

**Final Program**

# **PVP 2017**

**2017 Pressure Vessels & Piping Conference**

***A New Era of Service  
to the Pressure Vessels and  
Piping Industry***



**July 16–20, 2017  
Hilton Waikoloa Village  
Waikoloa, Hawaii, USA**



## WELCOME TO PVP 2017

Welcome to Waikoloa, Hawaii, USA for a new era of the ASME Pressure Vessels & Piping Conference (PVP). After helping to advance the Pressure Vessels and Piping Industry for the last 50 years, the ASME-PVP is starting a new era of service to the industry and academia. The **ASME 2017 PVP Conference** promises to be the outstanding international technical forum for participants to further their knowledgebase by being exposed to diverse topics, and exchange opinions and ideas both from industry and academia in a variety of topics related to Pressure Vessels and Piping technologies for the power and process industries. The PVP Conference is a great place to exchange ideas and to meet colleagues as we all work to create and advance Pressure Vessels and Piping technologies for our global community of practice. The PVP Conference is a recognized forum for fruitful exchange of ideas with participants from over 40 countries in Europe, Africa, the Middle East, Asia, the Americas, and the Oceania islands.

The ASME Pressure Vessels & Piping Division is the primary sponsor of this Conference, with additional participation by the ASME Nondestructive Evaluation, Diagnosis and Prognosis Division (NDPD). This year, the Conference Technical Program contains approximately 750 technical papers and presentations organized into approximately 200 technical and panel discussion sessions, four technical tutorials, two special tutorials, an EPRI Dissimilar Welds in High Temperature Applications Workshop, a special presentation for Early Career Engineers, and our outstanding Rudy Scavuzzo Student Paper Symposium and 25th Annual Student Paper Competition. The Technology Demonstration Forum is also organized as part of our Technical Program.

Technical papers presented in this Conference are separated into tracks, according to their technical areas, and are available at the Conference in the form of a CD-ROM. The program is published on the ASME Event Connect app.

A key component of every PVP Conference is the opportunity to socialize and make new friends—this year's Conference offers several great possibilities in beautiful Hawaii. Enjoy the **Pu'uuhonua O Hōnaunau National Historical Park & Kona Joes Coffee Tour** on Monday—this tour will let you explore some of the most significant traditional Hawaiian sites on the Hawaiian archipelago. One of the most prominent features of the park is the Pu'uuhonua or place of refuge, which is enclosed by the Great Wall, a massive 965 foot long masonry wall. Monday evening we all meet at the **Conference-Wide Reception**, which will be held on the Grand Promenade of our conference resort, the Hilton Waikoloa Village. The **Hamakua, Macadamia Nut Co., Shopping in Hawi, and Visit King Kamehameha Statue Tour** on Tuesday features a variety of cultural, educational and outdoor activities. Additional details regarding these tours can be found later in this program.

