, Bin Ren, Zhe Pu, JieLu Wang, ShuHong Liu & Shaojun Wang, *Shanghai Institute of Special Equipment Inspection and Technical Research, Shanghai, China*

Modification and Extension of Screening Criteria for Fatigue Analysis
Technical Paper Publication: PVP2019-93341

Jun Shen, Ming-wan Lu, Zhenyu Wang, Heng Peng & Yinghua Liu, *Tsinghua University, Beijing, China*

Research on Risk Assessment Method and System Development of Small Ammonia Refrigeration Unit
Technical Paper Publication: PVP2019-93592

Xiang Li, Weihua Wang, Weike Jing, Jin Shi & Fakun Zhuang, *China Special Equipment Inspection & Research Institute, Beijing, China*

TECHNICAL SESSION 2.3E (SPC-2-2)

Student Paper Symposium - PhD - II
Losaya Conference Center, Bowie A 2:15pm - 4:00pm

Session Developer:
Osamu Furuya, *Tokyo Denki University, Saitama, Japan*

Session Co-Developer/Session Chair:
Daniel Broc, *CEA Saclay, Gif-sur-Yvette, France*

Session Co-Chair:
Maher Younan, *American University in Cairo, New Cairo, Egypt*

A New Methodology for CTOD Estimation Using Double Clip Gauge in Pipeline Steels
Technical Paper Publication: PVP2019-93647

Marcus N. Silvestre & Diego F. S. Burgos, *Department of Naval Architecture and Ocean Engineering, University of Sao Paulo, Sao Paulo, Sao Paulo, Brazil*

Understanding the Discontinuity of the Lift Force of Pressure Safety Valves
Technical Paper Publication: PVP2019-93781

Chaoyong Zong, Fengjie Zheng & Xueguan Song, *Dalian University of Technology, Dalian, China*

Vibration Suppression in Frame-Structural Tower with Fluid Viscous Dampers
Technical Paper Publication: PVP2019-93333

Xiantao Fan, Yian Du & Wei Tan, *Tianjin University, Tianjin, China*

TECHNICAL SESSION 2.3F (SE-4-1)

Resilience and Metamaterials
Losaya Conference Center, Bowie B 2:15pm - 4:00pm

Session Developer/Session Chair:
Oreste Salvatore Bursi, *University of Trento, Trento, Italy*

Session Developer/Session Co-Chair:
Alessandra Marino, *INAIL/DIT, Rome, Italy*

A Kriging-Based Surrogate Model for Seismic Fragility Analysis of Unanchored Storage Tanks
Technical Paper Publication: PVP2019-93259

Hoang Nam Phan, *The University of Danang - University of Science and Techonology, Da Nang, Viet Nam*
Fabrizio Paolacci & Daniele Corritore, *University of Roma Tre, Rome, Italy,*
Nicola Tondini & Oreste Salvatore Bursi, *University of Trento, Trento, Italy*

On the Resilience Calculation of Process Plants Based on Monte Carlo Simulations
Technical Presentation: PVP2019-93280

Bledar Kalemi, Daniele Corritore, Antonio Caputo, Fabrizio Paolacci & Moritz Wenzel, *University of Trento, Trento, Italy*

Sliding Response of Unanchored Steel Storage Tanks Subjected to Seismic Loading
Technical Paper Publication: PVP2019-93310

Bledar Kalemi & Daniele Corritore, *University of Roma Tre, Rome, Italy*
Muhammad Farhan, *University of Patras, Patras, Greece*

Seismic Resilience of a Black Carbon Plant and the Importance of its Industry Specific Components
Technical Presentation: PVP2019-93652

Moritz Wenzel & Oreste Salvatore Bursi, *University of Trento, Trento, Italy,*
Bledar Kalemi, Antonio Caputo & Fabrizio Paolacci, *University of Roma Tre, Rome, Italy*

TECHNICAL SESSION 2.3G (CT-1-2)

Design and Analysis of Bolted Flanged Joints - II
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande E.
2:15pm - 4:00pm

Session Developer/Session Co-Chair:
Toshiyuki Sawa, *Hiroshima University, Koto-city, Japan*

Session Co-Developer/Session Chair:
Manfred Schaaf, *AMTEC Gmbh, Lauffen, Germany*

The Fundamental Mechanical Characteristics Evaluation for Bolted Pipe Flange Connections with RTJ Gaskets under Internal Pressure.
Technical Paper Publication: PVP2019-93489

Kenshiro Nakade & Koji Sato, *Nippon Valqua Industries, Ltd., Gojo, Japan*
Toshiyuki Sawa, *Hiroshima University, Koto-city, Japan*

Evaluation of Flange Calculations using Strain-based Acceptance Criteria
Technical Paper Publication: PVP2019-93521

Alexander Mutz, *Kernkraftwerk Gösgen-Däniken AG, Däniken, Switzerland*
Manfred Schaaf, *AMTEC Gmbh, Lauffen, Germany*

A Calculation Method of the Load Factor and Design for Bolted Gasketed Pipe Flange Connections under Internal Pressure
Technical Paper Publication: PVP2019-93547

Toshiyuki Sawa, *Hiroshima University, Koto-city, Japan*
Toshio Mabuchi, *Chiyoda Corporation, Yokohama, Japan*
Koji Sato, *Nippon Valqua Industries, Ltd., Gojo, Japan*

Study of Simplified Assembly Patterns with Load-Based Feedback and Preemptive Elastic Interaction Compensation
Technical Paper Publication: PVP2019-93697

Jordan Richardson, *Applied Bolting Technology, Bellows Falls, VT, USA*

TECHNICAL SESSION 2.3H (DA-8-1)

Joint FFS Symposium with Codes & Standards
Hill County Level (3rd floor), Hyatt Regency, Llano
2:15pm - 4:00pm

Session Developer:
Kannan Subramanian, *Stress Engineering Services, Metairie, LA, USA*

Session Chair:
Jianfeng Shi, *Zhejiang University, Hangzhou, Zhejiang, China*

Session Co-Chair:
Guide Deng, *China Special Equipment Inspection Research Int, Beijing*

Research on Post-fire Metallographic Structure and Hardness of Quenched and Tempered High Strength Steel 07MnMoVR
Technical Paper Publication: PVP2019-93423

Shanshan Shao, Luowei Cao & Guide Deng, *China Special Equipment Inspection and Research Institute, Beijing, China*
Guodong Jia, *State Administration for Market Regulation, Beijing, China*

Critical Crack Sizes of Pressure Vessels Based on Failure Assessment Diagram under Design Requirements
Technical Paper Publication: PVP2019-93575

Yuebing Li, Weiya Jin, Mingjue Zhou & Zengliang Gao, *Zhejiang University of Technology, Hangzhou, China*

Effect of Outer Surface Defects on Large Capacity Composite Cylinders for Tube Trailers
Technical Paper Publication: PVP2019-93776

Guide Deng, Zhaojiang Gao & Liang Sun, *China Special Equipment Inspection Research Int, Beijing, China*
Hao Wang, *Taiyuan University of Technology, Taiyuan, China*
Guodong Jia, *State Administration for Market Regulation, Beijing, China*

Influence of Quenching-Tempering on the Carbide Precipitation of 2.25Cr-1Mo-0.25V Reactor Pressure Vessel Steel
Technical Paper Publication: PVP2019-93054

Yafei Wang, Songyan Hu, Guangxu Cheng & Zaoxiao Zhang, *Xi'an Jiaotong University, Xi'an, China*
Jianxiao Zhang, *Lanzhou LS Heavy Equipment Co. Ltd, Lanzhou, China*

TECHNICAL SESSION 2.3I (CS-1-3)

Structural Integrity of Pressure Components - III
Hill County Level (3rd floor), Hyatt Regency, Live Oak
2:15pm - 4:00pm

Session Developer:
Michael Benson, *U. S. Nuclear Regulatory Commission, Washington, DC, DC, USA*

Session Chair:
Steven Xu, *Kinectrics, Toronto, ON, Canada*

Session Co-Chair:
Giovanni Facco, *U.S. Nuclear Regulatory Commission, Washington, D.C., DC, USA*

A Method to Estimate Cross-Sectional Stress Distributions on Reinforced Nozzle Corners under Internal Pressure
Technical Paper Publication: PVP2019-93266

Chang-Sik Oh, Tae-Kwang Song & Sang-Min Lee, *Korea Institute of Nuclear Safety, Daejeon, Korea (Republic)*

Level Three Assessment of Local Thin Areas in Pipelines Using Web-Enabled FEA
Technical Paper Publication: PVP2019-93584

Donald Brown, Daniel Spring, Charles Panzarella, *Equity Engineering Group, Cleveland, OH, USA*

Effect of Bending Load on Burst Pressure of Nuclear Power Plant Steam Generator Tubes with Uniform Wall Thinning
Technical Paper Publication: PVP2019-93758

Michael Liu, *Intertek AIM, San Mateo, CA, USA*
Robert Gialdini, Russell Cipolla, *Intertek AIM, Santa Clara, CA, USA*
Chang-Hoon Ha, Min-Ki Cho & Park Tae-Jung, *Doosan Heavy Industries & Construction Co. Ltd., Changwon, Gyeongnam, Korea (Republic)*

Establishment of Industry Standard Flange Sealing Effectiveness Measure (Leakage Rate Based) Methodology
Technical Paper Publication: PVP2019-94054

Przemyslaw Lutkiewicz & David Robertson, *Freudenberg Oil & Gas Technologies, Drammen, Norway*
Michael Pulvino, *Freudenberg Oil & Gas Technologies, Houston, TX, USA*

TECHNICAL SESSION 2.3J (HPT-4-1)

Equipment for the High Pressure Polyethylene Industry
Hill County Level (3rd floor), Hyatt Regency, Blanco
2:15pm - 4:00pm

Session Developer/Session Chair:
Hermann Maderbacher, *BHDT Gmbh, Kapfenberg, Austria*

Session Developer/Session Co-Chair:
Matthias Blome, *MAXIMATOR GmbH, Nordhausen, Germany*

Limits of Allowable Static and Cyclic Loads on Lens Ring Gaskets
Technical Paper Publication: PVP2019-93566

Hermann Maderbacher, *BHDT Gmbh, Kapfenberg, Austria*

Safe and Reliable Temperature and Pressure Measurement for High Pressure
Technical Paper Publication: PVP2019-93850

Tony Maupin, *WIKA USA, Lawrenceville, GA, USA*
Jennifer Breunig, *WIKA USA, Pasadena, TX, USA*

Bolted High Pressure Girth Flange Connections
Technical Paper Publication: PVP2019-93937

Christoph Hantsch, *LyondellBasell, Wesseling, Germany*

Improving Fatigue Properties of High Pressure Tubes SANDVIK HP120 compared to TP316L
Technical Paper Publication: PVP2019-93633

Thomas Froböse, *Sandvik Materials Technology Germany GmbH, Werther, Nordrhein-Westfalen, Germany*

TECHNICAL SESSION 2.3K (OAC-4-1)

Thermal and Structural Analysis and Testing
Hill County Level (3rd floor), Hyatt Regency, Nueces
2:15pm - 4:00pm

Session Developer/Session Chair:
Mike Weber, *Bundesanstalt fuer Materialforschung und -pruefung (BAM), Berlin, Germany*

Session Developer/Session Co-Chair:
Paul Blanton, *Savannah River National Laboratory, Aiken, SC, USA*

Themal Analysis of the 9975 Package Used for Long Term Nuclear Material Storage
Technical Paper Publication: PVP2019-93058

David Tamburello & Matthew Kesterson, *SRNS, Aiken, SC, USA*
Steve Hensel, *SRNL, Martinez, GA, USA*

Thermal Analysis of the 9977 Package Used for Nuclear Material Storage
Technical Paper Publication: PVP2019-93059

David Tamburello & Matthew Kesterson, *SRNS, Aiken, SC, USA*
Steve Hensel, *SRNL, Martinez, GA, USA*

Evaluation of Structural Honeycomb Sensitivity to Filler Metal Reinforcement
Technical Paper Publication: PVP2019-94070

Joshua Flach & Paul Blanton, *Savannah River National Laboratory, Aiken, SC, USA*

Modeling Shock and Vibration on Used Nuclear Fuel during Normal Conditions of Transportation
Technical Paper Publication: PVP2019-93619

Nicholas Klymyshyn, Pavlo Ivanusa, Kevin Kadooka & Casey Spitz, *Pacific Northwest National Laboratory, Richland, WA, USA*

TECHNICAL SESSION 2.3L (FSI-2-6)

Vortex-Induced Vibrations and Periodic Wake Dynamics
Hill County Level (3rd floor), Hyatt Regency, Pecan
2:15pm - 4:00pm

Session Developer:
Laszlo Baranyi, *University of Miskolc, Miskolc, Hungary*

Session Chair:
Jose Antunes, *Instituto Superior Tecnico, Bobadela, Lisbon, Portugal*

Session Developer/Session Co-Chair:
Md Mahbub Alam, *Harbin Institute of Technology, Shenzhen, Shenzhen, China*

Wavelet Analysis of FIV Response for Single Cylinder and Pairs of Cylinders in Tandem and Side-By-Side
Technical Paper Publication: PVP2019-93665

Roberta F. Neumeister, Adriane P. Petry & Sergio V. Möller, *Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, Brazil*

The Wake of Two Tandem Cylinders
Technical Paper Publication: PVP2019-94012

Farhan Zafar, Md Mahbub Alam & Zaka Muhammad *Harbin Institute of Technology, Shenzhen, China*
Md Islam, *KUST, Dubai, UAE*

Phase-Locked PIV Measurements of Vortex Shedding Characteristics Downstream of Straight Circular Finned Cylinders during Acoustic Resonance
Technical Paper Publication: PVP2019-93745

Rashid Islam & Mahmoud Shaaban, *University of Ontario Institute of Technology, Oshawa, ON, Canada*
Atef Mohany, *University of Ontario Institute of Technology, Whitby, ON, Canada*

TECHNICAL SESSION 2.3M (NDPD-1-3)

Non-Destructive Evaluation (NDE) Research - III
Hill County Level (3rd floor), Hyatt Regency, Pecos
2:15pm - 4:00pm

Session Developer/Session Chair:
Min Zhang, *Praxair, Tonawanda, NY, USA*

Session Co-Chair:
Ju Ding, *Shanghai Insitute of Specical Equipment Inspection and Technical Research, Shanghai, China*

Research on Digital Radiographic Inspection of In-service Nonmetallic Materials Pipe
Technical Paper Publication: PVP2019-93195

Shuhong Liu, Luyun Zhou, Ju Ding, Chenhuai Tang, Ye Zhang & Yuqing Yang, *Shanghai Institute of Special Equipment Inspection and Technical Research, Shanghai, China*
Dengchao Tang, *Xi'an Jiaotong University, Xi'an, China*

A Study of Flexible Magnetic Camera for Welded Tubular Joint Inspection
Technical Paper Publication: PVP2019-93371

Eunho Choe & Jinyi Lee,Chosun *University, Gwangju, Korea (Republic)*
Hoyong Lee, *Gwangju University, Gwangju, Korea (Republic)*

Real-Time Eddy Current Imaging and Flaw Detection under TSP by Cylinder-Type Magnetic Camera
Technical Paper Publication: PVP2019-93374

Sejin Kim & Jinyi Lee Chosun *University, Gwangju, Korea (Republic)*
Hoyong Lee, *Gwangju University, Gwangju, Korea (Republic)*

A New Accurate Quantitative Inspection Technology to the Corrosion for the Offshore Erect Pipeline
Technical Paper Publication: PVP2019-93440

Guangpei Cong, Yunrong Lyu & Shuxia Fu, *Guangdong University of Petrochemical Technology, Maoming, China*
Yujiang Sun & Guanglei Lv, *CNOOCS, Tianjin, China*

TECHNICAL SESSION 2.3N (DA-2-3)

Design and Analysis of Piping and Piping Components: Nuclear Service
Hill County Level (3rd floor), Hyatt Regency, Frio
2:15pm - 4:00pm

Session Developer/Session Chair:
Bing Li, *Kinectrics NSS, Toronto, ON, Canada*

Session Developer/Session Co-Chair:
Chakrapani Basavaraju, *USNRC, Rockville, MD, USA*

ADS-4 Pipe Vibration Evaluation during AP1000® Preoperational Testing
Technical Paper Publication: PVP2019-93282

David Suddaby, Tim Nowicki, Joshua Donovan, Alex Conn & Madhur Paharia, *Westinghouse Electric Company, Cranberry Towship, PA, USA*

Elastic-Plastic Fitness-For-Service Assessment of Class 1 Nuclear Pipe Elbow
Technical Paper Publication: PVP2019-93303

Usama Abdelsalam, Stephen Jeremia & DK Vijay, *Kinectrics, Toronto, ON, Canada*
Renita Pavia, *Bruce Power, Toronto, ON, Canada*

Modification to Shield Tank Overpressure Protection in a CANDU Reactor for Beyond Design Basis Event
Technical Paper Publication: PVP2019-93026

Michael Huang, Khurram Khan, Jefferson Tse & Bing Li, *Kinectrics NSS, Toronto, ON, Canada*
Ali Etedali-Zadeh, *Bruce Power, Tiverton, ON, Canada*

A Simplified Thermal Load Evaluation Method for Localized Lug Stresses Beyond Sec. III Appendix-Y
Technical Paper Publication: PVP2019-93127

Tsubasa Matsumiya, Daniel Garcia-Rodriguez & Noriyuki Takamura, *Hitachi-GE Nuclear Energy, Ltd., Hitachi-shi, Ibaraki, Japan*
Akira Nebu, *Hitachi, Ltd., Hitachi-shi, Ibaraki, Japan*

TECHNICAL SESSION 2.3Q (TW-2-5)

Bolted Joint Design, Analysis, and Code Compliance - Part 1
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande W.
2:15pm - 4:00pm

Session Developer/Session Chair:
Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*

Presented by:
Sayed Nassar, *Oakland University, Rochester, MI, USA*
Warren Brown, *Integrity Engineering Solutions, Dunsborough, WA, Australia*

Block 2.4 Tuesday, July 16 4:15PM – 6:00PM

TECHNICAL SESSION 2.4A (CT-7-2)

Computational Applications in Elastic-Plastic Analysis and Fitness for Service Assessment
Losaya Conference Center, Bowie C 4:15pm - 6:00pm

Session Developer:
Wolf Reinhardt, *Candu Energy Inc, Mississauga, ON, Canada*

Session Co-Developer/Session Chair:
Reza Adibi-Asl, *Kinectrics, Toronto, ON, Canada*

Session Co-Chair:
Bhaskar Shitole, *Wood PLC, Calgary, AB, Canada*

Prediction of High-Risk Corrosion Region Using Computational Fluid Dynamics Technology in Outlet Pipeline of REAC System
Technical Paper Publication: PVP2019-93038

Xiaofei Liu, Henghui Xu, Shun Shi, Chengcheng Gong, Guofu Ou, Chao Wang & Haozhe Jin, *Zhejiang Sci-Tech University, Hangzhou, Zhejiang, China*

Elasto-plastic Analysis of Pipe Structure by Transfer Matrix Method
Technical Paper Publication: PVP2019-93169

Masayuki Arai, Shoichi Kuroda & Kiyohiro Ito, *Tokyo University of Science, Tokyo, Japan*

Large-Scale Parallel Thermal Elastic-Plastic Welding Simulation Using Balancing Domain Decomposition Method
Technical Paper Publication: PVP2019-93237

Yasunori Yusa, Yuma Murakami & Hiroshi Okada, *Tokyo University of Science, Noda, Chiba, Japan*

Pure Plastic Behavior and the Assumption of Zero Elasticity at the Limit Load
Technical Paper Publication: PVP2019-93699

Pedro V. Marcal, *MPACT, Corp., Oak Park, CA, USA*
Robert Rainsberger, *XYZ Scientific Applications, Inc., Pleasant Hill, CA, USA*
Jeffrey T. Fong, *NIST, Gaithersburg, MD, USA*

PANEL SESSION 2.4B (MF-1-7)

Round-Robin Analyses of Constraint Effects on Fracture Initiation Toughness for Specimens and Surface-Cracked Pipe - II
Losaya Conference Center, Maverick B 4:15pm - 6:00pm

Session Developer/Session Chair:
Gery Wilkowski, *Engineering Mechanics Corporation Columbus, Upper Arlington, OH, USA*

Session Co-Developer:
Sureshkumar Kalyanam, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Session Co-Chair:
Frederick (Bud) Brust, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Panelists:

Gery Wilkowski, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*
Suresh Kalyanam, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*
Greg Thorwald, *Quest Integrity Group, Boulder, CO, USA*
Steven Xu, Kinectrics, Toronto, ON, Canada
D.-J. Shim, *COMPANY/UNIVERSITY, CITY, STATE, COUNTRY*
Giovanni Facco, *U.S. Nuclear Regulatory Commission, Washington, DC, USA*
Steve Smith, *COMPANY/UNIVERSITY, CITY, STATE, COUNTRY*
Bill Y.J. Chao, *COMPANY/UNIVERSITY, CITY, STATE, COUNTRY*
P.S. Lam, *COMPANY/UNIVERSITY, CITY, STATE, COUNTRY*
Yun-Jae Kim, *Korea University, Seoul 136-701, Korea (Republic)*
Bruce Williams, *CanmetMaterials, Natural Resources Canada, Hamilton, ON, Canada*
Jack Beswick, *COMPANY/UNIVERSITY, CITY, STATE, COUNTRY*
Yifan Huang, *COMPANY/UNIVERSITY, CITY, STATE, COUNTRY*
Frederick (Bud) Brust, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

TECHNICAL SESSION 2.4C (MF-18-1)

Additive Manufacturing and Materials
Losaya Conference Center, Maverick A 4:15pm - 6:00pm

Session Developer/Session Chair:
Paul Korinko, *Savannah River National Laboratory, Aiken, SC, USA*

Session Co-Developers:
Chris San Marchi, *Sandia National Laboratories, Livermore, CA, USA*
Catrin Mair Davies, *Imperial College London, London, UK*
Anthony Horn, *Wood, Warrington, UK*
Judith Todd, *Pennsylvania State University, University Park, PA, USA*
Sylvain Pillot, *Arcelormittal Global R&D, Le Creusot, France*
Arindam Chakraborty, *VIAS, Houston, TX, USA*
Vincent Robin, *EDF, Chatou, France*
Ozan Gurdal, *Nuclear Advanced Manufacturing Research Centre, University of Sheffield, Sheffield, UK*

Session Developer/Session Co-Chair:
Andrew Duncan, *Savannah River National Laboratory, Aiken, SC, USA*

Influence of an Elevated Temperature Environment on the Tensile Mechanical Properties of a 3D Printed Thermoplastic Polymer
Technical Paper Publication: PVP2019-93589

Jose Torres, Otito Onwuzurike, Amber McClung & Juan D. Ocampo, *St. Mary's University, San Antonio, TX, USA*

Modelling the Fracture Behaviour of 316l Stainless Steel Samples Manufactured through Selective Laser Melting
Technical Presentation: PVP2019-93675

Catrin Mair Davies, Richard Williams, Tobias Ronneberg & Paul Hooper, *Imperial College London, London, UK*

Crack Repair using Hybrid Additive Manufacturing and Friction Stir Processing
Technical Paper Publication: PVP2019-93688

Fadi Al-Badour & Ibrahim Hassan Zainelabdeen, *King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia*
Rami Suleiman & Akeem Adesina, *Center of Research Excellence in Corrosion, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia*

Hydrogen Effects on Fracture Toughness of Additively Manufactured Type 304l Stainless Steel
Technical Paper Publication: PVP2019-93709

Tony McWilliams, Michael Morgan & Paul Korinko, *Savannah River National Laboratory, Aiken, SC, USA*

TECHNICAL SESSION 2.4D (CS-11-4)

Extreme Pressure Equipment - II
Losaya Conference Center, Seguin 4:15pm - 6:00pm

Session Developer:
Guangxu Cheng, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*

Session Co-Developer/Session Chair:
Yinghua Liu, *Tsinghua University, Beijing, China*

Session Co-Chair:
Jun Shen, *Tsinghua University, Beijing, China*

Comparison of Ellipsoidal and Equivalent Torispherical Heads under Internal Pressure: Buckling, Plastic Collapse and Design Rules
Technical Paper Publication: PVP2019-93039

Jinyang Zheng, Keming Li, Yehong Yu, Zekun Zhang, Wenzhu Peng, Chaohua Gu & Ping Xu, *Zhejiang University, Hangzhou*

Inspection Case Analysis of Natural Gas Manifold in a High Acid Gas Field
Technical Paper Publication: PVP2019-93383

JieLu Wang, Xiaoying Tang, Yantian Zuo, Pan Song & Yuqing Yang, *Shanghai Institute of Special Equipment Inspection and Technical Research, Shanghai, China*
Wenming Song, *Lanpec Technologies Limited, Lanzhou, China*

Comprehensive Comparison of Type III and Type IV Cylinders for On-Board Hydrogen Storage
Technical Paper Publication: PVP2019-93883

Zhengli Hua, Chaohua Gu, Jianfeng Shi & Jinyang Zheng, *Zhejiang University, Hangzhou, China*

Technical Progress in Chinese Standard of Ultra-High Pressure Vessels
Technical Paper Publication: PVP2019-93487

Zhiwei Chen & Guoyi Yang, *China Standaradization Committee, Beijing, China*
Tao Li & Jinyang Zheng, *Zhejiang University, Hangzhou, China*
Guide Deng, *China Special Equipment Inspection Research Int, Beijing, China*

TECHNICAL SESSION 2.4E (FSI-4-1)

Transient-Dynamic Effects and Failure Modes
Losaya Conference Center, Bowie A 4:15pm - 6:00pm

Session Developer/Session Chair:
Victor Janzen, *victorpjanzen.com, Pembroke, ON, Canada*

Session Co-Developer:
Teguewinde Sawadogo, *Canadian Nuclear Laboratories, Chalk River, ON, Canada*

Session Developer/Session Co-Chair:
Helen Cothron, *Electric Power Research Institute, Hixson, TN, USA*

A Proposed Guideline for Applying Waterhammer Predictions under Transient Cavitation Conditions Part 1: Pressures
Technical Presentation: PVP2019-93355

Matthew Stewart & Greg Wunderlich, *AECOM, Greenwood Village, CO, USA*
Trey Walters & Erin Onat, *Applied Flow Technology, Colorado Springs, CO, USA*

A Proposed Guideline for Applying Waterhammer Predictions under Transient Cavitation Conditions Part 2: Imbalanced Forces
Technical Presentation: PVP2019-93357

Matthew Stewart & Greg Wunderlich, *AECOM, Greenwood Village, CO, USA*
Trey Walters, *Applied Flow Technology, Colorado Springs, CO, USA*

Simulation of Sloshing Wave Crest Impact Pressure Acting on a Fixed Roof Cylindrical Tank Subjected to a Sinusoidal Excitation.
Technical Paper Publication: PVP2019-93379

Yukihiro Toyoda, *Central Research Institute of Electric Power Industry, Abiko-shi, Chiba, Japan*
Yasuki Ohtori, *Tokyo City University, Tokyo, Japan*

Investigation on Typical Failure Mode of High-Pressure Hydrogen Cylinders for Vehicles
Technical Paper Publication: PVP2019-93174

Yiwen Yuan, JieLu Wang & Facai Ren, *Shanghai Institute of Special Equipment Inspection and Technical Research, ShangHai, China*

TECHNICAL SESSION 2.4F (SE-5-1)

Structural Dynamics
Losaya Conference Center, Bowie B 4:15pm - 6:00pm

Session Developer/Session Chair:
Kiyoshi Aida, *Mitsubishi Hitachi Power Systems, Ltd., Kure-Shi, Japan*

Session Developer/Session Co-Chair:
Katsuhisa Fujita, *Osaka City University, Osaka, Japan*

Study on the Predictive Evaluation Method of Nonlinear Sloshing Wave Crest Impact Load acting on the Roof of Cylindrical Tanks
Technical Paper Publication: PVP2019-93442

Hideyuki Morita, Tomoshige Takata, Hideki Madokoro & Hiromi Sago, *Mitsubishi Heavy Industries, Kobe, Hyogo-ken, Japan*
Shinobu Yokoi, *Mitsubishi Fbr Mitsubishi Heavy Industries, Ltd, Takasago, Hyogo, Japan*
Tomohiko Yamamoto, *Japan Atomic Energy Agency, Oarai, Higashi-Ibaraki, Japan*

Effect of Deformation of Core Elements of Fast Reactor Core to the Seismic Response
Technical Paper Publication: PVP2019-93769

Akihisa Iwasaki & Kazuteru Kawamura, *Mitsubishi Heavy Industries, Ltd., Takasago, Japan*
Shinichiro Matsubara, *Mitsubishi Heavy Industries, Ltd., Kobe, Japan*
Hidenori Harada, *Mitsubishi FBR Systems, Inc, Tokyo, Japan*
Tomohiko Yamamoto, *Japan Atomic Energy Agency, Oarai, Higashi-Ibaraki, Japan*

Fast Reactor Core Seismic Analysis for Verification of Assessment Model Considering Deformation of Core elements
Technical Paper Publication: PVP2019-93778