### PVP 2017 PROGRAM LAYOUT

	<b>Sunday July 16, 2017</b>	<b>Monday July 17, 2017</b>	<b>Tuesday July 18, 2017</b>	<b>Wednesday July 19, 2017</b>	<b>Thursday July 20, 2017</b>	<b>Friday July 21, 2017</b>
<b>7:30 am 8:15 am</b>	Arrival Registration Opens <b>(8:00 am – 6:00 pm)</b>	Authors' Breakfast/Briefing Registration Open <b>(7:30 am – 4:00 pm)</b>	Authors' Breakfast/Briefing Registration Open <b>(7:30 am – 4:00 pm)</b>	Authors' Breakfast/Briefing Registration Open <b>(7:30 am – 3:00 pm)</b>	Authors' Breakfast/Briefing Registration Open <b>(7:30 am – 3:00 pm)</b>	Open
<b>8:30 am 10:15 am</b>	Open	<b>Block 1.1</b> Technical Sessions Technology Demonstration Forum	<b>Block 2.1</b> Technical Sessions Technical Tutorial Technology Demonstration Forum	<b>Block 3.1</b> Technical Sessions Technical Tutorial	<b>Block 4.1</b> Technical Sessions EPRI Workshop on High Temperature Dissimilar Metal Welds	<b>Block 5.1</b> EPRI Workshop on High Temperature Dissimilar Metal Welds
<b>10:30 am 12:15 pm</b>	Open	<b>Block 1.2</b> Plenary Session Technology Demonstration Forum	<b>Block 2.2</b> Technical Sessions Technical Tutorial Technology Demonstration Forum	<b>Block 3.2</b> Technical Sessions Technical Tutorial	<b>Block 4.2</b> Technical Sessions EPRI Workshop on High Temperature Dissimilar Metal Welds	<b>Block 5.2</b> EPRI Workshop on High Temperature Dissimilar Metal Welds
<b>12:15 pm 1:45 pm</b>	Open	Technical Committee Meetings	Technical Committee Meetings	Open	Open	Open
<b>2:00 pm 3:45 pm</b>	Two Special Tutorials <b>(1:00 pm – 3:00 pm)</b>	<b>Block 1.3</b> Technical Sessions Technical Tutorial Technology Demonstration Forum	<b>Block 2.3</b> Technical Sessions Technical Tutorial Technology Demonstration Forum	<b>Block 3.3</b> Technical Sessions	<b>Block 4.3</b> Technical Sessions EPRI Workshop on High Temperature Dissimilar Metal Welds	Open
<b>4:00 pm 5:45 pm</b>	Early Career Engineers Forum <b>(3:30 pm – 4:30 pm)</b> Student Paper Competition Orientation <b>(4:30 pm – 4:45 pm)</b> Women Engineers/Early Career Engineers Event/Students Social Event <b>(4:30 pm – 5:30 pm)</b>	<b>Block 1.4</b> Technical Sessions Technical Tutorial Technology Demonstration Forum	<b>Block 2.4</b> Technical Sessions Technical Tutorial Technology Demonstration Forum	<b>Block 3.4</b> PVP Division Honors and Awards Assembly and Dinner <b>(5:00 pm – 10:00 pm)</b>	<b>Block 4.4</b> Technical Sessions Conference Evaluation EPRI Workshop on High Temperature Dissimilar Metal Welds	Open
<b>Evening</b>	Open	Conference-Wide Reception <b>(6:15 pm – 8:00 pm)</b>	Open		Open	Open

## PVP DIVISION

As the Pressure Vessels and Piping Division celebrates its 51st Anniversary in Hawaii, one may wonder how did it start? The Pressure Vessel Research Committee (PVRC), which was the research arm of ASME, had the most experienced members in designing and manufacturing Pressure Vessels, Valves and Pumps, sponsored research programs on thin and thick shells theory with cooperation of the Atomic Energy Commission (AEC) and other organizations as early as 1958. A number of institutions participated in the program, among them was Pennsylvania State University dealing with stress analysis of pressure vessels with nozzle inserts with different types of reinforcement pads under combined loading with results published in WRC bulletins of 1963 and 1964 by D. Hardenberg and S.Y. Zamrik. 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, who was with Taylor Forge and a very active member, spearheaded an organizational meeting at the 1965 ASME Winter Annual Meeting (WAM) in Chicago to form a Pressure Vessels and Piping Division within ASME to encompass all technical aspects. F. Williams and D. Young introduced recommendations to ASME to create a Division, called Pressure Vessels and Piping (PVP). The recommendation passed unanimously and D. Young was named the first Division Chair on April 13, 1966. Thus, the Pressure Vessels and Piping Division (PVPD) was born.

The PVP division evolved over the years from a small division with four Technical Committees to what is today eight committees with a strong, vital membership. The Division leadership in those years had a global vision to be an international body and to have international experts involved in the division growth. The leadership of the division established a Mission and Core Values to build on:

- **The Mission** is 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.
- **The Core Values** are to embrace integrity and ethical conduct and 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 the technology development in the Pressure Vessels industry. PVP conferences continue to be successful due to the dedication of our volunteers who are, in turn, supported by their companies.

ASME is truly international, and the PVP Division does quite well in this area. From 1991 to 2000, the number of contributors from outside of North America grew from about one-third to more than two-thirds, and our Conference continually hosts attendees from 35-42 different countries representing all regions of the globe. Needless to say, the technical content and the quality of PVP Conference sessions have benefited considerably from overseas participation.

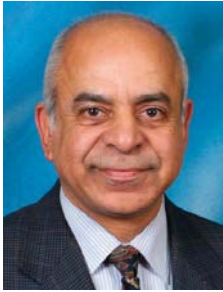
To encourage students in Conference participation, the Rudy Scavuzzo Student Paper Symposium and Competition is held every year. The PVP Division encourages students and early career engineers to get involved with the Conference and the Division. PVP Conference attendees are encouraged to be accompanied by their spouses; this provides and promotes a welcoming atmosphere that further develops friendship, broadens relationships and extends interaction and networking. Another unique strength that the PVP Division utilizes is the commitment and active participation of our PVPD Senate Operations Committee and spouses who work with us to create and maintain the "PVP Family" atmosphere that makes our social events successful.

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**The American Society of Mechanical Engineers  
Pressure Vessels & Piping Division**

**PVP 2017 Conference Committees**



Maher Y. A. Younan  
Conference Chair



Pierre Mertiny  
Technical Program Chair



Sam Y. Zamrik  
Conference Advisor

**PVP Technical Program Representatives**

Codes & Standards	Ryan L. Crane, Kiminobu Hojo
Computer Technology & Bolted Joints	Robert Noble, Bijan Azadi_Borujeni
Design & Analysis	Bing Li
Fluid-Structure Interaction	Lambros Kaiatsis, Victor Janzen
High-Pressure Technology	Kannan Subramanian, Kumarswamy Karpanan,
Materials & Fabrication	Xian-Kui Zhu
Operations, Applications & Components	Yasumasa Shoji, Alton Reich
Seismic Engineering	Fabrizio Paolacci, Osamu Furuya
Student Paper Competition	Daniel T. Peters, Marina B. Ruggles-Wrenn
ASME NDPD Division	Sandra Dugan
EPRI Dissimilar Welds in High Temperature Applications Workshop	Jonathan Parker, Elizabeth Benton
Technology Demonstration Forum	Carl E. Jaske, James F. Cory, Jr.

**Student Paper Competition Session Developers**

Codes & Standards	Peter James, Andrew Wasylyk, Jianfeng Shi
Computer Technology & Bolted Joints	Yasumasa Shoji
Design & Analysis	Kannan Subramanian, Bing Li
Fluid-Structure Interaction	Victor Janzen, Christina Giannopapa, Lambros Kiaktsis, George Papadakis
High-Pressure Technology	Maresh Aggarwal
Materials & Fabrication	Noel O'Dowd,

Operations, Applications & Components

Seismic Engineering

PVP Senate

**PVP Division Executive Committee (2016–2017)**

Douglas A. Scarth  
Maher Y. A. Younan  
Pierre Mertiny  
Hakim A. Bouzid  
Trevor G. Seipp  
Darren Stang

Haiyang Qian  
Yasumasa Shoji,  
Steve Hensel  
Fabrizio Paolacci,  
Tasmin Hassan  
Daniel T. Peters,  
Marina B. Ruggles-Wrenn

Chair  
Vice Chair  
Programs Chair  
Communications Chair  
Honors and Awards Chair  
Professional Development Chair

**PVP Senate of Past Division Chairs**

Marina B. Ruggles-Wrenn, Historian, (2016-2017)	2015–16
Daniel T. Peters, President, (2016-2017)	2014–15
Michael E. Nitzel,	2012–14
Ronald S. Hafner	2011–12
Young W. Kwon	2010–11
Luc H. Geraets*	2009–10
Artin A. Dermenjian	2008–09
James F. Cory, Jr.,	2007–08
Judith A. Todd	2006–07
M. K. Au-Yang*	2005–06
Ismail T. Kisisel	2004–05
William J. Bees	2003–04
Howard H. Chung	2002–03
Joseph Sinnappan	2001–02
A. G. (Jack) Ware	2000–01
Robert F. Sammataro*	1999–00
Thou-Han Liu	1998–99
William E. Short, II	1997–98
Richard C. Gwaltney*	1996–97
Shoei-Sheng Chen*	1995–96
Greg L. Hollinger	1994–95
Carl E. Jaske	1993–94
Rudy J. Scavuzzo*	1992–93
Sam Y. Zamrik	1991–92
G. E. Otto Widera	1990–91
Robert H. Mallett	1989–90
Robert W. Swindeman	1988–89
Alexander H. C. Marr	1987–88
Jeffrey T. Fong	1986–87
Don B. Van Fossen	1985–86
James R. Farr*	1984–85
Charles F. Nash	1983–84
Donald S. Griffin	1982–83
Richard H. Gallagher*	1981–82
L. Eugene Hulbert	1980–81
Robert E. Nickell*	1979–80
Roger F. Reedy	1978–79
David H. C. Pai	1977–78
Pedro V. Marcal	1976–77
Harold H. Waite*	1975–76
Robert L. Cloud	1974–75
Charles V. Moore	1973–74
Irwin Berwin*	1972–73
Danos Kallas*	1971–72
Robert J. Cepluch*	1970–71
Charles F. Larson	1969–70
Gunther P. Eschenbrenner	1968–69