Shinichiro Matsubara, *Mitsubishi Heavy Industries, Ltd., Kobe, Japan*
Akihisa Iwasaki, & Kazuteru Kawamura, *Mitsubishi Heavy Industries, Takasago, Japan*
Hidenori Harada, *Mitsubishi Fbr Systems, Inc, Tokyo, Japan*
Tomohiko Yamamoto, *Japan Atomic Energy Agency, Oarai, Higashi-Ibaraki, Japan*

Design Validation of an Oval Exhaust Silencer Using FEA
Technical Presentation: PVP2019-93973

Agron Gjinolli, Paul Liang & Gary Goplen, *Dürr Universal, Inc., Stoughton, WI, USA*

TECHNICAL SESSION 2.4G (CT-3-1)

Leak Tightness and Fugitive Emissions - I
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande E.
4:15pm - 6:00pm

Session Developer/Session Chair:
Takashi Kobayashi, *National Institute of Technology, Numazu College, Numazu, Shizuoka, Japan*

Session Developer/Session Co-Chairs:
Satoshi Nagata, *Toyo Engineering Corporation, Narashino, Chiba, Japan*
Dale Rice, P.E., *VSP Technologies, Leland, NC, USA*

Comparison of EN 13555 Gasket Test Data with Predicted Leak Rates Derived from Draft PVRC Equations
Technical Paper Publication: PVP2019-93061

Dale Rice, P.E., *VSP Technologies, Leland, NC, USA*
Jerry Waterland, *VSP Technologies, Prince George, VA, USA*

Leak Behavior and Prediction of Metal Joint Gaskets in Simplified Leak Test
Technical Paper Publication: PVP2019-93474

Yuya Omiya, Masahiro Fujii, *Okayama University, Okayama, Japan*

New Leakage Requirements of ASME B16.20 and Current Generation Spiral Wound Gaskets
Technical Paper Publication: PVP2019-93928

Anita Bausman, *VSP Technologies, Kingsport, TN, USA*
Jerry Waterland, *VSP Technologies, Prince George, VA, USA*
Daniel Reid, *VSP Technologies, Kingwood, TX, USA*

Performance of Semi-Metallic Gaskets with Nubbins
Technical Paper Publication: PVP2019-93027

Robert Taylor, *3S Superior Sealing Services LLC, Houston, TX, USA*
David Fairbanks, *Sinclair Oil, Sinclair, WY, USA*

TECHNICAL SESSION 2.4H (DA-8-5)

FFS - General Topics
Hill County Level (3rd floor), Hyatt Regency, Llano
4:15pm - 6:00pm

Session Developer/Session Chair:
Ishita Chakraborty, *Stress Engineering Services, Houston, TX, USA*

Session Co-Chair:
Abdullatif Alsalmi, *SABIC, Al-Jubail, Saudi Arabia*

Brittle Fracture Assessments on Piping Systems - MSOT Curves
Technical Paper Publication: PVP2019-93736

Ishita Chakraborty, *Stress Engineering Services, Houston, TX, USA*
Kannan Subramanian, *Stress Engineering Services, Metairie, LA, USA*
Jorge Penso, *Shell Projects and Technology, Houston, TX, USA*

Behavior of Open-Top Storage Tanks Subjected to Harmonic Settlement
Technical Presentation: PVP2019-93805

Harsh Bohra, Sukru Guzey, *Purdue University, West Lafayette, IN, USA*

Fitness-For-Service Assessment of Externally Corroded Convection Coil Tube
Technical Paper Publication: PVP2019-93829

Gys Van Zyl & Abdullatif Alsalmi, *Sabic, Jubail, Saudi Arabia*

TECHNICAL SESSION 2.4I (CS-15-1)

Probabilistic and Risk-Informed Methods for Structural Integrity Assessment
Hill County Level (3rd floor), Hyatt Regency, Live Oak
4:15pm - 6:00pm

Session Developer/Session Co-Chair:
Steven Xu, *Kinectrics, Toronto, ON, Canada*

Session Co-Developer/Session Chair:
Yinsheng Li, *Japan Atomic Energy Agency, Ibaraki-Ken, Japan*

Applications of Probabilistic Fracture Mechanics Methodology for Japanese Reactor Pressure Vessels Using PASCAL4
Technical Paper Publication: PVP2019-93935

Kai Lu, *Japan Atomic Energy Agency, Naka-Gun, Japan*
Jinya Katsuyama & Yinsheng Li, *Japan Atomic Energy Agency, Ibaraki-Ken, Japan,*
Shinobu Yoshimura, *The University of Tokyo, Tokyo, Japan*

Inspection Optimization Justification for PWR Main Steam and Feedwater Nozzles Using Probabilistic Fracture Mechanics
Technical Paper Publication: PVP2019-93948

Christopher Lohse, Do-Jun Shim & Deepak Somasundaram, *Structural Integrity Associates, San Jose, CA, USA*
Robert Grizzi, *Electric Power Research Institute, Palo Alto, CA, USA*
Gary Stevens, *Tony Cinson, Electric Power Research Institute, Charlotte, NC, USA*

Effect of Coolant Water Temperature of ECCS on Failure Probability of RPV
Technical Paper Publication: PVP2019-93967

Jinya Katsuyama & Yinsheng Li, *Japan Atomic Energy Agency, Ibaraki, Japan*
Koichi Masaki, *Japan Atomic Energy Agency, Tokai, Japan*
Kai Lu, *Japan Atomic Energy Agency, Naka-Gun, Japan*
Tadashi Watanabe, *University of Fukui, Fukui, Japan*

TECHNICAL SESSION 2.4J (HPT-4-2)

High Pressure Compressor Pulsation/Vibration Tuning and Pressure Relieving Components
Hill County Level (3rd floor), Hyatt Regency, Blanco
4:15pm - 6:00pm

Session Developer/Session Chair:
Cosimo Carcasci, *CST, Firenze, Italy*

Session Developer/Session Co-Chair:
Stefan Rüsenberg, *REMBE Gmbh Safety + Control, Brilon, Germany*

Experimental Studies on Discharge Characteristics of the Typical Thermally-activated Pressure Relieve Device Used for High-pressure Hydrogen Storage Cylinder in Different Fire Conditions
Technical Paper Publication: PVP2019-93381

Ke Bo, Jinyang Zheng & Binbin Liao, *Zhejiang University, Hangzhou, China*
Chunlin Gu, Baodi Zhao & Qianghua Huang, *China Special Equipment Inspection & Research Institute, Beijing, China*

Tuning of the Acoustical Analysis Model for Hypercompressors through Strain Gage Pulsation Measurements
Technical Paper Publication: PVP2019-93077

Andrea Fusi, Cosimo Carcasci & Marco Sacco, *Compression Service Technology srl, Firenze, Italy*
Leonardo Cappelli, *University of Florence, Firenze, Italy*

Pulsation and Vibration Control for High Pressure Reciprocating Compressor Piping Systems
Technical Presentation: PVP2019-93089

Sarah Simons, Benjamin White & Eugene Broerman, *Southwest Research Institute, San Antonio, TX, USA*

TECHNICAL SESSION 2.4K (OAC-4-2)

Shipping Package Design and Radioactive Material Containment
Hill County Level (3rd floor), Hyatt Regency, Nueces
4:15pm - 6:00pm

Session Developer/Session Chair:
Steve Hensel, *SRNL, Martinez, GA, USA*

Session Developer/Session Co-Chair:
David Tamburello, *SRNS, Aiken, SC, USA*

Development and Application of a Finite Element Model Representing the Rapid Partial Release of Elastomeric O-Ring Seals
Technical Presentation: PVP2019-93992

Mike Weber, Anja Koemmling, Maha Zaghdoudi, Matthias Jaunich & Dietmar Wolff, *Bundesanstalt fuer Materialforschung und -pruefung (BAM), Berlin, Germany*

SR-102 Package Replacement
Technical Paper Publication: PVP2019-94068

Christopher Cable, *Savannah River Nuclear Solutions, Aiken, SC, USA*

Leakage Rate Testing Options for Triple-Seal Containment Vessel Design
Technical Presentation: PVP2019-94069

Kurt Eberl, *Savannah River National Laboratory, Aiken, SC, USA*
Donald Trapp, *Greg Sides, Don Hoang & Ed Ketusky, Savannah River Nuclear Solutions, Aiken, SC, USA*

The Application of Nupack to the Design of a Type B Packaging Containment Vessel
Technical Paper Publication: PVP2019-94071

Kathryn Karius, Kurt Eberl, Charles McKeel & Glenn Abramczyk, *Savannah River National Laboratory, Aiken, SC, USA*

TECHNICAL SESSION 2.4L (FSI-2-7)

FIV in Heat Exchanger Tube Arrays - II
Hill County Level (3rd floor), Hyatt Regency, Pecan
4:15pm - 6:00pm

Session Developer/Session Chair:
Marwan Hassan, *University of Guelph, Guelph, ON, Canada*

Session Co-Developer:
Michel Pettigrew, *CNL AECL Chalk River, Deep River, ON, Canada*

Session Co-Chair:
Wei Tan, *Tianjin University, Tianjin, China*

Study on Added Mass Coefficient and Coupling Effect of Concentric Tube Bundles
Technical Paper Publication: PVP2019-93363

Zhenshu Zhang, Kai Guo, Tianbao Zhang & Wei Tan, *Tianjin University, Tianjin, Tianjin, China*

Investigations of In-plane Fluidelastic Instability in a Multi-span U-bend Test Rig – Tests in Two-phase Flow
Technical Paper Publication: PVP2019-93729

Paul Feenstra, Teguewinde Sawadogo & Bruce Smith, *Canadian Nuclear Laboratories, Deep River, ON, Canada*
Victor Janzen, *victorpjanzen.com, Pembroke, ON, Canada*
Anne McLellan, *Canadian Nuclear Laboratories, Chalk River, ON, Canada*
Helen Cothron, *Electric Power Research Institute, Hixson, TN, USA*
Sean Kil, *Electric Power Research Institute, Charlotte, NC, CA, USA*

Equivalent Theodorsen Function for Fluidelastic Excitation in a Normal Triangular Array
Technical Paper Publication: PVP2019-94010

Loay Alyaldin & Njuki Mureithi, *Ecole Polytechnique, Montreal, QC, Canada*

Towards an Updated Design Methodology for Steam Generator Tube Flow-Induced Vibration
Technical Presentation: PVP2019-94041

Victor Janzen, *victorpjanzen.com, Pembroke, ON, Canada*
Bruce Smith, *Canadian Nuclear Laboratories, Deep River, ON, Canada*
Paul Feenstra, Michel J Pettigrew & Teguewinde Sawadogo, *Canadian Nuclear Laboratories, Chalk River, ON, Canada*

TECHNICAL SESSION 2.4M (DA-7-1)

Thermal Stresses and Elevated Temperature Design
Hill County Level (3rd floor), Hyatt Regency, Pecos
4:15pm - 6:00pm

Session Developer/Session Chair:
Albert Segall, *Penn State University, University Park, PA, USA*

Session Developer/Session Co-Chair:
San Iyer, *Candu Energy Inc., Mississauga, ON, Canada*

Session Co-Developer:
Tasnim Hassan, *NC State University, Raleigh, NC, USA*

Thermal Solutions for a Plate with an Arbitrary Temperature Transient on One Surface and Convection on the Other: Direct and Inverse Formulations
Technical Paper Publication: PVP2019-93313

Albert Segall, *Penn State University, PA, USA*
Craig Schoof, *Cascadia Engineering LLC, Redmond, WA, USA*
Dan Yastishock, *NAVAIR, Lexington Park, MD, USA*

Comparison and Assessment of the Creep-fatigue and Ratcheting Design Methods for a Reference Gen3 Molten Salt Concentrated Solar Power Receiver
Technical Paper Publication: PVP2019-93572

Bipul Barua, *Argonne National Laboratory, Lemont, IL, USA*
Mark Messner, *Argonne National Laboratory, Plainfield, IL, USA*
Michael McMurtrey, *Idaho National Laboratory, Idaho Falls, ID, USA*

Flaw Tolerance of Heavy Wall Components Subject to Thermal Shocks
Technical Presentation: PVP2019-93810

Dave Dewees, *Becht Engineering Co., Inc., Medina, OH, USA*
J. Adin Mann III, *Emerson Process Management, Fisher Valve Division, Marshalltown, IA, USA*
Christopher Johnson, *Emerson, Polk City, IA, USA*

Uncertainties in Pressurized Thermal Shock Analyses
Technical Paper Publication: PVP2019-94076

Markus Niffenegger, Oriol Costa Garrido, Diego F. Mora, Guian Qian, Roman Mukin & Bojan Niceno, *Paul Scherrer Institute, Villigen, Switzerland*
Medhat Sharabi, *University of Nottingham, Nottingham, UK*
Nathan N. Lafferty, *ETH, Zurich, Switzerland*

TECHNICAL SESSION 2.4N (DA-2-4)

Design and Analysis of Piping and Piping Components: Branch Connections & SIFs
Hill County Level (3rd floor), Hyatt Regency, Frio
4:15pm - 6:00pm

Session Developer/Session Chair:
Chakrapani Basavaraju, *USNRC, Rockville, MD, USA*

Session Developer/Session Co-Chair:
Bing Li, *Kinectrics NSS, Toronto, ON, Canada*

Implementing B31J-2017 SIF and Flexibility Factor Changes for B31 Piping Systems
Technical Paper Publication: PVP2019-94074

Anthony W. Paulin Jr., *Paulin Research Group, Houston, TX, USA*
Lorna Carpenter, *BP America, Inc., Houston, TX, USA*
Charles W. Becht IV, *Becht Engineering Co., Inc., Liberty Corner, NJ, USA*

Economic Impact of Current SIF, Flexibility, Inspection and Manufacturing Changes as They Relate to the B31 Piping Codes
Technical Paper Publication: PVP2019-94075

Anthony W. Paulin Jr., *Paulin Research Group, Houston, TX, USA*
Glynn Woods, *GCS Consulting Services Inc, New Ulm, TX, USA*

B31 J SIF and k-Factor Test of Sweeplus®
Technical Paper Publication: PVP2019-93024

Yuqing Liu, Ismat El Jaouhari & Philip Diwakar, *Bechtel Inc., Sugar Land, TX, USA*
Dan Lin, *Bechtel, Houston, TX, USA*

Investigation of the Stresses and Interaction Effects of Nozzle-Cylinder Intersections When Subject to Multiple External Loads
Technical Paper Publication: PVP2019-93306

Murat Bozkurt, David Nash & Asraf Uzzaman, *University of Strathclyde Glasgow, Glasgow, Glasgow, Scotland, UK*

TUTORIAL SESSION 2.4Q (TW-2-6)

Bolted Joint Design, Analysis, and Code Compliance - Part 2

Ballroom Level (2nd floor), Hyatt Regency, Rio Grande W.
4:15pm - 6:00pm

Session Developer/Session Chair:
Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*

Presented by:
Sayed Nassar, *Oakland University, Rochester, MI, USA*
Warren Brown, *Integrity Engineering Solutions, Dunsborough, WA, Australia*

Block 3.1 Monday, July 17 8:15AM – 10:00AM

TECHNICAL SESSION 3.1A (CS-21-1)

Fatigue Monitoring and Related Assessment Method

Losaya Conference Center, Bowie C 8:15am - 10:00am

Session Developer/Session Chair:
Juergen Rudolph, *Framatome GmbH, Erlangen, Bavaria, Germany*

Session Co-Chair:
Jose Freire, *Puc-Rio, Rio de Janeiro, Brazil*

Fast Fatigue Evaluation (FFE) under Complex Operational Loading Conditions

Technical Presentation: PVP2019-93912

Alexander Mutz, *Kernkraftwerk Gösgen-Däniken AG, Däniken, Switzerland*
Juergen Rudolph & Steffen Bergholz, *Framatome GmbH, Erlangen, Bavaria, Germany*

Determination of Inspection Intervals Based on Realistic Load Monitoring and Fracture Mechanics

Technical Paper Publication: PVP2019-93914

Juergen Rudolph & Steffen Bergholz, *Framatome GmbH, Erlangen, Bavaria, Germany*
Dalibor Jerinic, *TÜV NORD Systems GmbH & Co. KG, Hamburg, Germany*
Detlef Rieck, *ENCOS GmbH & Co. KG, Greifswald, Germany*

Fatigue Assessment and Monitoring of a Dented Pipeline Specimen

Technical Paper Publication: PVP2019-93663

Jose Freire, *Puc-Rio, Rio De Janeiro, Brazil,*
Vitor Paiva, Giancarlo Gonzáles, Ronaldo Vieira, Jose Eduardo Maneschy & Alexandre Ribeiro, *Pontifical Catholic University of Rio De Janeiro, Rio De Janeiro, Brazil*
Ana D'Almeida, *Cenpes Petrobras, Rio De Janeiro, Brazil*

Evaluation of Fatigue Crack Growth at Piping of Austenitic Stainless Steel under Biaxial Stress

Technical Paper Publication: PVP2019-93909

Shogo Harada, *Osaka University, Kishiwada, Japan*
Takanori Kitada, *Osaka University, Osaka, Japan*
Takao Nakamura, *Graduate School of Engineering, Osaka University, Osaka, Japan*

TECHNICAL SESSION 3.1B (DA-12-1)

Fracture - I

Losaya Conference Center, Maverick B 8:15am - 10:00am

Session Developer/Session Chair:
Shane Finneran, *DNV GL, Dublin, OH, USA*

Session Co-Chair:
Alicia Avery P.Eng., *A.C. Avery Projects Inc., Calgary, AB, Canada*

Electric Potential Drop Method for Evaluating Crack Initiation and Crack Propagation: the Help of FE Simulation

Technical Paper Publication: PVP2019-93144

Patrick Le Delliou, *EDF, Moret Sur Loing, France*

Adjusted J-R Toughness Curve for Pipes Using J-A2 Crack Constraint of CT Specimens and 3D Crack Meshes

Technical Paper Publication: PVP2019-93683

Greg Thorwald, *Quest Integrity Group, Boulder, CO, USA*
Kenneth Bagnoli, *ExxonMobil Research and Engineering, Spring, TX, USA*

Evaluation of Fatigue Cracks using XFEM
Technical Presentation: PVP2019-93818

M. Wasy Akhtar, *JBL Technologies, Houston, TX, USA*

Proposal of Ductile Damage Model Based on Unit Cell Analysis for Prediction of Ductile Crack Growth Resistance of Cracked Component
Technical Paper Publication: PVP2019-93098

Takehisa Yamada, *IHI Corporation, Yokohama, Kanagawa, Japan*
Mitsuru Ohata, *Osaka University, Suita, Osaka, Japan*

TECHNICAL SESSION 3.1C (MF-18-2)

Advanced Manufacturing Techniques
Losaya Conference Center, Maverick A 8:15am - 10:00am

Session Developer/Session Chair:
Andrew Duncan, *Savannah River National Laboratory, Aiken, SC, USA*

Session Co-Developers:
Chris San Marchi, *Sandia National Laboratories, Livermore, CA, USA*
Catrin Mair Davies, *Imperial College London, London, UK*
Ozan Gurdal, *Nuclear Advanced Manufacturing Research Centre, University of Sheffield, Sheffield, UK*
Vincent Robin, *EDF, Chatou, France*
Arindam Chakraborty, *VIAS, Houston, TX, USA*
Sylvain Pillot, *Arcelormittal Global R&D, Le Creusot, France*
Judith Todd, *Pennsylvania State University, University Park, PA, USA*
Anthony Horn, *Wood, Warrington, UK*

Session Developer/Session Co-Chair:
Paul Korinko, *Savannah River National Laboratory, Aiken, SC, USA*

On the Microstructural Evolution and Porosity Consolidation in 316L Stainless Steel during Hot Isostatic Pressing
Technical Paper Publication: PVP2019-93016

Adam J. Cooper, *Wood, Warrington, UK*
Olivia C. G. Tuck, *National Nuclear Laboratory, Warrington, UK*
Samuel Armson, Michael Preuss, *University of Manchester, Manchester, UK*

Development of a New Austenitic Stainless Steel (Low-C-18Cr-11Ni-3Cu-Mo-Nb-B-N) with High Sensitization Resistance and High Temperature Strength
Technical Paper Publication: PVP2019-93187

Yuhei Suzuki, Shogo Aota, Etsuo Dan, Takahiro Osuki, Nao Otaki & Hirokazu Okada, *Nippon Steel & Sumitomo Metal Corporation, Amagasaki, Japan*
Masaki Ueyama & Toshihide Ono, *Nippon Steel & Sumitomo Metal Corporation of America, Houston, TX, USA*

Intelligent Fixtures to Accelerate Pressure Vessel Manufacture
Technical Presentation: PVP2019-94082

Craig Hamer, *Nuclear Advanced Manufacturing Research Center, Sheffield, UK*

TECHNICAL SESSION 3.1D (CS-11-5)

Integrity assessment
Losaya Conference Center, Seguin 8:15am - 10:00am

Session Developer/Session Co-Chair:
Yinghua Liu, *Tsinghua University, Beijing, China*

Session Co-Developer/Session Chair:
Jun Shen, *Tsinghua University, Beijing, China*

Thinking on Intelligent Design, Manufacture and Maintenance of Pressure Equipment in China
Technical Paper Publication: PVP2019-93364

Xuedong Chen, Zhichao Fan, Tao Chen, Shuangqing Xu, *Hefei General Machinery Research Institute, Hefei, China*
Guofu Ou, *Zhejiang Sci-Tec University, Hangzhou, Zhejiang, China*
Xiaoying Tang, *Shanghai Special Equipment Supervision and Inspection Technology Research Institute, Shanghai, China*

Analysis of Tube Bending Deformation in Petrochemical Heater Furnace Tubes
Technical Paper Publication: PVP2019-93454

Yufeng Ye, Haoping Xie, Huibin Liu, Pengwu Cai & Weican Guo, *Zhejiang Provincial Special Equipment Inspection and Research Institute, Hangzhou, China*

A Study on Conservative Degree of Two Safety Assessment Methods for Piping and Vessels with Defects
Technical Paper Publication: PVP2019-93789

Meng He, Haitao Li, Zhiyuan Han, Guoshan Xie, Liang Sun & Weihua Wang, *China Special Equipment Instpection and Research Institute, Beijing, China*

TECHNICAL SESSION 3.1E (FSI-4-2)

Flow-Induced Effects
Losaya Conference Center, Bowie A 8:15am - 10:00am

Session Developer/Session Chair:
Helen Cothron, *Electric Power Research Institute, Hixson, TN, USA*

Session Co-Developer:
Teguewinde Sawadogo, *Canadian Nuclear Laboratories, Chalk River, ON, Canada*

Session Developer/Session Co-Chair:
Victor Janzen, *victorpjanzen.com, Pembroke, ON, Canada*

The Influencing Mechanism of Hydrodynamic Factors on Naphthenic Acid Flow-induced Corrosion
Technical Paper Publication: PVP2019-93426

Yunrong Lyu, *Guandong University of Petrochemical Technology, Maoming, Guangdong, China*

Computation of Boiling Water Reactor Annulus Flow Loads Using 2D Potential Flow Methodology and 3D Finite Element Analysis: A Comparative Study
Technical Paper Publication: PVP2019-93753

Shari Day, Minji Fong, *Structural Integrity Associates, Inc., San Jose, CA, USA*
Matthew Walter, *Structural Integrity Associates, Inc., Centennial, CO, USA*

Tunable EOS Material Model in the Simulation of Pulsed Mercury Spallation Target Vessel
Technical Paper Publication: PVP2019-93292

Lianshan Lin, Drew Winder, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*

TECHNICAL SESSION 3.1F (SE-6-1)

Seismic Analysis and Design of Piping Systems - I
Losaya Conference Center, Bowie B 8:15am - 10:00am

Session Developer/Session Chair:
Gerry Slagis, *G C Slagis Associates, Roseville, CA, USA*

Session Co-Developer:
Izumi Nakamura, *National Res Inst Earth Sci/disaster Prevention, Hyogo, Japan*

Session Co-Chair:
Satoru Kai, *IHI Corporation, Yokohama, Japan*

Fatigue Evaluation Method of Piping System Based on Total Input Energy and One Cycle Momentary Input Energy
Technical Paper Publication: PVP2019-93631

Michiya Sakai, Shinichi Matsuura, Ryuya Shimazu, Yohei Ono & Yutaka Hagiwara, *Central Research Institute of Electric Industry, Abiko, Chiba, Japan*
Ichiro Tamura, *The Chugoku Electric Power Company, Hiroshima, Japan*

Numberical Metamodeling of a Coupled Tank-Piping System for Seismic Fragility Analysis with Artificial Waveforms
Technical Paper Publication: PVP2019-93685

Rocco di Filippo, *University of Trento - DICAM, Trento, Italy,*
Giuseppe Abbiati, *IBK, ETH, Zurich, Switzerland*
Osman Sayginer, Patrick Covi & Oreste Salvatore Bursi, *University of Trento, Trento, Italy*
Fabrizio Paolacci, *University of Roma Tre, Rome, Italy*

Seismic Evaluation Method of Piping Systems by Inelastic Response Spectrum Analysis Part 1 - Response Analysis
Technical Paper Publication: PVP2019-93898

Ichiro Tamura, *The Chugoku Electric Power Company, Hiroshima, Japan*
Michiya Sakai, Shinichi Matsuura & Ryuya Shimazu, *Central Research Institute of Electric Industry, Abiko, Chiba, Japan*
Hiroaki Tamashiro, Soichi Mabuchi, *Itochu Techno-Solutions Corporation, Tokyo, Japan*

TECHNICAL SESSION 3.1G (CT-3-2)

Leak Tightness and Fugitive Emissions - II
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande E.
8:15am - 10:00am

Session Developer/Session Chair:
Takashi Kobayashi, *National Institute of Technology, Numazu College, Numazu, Shizuoka, Japan*

Session Developer/Session Co-Chairs:
Satoshi Nagata, *Toyo Engineering Corporation, Narashino, Chiba, Japan*
Dale Rice, P.E., *VSP Technologies, Leland, NC, USA*

The Use of Different Media in Leakage Tests
Technical Paper Publication: PVP2019-93531

Manfred Schaaf, Frank Herkert, *AMTEC Gmbh, Lauffen, Germany*
Adam Arnett, *Amtec North America, Athens, OH, USA*

Prediction of Liquid and Gas Leak Rates in Packed Stuffing Boxes
Technical Paper Publication: PVP2019-93001

Ali Salah Omar Aweimer & Abdel-Hakim Bouzid, *École de Technologie Supérieure, Montreal, QC, Canada*

Difference in Mechanical and Leakage Behavior of Pipe-Socket Threaded Joints Subjected to Bending Moment Due to the Thread Combinations; Taper-Taper and Taper-Parallel
Technical Presentation: PVP2019-93756

Satoshi Nagata, *Toyo Engineering Corporation, Narashino, Chiba, Japan*
Shinich Fujita, *Japan Pipe Fittings Association, Tokyo, Japan*
Toshiyuki Sawa, *Hiroshima University, Koto-city, Japan*

Consideration on the Minimum Gasket Stress to Maintain Sealability of Bolted Flanged Connections Subjected to External Bending Moment
Technical Presentation: PVP2019-93965

Takashi Kobayashi, *National Institute of Technology, Numazu College, Numazu, Shizuoka, Japan*

TECHNICAL SESSION 3.1H (CS-14-1)

Repair and Mitigation of Degraded Components in Nuclear Power Plants
Hill County Level (3rd floor), Hyatt Regency, Llano
8:15am - 10:00am

Session Developer/Session Chair:
Steven L. McCracken, *Electric Power Research Institute, Harrisburg, NC, USA*

Session Developer/Session Co-Chair:
Jonathan Tatman, *Electric Power Research Institute, Charlotte, NC, USA*

Full Structural Weld Overlay on a Super Emergency Feedwater Nozzle at the Dukovany Nuclear Power Plant
Technical Paper Publication: PVP2019-93664

Steven L. McCracken, *Electric Power Research Institute, Harrisburg, NC, USA*
Marek Palán, *CEZ, a.s., Temelín, Czech Republic*
Pavel Mlynár, *CEZ, a.s., Dukovany, Czech Republic*
Nicholas Mohr, *Electric Power Research Institute, Charlotte, NC, USA*

Technical Basis for Weld Overlay Repair to Address Thermal Fatigue Cracking in Class 1, 2, and 3 Nuclear Reactor Piping
Technical Paper Publication: PVP2019-93360

Stephen Marlette, *Westinghouse Electric Company, Cranberry Township, PA, USA*
Steven L. McCracken, *Electric Power Research Institute, Harrisburg, NC, USA*
David Segletes, *Structural Integrity Associates, Huntersville, NC, USA*

Review of Ferrite Number (FN) Requirements and Proposed Changes to Code Case N-504-4 and Nonmandatory Q
Technical Paper Publication: PVP2019-93637

Steven L. McCracken, *Electric Power Research Institute, Harrisburg, NC, USA*
David Segletes, *Structural Integrity Associates, Huntersville, NC, USA*

Evaluation of Laser Peening for Mitigation of Primary Water Stress Corrosion Cracking in Pressurized Water Reactors
Technical Paper Publication: PVP2019-93361

Stephen Marlette, *Westinghouse Electric Company, Cranberry Township, PA, USA*
Stan Bovid, *LSP Technologies, Inc., Dublin, OH, USA*