Vito Salerno\* 1967–68  
 Dana Young\* 1966–67  
 \*Deceased

**PVP Division Technical Committee Chairs**

Codes & Standards	Russell C. Cipolla
Computer Technology & Bolted Joints	Wolf Reinhardt
Design & Analysis	Ravi Baliga
Fluid-Structure Interaction	Christina Giannopapa
High-Pressure Technology	Karl Simpson
Materials & Fabrication	Michiel Brongers
Operations, Applications & Components	Matthew R. Feldman
Seismic Engineering	Tomoyo Taniguchi

**PVP Division Administrative Committee Chairs**

Membership Chair	Darren L. Stang
Website & PVPD Newsletter Editor	Hakim A. Bouzid
International Coordination	Xian-Kui Zhu

**ASME Journal of Pressure Vessel Technology**

Editor	Young W. Kwon
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**ASME President**

C. Wise	2017–2018
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**ASME Staff**

Executive Director	Thomas G. Loughlin
Program Manager	Jamie Hart
ASME Staff	Javanni Kiezer, Danielle Rojas

**OPENING CEREMONY and PLENARY SESSION**

**A New Era of Service to the Pressure Vessels and Piping Industry**

The Conference opens on Monday, July 17, at 10:30 am, in the *Monarchy Ballroom*. Representatives of the American Society of Mechanical Engineers will welcome the attendees. The first presentation will be delivered by Dr. Stewart Williams, Director of the Welding Engineering, and Laser Processing Center, Professor of Welding Science and Engineering, School of Aerospace, Transport and Manufacturing, Cranfield University. The second presentation will be delivered by Dr. Thomas R. Kurfess, P.E., Professor, George W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology.

**Plenary Speaker**



**Dr. Stewart Williams**

Welding Engineering and Laser Processing Center  
 Cranfield University, Cranfield, UK

**Large Scale Metal Wire + Arc Additive Manufacture for Pipes and Pressure Vessels**

Additive manufacture of large engineering structural parts is currently of great interest to industry in general. The only realistic processes for this are those based on wire feed technology and their status will be briefly reviewed. Wire + Arc Additive Manufacture (WAAM) shows the highest level business benefit, and examples of systems, capabilities and associated material properties will be given. There are many potential applications of WAAM for production of pressure vessels and pipe structures which will be highlighted. Developments required for WAAM to allow industrial application including the approach towards qualification will be

discussed. The presentation will conclude with two case studies of building steel pipe elbow structures and a titanium pressure vessel.

**Plenary Speaker**



**Dr. Thomas R. Kurfess, Ph.D., P.E.**

George W. Woodruff School of Mechanical Engineering  
 Georgia Institute of Technology, Atlanta, Georgia USA

**High Performance Computing and Big Data the Parents of the Digital Twin**

Sensors are ubiquitous in modern manufacturing operations, and they generate significant quantities of data. With the advent of low cost, readily available broad band communication and virtually infinite cloud storage, many of the old stigmas related to taking data from a plant are no longer of concern. However, the question still remains as to what to do with the data. This lecture will discuss the use of large scale data sets from production operations and how they can be leveraged to better understand not only traditional operations, but untapped opportunities from data that are readily available today. Such opportunities provide an improved platform for classical analytic techniques as well as more modern, data intensive approaches to process and operations modeling. The talk will then focus on a specific next generation digital representations and their application to pressure vessels and piping. Examples will be given for both manufacturing operations (additive and subtractive) and validation/verification, as well as how this capability is extensible to cloud computing operations, and next generation technology and business models such as Desktop as a Service (DAAS). The talk will conclude with a discussion of the technology, workforce and infrastructural directions and needs to fully enable the next generation digital twin, and where such a capability will drive the future of manufacturing.

**HONORS and AWARDS ASSEMBLY**

The ASME PVP Division Honors and Awards Assembly, during which Division and selected ASME Society awards are presented, will be held on Wednesday, July 19, from 5:00 pm until 10:00 pm, in the *Monarchy Ballroom*. The top PVP Division award, the ASME S. Y. Zamrik PVP Medal, will be presented to Mr. Mahendra Rana.