TECHNICAL SESSION 3.1I (MF-27-1)

Structural Integrity Assessment and Chloride Induced Stress Corrosion Cracking in Spent Nuclear Fuel Canisters
Hill County Level (3rd floor), Hyatt Regency, Live Oak
8:15am - 10:00am

Session Developer:
Yun-Jae Kim, *Korea University, Seoul 136-701, Korea (Republic)*

Session Co-Developer:
Hsoung-Wei Chou, *Institute of Nuclear Energy Research, Taoyuan City, Taiwan*

Session Co-Developer/Session Chair:
Poh-Sang Lam, *Savannah River National Lab, Aiken, SC, USA*

Session Co-Chair:
Andrew Duncan, *Savannah River National Laboratory, Aiken, SC, USA*

Development of a Tester for Chloride-Induced Stress Corrosion Cracking using Immersion Method
Technical Paper Publication: PVP2019-93922

Jae-Yoon Jeong, Myeong Woo Lee & Yun-Jae Kim, *Korea University, Seoul 136-701, Korea (Republic)*
Robert Sindelar & Andrew Duncan, *Savannah River National Laboratory, Aiken, SC, USA*

Engineering J Estimates for Spent Fuel Canisters under Combined Mechanical and Welding Residual Stresses
Technical Paper Publication: PVP2019-93936

Hyun Jae Lee & Yun-Jae Kim, *Korea University, Seoul 136-701, Korea (Republic)*
Poh-Sang Lam & Robert Sindelar, *Savannah River National Laboratory, Aiken, SC, USA*

Crack Growth Rate Testing and Large Plate Demonstration under Chloride-Induced Stress Corrosion Cracking Conditions in Stainless Steel Canisters for Storage of Spent Nuclear Fuel
Technical Paper Publication: PVP2019-94031

Poh-Sang Lam, Andrew Duncan, Lisa Ward & Robert Sindelar, *Savannah River National Laboratory, Aiken, SC, USA*
Yun-Jae Kim, Jae-Yoon Jeong, Hyun Jae Lee & Myeong Woo Lee, *Korea University, Seoul, Korea (Republic)*

Crack Growth Rate Model for CISCC of Stainless Steel Canisters
Technical Paper Publication: PVP2019-94055

John Broussard, *Dominion Engineering, Inc., Reston, VA, USA*
Charles Bryan, *Sandia National Laboratories, Albuquerque, NM, USA*
Robert Sindelar & Poh-Sang Lam, *Savannah River National Lab, Aiken, SC, USA*

TECHNICAL SESSION 3.1J (HPT-3-1)

Fitness for Service and NDE of High Pressure Vessels and Piping
Hill County Level (3rd floor), Hyatt Regency, Blanco
8:15am - 10:00am

Session Developer/Session Chair:
Jan Keltjens, *SABIC, Geleen, Netherlands*

Session Co-Chair:
Christopher Tipple, *Structural Integrity Associates, Centennial, CO, USA*

Fitness-for-Service Involving ASME Section VIII, Division 3
Technical Presentation: PVP2019-93733

Kannan Subramanian, *Stress Engineering Services, Metairie, LA, USA*
Ovidio Gonzalez, *Westlake Longview Corporation, Longview, TX, USA*
Won Kim, *Stress Engineering Services, Houston, TX, USA*

Proposal of New Code Case for Alternative UT Flaw Evaluation and Acceptance Criteria of Subsurface Flaw Near Component Surface in Section VIII Division 2 and Division 3
Technical Paper Publication: PVP2019-93105

Susumu Terada, *Kobe Steel, Ltd., Takasago, Hyogo, Japan*

The Strain Concentration of High Strength Girth Weld Subjected to Tensile Displacement
Technical Paper Publication: PVP2019-93530

Jian Shuai, YinHui Zhang, Zhiyang Lv & Yaodong Shuai, *China University of Petroleum, Beijing, China*

Review of Ocean Simulation Lab FFS Program
Technical Presentation: PVP2019-93708

Chris Storey, *Southwest Research Institute, San Antonio, TX, USA*

PANEL SESSION 3.1K (OAC-6-1)

Mitigating Flange Leaks - Practical Field Experience
Hill County Level (3rd floor), Hyatt Regency, Nueces
8:15am - 10:00am

Session Developer/Session Chair:
Ebadollah Jamalyaria, *Flexitallic, Deer Park, TX, USA*

Session Co-Developer:
Warren Brown, *Integrity Engineering Solutions, Dunsborough, WA, Australia*

Session Developer/Session Co-Chair:
Joel Baulch, *Teadit North America, Pasadena, TX, USA*

Panelists:
Ebadollah Jamalyaria, *Flexitallic, Deer Park, TX, USA*
Warren Brown, *Integrity Engineering Solutions, Dunsborough, WA, Australia*
Joel Baulch, *Teadit North America, Pasadena, TX, USA*

TECHNICAL SESSION 3.1L (CS-3-1)

EAF European Projects (INCEFA-PLUS, Finland & Germany)
Hill County Level (3rd floor), Hyatt Regency, Pecan
8:15am - 10:00am

Session Developer/Session Chair:
Seiji Asada, *Mitsubishi Heavy Industries, Ltd, Kobe, Japan*

Session Developer/Session Co-Chair:
Claude Faidy, *CF Integrity Engineering, Tassin, France*

INCEFA-PLUS (Increasing Safety in NPPs by Covering Gaps in Environmental Fatigue Assessment)
Technical Paper Publication: PVP2019-93276

Kevin Mottershead, *Wood PLC, Warrington, UK*
Matthias Bruchhausen, *European Commission, Joint Research Centre, Petten, Netherlands*
Sergio Cicero, *University of Cantabria, Santander, Spain*
Sam Cuvilliez, *EDF - DIPNN - DT, Lyon, France*

Environmentally Assisted Fatigue Data from the INCEFA-PLUS Project
Technical Paper Publication: PVP2019-93085

Matthias Bruchhausen, *European Commission, Joint Research Centre, Petten, Netherlands*
Alec McLennan & Kevin Mottershead, *Wood PLC, Warrington, UK*
Roman Cicero, *Inesco Ingenieros, Santander, Spain*
Cailtin Huotilainen, *3VTT Technical Research Centre of Finland Ltd., Finland*
Jean-Christophe Le Roux, *EDF R&D, Moret Sur Loing, France*
Marc Vankeerberghen, *Belgian Nuclear Research Centre, Mol, Belgium*

Environmental Fatigue Management for Long Time Operation - Finnish Point of View
Technical Paper Publication: PVP2019-94015

Jussi Solin & Tommi Seppänen, *VTT Technical Research Centre of Finland Ltd., Finland*
Petri Lemettinen, *Fortum Power and Heat Oy, Finland*
Juha Isometsa & Erkki Pulkkinen, *TVO, Eurajoki, Finland*

Important Effects in Environmentally Assisted Fatigue (EAF) of Austenitic and Ferritic Steel Components Including Welds and Their Consideration in a Fatigue Assessment Concept
Technical Paper Publication: PVP2019-93913

Juergen Rudolph, Matthias Herbst & Armin Roth, *Framatome GmbH, Erlangen, Bavaria, Germany*
Christian Swacek & Tim Schopf, *University of Stuttgart, Stuttgart, Germany*

TECHNICAL SESSION 3.1M (DA-17-1)

Composite Materials and Structures
Hill County Level (3rd floor), Hyatt Regency, Pecos
8:15am - 10:00am

Session Developer/Session Chair:
Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*

Session Developer/Session Co-Chair:
Mo Uddin, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Composite Overwrapped Pipe Burst Test: Modeling and Experimentation
Technical Presentation: PVP2019-93076

Andrew Littlefield, Michael Macri, Joshua Root & Lucas Smith, *US Army RDECOM-ARDEC Benét Labs, Watervliet, NY, USA*

Development of Creep Test Method for Thermoplastic Fiber-Reinforced Polymer Composite Tubes Under Pure Hoop Loading
Technical Paper Publication: PVP2019-93302

Hai Doan, Hossein Ashrafizadeh & Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*

Rehabilitation of Service Water Heat Exchanger Piping System Combining the Use of CIPP and CFRP Composite Technologies
Technical Presentation: PVP2019-93300

Tomas Jimenez, *Fibrwrap, San Diego, CA, USA*
Amber Wagner, *Insituform Technologies, San Diego, CA, USA*

TECHNICAL SESSION 3.1N (DA-2-2)

Design and Analysis of Piping and Piping Components: Vibration Topics
Hill County Level (3rd floor), Hyatt Regency, Frio
8:15am - 10:00am

Session Developer/Session Chair:
Chakrapani Basavaraju, *USNRC, Rockville, MD, USA*

Session Developer/Session Co-Chair:
Pieter Van Beek, *TNO, Delft, Netherlands*

Improved VIV Screening Method for Manifold Piping and Tie-in Spool Design
Technical Paper Publication: PVP2019-93035

M Liu, *Aker Solutions, Windsor, UK*
Colin Cross, *Aker Solutions, London, UK*

Novel Mitigation Technique to Reduce Stress at Pipe Welds Caused by Acoustic Induced Vibrations (AIV)
Technical Paper Publication: PVP2019-93718

Brandon Ridens & Sarah Simons, *Southwest Research Institute, San Antonio, TX, USA*

Piping Vibration of Multi-Treater System in OCU Process Plant
Technical Paper Publication: PVP2019-93394

Jae-Yeol Park, Manjin Kim & Minkyu Han, *Samsung Engineering, Seoul, Korea (Republic)*

Analysis Approach Examples for Flow-Induced Piping Vibration Mitigation
Technical Paper Publication: PVP2019-93314

Brian Voll, Sargent & Lundy, *LLC, Wheaton, IL, USA*

TECHNICAL SESSION 3.1O (DA-15-1)

Coke Drum Skirts and Other Components
Losaya Conference Center, Navaro 8:15am - 10:00am

Session Developer/Session Chair:
Antonio Seijas, *Phillips66 Company, Katy, TX, USA*

Session Developer/Session Co-Chair:
Julian Bedoya, *ExxonMobil Research & Engineering Co., Spring, TX, USA*

A Review of Optimising the Design of a New Coke Drum Skirt
Technical Paper Publication: PVP2019-93135

Alexander Berry, *Phillips66, Lincolnshire, UK*
Warren Brown, *Integrity Engineering Solutions, Dunsborough, WA, Australia*
Antonio Seijas, *Phillips66 Company, Katy, TX, USA*
Sarah J. Cook, *Phillips66, South Killingholme, UK*

Coke Drum Bottom Head Flange Design Opimisation
Technical Paper Publication: PVP2019-93136

Alexander Berry, *Phillips66, Lincolnshire, UK*
Warren Brown, *Integrity Engineering Solutions, Dunsborough, WA, Australia*
Antonio Seijas*, Phillips66 Company, Katy, TX, USA*
Sarah J. Cook, *Phillips66, South Killingholme, UK*

Further Investigation into the Damage Tolerance of Different Coke Drum Support Skirt Designs
Technical Paper Publication: PVP2019-93529

Seetha Ramudu Kummari & Phillip E. Prueter, *The Equity Engineering Group, Inc., Shaker Heights, OH, USA*
Michael Bifano, *The Equity Engineering Group, Inc., Novelty, OH, USA*
Antonio Seijas, *Phillips66 Company, Katy, TX, USA*
Ben Hantz, *Valero, San Antonio, TX, USA*

Importance of Accurate and Detailed Data Processing of Laser Mapping in Coke Drum
Technical Paper Publication: PVP2019-93674

Daryl Rutt, Stephen Park, Darren Love, Egler Araque & Rick Clark, *CIA Inspection, Hannon, ON, Canada*

TUTORIAL SESSION 3.1Q (TW-2-7)

Additive Manufacturing - Overview of Processes, Qualification, Testing and Future Prospects - Part 1
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande W.
8:15am - 10:00am

Session Developer/Session Chair:
Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*

Presented by:
Paul Korinko, *Savannah River National Laboratory, Aiken, SC, USA*

Block 3.2 Wednesday, July 17 10:15AM – 12:00PM

TECHNICAL SESSION 3.2A (CS-30-1)

Fatigue Assessment & Management - A Probabilistic Perspective
Losaya Conference Center, Bowie C
10:15am - 12:00pm

Session Developer/Session Chair:
Yogen Garud, *SIMRAND, LLC, San Jose, CA, USA*

Session Co-Chair:
Arindam Chakraborty, *VIAS, Houston, TX, USA*

Lower Tail Estimation of Fatigue Life
Technical Paper Publication: PVP2019-93104

D. Gary Harlow, *Lehigh University, Bethlehem, PA, USA*

Uncertainty Quantification and Sensitivity Analysis for Net Section Collapse Criterion of Pipes under Pressure and Bending
Technical Paper Publication: PVP2019-93867

Yogen Garud, *SIMRAND, LLC, San Jose, CA, USA*
Gary Stevens, *Electric Power Research Institute, Charlotte, NC, USA*

Fatigue-Data-Based Reliability-Target Modeling: A Statistical Multi-Scale vs. Deterministic Reliability-Safety-Factor-Based Approach
Technical Presentation: PVP2019-94060

Jeffrey Fong, N. Alan Heckert & James Filliben, *NIST, Gaithersburg, MD, USA*

TECHNICAL SESSION 3.2B (DA-12-2)

Fracture - II
Losaya Conference Center, Maverick B
10:15am - 12:00pm

Session Developer/Session Chair:
Shane Finneran, *DNV GL, Dublin, OH, USA*

Session Co-Chair:
Alicia Avery P.Eng., *A.C. Avery Projects Inc., Calgary, AB, Canada*

New Model for Ductile Rupture under Cylic Loading Conditions
Technical Paper Publication: PVP2019-93836

Al Mahdi Remmal, *Framatome / Sorbonne Université - Université Pierre et Marie Curie, La Defense, Ile De France, France*
Stéphane Marie, *Framatome, Courbevoie, France*
Jean-Baptiste Leblond, *Laboratoire d'Alembert - Sorbonne Université, Université Pierre et Marie Curie, Paris, France*

Effects of Local Wall Thinning with Crack on Stress Intensity Factor for Pipes Subject to Combined Pressure and Bending
Technical Paper Publication: PVP2019-93761

Joy (Xiaoya) Tao, *EDF Energy Generation, Gloucester, UK*
Lei Zhu, *EDF Energy NNB, Bristol, UK*

Prediction of Fracture Location in Tensile Test of Short-Fiber-Self-Reinforced Polyethylene Composite Plates
Technical Paper Publication: PVP2019-93546

Naoya Tada, Ming JIN, Takeshi Uemori & Junji Sakamoto, *Okayama University, Okayama, Japan*

Comparison of Fracture Assessments of Corrosion Pits using Sharp and Blunt Notched Crack Procedures
Technical Paper Publication: PVP2019-93297

Caroline Meek, Matthew Spence, *National Nuclear Laboratory, Warrington, UK*

TECHNICAL SESSION 3.2C (MF-2-1)

Materials for Hydrogen Service - I : Deformation and Fracture
Losaya Conference Center, Maverick A
10:15am - 12:00pm

Session Developer/Session Chair:
Chris San Marchi, *Sandia National Laboratories, Livermore, CA, USA*

Session Developer/Session Co-Chair:
Paolo Bortot, *TenarisDalmine, Dalmine, Italy*

Re-Examining HELP: Mechanism, Hypothesis, or None-of-the-Above?
Technical Presentation: PVP2019-93614

Ryan Sills, *Sandia National Laboratories, Livermore, CA, USA*

Effect of Hydrogen Isotopes on the Fracture Toughness Properties of Types 304L and 316L Stainless Steel Forgings
Technical Paper Publication: PVP2019-93702

Michael Morgan, *Savannah River National Laboratory, Aiken, SC, USA*

Evaluating the Resistance of Austenitic Stainless Steel Welds to Hydrogen Embrittlement
Technical Paper Publication: PVP2019-93823

Joe Ronevich, Chris San Marchi & Dorian Balch, *Sandia National Laboratories, Livermore, CA, USA*

TECHNICAL SESSION 3.2D (CS-13-1)

High Temperature Codes and Standards
Losaya Conference Center, Seguin 10:15am - 12:00pm

Session Developer/Session Chair:
Kamran Nikbin, *ICL, London, UK*

Session Co-Chair:
Yinsheng Li, *Japan Atomic Energy Agency, Ibaraki-Ken, Japan*

The Influence of Multiaxial Stress Relaxation on Component Creep Damage Accumulation
Technical Paper Publication: PVP2019-93096

Nayden Matev, Robert A. Ainsworth & Meini Su, *University of Manchester, Manchester, UK*
Mark Stevens, *Frazer-Nash Consultancy, Bristol, UK*
Alan Jappy, *Frazer-Nash Consultancy Ltd, Surrey, UK*

A Unified Engineering Inelastic Model for 316H Stainless Steel
Technical Paper Publication: PVP2019-93641

V.-T. Phan & Ting-Leung Sham, *Argonne National Laboratory, Lemont, IL, USA*
Mark Messner, *Argonne National Laboratory, Plainfield, IL, USA*

Development of the External Pressure Chart of 2.25Cr-1Mo and Mod.9Cr-1Mo Steel for Elevated Temperature Design
Technical Paper Publication: PVP2019-93777

Masanori Ando, Satoshi Okajima, *Japan Atomic Energy Agency, Ibaraki, Japan*
Kazumichi Imo, *Hitachi GE Nuclear Energy, Ibaraki, Japan*

TECHNICAL SESSION 3.2E (FSI-1-1)

Friction, Drag and Two-Fluid Flow
Losaya Conference Center, Bowie A
10:15am - 12:00pm

Session Developer/Session Chair:
Jong Chull Jo, *Pusan National University/Korea Institute of Nuclear Safety, Busan, Korea (Republic)*

Session Developer/Session Co-Chair:
Arris Tijsseling, *TU Eindhoven, Eindhoven, Netherlands*

Session Co-Developer:
Thorsten Neuhaus, *TUEV NORD EnSys GmbH & Co. KG, Hamburg, Germany*

Evaluating and Proposing New Explicit Equations for the Darcy Friction Factor
Technical Paper Publication: PVP2019-93606

Shusheng Yang, *Wison Engneering Limited, Shanghai, China*
Li Song, *Bechtel, Houston, TX, USA*
Yuqing Liu, *Bechtel, Sugar Land, TX, USA*

Experimental Investigation on Flow Field Characteristics by Drag Reducing Agent Additives in Stirred Vessel
Technical Paper Publication: PVP2019-93415

Xueyu Qi, Ting Wu, Yiming Chen, Ke Yang, Wei Wang & Jing Gong, *China University of Petroleum, Beijing, China*
Wei Zhao, *SINOPEC Dalian Research Institute of Petroleum and Petrochemicals, Dalian, China*

Numerical Simulation of Oil-Water Two-Phase Stratified Flow Based on Diffusion Interface Model
Technical Presentation: PVP2019-93439

Xueyu Qi, Jing Gong, *China University of Petroleum-Beijing, Beijing, China*

Dancing Manhole Cover: A Nonlinear Spring-Mass System
Technical Paper Publication: PVP2019-93086

Arris Tijsseling, *TU Eindhoven, Eindhoven, Netherlands*
Jose Vasconcelos, *Auburn University, Auburn, AL, USA*
Qingzhi Hou, *Tianjin University, Tianjin, China*
Zafer Bozkus, *Middle East Technical University, Ankara, Turkey*

TECHNICAL SESSION 3.2F (SE-6-2)

Seismic Analysis and Design of Piping Systems - II
Losaya Conference Center, Bowie B
10:15am - 12:00pm

Session Developer:
Gerry Slagis, *G C Slagis Associates, Roseville, CA, USA*

Session Co-Developer:
Izumi Nakamura, *National Res Inst Earth Sci/disaster Prevention, Hyogo, Japan*

Session Chair:
Spyros A. Karamanos, *University of Thessaly, Volos, Greece*

Session Co-Chair:
Akihito Otani, *IHI Corporation, Yokahoma, Kanagawa, Japan*

Evaluation Concept for Plastic Collapse on Piping System
Technical Paper Publication: PVP2019-93438

Satoru Kai & Akihito Otani, *IHI Corporation, Yokahoma, Kanagawa, Japan*

Numerical Investigation on Strength of Tee Pipes under In-Plane / Out-of-Plane Cyclic Loading
Technical Paper Publication: PVP2019-93559

Izumi Nakamura, *National Research Institute for Earth Sciences/Disaster Prevention, Hyogo, Japan*

Buckling and Fatigue Evaluation of Braced Piping Support by Numerical Analysis
Technical Paper Publication: PVP2019-93830

Ryuya Shimazu & Michiya Sakai, *CRIEPI, Abiko, Chiba, Japan*

TECHNICAL SESSION 3.2G (CT-4-1)

Assembly of Bolted Joints
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande E.
10:15am - 12:00pm

Session Developer/Session Chair:
Jerry Waterland, *VSP Technologies, Prince George, VA, USA*

Session Co-Developer:
Anita Bausman, *VSP Technologies, Kingsport, TN, USA*

Session Developer/Session Co-Chair:
Linbo Zhu, *Xi'an Jiaotong University, Xi'an, Shanxi, China*

A Novel Methodology to Optimize the Tightening Sequence in Bolted Flange Joints
Technical Paper Publication: PVP2019-93062

Linbo Zhu & Wei Wang, Jing Gong, *Xi'an Jiaotong University, Xi'an, Shanxi, China*
Abdel-Hakim Bouzid, *Ecole Technologie Superieure, Montreal, QC, Canada*

Effective Shank Length of Bolts under Lateral Loads
Technical Paper Publication: PVP2019-93185

Yongjian Gao, Zhai Zhang & Qing Yu, *SNERDI, Shanghai, China*
Bingbing Chen, Sanlong Zheng & Chengchen Xie, *Zhejiang University of Technology, Hangzhou, China*

Impact of BFJA Training on Bolted Flange Joint Assembly Reliability
Technical Paper Publication: PVP2019-93679

Ross Dupre, *VSP Technologies, Sulphur, LA, USA*

Importance of Anti-Seize Base Grease Selection for Extreme Bolting Applications
Technical Presentation: PVP2019-93864

Donald Oldiges, *Jet-Lube, LLC, Rockwall, TX, USA*
Scott Hamilton, *Hex Technology, Austin, TX, USA*

TECHNICAL SESSION 3.2H (CS-14-2)

Research Activities Supporting Repair of Irradiated Materials
Hill County Level (3rd floor), Hyatt Regency, Llano
10:15am - 12:00pm

Session Developer/Session Chair:
Steven L. McCracken, *Electric Power Research Institute, Harrisburg, NC, USA*

Session Developer/Session Co-Chair:
Jonathan Tatman, *Electric Power Research Institute, Charlotte, NC, USA*

Auxiliary Beam Stress Improved Laser Welding for Repair of Irradiated Light Water Reactor Components
Technical Paper Publication: PVP2019-93667

Jian Chen, Zhili Feng, Roger Miller, Wei Tang, Maxim Gussev & Keith Leonard, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*
Jonathan Tatman, Ben Sutton & Greg Frederick, *Electric Power Research Institute, Charlotte, NC, USA*

Friction Stir Welding and Preliminary Characterization of Irradiated 304 Stainless Steel
Technical Paper Publication: PVP2019-93899

Wei Tang, Maxim Gussev, Zhili Feng, Brian Gibson, Roger Miller, Jian Chen, Scarlett Clark & Keith Leonard, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*
Jonathan Tatman, Ben Sutton & Greg Frederick, *Electric Power Research Institute, Charlotte, NC, USA*

Hot Cell Pulsed Laser Welding of Neutron Irradiated Type 304 Stainless Steel with a Maximum Damage Dose of 28 dpa
Technical Paper Publication: PVP2019-93316

Jonathan Tatman, Ben Sutton & Greg Frederick, *Electric Power Research Institute, Charlotte, NC, USA*
Paula Freyer, *Westinghouse Electric Company, Pittsburgh, PA, USA*
Frank Garner, *Radiation Effects Consulting, Richland, WA, USA*

TECHNICAL SESSION 3.2I (MF-21-1)

Asian Programs in Structural Integrity
Hill County Level (3rd floor), Hyatt Regency, Live Oak
10:15am - 12:00pm

Session Developer:
Yuh Chao, *Universityof South Carolina, Columbia, SC, USA*

Session Chair:
Yinghua Liu, *Tsinghua University, Beijing, China*

Session Developer/Session Co-Chair:
Hsoung-Wei Chou, *Institute of Nuclear Energy Research, Taoyuan City, Taiwan*

Session Co-Developer:
Poh-Sang Lam, *Savannah River National Lab, Aiken, SC, USA*

RPV Irradiation Surveillance Programmes in China
Technical Paper Publication: PVP2019-93068

Shuo Zhang, Haisheng Zhang & Kai Sun, *Nuclear Power Institute of China, Chengdu, China*

The Optimization Design of Storage Efficiency and Structural Analysis for the 3 Cubic Meter Radioactive Waste Container
Technical Paper Publication: PVP2019-93201

Yu-Yu Shen, Hsien-Chou Lin & Hsoung-Wei Chou, *Institute of Nuclear Energy Research, Taoyuan City, Taiwan*

A Novel Heat Input Equation for Analysis Welding Thermal Distribution and Welding Residual Stress
Technical Paper Publication: PVP2019-93362

Linwei Ma, Xiaotao Zheng, Wei Wang, Wei Lin, Jianmin Xu & Jiuyang Yu, *Wuhan Institute of Technology, Wuhan, China*

Evaluation of Irradiation Embrittlement of the Chinese RPV Steels
Technical Paper Publication: PVP2019-93615

Yupeng Cao, Yinbiao He, Binxi Wang, Yifeng Huang, Hui Li & Yan Yu, *Shanghai Nuclear Engineering Research and Design Institute, Shanghai, China*
Hu Hui, *East China University of Science and Technology, Shanghai, China*

TECHNICAL SESSION 3.2J (HPT-1-1)

Fatigue Performance for High Pressure Equipment
Hill County Level (3rd floor), Hyatt Regency, Blanco
10:15am - 12:00pm

Session Developer:
Mordechai Perl, *Ben Gurion University of The Negev, Beer Sheva, Israel*

Session Chair:
Phillip Prueter, *The Equity Engineering Group, Inc., Shaker Heights, OH, USA*

Session Co-Chair:
Melanie Sarzynski, Wiss, *Janney, Elstner Associates, Inc., Houston, TX, USA*

The Favorable Effect of Swage and Hydraulic Autofrettage on the Fracture Endurance and Fatigue Life of an Internally Cracked Smooth Tank Gun Barrel
Technical Presentation: PVP2019-93183

Mordechai Perl & Tomer Saley, *Ben-Gurion University of The Negev, Beer-Sheva, Israel*

Development of Material Parameters for Kinematic Hardening Models for the Bauschinger Effect in Certain ASME Section VIII, Div. 3 Materials
Technical Presentation: PVP2019-94038

Joseph Kapp, *Benet Labs/ Elmhurst Systems, Wynantskill, NY, USA*
Christopher Aiello, *Benet Labs, Delmar, NY, USA*
Edward Troiano, *US Army Benet Labs, Watervliet, NY, USA*

Fracture Mechanics Based Asset Management Approach in SCC Environments
Technical Paper Publication: PVP2019-94030

David Segletes, *Structural Integrity Associates, Huntersville, NC, USA*
Christopher Tipple, *Structural Integrity Associates, Centennial, CO, USA*
Daniel Peters, *Structural Integrity Associates, Edinboro, PA, USA*

The Effect of Small Amplitude High Frequency Load Oscillations on the Fatigue Crack Growth in an End Closure on a High Pressure Component
Technical Presentation: PVP2019-94036

Joseph Kapp, *Benet Labs/ Elmhurst Systems, Wynantskill, NY, USA*

TECHNICAL SESSION 3.2K (OAC-6-2)

Continued Safe Operation of Piping and Pipeline Systems
Hill County Level (3rd floor), Hyatt Regency, Nueces
10:15am - 12:00pm

Session Developer/Session Chair:
Ebadollah Jamalyaria, *Flexitallic, Deer Park, TX, USA*

Session Co-Developer:
Joel Baulch, *Teadit North America, Pasadena, TX, USA*

Session Developer/Session Co-Chair:
Warren Brown, *Integrity Engineering Solutions, Dunsborough, WA, Australia*

Comparative Risks of Hydrostatic and Pneumatic Pipeline Testing
Technical Paper Publication: PVP2019-93048

David Simpson, *Muleshoe Engineering, Farmington, NM, USA*

Analysis of Products Pipeline Accident Infiltration Process in Soil Condition
Technical Paper Publication: PVP2019-93069

Xiao Wang, Yongtu Liang, Shengli Liu & Mengyu Wu, *China University of Petroleum, Beijing, Beijing, China*

Proposal for Improving Insulation Installation Practice for Superheated Steam Line
Technical Paper Publication: PVP2019-93503

Shinichiro Kanamaru & Yoshinori Yamada, *JGC Corporation, Yokohama, Kanagawa, Japan*
Shaoxiang Qian, *EN Technology Center, JGC Corporation, Yokohama, Japan*

Creep Damage of Dissimilar Flanges Below API 579-1/ ASME FFS-1 Creep Damage Threshold
Technical Paper Publication: PVP2019-93034

Yoichi Ishizaki, Futoshi Yonekawa, Teppei Suzuki & Akira Hase, *Idemitsu Engineering Co. Ltd., Chiba, Japan*

TECHNICAL SESSION 3.2L (CS-3-2)

EAF Low Cycle Fatigue Testing
Hill County Level (3rd floor), Hyatt Regency, Pecan
10:15am - 12:00pm

Session Developer:
Seiji Asada, *Mitsubishi Heavy Industries, Ltd, Kobe, Japan*

Session Co-Developer/Session Chair:
Claude Faidy, *CF Integrity Engineering, Tassin, France*

Session Co-Chair:
Peter Gill, *Wood, Warrington, UK*

Environmentally-Assisted Fatigue Behavior of 316 Stainless Steels in Simulated PWR Primary Environment - Strain Holding, Zn-Addition, and Their Combined Effect
Technical Paper Publication: PVP2019-93134

Hyeon Bae Lee, Sub Kim, Junjie Chen & Changheui Jang, *Korea Advanced Institute of Science & Technology, Daejeon, Korea (Republic)*
Ho-Taesoon Kim, *KHNP-CRI, Daejeon, Korea (Republic)*
Gary Stevens, *Electric Power Research Institute, Charlotte, NC, USA*
Kawaljit Ahluwalia, *Electric Power Research Institute, Palo Alto, NJ, USA*

Study of the Effects of Non-Isothermal Conditions on Environmentally Assisted Fatigue in a PWR Primary Water Environment (Step III)
Technical Paper Publication: PVP2019-93271

Daiki Takagoshi & Yuichirou Nomura, *Mitsubishi Heavy Industry, Hyogo, Japan*
Seiji Asada, *Mitsubishi Heavy Industries, Ltd, Kobe, Japan*
Gary Stevens, *Electric Power Research Institute, Charlotte, NC, USA*
Kawaljit Ahluwalia, *Electric Power Research Institute, Palo Alto, NJ, USA*

Fatigue Initiation of 304L Stainless Steel subject to Thermal Shock Loading in a PWR Environment
Technical Paper Publication: PVP2019-93923

Peter J Gill & Peter Brown, *Wood, Warrington, UK*
David R. Tice & Norman Platts, *Wood Group plc., Warrington, Cheshire, UK*
Chris Currie, *Rolls-Royce, Derby, UK*

Room-Temperature Tensile Behavior of 82/182 Filler, Butter and Heat-Affected-Zones in a 508 LAS - 316 SS Dissimilar Weld: Tensile Test, Material Model and Finite Element Model Validation
Technical Paper Publication: PVP2019-93952

Subhasish Mohanty, Joseph Listwan, Saurindran Majumdar & Krishnamurti Natesan, *Argonne National Laboratory, Lemont, IL, USA*

TECHNICAL SESSION 3.2M (DA-17-2)

Composite Materials and Pipes
Hill County Level (3rd floor), Hyatt Regency, Pecos
10:15am - 12:00pm

Session Developer/Session Chair:
Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*

Session Developer/Session Co-Chair:
Mo Uddin, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Mechanical Behaviors of Reinforced Thermoplastic Pipe under Combined Load
Technical Paper Publication: PVP2019-93540

Baodong Wang, Hong Zhang, Xiaoben Liu, *China University of Petroleum, Beijing, China*

Numerical Studies on the Piezoelectrically Induced Deformations of Smart Composite Cylinders
Technical Paper Publication: PVP2019-93970

P.M. Anilkumar & B.N. Rao, *Indian Institute of Technology Madras, Chennai, Tamil Nadu, India*

Repair of B31.1 Fiber Reinforced Polymer Piping System Using Carbon Fiber Reinforced Polymer
Technical Paper Publication: PVP2019-93103

Jason Hebeisen, Timothy Adams, *Jensen Hughes, Independence, OH, USA*
Bruce Dubovecky, *Independent, Madison, OH, USA*
Tomas Jimenez, *Fibrwrap, San Diego, CA, USA*

Innovative Leak Detection Methodology in Pipelines by Measured Input Parameters in Single Branched Pipeline
Technical Paper Publication: PVP2019-93007

Ahmed Aly, Ahmed Lotfy & Hossam Abo Zaid, *MTC, Cairo, Egypt*

Pressure Surge Load Estimation on Pipes with Dimensional Reduction and Rayleigh Energy Method
Technical Paper Publication: PVP2019-93704

Seena Abu, Donghyung Lee & Juyoul Kim, *Samsung C&T Corporation, Seoul, Korea (Republic)*

Dynamic Response Analysis of Beam Mode Vibration of Piping System due to Turbulent Flow around Bend
Technical Paper Publication: PVP2019-93784

Shunji Kataoka & Kota Matsuura, *JGC Corporation, Yokohama, Kanagwa, Japan*
Shaoxiang Qian, *EN Technology Center, JGC Corporation, Yokohama, Japan*

TECHNICAL SESSION 3.2N (DA-9-1)

Piping and Equipment Dynamics
Hill County Level (3rd floor), Hyatt Regency, Frio
10:15am - 12:00pm

Session Developer:
Pieter Van Beek, *TNO, Delft, Netherlands*

Session Chair:
Stefan Belfroid, *TNO, Delft, Netherlands*

Session Co-Chair:
Mike Porter, *Porter McGuffie, Inc., Lawrence, KS, USA*

Vibration Design of Amine Regenerator Tower & Its Piping System
Technical Paper Publication: PVP2019-93471

Jae-Yeol Park & Minsung Chae, *Samsung Engineering, Seoul, Korea (Republic)*

Suppression of Low Energy Natural Modes of Pipe for Mitigation of Turbulence Induced Vibration
Technical Paper Publication: PVP2019-93696

Seena Abu, *Samsung C&T Corporation, Seoul, Korea (Republic)*

TECHNICAL SESSION 3.20 (DA-15-2)

Assessment of Bulges in Coke Drums
Losaya Conference Center, Navaro 10:15am - 12:00pm

Session Developer:
Clay Rodery, *C&S Technology, LLC, League City, TX, USA*

Session Co-Developer/Session Chair:
Patrick Boster, *Stress Engineering Services Inc., Houston, TX, USA*

Session Developer/Session Co-Chair:
Jorge Penso, *Shell Projects and Technology, Houston, TX, USA*

A Method to Estimate Deformation Strains in the Context of Coke Drum Life Assessments - Part 1
Technical Paper Publication: PVP2019-93740

John Huang & Patrick Boster, *Stress Engineering Services Inc., Houston, TX, USA*
Kannan Subramanian, *Stress Engineering Services, Metairie, LA, USA*
Julian Bedoya, *ExxonMobil Research & Engineering Co., Spring, TX, USA*

The Evolution of Bulged Areas in the Cylindrical Section of Coke Drums
Technical Paper Publication: PVP2019-93673

Egler Araque, Darren Love, Stephen Park, Daryl Rutt, Armando J Moret Tapia & Rick Clark, *CIA Inspection, Hannon, ON, Canada*

Measuring the Effectiveness of Metal Weld Overlay Repair through Bulge Depth and Bulge Sharpness Analysis
Technical Paper Publication: PVP2019-93661

Egler Araque, Darren Love, Stephen Park, Daryl Rutt & Rick Clark, *CIA Inspection, Hannon, ON, Canada*

Low-Cycle Fatigue Evaluation of External Weld Repairs for Coke Drums
Technical Presentation: PVP2019-93808

Sebastian Romo, Shutong Zhang & Antonio Ramirez, *Ohio State University, Columbus, OH, USA*
Jorge Penso, *Shell Projects and Technology, Houston, TX, USA*
Darren Barborak, *AZZ, Duluth, GA, USA*

TUTORIAL SESSION 3.2Q (TW-2-8)

Additive Manufacturing - Overview of Processes, Qualification, Testing and Future Prospects - Part 2
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande W.
10:15am - 12:00pm

Session Developer/Session Chair:
Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*

Presented by:
Paul Korinko, *Savannah River National Laboratory, Aiken, SC, USA*

Block 3.3 Wednesday, July 17 2:15PM – 4:00PM

TECHNICAL SESSION 3.3A (DA-3-1)

Development of New Design Fatigue Curves in Japan
Losaya Conference Center, Bowie C 2:15pm - 4:00pm

Session Developer/Session Chair:
Seiji Asada, *Mitsubishi Heavy Industries, Ltd, Kobe 652-8585, Japan*

Session Developer/Session Co-Chair:
Masahiro Takanashi, *IHI Corporation, Isogo-ku, Japan*

Development of New Design Fatigue Curves in Japan - Discussion of Effect of Surface Finish on Fatigue Strength of Nuclear Component Materials
Technical Paper Publication: PVP2019-93167

Motoki Nakane, *Hitachi-GE Nuclear Energy, Ltd., Hitachi-shi, Japan*
Yun Wang, Hisamitsu Hatoh & Akihiko Hirano, *Hitachi,Ltd, Hitachi, Ibaraki-Ken, Japan*
Masato Yamamoto, *CRIEPI, Yokosuka, Japan*
Kentaro Hayashi, *The Kansai Electric Power Company, Fukui-Ken, Japan*

New Design Fatigue Curves in Japan - Discussion of Fatigue Crack Growth based on Fatigue Test Data with Large Scale Piping
Technical Paper Publication: PVP2019-93272

Masaru Bodai, *Mitsubishi Heavy Industries, Ltd., Takasago, Hyogo, Japan*
Yuichi Fukuta & Seiji Asada, *Mitsubishi Heavy Industries, Ltd, Kobe, Japan*
Kentaro Hayashi, *The Kansai Electric Power Company, Fukui-Ken, Japan*

Study on Incorporation of a New Design Fatigue Curve into JSME Environmental Fatigue Evaluation Method
Technical Paper Publication: PVP2019-93273

Seiji Asada, *Mitsubishi Heavy Industries, Ltd, Kobe, Japan*
Shengde Zhang, *Central Research Institute of Electric Power Industry, Yokosuka, Japan*
Masahiro Takanashi, *IHI Corporation, Isogo-ku, Japan*
Yuichirou Nomura, *Mitsubishi Heavy Industries, Ltd., Takasago, Hyogo, Japan*

Development of New Design Fatigue Curves in Japan-Discussion of Crack Growth Behavior in Large-Scale Fatigue Tests of Carbon and Low-Alloy Steel Plates
Technical Paper Publication: PVP2019-93393

Masahiro Takanashi, *IHI Corporation, Isogo-ku, Japan*
Hiroshi Ueda, *IHI Corporation, Yokohama, Japan*
Toshiyuki Saito & Takuya Ogawa, *Toshiba Energy Systems & Solutions Corporation, Yokohama, Japan*
Kentaro Hayashi, *The Kansai Electric Power Company, Fukui-Ken, Japan*

TECHNICAL SESSION 3.3B (MF-9-1)

Mechanistic Modelling of Deformation and Fracture
Losaya Conference Center, Maverick B 2:15pm - 4:00pm

Session Developer:
Anthony Horn, *Wood, Warrington, UK*

Session Co-Developer/Session Chair:
Harry Coules, *University of Bristol, Bristol, UK*

Session Co-Chair:
Mahmoud Mostafavi, *University of Bristol, Bristol, UK*

Analysis of Environmental Assisted Cracking in S420 Steel by Using the Theory of Critical Distances
Technical Paper Publication: PVP2019-93145

Pablo González, Sergio Cicero, Borja Arroyo & José A. Álvarez, *University of Cantabria, Santander, Spain*

A Local Approach to Assess Temperature Effects on Fracture Toughness Incorporating the Measured Statistics of Microcracks
Technical Paper Publication: PVP2019-93186

Claudio Ruggieri, *University of Sao Paulo USP, Sao Paulo, Sao Paulo, Brazil*
Andrey P. Jivkov, *University of Manchester, Manchester, UK*

Development of GTN Model Parameters for Simulating Ductile Fracture Behavior of X 70 Carbon Steel SENT Specimens
Technical Paper Publication: PVP2019-93542

Sung Ho Yoon, Tae-Young Ryu & Moon Ki Kim, *Sungkyunkwan University, Suwon, Korea (Republic)*
Jae-Boong Choi, *Sungkyunkwan University, Kyungi-do 440-746, Korea (Republic)*
Ik-Joong Kim, *Korea Gas Corporation, Ansan, Gyeonggi, Korea (Republic)*

The Influence of Prior Plastic Loading on the Accumulation of Creep Strain in 316H Stainless Steel
Technical Paper Publication: PVP2019-93639

Megan Taylor, Abdullah al Mamun & D. Knowles, *University of Bristol, Bristol, UK*

TECHNICAL SESSION 3.3C (MF-2-2)

Materials for Hydrogen Service - II: Methods and Microstructure
Losaya Conference Center, Maverick A 2:15pm - 4:00pm

Session Developer/Session Chair:
Joe Ronevich, *Sandia National Laboratories, Livermore, CA, USA*

Session Co-Chair:
Akihide Nagao, *JFE Steel Corporation, Kanagawa, Japan*

Session Co-Developer:
Chris San Marchi, *Sandia National Laboratories, Livermore, CA, USA*

Screening Technique of Hydrogen Embrittlement Sensitivity in Austenitic Stainless Steels using in-situ SP Test Method
Technical Paper Publication: PVP2019-93738

Hyung-Seop Shin, Kyung Oh Bae & Hyuckmin Kim, *Andong National University, Andong, Korea (Republic)*
Un Bong Baek, *Kriss, Daejeon 305-340, Korea (Republic)*
Seung Hoon Nahm, *Korea Research Institute of Standards and Science, Daejeon, Korea (Republic)*

Influence of Roughness of Inner Surface of Simple Mechanical Testing Method to Evaluate Influence of High Pressure Hydrogen Gas
Technical Paper Publication: PVP2019-93492

Toshio Ogata & Yoshinori Ono, *National Institute for Materials Science, Tsukuba, Ibaraki, Japan*

Experimental and Simulation Study on Effective Hydrogen Diffusivity of Cold-Worked Type-304 Austenitic Stainless Steel
Technical Paper Publication: PVP2019-93250

Jean-Gabriel Sezgin, *AIST HydroMate, Fukuoka, Fukuoka, Japan*
Daichi Takatori, *Fukuoka University, Department of Mechanical Engineering, Fukuoka, Japan*
Junichiro Yamabe, *Fukuoka University, Fukuoka, Japan*

Effect of Hydrogen on the Constituent-Specific Mechanical Properties in High Strength Quenched and Tempered (Q&T) Pressure Vessel Steels
Technical Presentation: PVP2019-93714

Lawrence Cho, May Martin, Ryan M. White, Veruska D. Malave, Damian Lauria, Matthew J. Connolly, Peter E. Bradley, Frank Del Rio & Andrew Slifka, *National Institute of Standards and Technology, Boulder, CO, USA*

TECHNICAL SESSION 3.3D (CS-18-1)

Development in HDPE and Non-metallic Pipe Codes and Standards
Losaya Conference Center, Seguin 2:15pm - 4:00pm

Session Developer/Session Chair:
Jianfeng Shi, *Zhejiang University, Hangzhou, Zhejiang, China*

Session Chair:
Preeti Doddihal, *Kinectrics Inc., Toronto, ON, Canada*

Session Developer/Session Co-Chair:
Xiang Li, *China Special Equipment Inspection & Research Institute, Beijing, China*

Sustained Pressure Test Results for Surface Scratches in PE4710, Cell Classification 445574C High Density Polyethylene Pipe Material
Technical Paper Publication: PVP2019-93071

Jason Hebeisen & Timothy Adams, *Jensen Hughes, Independence, OH, USA*
Douglas Munson, *Munson & Associates, Honolulu, HI, USA*

Development of Chinese Standard on Ultrasonic Inspection for Electrofusion Joint of Polyethylene Pipe
Technical Paper Publication: PVP2019-93499

Weican Guo, Cunjian Miao, Haijian Zhong, *Zhejiang Provincial Special Equipment Inspection and Research Institute, Hangzhou, China*
Yangji Tao, Jianfeng Shi & Jinyang Zheng, *Zhejiang University, Hangzhou, China*

Technical Basis for Maximum Allowable Indentation Depths in HDPE Pipes for Proposed Asme Section III Code Case on Alternative Requirements to Appendix XXVI for Inspection and Repair
Technical Paper Publication: PVP2019-93767

Douglas Scarth, *Kinectrics, Toronto, ON, Canada*
Prabhat Krishnaswamy, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*
Phillip Rush, *MPR Associates, Alexandria, VA, USA*
Douglas Munson, *Munson & Associates, Honolulu, HI, USA*

TECHNICAL SESSION 3.3E (FSI-1-2)

CFD and Two-Phase Flow
Losaya Conference Center, Bowie A 2:15pm - 4:00pm

Session Developer/Session Chair:
Arris Tijsseling, *TU Eindhoven, Eindhoven, Netherlands*

Session Developer/Session Co-Chair:
Jong Chull Jo, *Pusan National University/Korea Institute of Nuclear Safety, Busan, Korea (Republic)*

Session Co-Developer:
Thorsten Neuhaus, *TUEV NORD EnSys GmbH & Co. KG, Hamburg, Germany*

Numerical Investigation of Pressure Fluctuations and Vibrations for Upward Two-Phase Flow in a Pipe
Technical Paper Publication: PVP2019-93994

Alexander Meire, Laurent De Moerloose & Joris Degroote, *Ghent University, Ghent, Belgium*

CFD Investigation of Thermal-hydraulic of Secondary Side Flow Field in a Steam Generator
Technical Paper Publication: PVP2019-93175

Xiong Guangming, Duan Yuangang, Zhu Yong & Long Teng, *State Key Laboratory of Nuclear Power Safety Monitoring Technology and Equipment, ShenZhen, GuangDong, China*
Wei Tan & Tong Su, *Tianjin University, Tianjin, China*

Effects of Initial Pressure and Length of a Broken Pipe on the Transient Hydraulic Loads Acting on Nuclear Steam Generator Tubes and Supports During Blowdown Following a Sudden FeedWater Pipe Break
Technical Paper Publication: PVP2019-93132

Jong Chull Jo, *Pusan National University/Korea Institute of Nuclear Safety, Busan, Korea (Republic)*
Jae Jun Jeong, & Byong Jo Yun, *Pusan National University, Busan, Korea (Republic)*

A Hybrid Model to Analyze the Fluid-Structure Interaction Phenomenon of A Relief System and Experiment Validation
Technical Paper Publication: PVP2019-93779

Fengjie Zheng, Fuzheng Qu & Xueguan Song, *Dalian University of Technology, Dalian, China*

TECHNICAL SESSION 3.3F (SE-7-1)

Seismic Evaluation of Systems, Structures and Components
Losaya Conference Center, Bowie B 2:15pm - 4:00pm

Session Developer/Session Chair:
Satoru Kai, *IHI Corporation, Yokohama, Japan*

Session Developer/Session Co-Chair:
Akemi Nishida, *Japan Atomic Energy Agency, Chiba, Japan*

Session Co-Developer:
Akihito Otani, *IHI Corporation, Yokahoma, Kanagawa, Japan*

Resource Allocation Model toward Seismic Water Pipeline Risk Mitigation Measures
Technical Paper Publication: PVP2019-93057

Elnaz Peyghaleh & Tarek Alkhrdaji, *Structural Technologies, Columbia, MD, USA*

Experimental Study of Near-fault Effect on Sloshing Mode of Storage Liquid in Tanks
Technical Paper Publication: PVP2019-93388

Juin-Fu Chai, Fan-Ru Lin, Wei-Hung Hsu, Tzu-Chieh Chien, Zhi-Yu Lai & Zhen-Yu Lin,*National Center for Research on Earthquake Engineering (NCREE), Taipei, Taiwan*

Seismic Evaluation Methods for Fire Protection Sprinkler Piping Systems in Buildings
Technical Paper Publication: PVP2019-93443

Fan-Ru Lin, Juin-Fu Chai & Yung-An Tsai, *National Center for Research on Earthquake Engineering (NCREE), Taipei, Taiwan*
Chang-Chen Yeh, *Department of Civil Engineering, National Taiwan University, Taipei, Taiwan*
Kuo-Chun Chang, *National Taiwan University, Taipei, Taiwan*

Evaluated Results of Seismic Design Approach Using Inelastic Dynamic Analysis for Equipment
Technical Paper Publication: PVP2019-93532

Ichiro Tamura & Atsushi Okubo, *The Chugoku Electric Power Company, Hiroshima, Japan*
Yusuke Minakawa & Yoshio Namita, *Hitachi-GE Nuclear Energy, Ltd., Ibaraki-ken, Japan*
Tadashi Iijima, *Hitachi-GE Nuclear Energy, Ltd., Hitachi, Japan*
Nobuyoshi Goshima, *Mitsubishi Heavy Industries, Ltd., Kobe, Japan*
Masanori Amino, *MHI Nuclear Systems, Kobe, Japan*
Yukihiko Okuda, Shunji Okuma, *Toshiba Energy Systems & Solutions Corporation, Yokohama, Japan*

TECHNICAL SESSION 3.3G (CT-9-1)

Special Applications of Bolted Flanged Joints
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande E.
2:15pm - 4:00pm

Session Developer/Session Chair:
Jerry Waterland, *VSP Technologies, Prince George, VA, USA*

Session Developer/Session Co-Chair:
Massimiliano De Agostinis, *University of Bologna, Bologna, Italy*

Evaluation of Gasket Performance at Cryogenic Temperature
Technical Presentation: PVP2019-93350

Florian Werner, *TEADIT Deutschland GmbH, Cologne, Germany*
Manfred Schaaf, *AMTEC Gmbh, Lauffen, Germany*

Bolt Strength in Sectional Body Construction of Valves
Technical Paper Publication: PVP2019-93775

Bhaskar Shitole, *Wood Plc, Calgary, AB, Canada*

Effect of Internal Pressure on Gasket Stress and Leakage Rate of Bolted Flanged Joint during the Long Term Service at High Temperature
Technical Paper Publication: PVP2019-93236

Jilin Xue, Xuedong Chen, Zhichao Fan & Lu Wang, *Hefei General Machinery Research Institute Co. Ltd., Hefei, China*

Variables Affecting Nut Factors in Bolted Flanged Connections
Technical Paper Publication: PVP2019-93721

Justin Aycock, Jeffery Wilson, *VSP Technologies, Prince George, VA, USA*
Anita Bausman, *VSP Technologies, Kingsport, TN, USA*

TECHNICAL SESSION 3.3H (CS-14-3)

New Developments and Applications for Repair and Replacement Activities
Hill County Level (3rd floor), Hyatt Regency, Llano
2:15pm - 4:00pm

Session Developer/Session Co-Chair:
Steven L. McCracken, *Electric Power Research Institute, Harrisburg, NC, USA*

Session Co-Developer/Session Chair:
Nicholas Mohr, *Electric Power Research Institute, Charlotte, NC, USA*

Welding Process Development for Spent Nuclear Fuel Canister Repair
Technical Paper Publication: PVP2019-93946

Wei Tang, Roger Miller, Jian Chen, Doug Kyle & John Scaglione, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*
Stylianos Chatzidakis, *Oak Ridge National Laboratory, Knoxville, TN, USA*
Caleb Schrad, *Trine University, Angola, IN, USA*

Fundamental Relationship between Indentation Techniques and Toughness applied to Temper Bead qualification
Technical Paper Publication: PVP2019-93950

Boeing Smith & Antonio Ramirez, *The Ohio State University, Columbus, OH, USA*
Steve McCracken & Stephen Tate, *Electric Power Research Institute, Charlotte, NC, USA*

New Code Case Development for the Mitigation of PWSCC and CISCC in ASME Section III Components by Advanced Surface Stress Improvement Technology
Technical Paper Publication: PVP2019-93232

Sungwoo Cho, *Doosan, Gyeongsangnam-Do, Gyeongsangnam-Do, Korea (Republic)*
Nicholas Mohr, *Electric Power Research Institute, Charlotte, NC, USA*
Young Sik Pyun, Auezhan Amanov, *Sun Moon University, Asan, Korea (Republic)*
John Broussard, *Dominion Engineering, Inc., Reston, VA, USA*

Development of the Technical Basis for the New Code Case - Mitigation of PWSCC and CISCC in ASME Section III Components by the Advanced Surface Stress Improvement Technology
Technical Paper Publication: PVP2019-93330

Sungwoo Cho, *Doosan, Gyeongsangnam-Do, Korea (Republic)*
Won Geun Yi, *Doosan Heavy Industries & Construction, Chang Won, Gyeongnam, Korea (Republic)*
Nicholas Mohr, *Craig Stover & Jonathan Tatman, Electric Power Research Institute, Charlotte, NC, USA*
Auezhan Amanov & Young Sik Pyun, *Sun Moon University, Asan, Korea (Republic)*
Vijay Vasudevan & H Naralasetty, *University of Cincinnati, Cincinnati, OH, USA*
Youngsik Kim & K.T. Kim, *Andong University, Andong, Korea (Republic)*

TECHNICAL SESSION 3.3I (MF-10-1)

Pipeline Integrity
Hill County Level (3rd floor), Hyatt Regency, Live Oak
2:15pm - 4:00pm

Session Developer/Session Chair:
Xian-Kui Zhu, *EWI, Columbus, OH, USA*

Session Developer/Session Co-Chair:
Dong-Yeob Park, *CanmetMaterials, Natural Resources Canada, Calgary, AB, Canada*

Fracture Toughness Testing of an Overmatched Pipe Girth Weld Using Clamped SE(T) Specimens
Technical Paper Publication: PVP2019-93256

Claudinei Ferreira & Claudio Ruggieri, *University of Sao Paulo, Sao Paulo, Brazil*
Diego F. S. Burgos, *Department of Naval Architecture and Ocean Engineering, University of Sao Paulo, Sao Paulo, Brazil*

The Effects of Non-Proportional Biaxial Loading Paths on Ductile Fracture Initiation: A Void Growth Analysis
Technical Paper Publication: PVP2019-93312

Zhaoyu Jin & Xin Wang, *Carleton University, Ottawa, ON, Canada*

Review of Tensile Strain Capacity Prediction Models for Strain-Based Design of Pipelines
Technical Paper Publication: PVP2019-93220

Dong-Yeob Park, *CanmetMaterials, Natural Resources Canada, Calgary, AB, Canada*
Jim Gianetto, *Government of Canada-Natural Resources, Hamilton, ON, Canada*

Determination of Pipeline Yielding Occurred in Hydrostatic Pressure Testing
Technical Paper Publication: PVP2019-93087

Xian-Kui Zhu, *EWI, Columbus, OH, USA*

TECHNICAL SESSION 3.3J (HPT-1-4)

Joint Symposium with Codes & Standards
Hill County Level (3rd floor), Hyatt Regency, Blanco
2:15pm - 4:00pm

Session Developer:
Jianfeng Shi, *Zhejiang University, Hangzhou, Zhejiang, China*

Session Co-Developer:
Kannan Subramanian, *Stress Engineering Services, Metairie, LA, USA*

Session Chair:
Jinyang Zheng, *Zhejiang University, Hangzhou*

Session Co-Chair:
Melanie Sarzynski, *Wiss, Janney, Elstner Associates, Inc., Houston, TX, USA*

Study on Key Process Parameters of the Local Post Weld Heat Treatment by Electric Heating for the Large Thick-walled Pressure Vessel Cylinder Butt Weld
Technical Paper Publication: PVP2019-93512

Fang Ji, Guide Deng, Liang Sun, Cenfan Liu & Xiaonan Zhao, *China Special Equipment Instpection and Research Institute, Beijing, China*

Light Weight Design of Multi-layered Steel Vessels for High-pressure Hydrogen Storage
Technical Paper Publication: PVP2019-93934

Sheng Ye, Jinyang Zheng, Ting Yu, Chaohua Gu & Zhengli Hua, *Zhejiang University, Hangzhou, China*

Overview of Revisions to the ASME Boiler and Pressure Vessel Code Section VIII Division 3 for the 2019 Edition and Near Future
Technical Paper Publication: PVP2019-93102

Adam Maslowski, *ASME, New York, NY, USA*
Gregory Mital, *Shape Technologies Group, Kent, WA, USA*
Daniel Peters, *Structural Integrity Associates, Edinboro, PA, USA*
Kannan Subramanian, *Stress Engineering Services, Metairie, LA, USA*

Case Study on the Effect of Mean Stress on Ground Storage Vessels for Fuelling
Technical Paper Publication: PVP2019-93843

Daniel Peters, *Structural Integrity Associates, Edinboro, PA, USA*
Myles Parr & Matthew Naugle, *Structural Integrity Associate, San Diego, CA, USA*

TECHNICAL SESSION 3.3K (OAC-6-4)

Fitness for Service and Damage Mechanisms
Hill County Level (3rd floor), Hyatt Regency, Nueces
2:15pm - 4:00pm

Session Developer/Session Chair:
Ebadollah Jamalyaria, *Flexitallic, Deer Park, TX, USA*

Session Co-Developer:
Joel Baulch, *Teadit North America, Pasadena, TX, USA*

Session Co-Chair:
Warren Brown, *Integrity Engineering Solutions, Dunsborough, WA, Australia*

Fitness for Service Assessment of Carbon Steel Vessel with Localized Deformation during Local PWHT
Technical Paper Publication: PVP2019-93457