**ASME S. Y. Zamrik PVP Medal Recipient**



**Mr. Mahendra D. Rana**

Niantic, CT

Mahendra D. Rana received his B.E. in Mechanical Engineering from the Maharaja Sayajirao University of Baroda in India in 1967. He subsequently received a Masters in Mechanical Engineering from the Illinois Institute of Technology in 1970. He started his career in the aircraft industry focusing on fatigue evaluation and mechanical design of jet engine components. In 1974 he joined the Linde Division of Union Carbide Corp, which subsequently became Praxair. Over his career at Praxair, he was responsible for the design of cryogenic storage tanks, development of weight-efficient portable high pressure gas storage cylinders, as

## Coffee Breaks and Refreshments

Coffee and refreshments are available throughout the week on the *Grand Promenade of the Conference Center*. This hub of activity features the *Technology Demonstration Forum*, exhibit booths, coffee breaks, guest activity information area, and registration.

well as structural integrity assessments and fracture control programs for all pressure vessels used at Praxair. Additionally, he provided pressure vessel consulting to all Praxair groups. Mr. Rana retired from Praxair in June 2016.

Starting in 1993, Mr. Rana became active in the ASME PVP Division, starting in the Codes and Standards Technical Committee. He has actively developed technical sessions from 1993 to 2009. He served as Technical Program Representative (TPR) for the Codes and Standards Technical Committee multiple times, a role that required substantial work each year. From 2000-2002 he served as Vice-Chair of the Codes and Standards Technical Committee, and from 2002-2006 he served as Chair. Over his tenure as Vice-Chair and then Chair, he completely revitalized the Technical Committee, laying the foundation for its continued success. Today, ten years after his term as Chair, this Technical Committee continues to be a strong and substantial contributor to the PVP Division and the PVP Conference.

Mr. Rana has also been very active in ASME Codes and Standards development, for which he was awarded the J. Hall Taylor Medal in 2011. Significantly for the PVP Division, much of the Codes and Standards development work that he was involved in was first published and presented at PVP Conferences. Mr. Rana has received numerous other awards over the years for his significant contributions to ASME, including the ASME Dedicated Service Award in 2009. He was elected to the grade of ASME Fellow in 2004.

Mr. Rana has two patents, and many publications in the PVP conference and ASME-Journal of Pressure Vessel Technology. He has contributed to many ASME Code committees and ISO standards. Some of his major projects include:

- Development of high-strength (200-250 ksi) cryoformed, welded stainless steel gas cylinder including fracture mechanics based R&D work.
- Structural support design of a Praxair jet piercing machine.
- Development of a high-strength (155-175 ksi UTS) seamless steel cylinder for high pressure gases.
- Design of several cryogenic storage ASME Coded tanks with sizes ranging from 1,000 to 65,000 gallons.
- Determination of fracture critical-flaw sizes of acoustic emission tested DOT regulated high pressure gas storage vessel.
- Fracture testing and evaluation of new steels for cryogenic pressure vessel application.

In summary, Mr. Rana has provided outstanding service to ASME, ASME Codes and Standards, and particularly the PVP Division.

## 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 Tutorial:** This is a one-hour or two-hour conference session, held on Sunday afternoon. The session leader will make available the necessary presentation material.

**Technical Tutorials:** These tutorials are approximately 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 electronic format.

Each attendee will receive a Certificate of Attendance, as proof that the attendee has participated in the Special Tutorial, or the Technical Tutorial.

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 2017 PVP Conference is presented in the following.

## SPECIAL TUTORIALS

### Business Planning for Engineers

**Alton Reich, MS, PE Streamline Automation, LLC / Vital Metrix, Inc.**

**Sunday, July 16, 1:00 pm – 3:00 pm**

*Kohala 3, Conference Center*

Many engineers feel the entrepreneurial itch, and some of us are insane enough to act on it. This tutorial will discuss some tools and techniques that can be used to evaluate business ideas, the potential market for them, and help to focus thinking and effort on the things you don't know before making a decision to go forward. These tools can also be used within larger organizations (i.e. the company you still work for) to evaluate new business opportunities. We will discuss the lean canvas as a tool for business planning, which distills a business plan down to one page that is easily modified as an entrepreneur learns new things, and serves as the nucleus of a written business plan. We will also discuss customer discovery, the value of low fidelity prototypes, and the importance of finding out that you're wrong quickly. This session is developed by an engineer who worked at successively smaller companies until starting his own (with a couple of partners). In 2015 he spun out a medical device company that required attracting investors and being able to answer their questions. He hopes to impart some hard-earned knowledge to tutorial attendees.