Utkarsh Shah, *Shell Eastern Petroleum (Pte) Ltd, Singapore, Singapore*
Piyush Prasad, *Shell India Markets Pvt. Ltd., Bengaluru, Karnataka, India*

Vibration Assessment of Thermowell
Technical Paper Publication: PVP2019-93467

Piyush Prasad, *Shell India Markets Pvt. Ltd., Bengaluru, Karnataka, India*
Sudhanshu Poddar, *Shell India Markets Private Limited, Bangalore, India*
Finlay Casey, *QGC PTY Limited, Chinchilla, Queensland, Australia*

The Effect of Operational Parameters and Material Properties on Hardness Removal Efficiency by Electrochemical Technique
Technical Paper Publication: PVP2019-93496

Wei Lin, Chen Qi, Wu Libing, Wei Wang, Ma Linwei, Xiaotao Zheng, Xu Jianmin & Jiuyang Yu, *Wuhan Institute of Technology, Wuhan, China*

Development of Remote-Control Instrument for Visual Check at Narrow Space
Technical Presentation: PVP2019-94014

Yuki Kobayashi, Kohei Tada, Takeshi Ueda, Kazuhide Yamamoto& Takumi Matsumura, *Mitsubishi Heavy Industries, Kobe, Japan*

TECHNICAL SESSION 3.3L (CS-3-3)

EAF Low Cycle Fatigue Evaluation
Hill County Level (3rd floor), Hyatt Regency, Pecan
2:15pm - 4:00pm

Session Developer:
Seiji Asada, *Mitsubishi Heavy Industries, Ltd., Kobe, Japan*

Session Co-Developer/Session Chair:
Peter Gill, *Wood, Warrington, UK*

Session Co-Chair:
Subhasish Mohanty, *Argonne National Laboratory, Lemont, IL, USA*

An Extensive Fatigue Testing Campaign on 304L Austenitic Stainless Steel in Support of the Fen Integrated Approach: Explicit Quantification of the Interaction between Surface Finish and PWR Environmen
Technical Presentation: PVP2019-93080

Laurent de Baglion, *Framatome, Courbevoie, France*
Sam Cuvilliez, EDF - DIPNN - DT, Lyon, France

Strain-Controlled Low Cycle Fatigue of Stainless Steel in PWR Water
Technical Paper Publication: PVP2019-93279

Tommi Seppänen, Jouni Alhainen, Esko Arilahti & Jussi Solin, *VTT Technical Research Centre of Finland Ltd., Finland*

Particular Fatigue Resistance of Stabilized Stainless Steel - Endurance Limit, Strength and Ductility of Fatigued Steel
Technical Paper Publication: PVP2019-93317

Jussi Solin, Jouni Alhainen, Esko Arilahti &Tommi Seppänen, *VTT Technical Research Centre of Finland Ltd., Finland*
Wolfgang Mayinger, *Preussenelektra Gmbh., Hanover 30457, Germany*

Fatigue of NPP Components Simulated by Non-uniformly Strained Stainless Steel Specimens
Technical Paper Publication: PVP2019-93833

Jussi Solin, Jouni Alhainen, Esko Arilahti & Tommi Seppänen, *VTT Technical Research Centre of Finland Ltd., Finland*
Wolfgang Mayinger, *Preussenelektra Gmbh., Hanover, Germany*

TECHNICAL SESSION 3.3M (MF-13-1)

Composite and Non-Metallic Systems for Pressure Vessels and Piping
Hill County Level (3rd floor), Hyatt Regency, Pecos
2:15pm - 4:00pm

Session Developer/Session Chair:
Mo Uddin, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Session Co-Developers:
Sureshkumar Kalyanam, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*
Jianfeng Shi, *Zhejiang University, Hangzhou, Zhejiang, China*
Noel P. O`Dowd, *University of Limerick, Limerick, Ireland*

Session Developer/Session Co-Chair:
Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*

Experimental Studies of Typical Defects on Large Capacity Hoop-Wrapped Composite Cylinder of Steel Liner Based on X-Ray Digital Radiography Test
Technical Paper Publication: PVP2019-93365

Sen Chai, Sanjiang Liu, Liang Huang & Ke Bo, *China Special Equipment Inspection and Research Institute, Beijing, China*
Yunxi Jiang, *Matrix U/E Technologies Ltd, Beijing, China*
Jianhao Bi, *ON Inspection Technologies LTD, Beijing, Beijing, China*

Ultrasonic Phased Array Inspection with Water Wedge for Butt Fusion Joints of Polyethylene Pipe
Technical Paper Publication: PVP2019-93500

Cunjian Miao, Weican Guo & Zhangwei Ling, *Zhejiang Provincial Special Equipment Inspection and Research Institute, Hangzhou, China*
Yinkang Qin, *Zhejiang University, Hangzhou, China*
Chengmin An, *Shenzhen Gas Co. Ltd, Shenzhen, China*
Zhifa Chen, *Shantou Institute of Ultrasonic Instruments Co. Ltd., Shantou, China*

A Thermal-Mechanical Analysis Model for Composite Overwrapped Pressure Vessel for Hydrogen during Fast Filling
Technical Paper Publication: PVP2019-93338

Yong Jiang, Ming Xu, Zhichao Fan, Xuedong Chen & Qiaoguo Wu, *Hefei General Machinery Research Institute, Hefei, Anhui, China*

High Temperature Performance of Bonded Composite Repairs for Pressure Vessel
Technical Paper Publication: PVP2019-93632

Ibrahim Alnaser & Michael Keller, *University of Tulsa, Tulsa, OK, USA*
Mahdi Kiani, *Clock Spring Company Inc., Houston, TX, USA*
Roger Walker, *Citadel Technologies, Tulsa, OK, USA*

TECHNICAL SESSION 3.3N (DA-2-5)

Design and Analysis of Piping and Piping Components: Supports, Relief Devices, and Pulsation
Hill County Level (3rd floor), Hyatt Regency, Frio
2:15pm - 4:00pm

Session Developer/Session Chair:
Kannan Subramanian, *Stress Engineering Services, Metairie, LA, USA*

Session Co-Chair:
Chakrapani Basavaraju, *USNRC, Rockville, MD, USA*

Design and Material Selection for Acoustic Isolated Pipe Supports
Technical Paper Publication: PVP2019-93460

Menno Eijgenhuijsen, *WorleyParsons Resources & Energy, Perth, WA, Australia*
Girish Masand, *GHD Pty Ltd, Perth, WA, Australia*

A Transfer Matrix Method for Free Vibration Analysis of Tapering Pipe
Technical Paper Publication: PVP2019-93118

Qingna Zeng, Yixiong Zhang & Donghui Wang, *Nuclear Power Institute of China, Chengdu, China*
Fenggang Zang, *Design and Research Sub-institute, Chengdu, China*

Estimation of Impact Energy for Seat Seals in Spring-Operated Pressure Relief Valves during the Reseating Process under Compressible Fluid Service Conditions
Technical Paper Publication: PVP2019-93336

Alex Schimanowski & Josef Schlattmann, *Hamburg University of Technology, Hamburg, Germany*

Basic Design Rules for Lines in Pulsating Flow Service
Technical Paper Publication: PVP2019-93459

Menno Eijgenhuijsen, *WorleyParsons Resources & Energy, Perth, WA, Australia*
Girish Masand, *GHD Pty Ltd, Perth, WA, Australia*

PANEL SESSION 3.30 (DA-15-4)

Closing Session: What's Next for the Industry?
Losaya Conference Center, Navaro 2:15pm - 4:00pm

Session Developer:
Clay Rodery, *C&S Technology, LLC, League City, TX, USA*

Session Co-Developer/Session Chair:
Julian Bedoya, *ExxonMobil Research & Engineering Co., Spring, TX, USA*

Session Developer/Session Co-Chair:
Jorge Penso, *Shell Projects and Technology, Houston, TX, USA*

Panelists:
- ***Clay Rodery,*** C&S Technology, LLC, League City, TX, USA,
- ***Julian Bedoya,*** ExxonMobil Research & Engineering Co., Spring, TX, USA
- ***Jorge Penso,*** Shell Projects and Technology, Houston, TX, USA

TUTORIAL SESSION 3.3Q (TW-2-9)

Flow Induced Vibration
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande W.
2:15pm - 4:00pm

Session Developer/Session Chair:
Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*

Presented by:
Benjamin A. White, *Southwest Research Institute, San Antonio, TX, USA*

Wednesday, July 17 5:00PM – 10:00PM

HONORS & AWARDS GALA AND DINNER

Ballroom Level (2nd floor), Hyatt Regency, Regency Ballroom 5:00pm - 10:00pm

Block 4.1 Thursday, July 18 8:15AM – 10:00AM

TECHNICAL SESSION 4.1A (DA-3-2)

Variable Amplitude Fatigue Loading
Losaya Conference Center, Bowie C 8:15am - 10:00am

Session Developer/Session Chair:
Masayuki Kamaya, *Institute of Nuclear Safety System, Mikata-gun Fukui, Japan*

Session Developer/Session Co-Chair:
M.H.C. Hannink, *NRG, Petten, Netherlands*

Crack Growth Due To Flow Mixing
Technical Paper Publication: PVP2019-93064

M.H.C. Hannink & Frederic Blom, *NRG, Petten, Netherlands*

Fatigue Performance of Welded Joints under Variable Amplitude Loading Spectra
Technical Paper Publication: PVP2019-93073

Xu Liu, *NSIRC/Brunel University London, Cambridge, UK*
Yanhui Zhang, *TWI Limited, Cambridge, UK*
Bin Wang, *Brunel University London, Uxbridge, Middlesex, UK*

Variable Loading Sequence Effect for Thermal Fatigue at a Mixing Tee
Technical Paper Publication: PVP2019-93267

Koji Miyoshi, *Institute of Nuclear Safety System, Inc., Fukui, Japan*
Masayuki Kamaya, *Institute of Nuclear Safety System, Mikata-gun Fukui, Japan*

Recent Operational Experience of Pressurized Water Reactor Safety Injection and Drain Line Cracking and Supporting Flaw Evaluations
Technical Paper Publication: PVP2019-93945

Greg Imbrogno, Stephen Marlette, Alexandria M. Carolan, Anees Udyawar & Mark Gray, *Westinghouse Electric Company, Cranberry Township, PA, USA*

TECHNICAL SESSION 4.1B (CS-22-1)

Fracture Toughness and Other Small Specimen Mechanical Properties
Losaya Conference Center, Maverick B 8:15am - 10:00am

Session Developer/Session Chair:
Masato Yamamoto, *CRIEPI, Yokosuka, Japan*

Session Developer/Session Co-Chair:
William Server, *ATI Consulting, Black Mountain, NC, USA*

Master Curve Fracture Toughness Characterization of Eurofer97 Steel Variants Using Miniature Multi-Notch Bend Bar Specimens for Fusion Applications
Technical Paper Publication: PVP2019-93797

Xiang Chen, Mikhail Sokolov, Arunodaya Bhattacharya, Logan Clowers & Yutai Katoh, *Oak Ridge National Laboratory, Oak Ridge, TN, USA*
Tim Graening & Michael Rieth, *Karlsruhe Institute of Technology, Karlsruhe, Baden-Württemberg, Germany*

PTS Evaluation Case Study Considering Actual Through Wall Fracture Toughness Distribution
Technical Paper Publication: PVP2019-93964

Masato Yamamoto & Masaki Nagai, *CRIEPI, Yokosuka, Japan*

A Framework for Estimating Burst Test Fracture Toughness for Zr-2.5Nb Pressure Tubes Using Data from Small Specimen Tests
Technical Paper Publication: PVP2019-94064

Steven Xu, *Kinectrics, Toronto, ON, Canada*
Kim Wallin, *KW-solutions Ltd, Finland*
David Cho, *Bruce Power, Toronto, ON, Canada*

TECHNICAL SESSION 4.1C (MF-2-3)

Materials for Hydrogen Service - III: Non-Ferrous Materials
Losaya Conference Center, Maverick A 8:15am - 10:00am

Session Developer/Session Chair:
Ryan Sills, *Sandia National Laboratories, Livermore, CA, USA*

Session Co-Chair:
Takashi Iijima, *AIST, Tsukuba, Japan*

Session Co-Developer:
Chris San Marchi, *Sandia National Laboratories, Livermore, CA, USA*

Various Strength Properties of Aluminum Alloys in High-Pressure Hydrogen Gas Environment
Technical Paper Publication: PVP2019-93478

Saburo Matsuoka, Satoko Yoshida, Hisao Matsunaga, *Kyushu University, Fukuoka, Japan,*
Takashi Iijima, *AIST, Tsukuba, Japan*
Junichiro Yamabe, *Fukuoka University, Fukuoka, Japan*

Fracture and Deformation Behavior in Slow Strain Rate Tensile Testing of Cu-Ni Alloy with Internal Hydrogen
Technical Paper Publication: PVP2019-93477

Kentaro Wada, Yuhei Ogawa, Osamu Takakuwa & Hisao Matsunaga, *Kyushu University, Fukuoka, Japan*
Junichiro Yamabe, *Fukuoka University, Fukuoka, Japan*
Takashi Iijima, *AIST, Tsukuba, Japan*

Change of Crack Initiation and Propagation Modes in Hydrogen-Related Failure of a Precipitation-Strengthened Ni-Based Superalloy 718 under Internal and External Hydrogen Conditions
Technical Paper Publication: PVP2019-93204

Yuhei Ogawa, Osamu Takakuwa, Saburo Okazaki, Saburo Matsuoka & Hisao Matsunaga, *Kyushu University, Fukuoka, Japan*

Preparation of Wet Coated Thin Barrier Films for Hydrogen Embrittlement in SUS304 Stainless Steel
Technical Paper Publication: PVP2019-93260

Kazuyoshi Kawami & Atsushi Kinoshita, *Asahimekki Co. Ltd., Tottori, Japan*
Bai An, Takashi Iijima, *National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan*
Seiji Fukuyama, *AIST, Higashihiroshima, Japan*
Mutsuharu Imaoka, Hiroyasu Tamai & Toshiyuki Tanaka, *Tottori Institute of Industrial Technology, Yonago, Japan*
Motonori Tamura, *The University of Electro-Communications, Chofu, Japan*

TECHNICAL SESSION 4.1D (CS-12-1)

Recent Developments in European Codes and Standards - I
Losaya Conference Center, Seguin 8:15am - 10:00am

Session Developer:
John Sharples, *Wood Group, Warrington, Cheshire, UK*

Session Co-Developer/Session Chair:
Jinhua Shi, *SI Consultant, West Midlands, UK*

Session Developer/Session Co-Chair:
Claude Faidy, *CF Integrity Engineering, Tassin, France*

How New French Nuclear Regulation for Pressure Equipment Imposed New Codes Developments
Technical Paper Publication: PVP2019-93033

Philippe Malouines, *Malouines AC&S, Maurepas, France*
Andrew Wasylyk, *Framatome, Courbevoie, France*
Pascal Duranton, *Framatome, Paris La Défense, France*

Valve Body Minimum Wall Thicnkess Comparison Between EN12516-1 and ASME B16.34
Technical Paper Publication: PVP2019-93234

Tom Geng & Andy Yin, *Emerson Automation Solutions, Tianjin, China*
Kyle A. Hausladen, *Emerson Automation Solutions, Marshalltown, IA, USA*

RCC-M Code: Recent Evolutions and Perspectives
Technical Paper Publication: PVP2019-93343

Manuela Triay, Benoit Lefever, Julien Quere, David Muller & Stéphane Marie, *Framatome, Courbevoie, France*
Eric Meister, *EDF Direction Technique, Lyon, France*
Sylvain Puybouffat, Emmanuel Chantelat, Julien Cadith & Nicolas de Mathan, *EDF Direction Industrielle, Saint-Denis, France*

ASME XI - RSE-M - General Comparison of Flaw Evaluation Rules
Technical Paper Publication: PVP2019-93435

Claude Faidy, *CF Integrity Engineering, Tassin, France*

TECHNICAL SESSION 4.1E (DA-14-1)

Evaluation and Countermeasure for BDBE
Losaya Conference Center, Bowie A 8:15am - 10:00am

Session Developer/Session Chair:
Bing Li, *Kinectrics NSS, Toronto, ON, Canada*

Session Developer/Session Co-Chair:
Naoto Kasahara, *University of Tokyo, Tokyo, Japan*

Experimental and Analytical Study on Local Failure of Structure Subjected to High Temperature and Pressure
Technical Paper Publication: PVP2019-93166

Yoshiki Tsunemoto, Takashi Sakaguchi & Naoto Kasahara, *University of Tokyo, Tokyo, Japan*
Takuya Sato, *JGC Corporation, Yokohama, Japan*

Research Plan and Progress to Realize Fracture Control of Nuclear Components
Technical Paper Publication: PVP2019-93545

Naoto Kasahara, *University of Tokyo, Tokyo, Japan*
Takashi Wakai, *Fast Reactor Fundamental Technology Development Department, Ibaraki, Japan*
Izumi Nakamura, *National Research Institute of Earth Sciences/Disaster Prevention, Hyogo, Japan*
Takuya Sato, *JGC Corporation, Yokohama, Japan*

A Proposal of Inelastic Constitutive Equations of Lead Alloys Used for Structural Tests Simulating Severe Accident Conditions
Technical Paper Publication: PVP2019-93820

Hashidate Ryuta, Onizawa Takashi & Takashi Wakai, *Japan Atomic Energy Agency, Ibaraki, Japan*
Naoto Kasahara, *University of Tokyo, Tokyo, Japan*

Effect of Thermal Aging on the Deformation and Failure Behaviors of Cast Austenitic Stainless Steels under Excessive Cyclic Loads
Technical Paper Publication: PVP2019-93969

Jin Weon Kim & Sang Eon Kim, *Chosun University, Gwangju, Korea (Republic)*
Yun Jae Kim, *Korea University, Seoul, Korea (Republic)*

High Pressure Feedwater Heater Bypass - CANDU HT Coolant Inlet Temperature Control
Technical Presentation: PVP2019-94081

Bing Li, *Kinectrics NSS, Toronto, ON, Canada*

TECHNICAL SESSION 4.1F (SE-8-1)

Multi-Hazards and Margins
Losaya Conference Center, Bowie B 8:15am - 10:00am

Session Developer/Session Chair:
Constantine Petropoulos, *Sargent & Lundy, Llc, Chicago, IL, USA*

Session Developer/Session Co-Chair:
Oreste Salvatore Bursi, *University of Trento, Trento, Italy*

Session Co-Developers:
Antonio Caputo, *University of Roma Tre, Rome, Italy,*
Ismail T. Kisisel, *Surgent & Lundy LLC, Chicago, IL, USA*

Overview of Current Practice for Analysis and Design of Independent Spent Fuel Storage Installation Pads
Technical Paper Publication: PVP2019-93666

Gunup Kwon, Khaled Ata, *Sargent & Lundy LLC, Chicago, IL, USA*

Assessment of Free Standing Body in Dry and Submerged Condition and under Seismic Loading
Technical Paper Publication: PVP2019-93741

Beniamino Rovagnati & Phuong H. Hoang, *Sargent & Lundy, Chicago, IL, USA*

Integrated Smart Seismic Risks Management
Technical Paper Publication: PVP2019-94027

Mariano Ciucci, *INAIL/DITSPIA, Roma, Italy*
Alessandra Marino, *INAIL/DIT, Roma, Italy*
Fabrizio Paolacci, *Department of Engineering - University of Roma Tre, Rome, Italy*
Oreste Salvatore Bursi, *University of Trento, Trento, Italy*

TECHNICAL SESSION 4.1G (CT-5-1)

Threaded Fasteners - I
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande E.
8:15am - 10:00am

Session Developer/Session Chair:
Sayed Nassar, *Oakland University, Rochester, MI, USA*

Session Developer/Session Co-Chair:
Toshiyuki Sawa, *Hiroshima University, Koto-city, Japan*

Finite-Element Analysis of Contact Stress at the Bearing Surfaces in Bolted Joints (Effect of Flange Bolt Shape and Dimensions)
Technical Paper Publication: PVP2019-93744

Atsushi Shirakawa, *Honda R&D Co.,LTD, Haga-gun Haga-machi, Tochigi, Japan*
Toshiyuki Sawa, *Hiroshima University, Koto-city, Japan*

Finite Element Analysis of Tapped Thread Joints: Setup of a Computationally Efficient Modeling Approach
Technical Paper Publication: PVP2019-94066

Massimiliano De Agostinis, Dario Croccolo, Stefano Fini, Giorgio Olmi & Francesco Robusto, *University of Bologna, Bologna, Italy*
Leonardo Bagnoli, *Ducati Motor Holding Spa, Bologna, Italy*

Residual Shank Torque of Bolted Joints: A Numerical Investigation
Technical Paper Publication: PVP2019-94067

Stefano Fini, Massimiliano De Agostinis, Dario Croccolo, Giorgio Olmi, Luca Paiardini & Francesco Robusto, *University of Bologna, Bologna, Italy*

Nondestructive Evaluation of Metal Strength, Toughness, and Ductility through Frictional Sliding
Technical Paper Publication: PVP2019-93770

Steven Palkovic, Parth Patel, Soheil Safari & Simon C. Bellemare, *Massachusetts Materials Technologies, Waltham, MA, USA*

TECHNICAL SESSION 4.1H (MF-5-1)

Fitness for Service and Failure Assessment - I
Hill County Level (3rd floor), Hyatt Regency, Llano
8:15am - 10:00am

Session Developer/Session Chair:
Marvin Cohn, *Intertek, Santa Clara, CA, USA*

Session Co-Developer:
Bruce Wiersma, *Savannah River National Laboratory, Aiken, SC, USA*

Session Developer/Session Co-Chair:
Carl Jaske, *HSI GROUP, INC., Columbus, OH, USA*

Failure Assessment Using XFEM for the Austenitic Stainless Steel Pipe with the Circumferential Crack Subjected to Bending and Torque
Technical Paper Publication: PVP2019-93240

Yohei Ono, Michiya Sakai, *CRIEPI, Abiko, Chiba, Japan*

Creep Life Evaluations of ASME B31.1 Allowance for Variation from Normal Operation - 11 Materials
Technical Paper Publication: PVP2019-93734

Marvin Cohn, *Intertek, Santa Clara, CA, USA*
Ron Haupt, *Pressure Piping Engineering Associates Inc, Foster City, CA, USA*

Design of an Intelligent Python Code for Validating Crack Growth Exponent by Monitoring a Crack of Zig-Zag Shape in a Cracked Pipe
Technical Paper Publication: PVP2019-93502

Jeffrey Fong, N. Alan Heckert & James Filliben, *NIST, Gaithersburg, MD, USA*
Pedro V. Marcal, *MPACT, Corp., Oak Park, CA, USA*
Robert Rainsberger, *XYZ Scientific Applications, Pleasant Hill, CA, USA*

TECHNICAL SESSION 4.1I (MF-14-1)

Probabilistic Assessment of Failure
Hill County Level (3rd floor), Hyatt Regency, Live Oak
8:15am - 10:00am

Session Developer/Session Co-Chair:
Steven Xu, *Kinectrics, Toronto, ON, Canada*

Session Chair:
Blair Carroll, *Canadian Nuclear Safety Commission, Ottawa, ON, Canada*

Session Co-Developer:
Yinsheng Li, *Japan Atomic Energy Agency, Ibaraki-Ken, Japan*

Probabilistic Facture Mechanics Analyses Comparison to LBB Assessments
Technical Paper Publication: PVP2019-93413

Robert Kurth, Cedric Sallaberry, Elizabeth Kurth & Frederick (Bud) Brust, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Probabilistic Risk Assessment of Aging Layered Pressure Vessels
Technical Paper Publication: PVP2019-93720

David S. Riha, Matthew L. Kirby, Joseph W. Cardinal, Laura C. Domyancic & John M. McFarland, *Southwest Research Institute, San Antonio, TX, USA*
Frederick (Bud) Brust, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Application of the Sil Analysis to the Safety Systems of a Process Plant
Technical Paper Publication: PVP2019-93853

Francesco Paolo Nigri, Corrado Delle Site & Maria R. Vallerotonda, *INAIL, Rome, Italy*

TECHNICAL SESSION 4.1J (HPT-2-1)

Impulsively Loaded Vessels
Hill County Level (3rd floor), Hyatt Regency, Blanco
8:15am - 10:00am

Session Developer/Session Chair:
David Gross, *Dominion Engineering, Inc., Reston, VA, USA*

Session Developer/Session Co-Chair:
Matthew Edel, *BakerRisk, San Antonio, TX, USA*

Analysis of EDS Vessel Clamping System and Door Seal
Technical Paper Publication: PVP2019-93755

Jerome Stofleth, Megan Tribble & John Ludwigsen, *Sandia National Laboratories, Albuquerque, NM, USA*
Robert Crocker, *Sandia National Laboratories, Livermore, CA, USA*

Fitness-for-Service Strategies for Impulsively Loaded Vessels
Technical Paper Publication: PVP2019-93116

Thomas A. Duffey, *TA Duffey, Consulting Engineer, Tijeras, NM, USA*
Kevin Fehlmann, *Los Alamos National Laboratory, Los Alamos, NM, USA*

Reactor Vessel Hazard Assessment Case Study
Technical Paper Publication: PVP2019-93856

Matthew Edel, *BakerRisk, San Antonio, TX, USA*
Gys Van Zyl, *Sabic, Jubail, Saudi Arabia*
Abdulrahman Atarji, *Sharq, Al-Jubail Industrial City, Saudi Arabia*

Engineering Analysis of Brittle Fracture in a Lens Ring Made from Ductile Material in an LDPE Pipe Line
Technical Presentation: PVP2019-94037

Joseph Kapp, *Benet Labs/ Elmhurst Systems, Wynantskill, NY, USA*
Karl Simpson, *Exxonmobil Chemical, Scotlandville, LA, USA*

TECHNICAL SESSION 4.1K (OAC-7-1)

Aging and Life Management and Extension
Hill County Level (3rd floor), Hyatt Regency, Nueces
8:15am - 10:00am

Session Developer/Session Chair:
Georges Bezdikian, *Georges Bezdikian Consulting, Le Vesinet, France*

Session Co-Developer/Session CoChair:
Garry Young, *Entergy Services Inc, Russellville, AR, USA*

International Civil Ageing Management and Assessment Methodology of Concrete
Technical Paper Publication: PVP2019-93029

F.H.E De Haan -de Wilde & C.G.M. De Bont, *NRG, Petten, Netherlands*

Continued Safe Operation (LTO Research Reactors) High Flux Reactor, Petten
Technical Paper Publication: PVP2019-93030

Lorenzo Stefanini, *Nuclear Research & Consultancy Group - NRG, Petten, North Holland, Netherlands*
F.H.E De Haan -de Wilde & J.F. Offerein, *NRG, Petten, Netherlands*

High Temperature Hydrogen Attack - New NDE advanced capabilities - Development and Feed Back
Technical Paper Publication: PVP2019-94001

Charles Le Neve & Sophie Loyan, *Total, Harfleur, France*
Leonard Lejeune & Steve Mahaut, *CEA, Gif-sur-Yvette, France*
Serge Demonte, Daniel Chauveau, Romain Renaud, Manuel Tessier, Nicolas Nourrit & Anthony Leguellaut, *ISgroupe, Villepinte, France*

Boron Injection Tank Repair at Indian Point Unit 3
Technical Paper Publication: PVP2019-93449

David Crane, *Westinghouse Electric Company, Cranberry Township, PA, USA*

TECHNICAL SESSION 4.1L (CS-3-4)

EAF Fatigue Crack Growth
Hill County Level (3rd floor), Hyatt Regency, Pecan
8:15am - 10:00am

Session Developer/Session Co-Chair:
Seiji Asada, *Mitsubishi Heavy Industries, Ltd, Kobe, Japan*

Session Co-Developer/Session Chair:
Subhasish Mohanty, *Argonne National Laboratory, Lemont, IL, USA*

Scaling of SN Curves for Varying 'Initiation' Crack Definitions from Striation Counted Environmental Fatigue Specimens - A 250micron Austenitic Stainless Steel SN curve and Associated Fen Factors
Technical Paper Publication: PVP2019-93847

Joseph D. Batten, *Rolls-Royce PLC - Marine, Derby, UK*
Chris Currie, *Jonathan Mann & Keith Wright, Rolls-Royce, Derbyshire, UK*

Fatigue Crack Initiation and Growth of Austenitic Stainless Steel Tube in High-temperature Water/Air with/without Mean Stress
Technical Presentation: PVP2019-93719

Wen Chen, *Paul Scherrer Institute, Brugg, Switzerland*
Philippe Spätig & Hans-Peter Seifert, *Paul Scherrer Institute, Villigen, Switzerland*
Yu-Hsuan Li, *National Tsing Hua University, Hsinchu, Taiwan*

A Critical Review of Recent Fatigue Crack Growth Data in Relation to ASME Code Case N-809
Technical Paper Publication: PVP2019-93563

Jonathan Mann & Chris Currie, *Rolls-Royce, Derby, UK*
David R. Tice & Norman Platts, *Wood Group plc., Warrington, Cheshire, UK*

Extension of Weighted Stress Intensity Factor Rate (WKR) Method to Characterisation of Varying Temperature and Loading Rate in Plant Realistic Waveform Fatigue Crack Growth Calculations
Technical Paper Publication: PVP2019-93855

Chris Currie, Jonathan Mann, Daniel Leary & Keith Wright, *Rolls-Royce, Derby, UK*
Peter Gill, *Wood, Warrington, UK*

TECHNICAL SESSION 4.1M (MF-3-1)

Welding Residual Stress and Distortion - I
Hill County Level (3rd floor), Hyatt Regency, Pecos
8:15am - 10:00am

Session Developer/Session Chair:
Frederick (Bud) Brust, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Session Co-Developer:
David Rudland, *US NRC, Frederick, MD, USA*

Session Co-Chair:
Shaopin Song, *University of Michigan, Ann Arbor, MI, USA*

An Optimized Heat Treatment Process to Reduce the Weld Residual Stress by Auxiliary Heating
Technical Paper Publication: PVP2019-93112

Yun Luo, Teng Gao & Wenchun Jiang, *China University of Petroleum, Qingdao, China*

Temperature Profile and its Effect on Hardness Numbers of a Mild Steel Butt Weld
Technical Paper Publication: PVP2019-93247

Qin Ma, *Walla Walla University, College Place, WA, USA*

Finite Element Modeling of Hybrid Friction Diffusion Welding of Tube-Tubesheet Joints
Technical Paper Publication: PVP2019-93484

Fadi Al-Badour, *King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia*

An Efficient Modelling Approach for Predicting Residual Stress in Power-Beam Welds
Technical Paper Publication: PVP2019-93528

Graeme Horne, Danny Thomas, Andrew Collett, Andrew Clay & Martin Cott, *Frazer-Nash Consultancy, Bristol, UK*
Andrew Moffat, *Frazer-Nash Consultancy, Dorking, UK*

TECHNICAL SESSION 4.1N (DA-2-6)

Design and Analysis of Piping and Piping Components: Design Optimization
Hill County Level (3rd floor), Hyatt Regency, Frio
8:15am - 10:00am

Session Developer/Session Chair:
Bing Li, *Kinectrics NSS, Toronto, ON, Canada*

Session Co-Chair:
Kannan Subramanian, *Stress Engineering Services, Metairie, LA, USA*

Optimization of Expanding Gathering Pipeline Network in Gas Fields
Technical Paper Publication: PVP2019-93373

Meng Yuan, *National Engineering Laboratory for Pipeline Safety, China University of Petroleum-Beijing, Beijing, China*
Yongtu Liang & Bohong Wang, *China University of Petroleum, Beijing, China*

Research on Collapse Failure Pressure of Large-Diameter Coiled Tubing with Considering Ovality and Wall Thickness Reduction
Technical Paper Publication: PVP2019-93526

Le Zhao, Hong Zhang & Qingquan Duan, *China University of Petroleum, Beijing, China*

Optimal Simplification for the Surface Process System in Oilfields
Technical Paper Publication: PVP2019-93028

Yongtu Liang, Bohong Wang, Jianqin Zheng & Xin Zhang, *China University of Petroleum, Beijing, China*
Tiantian Lei, *Guangdong Yuedian Group, Guangzhou, China*
Haoran Zhang, *The University of Tokyo, Chiba, Japan*

TECHNICAL SESSION 4.10 (MF-28-1)

Materials and Fabrication for Refining - I
Losaya Conference Center, Navaro 8:15am - 10:00am

Session Developer/Session Chair:
Cathleen Shargay, *Fluor, Irvine, CA, USA*

Session Co-Chair:
Kuntak Daru, *Fluor, Sugar Land, TX, USA*

Japanese Welding Guide line for Duplex Stainless Steel (DSS)
Technical Paper Publication: PVP2019-93022

Hiroyuki Iwamoto, *Chiyoda Corporation, Yokohama, Japan*
Fumiyoshi Minami, *Joining & Welding Research Institute (JWRI) Osaka University, Osaka, Japan*

Effect of Pre-Strain and Sensitization Treatment on the Corrosion Behavior for 2205 Duplex Stainless Steel in 6% FECL3 Solution
Technical Paper Publication: PVP2019-93244

Chengsi Zheng, Qingnan Fei, Weihai Kong & Zhibin Ai, *Hefei General Machinery Research Institute Co. Ltd., Hefei, Anhui, China*

Elimination of Backing Gas in Austenitic and Duplex Stainless Steel Welds Using Semiautomatic Gas Tungsten-Arc Hot Wire Welding
Technical Paper Publication: PVP2019-93782

Charles Patrick, Scott Witkowski & Ramon Solo, *ALS Maverick Testing Laboratories, Inc., La Porte, TX, USA*
William Newell, *Euroweld, Ltd., Mooresville, NC, USA*
Juvenal Calvo, *TIPTIG USA, Houston, TX, USA*

Hydrogen Induced Cracking of a Dissimilar Weld in a Hydrogen Manufacturing Plant
Technical Paper Publication: PVP2019-93961

Neil Park, *Shell, Fort Saskatchewan AB, AB, Canada*
Jorge Penso, *Shell Projects and Technology, Houston, TX, USA*

PANEL SESSION 4.1Q (EPRI-1-1)

EPRI Workshop on Structural Integrity of Components in High Temperature Applications

Component Design Approaches
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande W.
8:15am - 10:00am

Session Developer/Session Chair:
Jonathan Parker, *Electric Power Research Institute, Charlotte, NC, USA*

Session Co-Chair:
Sam Zamrik, *Penn State, State College, PA, USA*

Session Co-Developer:
Johnna Cortopassi, *Electric Power Research Insitute, Charlotte, NC, USA*

Design of High Energy Systems Working in the Creep Range

Charles Henley, *Kiewit Engineering Group Inc.*

Design of Welded Components for Creep Service

David Dewees, *Becht Engineering*

Design & Performance of Dissimilar Joints involving an Inconel 740H Transition Piece between Grade 92 and TP316 Pipes

William Bell, *Doosan Babcock*

Block 4.2 Thursday, July 18 10:15AM – 12:00PM

TECHNICAL SESSION 4.2A (DA-3-3)

Fatigue Life Assessment
Losaya Conference Center, Bowie C
10:15am - 12:00pm

Session Developer/Session Chair:
Ben Pellereau, *Rolls-Royce Group, PLC, Derby, UK*

Session Developer/Session Co-Chair:
Jia LI, *Framatome, La Défense, France*

Mean Stress Correction for Fatigue Life of Carbon Steel (Proposal of Non-Closure Model)
Technical Paper Publication: PVP2019-93253

Masayuki Kamaya, *Instiyute of Nuclear Safety System, Mikata-gun Fukui, Japan*

Evaluation of the Fatigue Strength of Notched Geometries Using a Microstructural Model and Generative Algorithms
Technical Paper Publication: PVP2019-93905

Jose Antonio Balbin Molina & V. Chaves, *Universidad de Sevilla, Sevilla, Spain*
Nicolas Larrosa, *University of Bristol, Bristol, UK*

Evaluation of Fatigue Crack Propagation by Delta-J Approach
Technical Paper Publication: PVP2019-93555

Jia Li, Olivier Ancelet, Alexandre Double & Stephane Chapuliot, *Framatome, Paris La Defense, France*

Investigation into Crack Closure Effects for Fatigue Crack Growth under Negative R Conditions
Technical Presentation: PVP2019-93920

Ben Pellereau, Chris Currie, Keith Wright & Jonathan Mann, *Rolls-Royce Group, PLC, Derby, UK*
Ben Coult, *Wood, Warrington, UK*

TECHNICAL SESSION 4.2B (MF-11-1)

Small Scale and Miniature Mechanical Testing
Losaya Conference Center, Maverick B
10:15am - 12:00pm

Session Developer/Session Chair:
Masato Yamamoto, *CRIEPI, Yokosuka, Japan*

Session Developer/Session Co-Chair:
William Server, *ATI Consulting, Black Mountain, NC, USA*

Load Normalization Method Accounting for Elastic Crack Growth
Technical Paper Publication: PVP2019-93226

Kim Wallin, *KW-solutions Ltd, Finland*
Steven Xu, *Kinectrics, Toronto, ON, Canada*

Application of the Incremental Step Loading Technique to Small Punch Tests in Hydrogen Embrittlement
Technical Paper Publication: PVP2019-93550

Borja Arroyo, Pablo Gonzalez, Laura Andrea, J.A. Alvarez & Roberto Lacalle, *University of Cantabria, Santander, Cantabria, Spain*

Effects of Extreme Hydrogen Environments on the Fracture and Fatigue Behavior of Additively Manufactured Stainless Steels
Technical Paper Publication: PVP2019-93903

Thale Smith, Chris San Marchi, Joshua Sugar & Dorian Balch, *Sandia National Laboratories, Livermore, CA, USA*

TECHNICAL SESSION 4.2C (MF-2-4)

Materials for Hydrogen Service - IV: Fatigue in Hydrogen Environments
Losaya Conference Center, Maverick A
10:15am - 12:00pm

Session Developer/Session Chair:
Hisao Matsunaga, *Kyushu University, Fukuoka, Japan*

Session Developer/Session Co-Chair:
Chris San Marchi, *Sandia National Laboratories, Livermore, CA, USA*

Temperature Dependence of Fatigue Crack Growth in Low-Carbon Steel under Gaseous Hydrogen
Technical Paper Publication: PVP2019-93451

Osamu Takakuwa, Yuhei Ogawa, Saburo Okazaki, Hisao Matsunaga & Saburo Matsuoka, *Kyushu University, Fukuoka, Japan*

Effect of Hydrogen on Tensile and Fatigue Properties of SUS301 Austenitic Stainless Steel
Technical Paper Publication: PVP2019-93395

Takashi Iijima, Hirotoshi Enoki & Bai An, *National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan*
Junichiro Yamabe, *Fukuoka University, Fukuoka, Japan*
Mitsuo Kimura, *The University of Tokyo, Tokyo, Japan*

Ductility and Fatigue Strength Loss of a Hydrogen-Charged 316L Austenitic Stainless Steel
Technical Paper Publication: PVP2019-93180

Un Bong Baek, *Kriss, Daejeon 305-340, Korea (Republic)*
Nguyen Thanh Tuan, Seung Hoon Nahm & Kwon Sang Ryu, *Korea Research Institute of Standards and Science, Daejeon, Korea (Republic)*

TECHNICAL SESSION 4.2D (CS-12-2)

Recent Developments in European Codes and Standards - II
Losaya Conference Center, Seguin
10:15am - 12:00pm

Session Developer:
John Sharples, *Wood Group, Warrington, Cheshire, UK*

Session Co-Developer/Session Chair:
Jinhua Shi, *SI Consultant, West Midlands, UK*

Session Developer/Session Co-Chair:
Claude Faidy, *CF Integrity Engineering, Tassin, France*

UK Programme On Codes, Standards And Procedure Needs Fof SMR And GEN IV Reactors - Phase 1 Output
Technical Paper Publication: PVP2019-93861

Peter James & John Sharples, *Wood Group, Warrington, Cheshire, UK*
Nicholas Underwood, *National Nuclear Laboratory, Warrington, UK*

Outline of the Recent Consolidated Revision of EN13445-3, Clause 18 and Related Annexes: Detailed Assessment of Fatigue Life
Technical Paper Publication: PVP2019-93910

Juergen Rudolph, *Framatome GmbH, Erlangen, Bavaria, Germany*
Guy Baylac, *AFNOR, Paris, France*
Ralf Trieglaff, *TÜV NORD Ensys Gmbh & Co. KG., Hamburg, Germany*
Rüdiger Gawlick, *LINDE AG, Pullach, Germany*
Michael Krämer, *TÜV SÜD Industrie Service GmbH, München, Germany*
Yves Simonet, *CETIM, Senlis, France*
Manuela Triay, *Framatome, Courbevoie, France*

Optimising the Safe Design of Pressurised Components
Technical Paper Publication: PVP2019-93154

Alison O'Connor, Catrin Mair Davies & Steve Garwood, *Imperial College London, UK*
Isabel Hadley, *TWI Ltd, Cambridge, UK*

TECHNICAL SESSION 4.2E (MF-29-1)

Rotating Equipment
Losaya Conference Center, Bowie A
10:15am - 12:00pm

Session Developer/Session Chair:
Haiyang Qian, *GE Power, Avon, CT, USA*

Session Developer/Session Co-Chair:
Michiel Brongers, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Session Co-Chair:
Chen Gang, *Shanghai Electric Power Generation Equipment Co., Ltd. Shanghai Turbine Plant, Shanghai, China*

Research on the Interference Fit of GV Seat under the Service Load
Technical Paper Publication: PVP2019-93304

Yifeng Hu, Sihua Xu & Chen Gang, *Shanghai Electric Power Generation Equipment Co. Ltd., Shanghai, China*

An Optimized Start-up Mode of Tower Solar Turbines with Heat Transfer Coefficient Model Based on Experiment Data
Technical Paper Publication: PVP2019-94049

Li Xiaoxiao, Chen Gang & Wang Peng, Shanghai Electric Power Generation Equipment Co. Ltd., Shanghai, China

TECHNICAL SESSION 4.2F (SE-9-1)

Advanced Seismic Evaluation and Code
Losaya Conference Center, Bowie B
10:15am - 12:00pm

Session Developer:
Akira Maekawa, *The Kansai Electric Power Co., Inc., Fukui, Japan*

Session Co-Developer:
Izumi Nakamura, *National Research Institute of Earth Sciences/Disaster Prevention, Hyogo, Japan, Akihito Otani, IHI Corporation, Yokahoma, Kanagawa, Japan*

Session Chair:
Tomoyo Taniguchi, *Tottori University, Tottori 680-8552, Japan*

Session Developer/Session Co-Chair:
Yinsheng Li, *Japan Atomic Energy Agency, Ibaraki-Ken, Japan*

Applicability of Seismic Fatigue Evaluation by JSME Code Case, NC-CC-008
Technical Paper Publication: PVP2019-93123

Akihito Otani, *IHI corporation, Yokahoma, Kanagawa, Japan,*
Izumi Nakamura, *National Research Institute of Earth Sciences/Disaster Prevention, Hyogo, Japan*
Tomoyoshi Watakabe & Masaki Morishita, *Japan Atomic Energy Agency, Ibaraki, Japan*
Tadahiro Shibutani & Masaki Shiratori, *Yokohama National University, Yokohama, Kanagawa, Japan*

Selection of the Test Specimens for Seismic Test of Air-Operated Valve Actuators for Nuclear Power Plant
Technical Paper Publication: PVP2019-93168

Nobuo Kojima, Koji Nishino & Yasuyuki Ito, *Toshiba Energy Systems & Solutions Corporation, Yokohama, Japan*
Yoshinao Matsubara, *Toshiba, Yokohama, Japan*
Yoshitaka Tsutsumi, *Chubu Electric Power Co., Inc., Nagoya, Japan*
Ryo Kubota, *Hitachi-GE Nuclear Energy, Ltd., Hitachi, Ibaraki, Japan*
Shigeki Suzuki, *Mitsubishi Heavy Industries, Ltd., Kobe, Japan*

Seismic Test Result of Air-Operated Valve Actuators for Nuclear Power Plant (Air-Operated Butterfly Valve (Direct Coupled Type))
Technical Paper Publication: PVP2019-93194

Yoshinao Matsubara, Toshiba, Yokohama, Japan
Koji Nishino, Nobuo Kojima, Yasuyuki Ito, *Toshiba Energy Systems & Solutions Corporation, Yokohama, Japan*
Yoshitaka Tsutsumi, *Chubu Electric Power Co.,Inc., Nagoya, Japan*
Ryo Kubota, *Hitachi-GE Nuclear Energy, Ltd., Hitachi, Ibaraki, Japan*
Shigeki Suzuki, *Mitsubishi Heavy Industries, Ltd., Kobe, Japan*

Seismic Test Results of Air-Operated Valve Actuators for Nuclear Power Plants (Air-Operated Globe Valve (Cylinder Type))
Technical Paper Publication: PVP2019-93485

Ryo Kubota & Shin Kumagai, *Hitachi-GE Nuclear Energy, Ltd., Hitachi, Ibaraki, Japan*
Yoshitaka Tsutsumi, *Chubu Electric Power Co.,Inc., Nagoya, Japan*
Yoshinao Matsubara, *Toshiba, Yokohama, Japan*
Shigeki Suzuki, *Mitsubishi Heavy Industries, Ltd., Kobe, Japan*

Study on Seismic Designs Controlling Locations of Failure inside Steel Frame Structures under Severe Ground Motions
Technical Paper Publication: PVP2019-93629

Kensuke Shiomi, *IHI Corporation, Yokohama, Japan*

TECHNICAL SESSION 4.2G (CT-5-2)

Threaded Fastners - II
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande E.
10:15am - 12:00pm

Session Developer/Session Chair:
Toshiyuki Sawa, *Hiroshima University, Koto-city, Japan*

Session Developer/Session Co-Chair:
Sayed Nassar, *Oakland University, Rochester, MI, USA*

Evaluation of Bolt Strength Characteristics in Bolted Joints Using an Optical Fiber Sensor System
Technical Paper Publication: PVP2019-93491

Atsushi Shirakawa, *Honda R&D Co.,LTD, Haga-gun Haga-machi, Tochigi, Japan*
Toshiyuki Sawa, *Hiroshima University, Koto-city, Japan*

Novel Modeling of the Effect of Mean Stress on High-Cycle Fatigue Performance of Preloaded Threaded Fasteners
Technical Paper Publication: PVP2019-93915

Sayed Nassar, *Oakland University, Rochester, MI, USA*
Tianwu Li, *Oakland University, Auburn Hills, MI, USA*

Nut-Factor Variation on Coated High-Strength Steel Fasteners after Cycling Torquing
Technical Paper Publication: PVP2019-93874

Omar Rosas, Atahualpa Oscar Garcia, Jose Hernandez & Carlos Girault, *Doxsteel LLC, The Woodlands, TX, USA*
Donald Oldiges, *Jet-Lube Inc, Rockwall, TX, USA*

Influence of Vibration Behavior on the Energy Dissipation of the Bolted Joints
Technical Paper Publication: PVP2019-93409

Wenxiang Xu, Ligang Cai, Zhifeng Liu, Qiang Cheng & Ying Li, *CAD Centre, Beijing Universityof Technology, Beijing, China*

TECHNICAL SESSION 4.2H (MF-5-2)

Fitness for Service and Failure Assessment - II
Hill County Level (3rd floor), Hyatt Regency, Llano
10:15am - 12:00pm

Session Developer/Session Chair:
Carl Jaske, *HSI Group, Inc., Columbus, OH, USA*

Session Developer/Session Co-Chair:
Marvin Cohn, *Intertek, Santa Clara, CA, USA*

Session Co-Chair:
Bruce Wiersma, *Savannah River National Laboratory, Aiken, SC, USA*

Power Piping Grade 91 In-service Cracks
Technical Paper Publication: PVP2019-93869

Marvin Cohn, *Intertek, Santa Clara, CA, USA,*
Steve Paterson, *Independent Author, Watsonville, CA, USA*
Keith Rapkin, *FPL, Juno Beach, FL, USA*
Charles Henley, *Kiewit Engineering Group Inc., Lenexa, KS, USA*
Erick Liebl, *Liebl Engineering, Ltd., Sturgeon County, AB, Canada,*
Michael Johnson, *NRG, Houston, TX, USA*

Large Ranges in Power Piping Girth Weld Creep Rupture Lives
Technical Paper Publication: PVP2019-93931

Marvin Cohn & Fatma Faham, *Intertek, Santa Clara, CA, USA*

CANDU Inconel X-750 Annulus Spacer Fitness-For-Service
Technical Paper Publication: PVP2019-93943

Winnie Lau, *Ontario Power Generation, Pickering, ON, Canada*
Douglas Scarth & Preeti Doddihal, *Kinectrics, Toronto, ON, Canada*

TECHNICAL SESSION 4.2I (MF-12-1)

Leak Before Break
Hill County Level (3rd floor), Hyatt Regency, Live Oak
10:15am - 12:00pm

Session Developer:
John Sharples, *Wood Group, Warrington, Cheshire, UK*

Session Co-Developer/Session Chair:
Peter Gill, *Wood, Warrington, UK*

Session Developer/Session Co-Chair:
David Rudland, *US NRC, Frederick, MD, USA*

Simple Calculations of J-integral for Through-Wall Crack in Welded Pipes Based on Failure Assessment Diagram
Technical Paper Publication: PVP2019-93561

Jun-Geun Park, Da-Som Jeon & Nam-Su Huh, *Seoul National University of Science and Technology, Seoul 139743, Korea (Republic)*
Sang-Min Lee & Ye-Ji Kim, *Korea Institute of Nuclear Safety, Daejeon, Korea (Republic)*

Role of Constraint in Specimen Geometries When Evaluating Fracture Toughness/Material Fracture Resistance for a Surface-Flawed Elbow
Technical Paper Publication: PVP2019-93732

Sureshkumar Kalyanam, Gery Wilkowski, Frederick (Bud) Brust, Yunior Hioe & Edward Punch, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Comparison of Deterministic and Probabilistic Approaches for LBB
Technical Presentation: PVP2019-94008

Do-Jun Shim, Deepak Somasundaram, Dilip Dedhia & Nathaniel Cofie, *Structural Integrity Associates, San Jose, CA, USA*
Craig Harrington, *Electric Power Research Institute, Cleburne, TX, USA*

Modeling of Cracked Pipe System - Effect of Boundary Conditions on Displacement-Controlled and Load-Controlled Leak-Before-Break
Technical Paper Publication: PVP2019-93927

Mo Uddin, Gery Wilkowski, Elizabeth Kurth & Lance Hill, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*
Kenneth Bagnoli, *ExxonMobil Research and Engineering, Spring, TX, USA*

TECHNICAL SESSION 4.2J (HPT-2-2)

Impact and Blast Loadings
Hill County Level (3rd floor), Hyatt Regency, Blanco
10:15am - 12:00pm

Session Developer/Session Chair:
Matthew Edel, *BakerRisk, San Antonio, TX, USA*

Session Developer/Session Co-Chair:
David Gross, *Dominion Engineering, Inc., Reston, VA, USA*

Evaluation of the Transportable Detonation Chamber for Processing Recovered Munitions
Technical Paper Publication: PVP2019-93296

Megan Tribble & Jerome Stofleth, *Sandia National Laboratories, Albuquerque, NM, USA*

PVB Blast Load Enhancement Due to Mach Stem
Technical Paper Publication: PVP2019-93774

William Lowry & Jihui Geng, *Baker Engineering and Risk Consultants, San Antonio, TX, USA*

Development of the Containment and Confinement System for Hazardous Material Shock Physics Experiments at Los Alamos National Laboratory
Technical Paper Publication: PVP2019-93689

Dusan Spernjak, Robert Valdiviez, Kevin Fehlmann, Dallas Hill, Joshem Gibson, Gerald Bustos, Jose Tafoya, Nathan Yost, Devin Cardon, John Bernardin, Anna Llobet Megias & Wendy Vogan McNeil, *Los Alamos National Laboratory, Los Alamos, NM, USA*

Study of the Flow Field in Cylindrical Vessel
Technical Paper Publication: PVP2019-93171

Sha Yang, Qi Dong, Liucheng Zhang, Jiahe Feng & Rongxi Hu, *Institute of Chemical Materials, China Academy of Engineering Physics, Mianyang, China*

TECHNICAL SESSION 4.2K (DA-11-1)

CFD in Design and Analysis
Hill County Level (3rd floor), Hyatt Regency, Nueces
10:15am - 12:00pm

Session Developer/Session Chair:
Sean McGuffie, *Porter McGuffie Inc, Lawrence, KS, USA*

Session Developer/Session Co-Chair:
Yanzhen He, *Porter McGuffie, Inc., Lawrence, KS, USA*

Numerical Investigations on the Effect of Cuttings Bed Remover Has on the Cuttings Carrying Capacity in Horizontal Drilling
Technical Paper Publication: PVP2019-93809

Tong Cao, Kaian Yu, Xuyue Chen, Hongwu Zhu, Yunqing Luo & Rui Zhang, *China University of Petroleum, Beijing, China*

Computations of Single and Multiphase Flows Using a Lattice Boltzmann Solver
Technical Paper Publication: PVP2019-93817

M. Wasy Akhtar, *JBL Technologies, Houston, TX, USA*
Holley C. Love, *University of Houston, Houston, TX, USA*

Computational Fluid Dynamics Modeling of an Experimental Thermal-Stratification Flow Case Using Abaqus/CFD
Technical Paper Publication: PVP2019-93932

Daniel Franken, *Kansas State University, Manhattan, KS, USA*
Subhasish Mohanty, *Argonne National Laboratory, Lemont, IL, USA*

CFD Analysis of Mixing Flow in Recombiner Tank of Tritium Removal Facility in Nuclear Power Plant
Technical Presentation: PVP2019-93987

Reza Ghafouri-Azar, *Ontario Power Generation, Pickering, ON, Canada*

TECHNICAL SESSION 4.2L (CS-3-5)

EAF Fatigue Analysis
Hill County Level (3rd floor), Hyatt Regency, Pecan
10:15am - 12:00pm

Session Developer/Session Chair:
Seiji Asada, *Mitsubishi Heavy Industries, Ltd, Kobe, Japan*

Session Co-Chair:
Peter J Gill, *Wood, Warrington, UK*

Critical Review of Strain Measures for Characterisation of Fatigue Damage in ASME Section III Fatigue Assessments
Technical Paper Publication: PVP2019-93849

Daniel Leary, Chris Currie & Keith Wright, *Rolls-Royce, Derbyshire, UK*

Finite Element Based Computational Weld Residual Stress Modeling of Pressurized Water Reactor Weld Nozzle for Environmental Fatigue Life Forecasting
Technical Presentation: PVP2019-93953

Subhasish Mohanty, Saurindran Majumdar & Krishnamurti Natesan, *Argonne National Laboratory, Lemont, IL, USA*

Implementation and Validation of a Fully Mechanistic (Non S~N) Fatigue Modeling and Life Estimation Approach in a High Performance Computing Framework and using ABAQUS-WARP3D FE Code
Technical Paper Publication: PVP2019-93954

Bipul Barua, Subhasish Mohanty, Saurindran Majumdar & Krishnamurti Natesan, *Argonne National Laboratory, Lemont, IL, USA*

Time-Series Fatigue Damage States Forecasting and Probabilistic Environmental Fatigue Life Prediction Using Markov-Chain-Monte-Carlo Techniques
Technical Paper Publication: PVP2019-93955

Jae Phil Park & Chi Bum Bahn, *Pusan National University, Busan, Korea (Republic)*
Subhasish Mohanty, *Argonne National Laboratory, Lemont, IL, USA*

TECHNICAL SESSION 4.2M (MF-3-2)

Welding Residual Stress and Distortion - II
Hill County Level (3rd floor), Hyatt Regency, Pecos
10:15am - 12:00pm

Session Developer:
Masahito Mochizuki, *Osaka University, Osaka, Japan*

Session Co-Developer:
Philippe Gilles, *Consultant, Paris, France*

Session Chair:
Fadi Al-Badour, *King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia*

Session Co-Chair:
Qin Ma, *Walla Walla University, College Place, WA, USA*

The Variability in Weld Residual Stress
Technical Paper Publication: PVP2019-93562

Henry Cathcart, *Frazer-Nash Consultancy, Warrington, Cheshire, UK*
Graeme Horne, *Frazer-Nash Consultancy, Bristol, UK*
Andrew Moffat, *Frazer-Nash Consultancy, Dorking, UK*

Analysis of Residual Stress Distribution Characteristics at Nozzle Weld in Pressure Vessel and Pipe Components
Technical Paper Publication: PVP2019-93598

Shaopin Song & Pingsha Dong, *University of Michigan, Ann Arbor, MI, USA*

Material Characterization on the Nickel-Based Alloy 600/82 NET-TG6 Benchmark Weldments
Technical Paper Publication: PVP2019-94017

Vasileios Akrivos & Mike Smith, *University of Manchester, Manchester, UK*

Weld Residual Stress and Fracture Behavior of NASA Layered Pressure Vessels
Technical Paper Publication: PVP2019-94021

Frederick (Bud) Brust, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*
Robert Dodds, Jr., *Consultant, Knoxville, TN, USA*
Joel Hobbs, Doug Wells & Brian Stoltz, *NASA Marshall Space Flight Center, Huntsville, AL, USA*

TECHNICAL SESSION 4.2N (DA-4-1)

Inelastic, Nonlinear and Limit Load Analysis for Design by Analysis - I
Hill County Level (3rd floor), Hyatt Regency, Frio
10:15am - 12:00pm

Session Developer:
Dan Vlaicu, *Ontario Power Generation, Pickering, ON, Canada*

Session Co-Developer/Session Chair:
Mandar Kulkarni, *Stress Engineering Services Inc., Houston, TX, USA*

Session Co-Chair:
Pritha Ghosh, *Stress Engineering Services, Houston, TX, USA*

Effect of Interference on Stress and Strain Distribution on the Spherical Sealing Cup of a PIG in Dented Pipeline
Technical Paper Publication: PVP2019-93037

Hang Zhang, Jinhui Dong & Can Cui, *China University of Petroleum, Beijing, China*
Ningsheng Liao, *Rice University, Houston, TX, USA*