### Process and Benefits of ASME Pressure Technology Codes & Standards Development

**William (Bill) Bees, Consulting Engineer, and Clay Rodery, Mechanical Integrity, BP p.l.c; and Mahendra Rana, Consultant, Niantic, Inc.**

**Sunday, July 16, 1:00 pm – 3:00 pm**

*Kohala 4, Conference Center*

Have you wondered how the Codes & Standards (C&S) that ASME produces happens? In addition to the benefits gained from membership in the PVP Division and attendance/participation in the ASME PVP Conference, ASME offers benefits to those interested in C&S development. This tutorial explains the:

- Process used in development of ASME C&S; specifically in the area of Pressure Technology Codes & Standards;
- Consensus process used in C&S/ANSI development;
- Benefits to participants in ASME C&S development activities;
- Types of participation in the C&S Committees, qualifications, and the expectations of participants;
- Relationship between the ASME Pressure Vessels & Piping Division and ASME C&S;
- Committee Structure under the Board on Pressure Technology C&S and areas of responsibilities;
- Emerging areas in Pressure Technology including those currently seeking participants; and
- Number of Standards and Codes under ASME and areas affected.

One of ASME's most valuable assets are the relationships with the volunteers who serve on C&S committees. ASME's policy is to afford all interested persons an opportunity to participate in the ASME C&S development process. Membership on a committee normally represents you as an individual, rather than as a representative of your employer or another organization. The Tutorial concludes with an open question and answer session.

### Early Career Engineers Forum (Forum Session)

**Artin Dermenjian, AAD Independent Operations (PVPD Senator)**

**Sunday, July 16, 3:30 pm – 4:30 pm**

*Kohala 4, Conference Center*

The first half of the forum will provide a brief history and background of ASME-PVP Division activities and how involvement in ASME-PVP will create and facilitate networking and mentoring opportunities. The second half of the forum will be an interactive workshop dealing with issues that new career engineers may face in the work place.



**Social Event for Women/Early Career Engineers and Students**  
**Sunday, July 16, 4:30 pm – 5:30 pm**

*Grand Staircase, Hilton Waikoloa Village*

A special social event will be held on Sunday for women engineers, early career engineers (five years or less from time of graduation), and students. This event is an opportunity for these individuals to meet the PVP Division leadership team and to learn how to get more involved in activities of the PVP Conference. 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 women engineers, early career engineers and students are welcome and encouraged to attend this event.

**TECHNICAL TUTORIALS**

**The Use of Computational Fluid Dynamics in Design**

**Sean M. McGuffie, and Mike Porter, Porter McGuffie Inc.**

**Monday, July 17, 2:00 pm – 3:45 pm (Part 1); and Monday, July 17, 4:00 pm – 5:45 pm (Part 2)**

*Kohala 4, Conference Center*

Computational fluid dynamics (CFD) is a methodology for solving the Navier-Stokes (NS) equations—the complete and perfect equations of fluid motion. The NS equations are nonlinear, coupled partial differential equations for which no direct solution exists, except in the most simplified cases. “Correct” solution of the equations requires a technique known as direct numerical simulation; where, due to the demands of the technique, only fundamental research on small geometric domains is conducted, using some of the largest supercomputers in the world. Given this fact, what can CFD be used for in an engineering environment? With the proper validation, a design basis calculation for a nuclear facility serves as an example of how far the technology can be pushed. It should be understood by the prospective attendee that CFD is an extremely broad topic that can only be explored around the periphery in a four-hour time-frame. Therefore, the goal of the tutorial is to provide a fundamental understanding of what CFD is, and how it can be used to support engineering design decisions. This will be accomplished through a 75 minute block devoted to theory/implementation. During this portion of the tutorial, the solution of the three fundamentals associated with every engineering problem—continuity, momentum and turbulence—will be discussed. The tutorial will cover the implications that the underlying mathematics have on problem formation and solution, not the actual mathematics. The primary goal is to promote the informed use of this powerful technique and inform the attendee on how to avoid some of the most common pitfalls associated with CFD analyses.