Elastic-Plastic Buckling Analysis of Spherical Latticed Shell of Large Scale Molten Salt Storage Tank
Technical Paper Publication: PVP2019-93067

Hui Tang, Qianyu SHI, Zhijian Wang & Qi Li, *Harbin Boiler Co. Ltd., Harbin, China*

On Modeling and Assessment of Bulk Liquid Storage Tanks with Foundation Settlements
Technical Paper Publication: PVP2019-93224

Mingxin Zhao, *Enterprise Products, Houston, TX, USA*

Direct Analysis of Post-Shakedown Quantities with the STPZ Considering Multi-Parameter Loading
Technical Paper Publication: PVP2019-93268

Bastian Vollrath & Hartwig Hübel, *Brandenburg University of Technology, Cottbus, Germany*

TECHNICAL SESSION 4.20 (MF-28-2)

Materials and Fabrication for Refining - II
Losaya Conference Center, Navaro
10:15am - 12:00pm

Session Developer/Session Chair:
Cathleen Shargay, *Fluor, Irvine, CA, USA*

Session Co-Chair:
Leslie Antalffy, *Fluor, Sugar Land, TX, USA*

Industry Experience Fabricating Hydroprocessing Reactors Using 2 1/4 Cr-1 Mo-V Steel
Technical Paper Publication: PVP2019-93229

Cathleen Shargay, *Fluor, Irvine, CA, USA*
Leslie Antalffy & Kuntak Daru, *Fluor, Sugar Land, TX, USA*

Improvement of Low-temperature Toughness in Weld Metal Made of 9Cr-1Mo-V Steel by GTAW Method
Technical Paper Publication: PVP2019-93466

Masakatsu Nakano, Tomohiro Tanaka, & Masamitsu Abe, *Hitachi Zosen Corporation, Kumamoto, Japan*
Mitsuyoshi Nakatani, *Hitachi Zosen Corporation, Osaka, Japan*
Hidenori Terasaki, *Kumamoto University, Kumamoto, Japan*

Longitudinal Seam Welded Piping Assessment in Refinery Reforming Units
Technical Paper Publication: PVP2019-93706

Mitul Dalal, *Shell Oil Co., LLC, Deer Park, TX, USA*
Jorge Penso, *Shell Projects and Technology, Houston, TX, USA*
Dave Dewees, *Becht Engineering Co., Inc., Medina, OH, USA*
Robert Brown, *Becht Engineering Co., Inc., Liberty Corner, NJ, USA*

Evaluation of Welding Techniques for Stainless Steels Piping Without Use of Backing Gas
Technical Paper Publication: PVP2019-93359

Siva Kumar Chiluvuri, *Shell Japan Ltd, Yokohama, Japan*
Jorge Penso, *Shell Projects and Technology, Houston, TX, USA*
Kevin Bliss, *Shell Global Solutions US Inc., Houston, TX, USA*

PANEL SESSION 4.2Q (EPRI-1-2)

EPRI Workshop on Structural Integrity of Components in High Temperature Applications

Factors Affecting High Temperature Strength & Ductility of Steels (Including Influence of Aging)
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande W.
10:15am - 12:00pm

Session Developer:
Jonathan Parker, *Electric Power Research Institute, Charlotte, NC, USA*

Session Co-Developer:
Johnna Cortopassi, *Electric Power Research Insitute, Charlotte, NC, USA*

Session Chair:
Ian Perrin, *Structural Integrity Associates, Huntersville, NC, USA*

Session Co-Chair:
Ashok Saxena, *University of Arkansas, Fayetteville, AR, USA*

Challenges and Solutions linked to Uncertainties in Strength and Ductility

Bob Ainsworth, *University of Manchester, Manchester UK*

Time Dependent Strength and Ductility

Doug Marriott, *Stress Engineering Services, Inc.*

Interrogation of High Temperature Microscale Deformation and Damage in 316 Stainless Steel

David Knowles, *Henry Royce Institute, The University of Manchester, Manchester, UK*
Mahmoud Mostafavi, *University of Bristol, Bristol, UK*

Block 4.3 Thursday, July 18 2:15PM – 4:00PM

TECHNICAL SESSION 4.3A (DA-3-4)

Fatigue Design
Losaya Conference Center, Bowie C
2:15pm - 4:00pm

Session Developer/Session Chair:
Laurent de Baglion, *Framatome, Courbevoie, France*

Session Co-Chair:
Moli Cao, *Framatome, Lynchburg, VA, USA*

Fatigue Analysis for the Lower Assembly of a U-tube Steam Generator
Technical Paper Publication: PVP2019-93222

Moli Cao, *Framatome, Lynchburg, VA, USA*

Fatigue Benchmark Comparison Effort between Code_aster and CNNC/NPIC Software - Part 1
Technical Paper Publication: PVP2019-93242

Hai Xie & Xuejiao Shao, *Nuclear Power Institute of China, Chengdu, Sichuan, China*
Han Liu, *EDF China, Beijing, China*

Inclined Surge Line Design Considerations for Analysis and Monitoring
Technical Paper Publication: PVP2019-93684

Jamie Oakman, Mark Gray, Benjamin Leber & Matthew Salac, *Westinghouse Electric Company, Cranberry Township, PA, USA*

Low-Cycle and High-Cycle Fatigue of Pipe Components: Markl's Method Revisited
Technical Paper Publication: PVP2019-93871

Xianjun Pei, Pingsha Dong & Shaopin Song, *University of Michigan, Ann Arbor, MI, USA*

TECHNICAL SESSION 4.3B (CS-36-1)

Master Curve Methods and Applications - I
Losaya Conference Center, Maverick B
2:15pm - 4:00pm

Session Developer/Session Chair:
William Server, *ATI Consulting, Black Mountain, NC, USA*

Session Developer/Session Co-Chair:
Masato Yamamoto, *CRIEPI, Yokosuka, Japan*

Impact of Using ASME Section XI Code Case N-830 on Plant Heatup and Cooldown Pressure-Temperature Limit Curves for Pressurized Water Reactors
Technical Paper Publication: PVP2019-93081

Alexandria M. Carolan & Anees Udyawar, *Westinghouse Electric Company, Cranberry Township, PA, USA*
Ben E, Mays, *Westinghouse Electric Company, Pittsburgh, PA, USA*
J. Brian Hall, *Westinghouse Electric Company, Churchill, PA, USA*

The Non-Effect of Yield Strength on RTT0 and on the Master Curve
Technical Paper Publication: PVP2019-93367

Mark Kirk, *Phoenix Engineering Associates, Inc., Unity, NH, USA*
Marjorie Erickson, *Phoenix Engineering Associates, Inc., Claremont, NH, USA*

Standard Charpy vs. Master Curve Approach in WWER RPV Integrity Evaluation
Technical Presentation: PVP2019-93519

Milan Brumovsky, *UJV Rez Plc, Husinec-Rez, Czech Republic*

TECHNICAL SESSION 4.3C (CS-8-1)

Hydrogen Effects on Materials Behavior
Losaya Conference Center, Maverick A
2:15pm - 4:00pm

Session Developer/Session Chair:
Steven Xu, *Kinectrics, Toronto, ON, Canada*

Session Developer/Session Co-Chair:
Chris San Marchi, *Sandia National Laboratories, Livermore, CA, USA*

Session Co-Developer:
David Cho, *Bruce Power, Toronto, ON, Canada*

Managing the Risks Associated with Operating a Hydrotreater Reactor with Possible High-Temperature Hydrogen Attack Damage
Technical Paper Publication: PVP2019-93533

Phillip E. Prueter & Ryan Jones, *The Equity Engineering Group, Shaker Heights, OH, USA*
Jacki Hess, Joel DeLuca, *Parkland Refining (B.C.) Ltd., Burnaby, BC, Canada*

Technical Basis for Fatigue Crack Growth Design Curves of Ferritic Steels in High-Pressure Gaseous Hydrogen in ASME Section VIII Division 3 Code
Technical Paper Publication: PVP2019-93907

Chris San Marchi & Joe Ronevich, *Sandia National Laboratories, Livermore, CA, USA,*
Paolo Bortot, *TenarisDalmine, Dalmine, Italy*
Yoru Wada, *Japan Steel Works, Muroran City, Hokkaido, Japan*
John Felbaum, *FIBA Technologies, Inc., Littleton, MA, USA*
Mahendra Rana, *Praxair, Niantic, CT, USA*

Assessment of Leak-Before-Break of a Newly Developed Type II Pressure Vessel with High-Pressure Hydrogen Gas
Technical Paper Publication: PVP2019-93447

Hiroshi Okano, Nobuyuki Ishikawa, Shusaku Takagi & Kazuki Matsubara, *JFE Steel Corporation, Kawasaki, Japan*
Akihide Nagao, *JFE Steel Corporation, Kanagawa, Japan*
Toshio Takano, Satoshi Kitagawa, *JFE Container Corporation, Tokyo, Japan*

Evaluation of the Crack Interaction and Failure Behavior of Components with Crack Fields Using a Damage Mechanical Approach
Technical Paper Publication: PVP2019-93911

Christian Swacek, Patrick Gauder & Michael Seidenfuss, *University of Stuttgart, Stuttgart, Germany*

TECHNICAL SESSION 4.3D (CS-9-1)

ASME Code Section XI Activities - I
Losaya Conference Center, Seguin
2:15pm - 4:00pm

Session Developer/Session Chair:
Russell Cipolla, *Intertek AIM, Santa Clara, CA, USA*

Session Developer/Session Co-Chair:
Ryan Crane, *ASME, New York, NY, USA*

Failure Estimation Method for Locally Wall-Thinned Pipes
Technical Presentation: PVP2019-93544

Yinsheng Li & Jinya Katsuyama, *Japan Atomic Energy Agency, Ibaraki-Ken, Japan*
Yoshihito Yamaguchi, *Japan Atomic Energy Agency, Tokai-Mura, Japan*

Consideration on Fatigue Crack Growth Threshold under Negative Stress Ratio
Technical Paper Publication: PVP2019-93870

Kunio Hasegawa, *Japan Atomic Energy Agency, Tokai Mura, Ibaraki-ken, Japan*
Saburo Usami, *Hitachi, Ltd, Hitachi-shi, Ibaraki-ken, Japan*
Valery Lacroix, *Tractebel Engineering, Brussels, Belgium*

Technical Basis Document for Alloy 82/182[1] Weld Inspection Code Case N-770 through N-770-6
Technical Paper Publication: PVP2019-94080

Paul Donavin, *Engineering Management, Eau Claire, MI, USA*
Warren Bamford, *Bamford Consulting Services, Loveland, OH, USA*
Stephen Marlette, *Westinghouse Electric Company, Cranberry Township, PA, USA*

A Co-Reliability-Target-Based Fatigue Failure Probability Model for Implementing the New ASME Boiler & Pressure Vessel Section XI Div 2 Reliability and Integrity Management Code: A Technical Brief
Technical Paper Publication: PVP2019-93508

Jeffrey Fong, N. Alan Heckert & James Filliben, *NIST, Gaithersburg, MD, USA*
Stephen W. Freiman, *Freiman Consulting, Potomac, MD, USA*

TECHNICAL SESSION 4.3F (SE-10-1)

Ratcheting Deformation of Materials and Piping
Losaya Conference Center, Bowie B 2:15pm - 4:00pm

Session Developer:
Tasnim Hassan, *NC State University, Raleigh, NC, USA*

Session Co-Developer/Session Chair:
Xu Chen, *Tianjin University, Tianjin, China*

Session Co-Chair:
Radim Halama, *VSB-Technical University of Ostrava, Ostrava, Czech Republic*

Experimental Study on Cryogenic Ratcheting of Prestrain Austenitic Stainless Steel SS304
Technical Paper Publication: PVP2019-93192

Leilei Li, Bingjun Gao & Junhua Dong, *Hebei University of Technology, Tianjin, China*
Xu Chen, *Tianjin University, Tianjin, China*

A Ratcheting Prediction Model of 35CrMo Bolt Steel Considering the Effect of Stress Amplitude
Technical Paper Publication: PVP2019-93369

Xiaotao Zheng & Wei Wang, *Wuhan Institute of Technology, Wuhan, China*
Sujuan Guo & Fuzhen Xuan, *East China University of Science and Technology, Shanghai, China*

Ratcheting Behaviour of 3D Printed and Conventionally Produced SS316L Material
Technical Paper Publication: PVP2019-93384

Radim Halama, Zbynek Paska & Pavel Pavlicek, *VSB-Technical University of Ostrava, Ostrava, Czech Republic*
Marek Pagac, *VSB-Technical University of Ostrava, Ostrava-Poruba, Czech Republic*
Xu Chen, *Tianjin University, Tianjin, China*

Effect of Mean Stress and Ratcheting Strain on the Low Cycle Fatigue Behavior of Nuclear Pressure Pipeline Steel
Technical Presentation: PVP2019-93124

Xu Chen, Dunji Yu, *Tianjin University, Tianjin, China*
Weiwei Yu, *Suzhou Nuclear Power Institute, Suzhou, Jiangsu, China*
Ying Luo, *Nuclear Power Institute of China, Chengdu, Sichuan, China*

Leakage of a High Temperature and High Pressure Flange Metal Gasket due to its Ratcheting in Alternating Pours of Rain
Technical Paper Publication: PVP2019-93193

Yanan Chen, Chulin Yu & Bingjun Gao, *Hebei University of Technology, Tianjin, China*
Jianbo Wang, *China Petroleum & Chemical Corporation Beijing Yanshan Company, Beijing, China*

TECHNICAL SESSION 4.3J (FSI-3-1)
Impact and Blast Loadings
Hill County Level (3rd floor), Hyatt Regency, Blanco
2:15pm - 4:00pm

Session Developer/Session Chair:
David Gross, *Dominion Engineering, Inc., Reston, VA, USA*

Session Developer/Session Co-Chair:
Matthew Edel, *BakerRisk, San Antonio, TX, USA*

Blast Attenuation in Tunnels or Pipes with Turns
Technical Paper Publication: PVP2019-93751

Jihui Geng, *Baker Engineering and Risk Consultants, San Antonio, TX, USA*
Kelly Thomas, *BakerRisk, San Antonio, TX, USA*

Mimicking Deflagration / Venting Scenarios on Lab-Scale for the High-Pressure Polymerization Technology Process
Technical Presentation: PVP2019-94003

Markus Busch & Oemer Delibalta, *TU Darmstadt, Darmstadt, Hessian, Germany*

Investigation on the Protection of the End Cover of the Cylinder Containment Vessel
Technical Paper Publication: PVP2019-93147

Liucheng Zhang, Qi Dong, Sha Yang, Jiahe Feng & Rongxi Hu, *Institute of Chemical Materials, China Academy of Engineering Physics, Mianyang, China*

A Coupled Acoustic-Structural Simulation of the Dynamics in a Boiling Water Nuclear Reactor during Re-Circulation Outlet Rupture
Technical Presentation: PVP2019-93651

Douglas Fankell & Matthew Walter, *Structural Integrity Associates, Centennial, CO, USA*

TECHNICAL SESSION 4.3L (CS-2-1)
Fatigue and Ratcheting Issues in Pressure Vessel and Piping Design
Hill County Level (3rd floor), Hyatt Regency, Pecan
2:15pm - 4:00pm

Session Developer:
Wolf Reinhardt, *Candu Energy Inc, Mississauga, ON, Canada*

Session Developer/Session Co-Chair:
Reza Adibi-Asl, *Kinectrics, Toronto, ON, Canada*

Session Chair:
Juergen Rudolph, *Framatome GmbH, Erlangen, Bavaria, Germany*

ASME III - RCC-M - General Comparison of Fatigue Design Rules
Technical Presentation: PVP2019-93434

Claude Faidy, *CF Integrity Engineering, Tassin, France*

Mode I Ductile Crack Growth of 1TCT Specimen under Large Cyclic Loading (Part III)
Technical Paper Publication: PVP2019-93476

Kiminobu Hojo, *Mitsubishi Heavy Industries Ltd, Kobe, Hyogo, Japan*

Method B Fatigue Screening in ASME BPV Code, Section VIII, Division 2, Part 5
Technical Paper Publication: PVP2019-93812

Kenneth Kirkpatrick, *Fluor, Inc., Sugar Land, TX, USA*
Christopher Johnson, *Emerson, Polk City, IA, USA*
J. Adin Mann III, *Emerson Process Management, Fisher Valve Division, Marshalltown, IA, USA*

Ratcheting due to Thermal Stratification
Technical Paper Publication: PVP2019-94043

Reza Adibi-Asl, Dara O'Kane & Edwin Chen, *Kinectrics, Toronto, ON, Canada*

TECHNICAL SESSION 4.3M (MF-3-3)

Welding Residual Stress and Distortion - III
Hill County Level (3rd floor), Hyatt Regency, Pecos
2:15pm - 4:00pm

Session Developer:
David Rudland, *US NRC, Frederick, MD, USA*

Session Co-Developer:
Frederick (Bud) Brust, *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, USA*

Session Chair:
Graeme Horne, *Frazer-Nash Consultancy, Bristol, UK*

Session Co-Chair:
Vincent Robin, *EDF, Chatou, France*

Welding Simulation Integrated with Machine Learning to Train a Meta-Model for Fast Exploration of Various Weld Sequence Scenarios
Technical Paper Publication: PVP2019-93672

Mahyar Asadi, *Applus+ Canada, Vancouver, BC, Canada*
Mohammad Mohseni, Majid Tanbakuei Kashani, Michael Fernandez & Mathew Smith, *Applus - SKC Engineering, Surrey, BC, Canada*

Weld Residual Stress in the Thick Duplex Stainless Steel Plate: Neutron Diffraction, Contour Method and Crystal Plasticity Finite Element Method
Technical Presentation: PVP2019-93841

Wenchun Jiang, Yu Wan, *China University of Petroleum, Qingdao, China*
Huamiao Wang, *Shanghai Jiao Tong University, Shanghai, China*
Wanchuck W., Huai Wang, *Korea Atomic Energy Research Institute, Daejeon, Korea (Republic)*
Jian Li, *China Academy of Engineering Physics, Mianyang, China*

Investigation into Residual Stresses in a Small Bore Pipe Weld with Stacked Stop/Start Locations
Technical Presentation: PVP2019-93918

Ben Pellereau, *Rolls-Royce Group, PLC, Derby, UK*
Paul Hurrell, *Wood Group, Warrington, Cheshire, UK*
Simon Walter, *Rolls-Royce, Derby, Derbyshire, UK*

Best Practices - Material Characterization and Material Behavior Law to Model Residual Stresses in Ni Base Multipass Welds
Technical Presentation: PVP2019-94026

Vincent Robin, Josselin Delmas & Sofiane Hendili, *EDF, Chatou, France*
Antoine Andrieu, *EDF, Moret Sur Loing, France*
David Albrecht, *EDF, Lyon, France*
Mike Smith & Vasileios Akrivos, *The University of Manchester, Manchester, UK*

TECHNICAL SESSION (4.3N DA-4-2)

Inelastic, Nonlinear and Limit Load Analysis for Design by Analysis - II

Hill County Level (3rd floor), Hyatt Regency, Frio
2:15pm - 4:00pm

Session Developer:
Dan Vlaicu, *Ontario Power Generation, Pickering, ON, Canada*

Session Co-Developer/Session Chair:
Pritha Ghosh, *Stress Engineering Services, Houston, TX, USA*

Session Co-Chair:
Mandar Kulkarni, *Stress Engineering Services Inc., Houston, TX, USA*

Modeling and Simulations of Down-Hole Tubular Expansion through Multistage Mandrel

Technical Paper Publication: PVP2019-93680

Rashid Khan, Mohammed Almeshaal, Anas Almotairi & Abdullah Almotiq, *Al Imam Mohammed Ibn Saud Islamic University, Riyadh, Saudi Arabia*

A Methodology to assess Elbow Fittings with Localized Low Yield Zones

Technical Paper Publication: PVP2019-93746

Pritha Ghosh, Mandar Kulkarni & Brent Vyvial, *Stress Engineering Services Inc., Houston, TX, USA*
James Ferguson, *Transcanada, Calgary, AB, Canada*

Research on Frame Size of Vehicle Mounted Hydrogen Supply System under Different Conditions Based on Parametric Design

Technical Paper Publication: PVP2019-93142

Jinhao Huang, Cheng-Hong Duan, Minghuang Zhao & Xiangpeng Luo, *Beijing University of Chemical Technology, Beijing, China*

A New Design Method for Axially Loaded Thin-Walled Cylindrical Shells Based on Elasto-Plastic Buckling Analysis

Technical Paper Publication: PVP2019-93233

Peng Jiao, Zhiping Chen & He Ma, *Zhejiang University, Hangzhou, China*

PANEL SESSION 4.3Q (EPRI-1-3)

EPRI Workshop on Structural Integrity of Components in High Temperature Applications

High Temperature Crack Growth

Ballroom Level (2nd floor), Hyatt Regency, Rio Grande W.
2:15pm - 4:00pm

Session Developer:
Jonathan Parker, *Electric Power Research Institute, Charlotte, NC, USA*

Session Co-Developer:
Johnna Cortopassi, *Electric Power Research Insitute, Charlotte, NC, USA*

Session Chair:
Charles Henley, *Kiewit Engineering Group Inc., Lenexa, KS, USA*

Session Co-Chair:
Allen Pfeffer, *Engineering Consultant, Deltona, FL, USA*

Creep & Creep-fatigue Crack Growth in Ex-Service Materials

Ashok Saxena, *University of Arkansas, Fayetteville, AR, USA*

Crack Growth of Tempered Martensitic Steel

Yukio Takahashi, *CRIEPI, Yokosuka, Japan*

High Temperature Crack Growth – Recent Advances Experiment and Analysis

Catrin Davies, *Imperial College, London, UK*

Block 4.4 Thursday, July 18 4:15PM – 6:00PM

TECHNICAL SESSION 4.4B (CS-36-2)

Master Curve Methods and Applications - II
Losaya Conference Center, Maverick B 4:15pm - 6:00pm

Session Developer/Session Chair:
Masato Yamamoto, *CRIEPI, Yokosuka, Japan*

Session Developer/Session Co-Chair:
William Server, *ATI Consulting, Black Mountain, NC, USA*

A Combined Model Approach for Estimating T0
Technical Paper Publication: PVP2019-93646

Marjorie Erickson, *PEAI, Claremont, NH, USA*

Addressing NRC Concerns Regarding Proposed CC N-830; Direct Use of Fracture Toughness for Flaw Evaluations of Pressure Boundary Materials in Class 1 Ferritic Steel Components
Technical Paper Publication: PVP2019-93653

Marjorie Erickson, *PEAI, Claremont, NH, USA*
Mark Kirk, *Phoenix Engineering Associates, Inc., Unity, NH, USA*

Sub-Size Specimen Testing of RPV Steels for Master Curve Analysis
Technical Presentation: PVP2019-93839

M. Kolluri, H.S. Nolles & F.J. Frith, *NRG, Petten, Netherlands*
O. Martin, *JRC, Petten, Netherlands*
V. Petrosyan, A. Petrosyan, *Armatom, Yerevan, Armenia*
G. Sevikyan, *ANPP, Metsamor, Armenia*

TECHNICAL SESSION 4.4D (CS-9-2)

ASME Code Section XI Activities - II
Losaya Conference Center, Seguin 4:15pm - 6:00pm

Session Developer/Session Chair:
Russell Cipolla, *Intertek AIM, Santa Clara, CA, USA*

Session Developer/Session Co-Chair:
Ryan Crane, *ASME, New York, NY, USA*

Technical Basis for Expansion of ASME BPVC Section XI, KIc Curve Applicability
Technical Paper Publication: PVP2019-93988

Hongqing Xu, *NuScale Power LLC, Forest, VA, USA*
Nathan Palm, *Electric Power Research Institute, Washington, PA, USA*
Anees Udyawar, *Westinghouse Electric Company, Cranberry Township, PA, USA*

Application Examples of ASME Code Case N-513 Implementation
Technical Paper Publication: PVP2019-94009

Bob McGill, *Intertek Engineering Consulting, Santa Clara, CA, USA*
Russell Cipolla, *Intertek AIM, Santa Clara, CA, USA*
Eric Houston, *Structural Integrity Associates, Centennial, CO, USA*
Ronald Janowiak, *Exelon, Hoffman Estates, IL, USA*

Technical Basis for a Proposed Second Revision to ASME Code Case N-806
Technical Paper Publication: PVP2019-93218

Bob McGill, *Intertek Engineering Consulting, Santa Clara, CA, USA*
George Antaki, *Becht Engineering Co., Inc., Aiken, SC, USA*
Mark Moenssens, *Westinghouse Electric Corporation, Pittsburgh, PA, USA*
Douglas Scarth, *Kinectrics, Toronto, ON, Canada*

Quantification of the Conservatisms in the Flaw Acceptability Assessment of Doel 3 and Tihange 2 RPVs Containing Hydrogen Flakes
Technical Paper Publication: PVP2019-93211

Valery Lacroix, *Tractebel Engineering, Brussels, Belgium*
Pierre Dulieu, *Tractebel, Brussels, Belgium*

PANEL SESSION 4.4J (HPT-2-3)

Preventing and Investigating High-Energy Releases and Explosions of Pressure Vessels
Hill County Level (3rd floor), Hyatt Regency, Blanco
4:15pm - 6:00pm

Session Developer/Session Chair:
Matthew Edel, *BakerRisk, San Antonio, TX, USA*

Session Developer/Session Co-Chair:
Dan Benac, *Baker Engineering and Risk Consultants, San Antonio, TX, USA*

Preventing and Investigating High-Energy Releases and Explosions of Pressure Vessels
Technical Presentation: PVP2019-93662

Dan Benac, *Baker Engineering and Risk Consultants, San Antonio, TX, USA*
Matthew Edel, *BakerRisk, San Antonio, TX, USA*

PANEL SESSION 4.4Q (EPRI-1-4)

EPRI Workshop on Structural Integrity of Components in High Temperature Applications

Assessment of Toughness and Fracture
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande W.
4:15pm - 6:00pm

Session Developer:
Jonathan Parker, *Electric Power Research Institute, Charlotte, NC, USA*

Session Co-Developer:
Johnna Cortopassi, *Electric Power Research Insitute, Charlotte, NC, USA*

Session Chair:
David Knowles, *Henry Royce Institute, The University of Manchester, Manchester, UK*

Session Co-Chair:
Yukio Takahashi, *CRIEPI, Yokosuka, Japan*

Toughness Assessment of Grade 92 Steels

Jude Foulds, *Clarius Consulting*
John Siefert & Jonathan Parker, *Electric Power Research Institute*

Influence of Cycling on High Temperature Performance
Doug Marriott, Stress Engineering Services

Jonathan Parker, *Electric Power Research Institute*

Block 5.1 Friday, July 19 8:15AM – 10:15AM

PANEL SESSION 5.1Q (EPRI-1-5)

EPRI Workshop on Structural Integrity of Components in High Temperature Applications

Structural Integrity Assessment using Fitness for Service Methods - I
Ballroom Level (2nd floor), Hyatt Regency, Rio Grande W.
8:15am - 10:00am

Session Developer:
Jonathan Parker, *Electric Power Research Institute, Charlotte, NC, United States*

Session Co-Developer:
Johnna Cortopassi, *Electric Power Research Insitute, Charlotte, NC, United States*

Session Chair:
Robert A. Ainsworth, *University of Manchester, Manchester, United Kingdom*

Session Co-Chair:
Dave Dewees, *Becht Engineering Co., Inc., Medina, OH, United States*

Application of Fitness-for-Service Methods to Predictions of Component Performance

Andreas Klenk, *MPA Stuttgart, Stuttgart, Germany*

FFS Methodologies Demonstrated by Consideration of Case Studies

Derrick Rogers, *Stress Engineering Services*

Leveraging Fitness-For-Service Methods in API 579-1/ ASME FFS-1 to Evaluate Damaged Components

Phil Prueter, *The Equity Engineering Group, Inc., Shaker Heights, OH, USA*

Key Issues in Design and Fabrication for Improved Performance

Patric de Smet, *Siemens Heat Transfer Technology B.V.*

Block 5.2 Friday, July 19 10:15AM – 12:15PM

PANEL SESSION 5.2Q (EPRI-1-6)

EPRI Workshop on Structural Integrity of Components in High Temperature Applications

Structural Integrity Assessment using Fitness for Service Methods - II

Ballroom Level (2nd floor), Hyatt Regency, Rio Grande W.
10:15am - 12:00pm

Session Developer:
Jonathan Parker, *Electric Power Research Institute, Charlotte, NC, United States*

Session Co-Developer:
Johnna Cortopassi, *Electric Power Research Insitute, Charlotte, NC, United States*

Session Chair:
Andreas Klenk, *MPA Stuttgart, Stuttgart, Germany*

Session Co-Chair:
Michael Caravaggio, *Electric Power Research Institute, Charlotte, NC, United States*

Base Metal Failure Analysis for Nozzle-to-Pipe Connection of CSEF Steels

Takumi Tokiyoshi, *Mitsubishi Heavy Industries, Ltd., Kobe, Hyogo, Japan*

Experience and Assessment of Grade 91 and Grade 92 Components

Ralf Mohrmann, *VGB*

Application of FFS Methods to Cracking of Boiler Components

Ian Perrin, *Structural Integrity Associates, Huntersville, NC, USA*

Acknowledgments

Codes and Standards
Track Organizer: ***Kiminobu Hojo,*** *Mitsubishi Heavy Industries Ltd, Kobe, Hyogo, Japan*
Track Co-Organizer: ***Valery Lacroix,*** *Tractebel Engineering, Brussels, Belgium*
Technical Committee Chair: ***Ryan Crane,*** *ASME, New York, NY, United States*

Computer Technology and Bolted Joints
Track Organizer: ***Yasumasa Shoji,*** *YS Corporation LLC, Tokyo, Japan*
Track Co-Organizer: ***Bhaskar Shitole,*** *Wood Plc, Calgary, AB, Canada*
Technical Committee Chair: ***Jerry Waterland,*** *VSP Technologies, Prince George, VA, United States*

Design & Analysis
Track Organizer: ***Alicia Avery P.Eng.,*** *A.C. Avery Projects Inc., Calgary, AB, Canada*
Track Co-Organizer: ***Kannan Subramanian,*** *Stress Engineering Services, Metairie, LA, United States*
Technical Committee Chair: ***Ravi Baliga,*** *Advent Energy Consultants Inc., San Ramon, CA, United States*

Fluid-Structure Interaction
Track Organizer: ***Daniel Broc,*** *CEA Saclay, Gif-sur-Yvette, OO, France*
Track Co-Organizer: ***Enrico Deri,*** *EDF, Chatou, France*
Technical Committee Chair: ***Tomoyo Taniguchi,*** *Tottori University Tottori 680-8552, Japan*

High-Pressure Technology
Track Organizer: ***Charles Becht V,*** *Becht Engineering Co., Inc., Liberty Corner, NJ, United States*
Track Co-Organizer: ***Christopher Tipple,*** *Structural Integrity Associates, Centennial, CO, United States*
Technical Committee Chair: ***Karl Simpson,*** *Exxonmobil Chemical, Scotlandville, LA, United States*

Materials & Fabrication
Track Organizer: ***Mo Uddin,*** *Engineering Mechanics Corporation of Columbus, Upper Arlington, OH, United States*
Track Co-Organizer: ***Mark Messner,*** *Argonne National Laboratory, Plainfield, IL, United States*
Technical Committee Chair: ***Michiel Brongers,*** *Engineering Mechanics Corporation of Columbus, Columbus, OH, USA*

Operations, Applications & Components
Track Organizer: ***Joseph Cluever,*** *LPI, Inc., Richland, WA, United States*
Track Co-Organizer: ***Mike Weber,*** *Bundesanstalt fuer Materialforschung und -pruefung (BAM), Berlin, Germany*
Technical Committee Chair: ***Georges Bezdikian,*** *Georges Bezdikian Consulting, Le Vesinet, France*

Seismic Engineering
Track Organizer: ***Osamu Furuya,*** *Tokyo Denki University, Saitama, Japan*
Track Co-Organizer: ***Taichi Matsuoka,*** *Meiji University, Kawasaki, Kanagawa 214-8571, Japan*
Technical Committee Chair: ***Fabrizio Paolacci,*** *University Roma Tre, Rome, OO, Italy*

Rudy Scavuzzo Student Paper Symposium and 27th Annual Student Paper Competition
Track Organizer: ***Douglas Scarth,*** *Kinectrics, Toronto, ON, Canada*
Track Co-Organizer: ***Maher Younan,*** *American University in Cairo, New Cairo, Egypt*

ASME Nondestructive Evaluation, Diagnosis and Prognosis Division (NDPD)
Track Organizer: ***Sandra Dugan,*** *Swiss Federal Nuclear Safety Inspectorate ENSI, Brugg, AG, Switzerland*
Track Co-Organizer: ***Vivek Agarwal,*** *Idaho National Laboratory, Idaho Falls, ID, United States*

EPRI Workshop on Structural Integrity of Components in High Temperature Applications
Track Organizer: ***Jonathan Parker,*** *Electric Power Research Institute, Charlotte, NC, United States*
Track Co-Organizer: ***Johnna Cortopassi,*** *Electric Power Research Insitute, Charlotte, NC, United States*

Chair/Co-chair, Developers/Co-Developers, Plenary & Tutorial Speakers

SD	Session Developer
Co-SD	Session Co-Developer
Chair	Session Chair
Co-SC	Session Co-Chair
SD,SC	Session Developer/Session Chair
SD,Co-SC	Session Developer/Session Co-Chair
Co-SD,Co-SC	Session Co-Developer/Session Co-Chair
Co-SD,SC	Session Co-Developer/Session Chair
PS	Planery Speaker
TS	Tutorial Speaker

Last Name	First Name	Technical Session	Role
Adibi-Asl	Reza	2.3A,2.4A,4.3L	SD/Co-SC,Co-SD/SC
Agarwal	Vivek	2.1M,2.2M	SC,Co-SC
Aida	Kiyoshi	2.4F	SD/SC
Ainsworth	Robert A.	5.1Q	SC
Alam	Md Mahbub	2.3L	SD/Co-SC
Al-Badour	Fadi	4.2M	SC
Alsalmi	Abdullatif	2.4H	Co-SC
Andrieu	Antoine	1.1I,1.3I,1.4I	Co-SD,Co-SD/Co-SC,SD/Co-SC
Antalffy	Leslie	4.2O	Co-SC
Antunes	Jose	2.3L	SC
Asada	Seiji	3.1L,3.2L,3.3A,3.3L,4.1L,4.2L	SD/Co-SC,SD,SD/SC
Avery	Alicia	1.1N,3.1B,3.2B	Co-SC
Baranyi	Laszlo	2.3L	SD
Barkley	Nathan	1.3N,1.4N,2.1N,2.2N	SD/Co-SC,SD/SC,Co-SD
Basavaraju	Chakrapani	2.3N,2.4N,3.1N,3.3N	SD/SC,SD/Co-SC,Co-SC
Baulch	Joel	3.1K,3.2K,3.3K	SD/Co-SC,Co-SD
Bausman	Anita	3.2G	Co-SD
Bedoya	Julian	3.1O,3.3O	SD/Co-SC,Co-SD/SC
Belfroid	Stefan	1.3L,3.2N	SC,Co-SC
Benac	Dan	4.4J	SD/Co-SC
Benson	Michael	2.1I,2.2I,2.3I	SD
Bezdikian	Georges	1.4K,4.1K	Co-SD/Co-SC,SD/SC
Blanton	Paul	2.3K	SD/Co-SC
Blome	Matthias	2.3J	SD/Co-SC
Bortot	Paolo	3.2C	SD/Co-SC
Boster	Patrick	3.2O	Co-SD/SC
Broc	Daniel	1.3E,1.4L,2.3E	Co-SD/SC,SD/Co-SC,SC
Brongers	Michiel	4.2E	SD/Co-SC
Brown	Warren	1.1G,1.3G,1.4G,2.1G,2.3Q,2.4Q,3.1K,3.2K,3.3K	SD/SC,SD/Co-SC,Co-SD,TS,Co-SC
Brumovsky	Milan	2.1K,2.2K	SD/Co-SC,SD/SC
Brust	Frederick	1.1A,1.3A,1.4A,2.3B,2.4B,4.1M,4.3M	Co-SD,SD/SC,Co-SC,Co-SD/SC
Bursi	Oreste S.	2.3F,4.1F	SD/Co-SC,SD/SC
Cao	Moli	4.3A	Co-SC
Caputo	Antonio	4.1F	Co-SD
Caravaggio	Michael	5.2Q	Co-SC
Carcasci	Cosimo	2.4J	SD/SC

Last Name	First Name	Technical Session	Role
Carroll	Blair	2.1I,2.2I,4.1I	SC,Co-SC
Chakraborty	Arindam	2.4C,3.1C,3.2A	Co-SD,Co-SC
Chakraborty	Ishita	2.4H	SD/SC
Chao	Yuh	3.2I	SD
Chen	Xu	4.3F	Co-SD/SC
Chen	Xuedong	2.3D	SD/SC
Cheng	Guangxu	2.4D	SD
Cho	David	4.3C	Co-SD
Chou	Hsoung-Wei	3.1I,3.2I	Co-SD,SD/Co-SC
Cipolla	Russell	4.3D,4.4D	SD/SC
Cluever	Joseph	1.1K,1.3K	SD/Co-SC
Cohn	Marvin	4.1H,4.2H	SD/Co-SC,SD/SC
Cortopassi	Johnna	4.1Q,4.2Q,4.3Q,4.4Q,5.1Q,5.2Q	Co-SD
Cothron	Helen	2.4E,3.1E	SD/SC,SD/Co-SC
Coules	Harry	2.1B,3.3B	SD/SC,Co-SD/SC
Crane	Ryan	4.3D,4.4D	SD/Co-SC
Daru	Kuntak	4.1O	Co-SC
Davies	Catrin Mair	1.1A,1.3A,1.4A,2.4C,3.1C	SD/Co-SC,SD/SC,SD,Co-SD
De Agostinis	Massimiliano	3.3G	SD/Co-SC
De Baglion	Laurent	4.3A	SD/SC
Demejian	Artin	0.4Q	TS
Deng	Guide	2.2D,2.3H	Co-SC
Dennis	Roger	1.1A,1.3A,1.4A	Co-SD
Deri	Enrico	2.1E	Co-SD
Dewees	Dave	5.1Q	Co-SC
Ding	Ju	2.3M	Co-SC
Doddihal	Preeti	1.1B,1.3E,2.2B,3.3D	SD/SC,Co-SC,SC
Donato	Gustavo	1.1B	Co-SD
Dugan	Sandra	1.1E	Co-SD
Duncan	Andrew	2.4C,3.1C,3.1I	SD/SC,SD/Co-SC,Co-SC
Edel	Matthew	4.1J,4.2J,4.3J,4.4J	SD/SC,SD/Co-SC
Elbakhshwan	Mohamed	2.1N	Co-SC
Ezekoye	Ike	0.3Q	TS
Ezekoye	Ike L.	2.1K,2.2K	SD/SC,SD/Co-SC
Facco	Giovanni	2.1I,2.3I	Co-SC,SC
Faidy	Claude	3.1L,3.2L,4.1D,4.2D	SD/Co-SC,Co-SD/SC
Fan	Zhichao	2.3D	Co-SC
Finneran	Shane	3.1B,3.2B	SD/SC
Freire	Jose	3.1A	Co-SC
Fujita	Katsuhisa	2.4F	SD/Co-SC
Furuya	Osamu	1.4F,2.3E	SD/SC,SD
Gang	Chen	4.2E	Co-SC
Garud	Yogen	3.2A	SD/SC
Gawande	K. P.	1.1M	SC
Ghosh	Pritha	4.2N,4.3N	Co-SC,Co-SD/SC
Gill	Peter J.	3.2L,3.3L,4.2I,4.2L	Co-SD/SC,Co-SC
Gilles	Philippe	4.2M	Co-SD
Goyder	Hugh	1.3L	SD
Gross	David	4.1J,4.2J,4.3J	SD/SC,SD/Co-SC
Gurdal	Ozan	2.4C,3.1C	Co-SD
Halama	Radim	4.3F	Co-SC

Last Name	First Name	Technical Session	Role
Hamilton	Scott	1.3G,1.4G	Co-SC
Han	Young-Hoon	1.1J	SD/SC
Hannink	M.H.C.	4.1A	SD/Co-SC
Hara	Kensuke	2.2L	SD/Co-SC
Hasegawa	Kunio	1.3H,1.4H	SD/SC,SD/Co-SC
Hassan	Marwan	1.1L,2.4L	SD/SC,SD/Co-SC
Hassan	Tasnim	2.1N,2.2N,2.4M,4.3F	SD/SC,Co-SD,SD
He	Yanzhen	4.2K	SD/Co-SC
Henley	Charles	4.3Q	SC
Hensel	Steve	2.4K	SD/SC
Hijazi	Iyad	1.3M,1.4M	SD/Co-SC,SD/SC
Hojo	Kiminobu	1.1H	SD/Co-SC
Horn	Anthony	2.4C,3.1C,3.3B	Co-SD,SD
Horne	Graeme	4.3M	SC
Hu	Xiaochen	2.2M	Co-SC
Hughes	Daniel	1.1A,2.2E	Co-SC
Iijima	Takashi	4.1C	Co-SC
Ismail M.	Abdel-Hamid	1.3B	SD/SC
Iyer	San	1.4E,2.4M	SD,SD/Co-SC
Jamalyaria	Ebadollah	3.1K,3.2K,3.3K	SD/SC
James	Peter	1.1E	SD
Janzen	Victor	2.1L,2.4E,3.1E	Co-SC,SD/Co-SC,SD/SC
Jaske	Carl	4.1H,4.2H	SD/SC,SD/Co-SC
Jesus	Abilio	1.4B	SD
Jia	Guodong	2.2D	SD/SC
Jüngert	Anne	2.2M	Co-SD
Jo	Jong Chull	3.2E,3.3E	SD/Co-SC,SD/SC
Johnson	James	2.2H	SD/SC
Kaculi	Jim	1.3J,2.2J	SD/SC
Kai	Satoru	3.1F,3.3F	Co-SC,SD/SC
Kalyanam	Sureshkumar	2.3B,2.4B,3.3M	Co-SD
Kamaya	Masayuki	4.1A	SD/SC
Kang	Heung Seok	2.2L	SD
Karamanos	Spyros A.	1.3F,3.2F	SC
Karpanan	Kumarswamy	1.4J,2.2J	SD/Co-SC,SD/SC
Kasahara	Naoto	4.1E	SD/Co-SC
Katz	Alon	2.2N	Co-SC
Keltjens	Jan	2.1H,3.1J	SD/SC
Kim	Yun-Jae	3.1I	SD
Kirchhofer	Rita	1.1A,1.3A,1.4A	Co-SD,Co-SD/SC
Kirkemo	Finn	1.3J	SD/Co-SC
Kisisel	Ismail T.	4.1F	Co-SD
Klenk	Andreas	5.2Q	SC
Knowles	David	4.4Q	SC
Kobayashi	Takashi	2.4G,3.1G	SD/SC
Kojima	Nobuo	1.1F	Co-SC
Korinko	Paul	2.4C,3.1C,3.1Q,3.2Q	SD/Co-SC,SD/SC,TS
Kulkarni	Mandar	4.2N,4.3N	Co-SD/SC,Co-SC
Lacroix	Valery	1.3H,1.4H	SD/Co-SC,SD/SC
Lam	Jessica	1.3B,2.2B	SD/Co-SC,Co-SC

Last Name	First Name	Technical Session	Role
Lam	Poh-Sang	1.1B,1.4B,3.1I,3.2I	SD/SC,Co-SC,Co-SD/SC,Co-SD
Larrosa	Nicolas	2.1B	SD/Co-SC
Lesiuk	Grzegorz	1.4B	SC
Li	Bing	1.1E,1.4E,2.3N,2.4N,4.1E,4.1N	Co-SC,Co-SD/SC,SD/Co-SC,SD/SC
LI	Jia	4.2A	SD/Co-SC
Li	Xiang	3.3D	SD/Co-SC
Li	Yinsheng	2.4I,3.2D,4.1I,4.2F	Co-SD/SC,Co-SC,Co-SD,SD/Co-SC
Liu	Yinghua	2.4D,3.1D,3.2I	SC,SD/Co-SC,Co-SD/SC
Loffredo	Matteo	1.1J	SD/Co-SC
Ma	Qin	4.2M	Co-SC
Maderbacher	Hermann	2.3J	SD/SC
Maekawa	Akira	1.1F,1.3F,4.2F	Co-SD,SD
Mamun	Abdullah al	1.4A	Co-SC
Marie	Stéphane	1.1I,1.3I,1.4I	SD/Co-SC,Co-SD/SC,Co-SD
Marino	Alessandra	2.3F	SD/Co-SC
Matsunaga	Hisao	4.2C	SD/SC
Matsuoka	Taichi	1.3E,1.4F	Co-SD,SD/Co-SC
Mayes	Alex	1.1M	Co-SC
McCracken	Steven L.	3.1H,3.2H,3.3H	SD/Co-SC,SD/SC
McGuffie	Sean	4.2K	SD/SC
McMurtrey	Michael	1.1D,1.3D	Co-SD
McNelly	Brendan	1.1N	SD/SC
Mertiny	Pierre	0.3Q,0.4Q,1.3Q,1.4Q,2.1Q,2.2Q,2.3Q, 2.4Q,3.1M,3.1Q,3.2M,3.2Q,3.3M,3.3Q	SD/SC,SD/Co-SC
Messner	Mark	1.1D,1.3D	Co-SC
Minagawa	Keisuke	2.1F,2.2F	SD/SC,SD/Co-SC
Mochizuki	Masahito	4.2M	SD
Mohanty	Subhasish	3.3L,4.1L	Co-SC,Co-SD/SC
Mohany	Atef	1.1L,1.3L,2.1L	Co-SD,SC
Mohr	Nicholas	3.3H	Co-SD/SC
Mostafavi	Mahmoud	3.3B	Co-SC
Moussou	Pierre	1.3L	SC
Mureithi	Njuki	1.4L	SD/SC
Nagao	Akihide	3.3C	Co-SC
Nagata	Satoshi	2.4G,3.1G	SD/Co-SC
Nakamura	Izumi	1.1F,1.3F,3.1F,3.2F,4.2F	Co-SD,Co-SD/SC
Nanstad	Randy K.	1.1C,1.3C,1.4C,2.1C,2.2C,2.3C	SD/Co-SC
Nassar	Sayed	2.3Q,2.4Q,4.1G,4.2G	TS,SD/Co-SC,SD/SC
Neuhaus	Thorsten	3.2E,3.3E	Co-SD
Nicak	Tomas	1.1I,1.3I,1.4I	SD/SC,Co-SD
Nikbin	Kamran	3.2D	SD/SC
Nishida	Akemi	3.3F	SD/Co-SC
O`Dowd	Noel P.	2.2E,3.3M	SD,Co-SD
Osage	David A.	1.3Q,1.4Q	TS
Otani	Akihito	1.3F,3.2F,3.3F,4.2F	Co-SC,Co-SD
Paidoussis	Michael	2.2L	SC
Paolacci	Fabrizio	2.1E,2.1F,2.2F	SD,SD/Co-SC,SD/SC
Park	Dong-Yeob	3.3I	SD/Co-SC
Park	Youngho	1.3M,1.4M,2.3A	SD/SC,SD/Co-SC,SC
Parker	Jonathan	4.1Q,4.2Q,4.3Q,4.4Q,5.1Q,5.2Q	SD/SC,SD

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Perl	Mordechai	3.2J	SD
Perrin	Ian	4.2Q	SC
Petropoulos	Constantine	4.1F	SD/SC
Pettigrew	Michel	2.1L,2.4L	SD,Co-SD
Pfeffer	Allen	4.3Q	Co-SC
Pham	Man	1.3J,2.1J	Co-SD,SD/SC
Pillot	Sylvain	2.4C,3.1C	Co-SD
Porter	Mike	3.2N	Co-SC
Prueter	Phillip E.	3.2J,1.3Q,1.4Q	SC,TS
Qian	Haiyang	1.1A,1.3A,1.3E,1.4A,1.4E,2.2E,4.2E	Co-SD,SD,SC,Co-SC,SD/SC
Reich	Alton	1.1K,1.3K	SD/SC
Reinhardt	Wolf	2.3A,2.4A,4.3L	SD
Ren	Weiju	1.1C,1.3C,1.4C,2.1C,2.2C,2.3C	SD/SC
Rice	Dale	2.4G,3.1G	SD/Co-SC
Rüsenberg	Stefan	2.4J	SD/Co-SC
Robin	Vincent	2.4C,3.1C,4.3M	Co-SD,Co-SC
Rodery	Clay	1.1G,1.3G,1.3N,1.4D,1.4G,1.4N,2.1G,3.2O,3.3O	Co-SD/SC,Co-SD,Co-SC,SD
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San Marchi	Chris	2.4C,3.1C,3.2C,3.3C,4.1C,4.2C,4.3C	SD/Co-SC,Co-SD,SD/SC
Sarzynski	Melanie	1.4J,3.2J,3.3J	Co-SC
Sawa	Toshiyuki	2.2G,2.3G,4.1G,4.2G	SD/Co-SC,SD/SC
Sawadogo	Teguewinde	2.4E,3.1E	Co-SD
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Scarth	Douglas	2.1E,2.2B	Co-SC,Co-SD
Schaaf	Manfred	2.2G,2.3G	SD/Co-SC,Co-SD/SC
Segall	Albert	2.4M	SD/SC
Seijas	Antonio	3.1O	SD/SC
Sepehri	Ali	1.1J	Co-SD
Server	William	4.1B,4.2B,4.3B,4.4B	SD/Co-SC,SD/SC
Sham	Ting-Leung	1.1D,1.3D	SD/SC
Shargay	Cathleen	4.1O,4.2O	SD/SC
Sharples	John	4.1D,4.2D,4.2I	SD
Shen	Jun	2.4D,3.1D	Co-SC,Co-SD/SC
Shi	Jianfeng	2.1D,2.3H,3.3D,3.3J,3.3M	Co-SD/SC,SD/SC,Co-SD,SD,SC
Shi	Jinhua	4.1D,4.2D	Co-SD/SC
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Cathcart	Henry	1.3M,4.2M
Chae	Minsung	3.2N
Chai	Juin-Fu	3.3F
Chai	Mengyu	2.2M
Chai	Sen	3.3M
Chakraborty	Ishita	1.4M,2.2L,2.4H
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Chang	Chia-Lung	2.2G
Chang	Kuo-Chun	3.3F
Chang	Yoon-Suk	1.3E
Chantelat	Emmanuel	4.1D
Chao	Yuh	1.4B
Chaouadi	Rachid	1.4H
Chapuliot	Stephane	4.2A
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Chatzopoulou	Giannoula	1.1F
Chauveau	Daniel	4.1K
Chaves	V.	4.2A
Chen	Bingbing	3.2G
Chen	Chentong	1.4B
Chen	Chun-Hung	2.1F
Chen	Edwin	4.3L
Chen	Haofeng	1.1A
Chen	Jian	3.2H,3.3H
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Chen	Minghui	2.1N
Chen	Shuangjian	1.3C
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Choe	Eunho	2.3M
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Clay	Andrew	4.1M
Clowers	Logan	4.1B
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Cothron	Helen	2.4L
Cott	Martin	4.1M
Coules	Harry	2.1B
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Crane	David	4.1K
Cremer	Ingo	1.4I
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Cross	Colin	3.1N
Cui	Can	4.2N
Currie	Chris	3.2L,4.1L,4.2A,4.2L
Cuvilliez	Sam	3.1L,3.3L
Dahl	Anna	1.1I,1.3I
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Dan	Yong	2.2D
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Daru	Kuntak	1.4N,4.2O
Das	Saurish	2.1K
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Day	Shari	3.1E
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De Baglion	Laurent	3.3L
De Bont	C. G. M.	4.1K
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De Jong	A.J.M.	2.3C
De Mathan	Nicolas	4.1D
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Dean	David	1.4A
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Dibasilio	David	1.3L
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Dolley	Evan J.	1.1C
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Dong	Jinhui	4.2N
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Ebrahimi	Kaveh	1.3N
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Elbanhawy	Osama	1.4L
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Han	Young-Hoon	1.1J,1.3J
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He	Xiaohua	1.3N,2.2E,2.2N
He	Yinbiao	3.2I
Hebeisen	Jason	3.2M,3.3D
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Hiramoto	Kazuhiko	2.2F
Hirano	Akihiko	3.3A
Hirota	Kazuo	1.4L,2.1L
Ho	Chin-En	1.3F
Hoang	Don	2.4K
Hoang	Phuong H.	4.1F
Hobbs	Joel	1.4B,4.2M
Hofmann	M.	2.1B
Hojo	Kiminobu	1.1H,4.3L
Hong	Jun	3.2G
Hongu	Junichi	1.3F
Honma	Yuta	2.2A
Hooper	Paul	2.4C
Horne	Graeme	1.3M,2.1A,4.1M,4.2M
Hossain	Md Abir	1.3A
Hou	Lei	1.1K
Hou	Qingzhi	3.2E
Houston	Eric	4.4D
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Huang	Fangfei	1.3K
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Huang	Michael	2.3N
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Ito	Kiyohiro	2.4A
Ito	Tomohiro	1.1F
Ito	Yasuyuki	4.2F
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Iwasaki	Akihisa	2.4F
James	Peter	4.2D
Jang	Changheui	3.2L
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Jesus	Abilio	1.4B
Jetter	Bob	1.1D,1.3D
Ji	Fang	3.3J
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Jia	Zhanbin	2.1L
Jiang	Li	1.3C
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Jianmin	Xu	3.3K
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Jung	Gonghyun	2.1G
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Kasahara	Naoto	4.1E
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Katoh	Yutai	4.1B

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Kawami	Kazuyoshi	4.1C
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Kesterson	Matthew	2.3K
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Khan	Khurram	2.3N
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Kheiri	Mojtaba	2.2L
Kil	Sean	2.4L
Kilambi	Sreelatha	2.1I
Kim	Bum Joon	1.4A
Kim	Ho-Sub	3.2L
Kim	Hune Tae	1.4H
Kim	Hyuckmin	3.3C
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Kim	Min-Chul	1.1C
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Kim	Sejin	2.3M
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Kim	Woojoo	1.4K
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Kim	Youngsik	3.3H
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Li	Yu-Hsuan	4.1L
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Liang	Jianping	1.3C
Liang	Paul	2.4F
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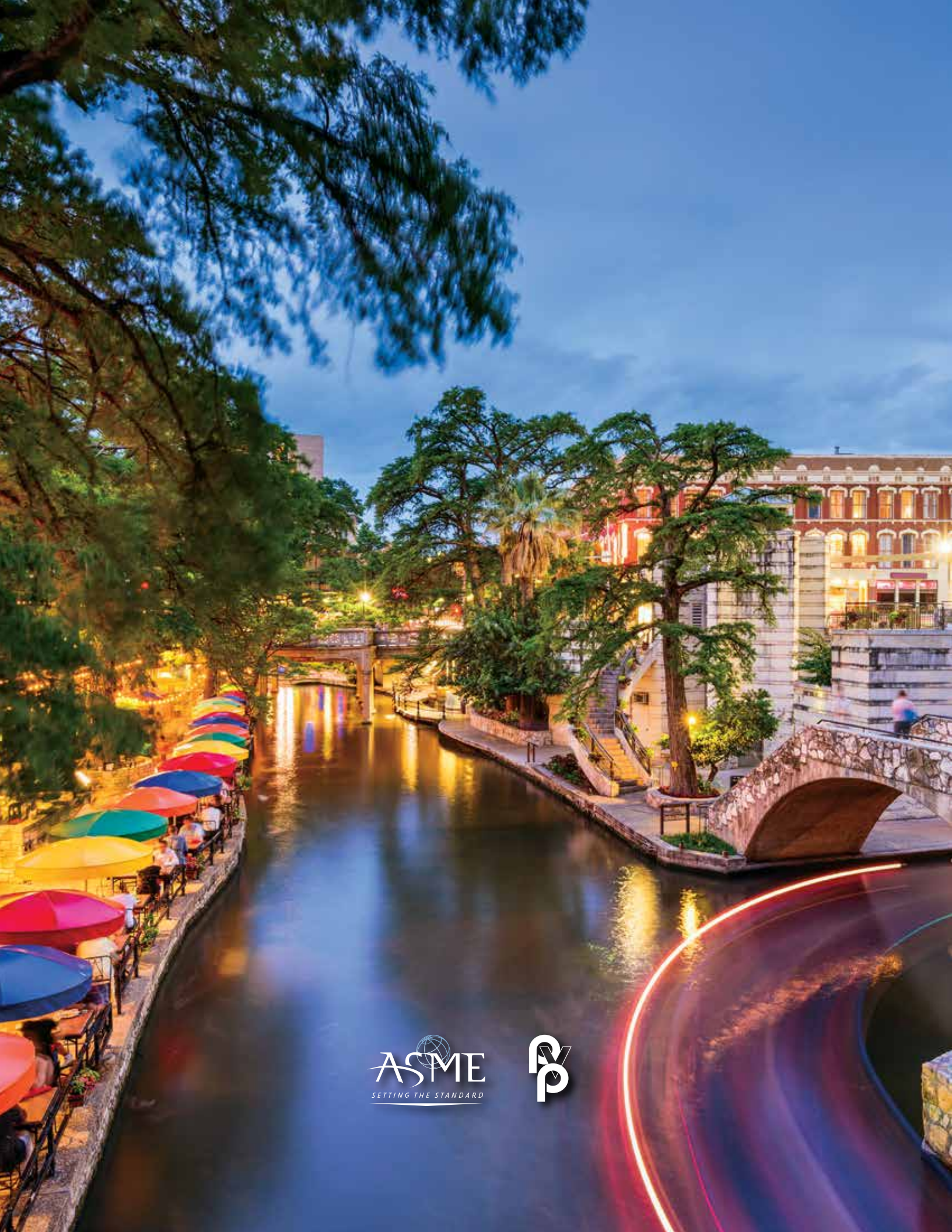
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