**Fitness-For-Service (FFS) Procedures for Evaluation of Damage or Defects in Pressurized Equipment using API 579-1/ASME FFS-1**

**Phillip Prueter and Brian Macejko, Equity Engineering Group, Inc.**

**Tuesday, July 18, 8:30 am – 10:15 am (Part 1); and Tuesday, July 18, 10:30 am – 12:15 pm (Part 2)**

*Kohala 4, Conference Center*

The objective of this technical tutorial is to describe a subset of the API 579 1/ASME FFS-1 Fitness-For-Service (FFS) procedures for evaluation of damage or defects in pressurized equipment. Lectures will be concentrated mostly on Level 1 and Level 2 evaluation procedures (including limitations, applicability, and acceptance criteria). This half-day technical tutorial will be broken into two (2) parts: Part 1, API 579 FFS Procedures - Volumetric Damage Focus, will include an overview of evaluation procedures for General Metal Loss and Local Metal Loss. Part 2, API 579 FFS Procedures - Fracture Focus, will include an overview of Brittle Fracture evaluation procedures and an introduction to Crack-Like Flaw evaluation procedures. Both Part 1 and Part 2 of the technical tutorial will include a lecture summarizing recent changes to the 2016 Edition of API 579 1/ASME FFS 1.

**Fatigue Assessment of Weldments**

**Pingsha Dong, University of Michigan, and Matthew Doré, TWI Ltd.**

**Tuesday, July 18, 2:00 pm – 3:45 pm (Part 1); and Tuesday, July 18, 4:00 pm – 5:45 pm (Part 2)**

*Kohala 4, Conference Center*

In the 2007 major rewrite of the ASME BPVC Section VIII Division 2, a new welded

joint fatigue method was introduced using a mesh-insensitive structural stress and master S-N curve approach. This tutorial will provide discussion on the basis of the method, and its applications in design by analysis evaluation of a number of examples on pressure vessel and piping components involving both finite element based calculations as well as simple cases that only involve manual calculations for solving fatigue problems. Specific topics include:

- Overview of conventional fatigue assessment methods and limitations.
- Basis of mesh-insensitive traction structural stress method and calculation examples.
- Formulation of master S-N curve and validation.
- Treatment of low cycle fatigue and non-proportional multiaxial fatigue.
- Application examples: Fatigue life evaluation of pressure vessels and fatigue life evaluation of girth welded pipe components.
- New developments that are considered for adoption by API 579: Structural strain method and cycle counting procedure for non-proportional multiaxial fatigue loading and master S-N curve based assessment.

In March 2014, BS 7608 was updated to include new assessment guidance incorporating the finite element based ‘hot spot’ stress methodology, amendments to the allowance for bending, as well as updating the recommendations on weld improvement techniques and the addition of new environmental test data. This tutorial will provide discussion on the basis of the revision to the guidance document, its application in fatigue design, as well as simple worked examples using the methods prescribed. Specific topics include:

- Introduction—Effect of welding on fatigue,
- Overview of TWI’s contribution to fatigue design and the development of BS7608,
- Review of recent developments:
  - Design curves in air and marine environment,
  - Plate thickness and bending effects,
  - Classification for bolt threads under direct stress,
- Stress analysis—Hot spot stress approach,
  - Classification of weld details,
  - Quality and Workmanship,
  - Assessment of cumulative damage under variable amplitude loading,
  - Fatigue life improvement techniques,
  - Use of test data to define design stresses.
- Fatigue assessment examples:
  - Fatigue assessment of girth welded pipe using S-N approach.
  - Fatigue assessment of welded vessels using fracture mechanics approach.

**ASME Section VIII, Division 3 Alternative Rules for Construction of High Pressure Vessels**

**Daniel Peters, PE, Structural Integrity Associates**

**Wednesday, July 19, 8:30 am – 10:15 am (Part 1); and Wednesday, July 19, 10:30 am – 12:15 pm (Part 2)**

*Kohala 4, Conference Center*

The purpose of this tutorial is to provide an overview of the design methodology and philosophy of ASME Section VIII Division 3, Alternative Rules for High Pressure Vessels. This will include an overview of the analysis methods used, including the application of FEA in meeting the requirements of the Code. This will include examples of practical applications for many of the techniques to demonstrate the philosophy of the Code criteria. This will include an overview of some of the problems in ASME PTB 5 2013, ASME Section VIII Division 3 Example Problem Manual. The tutorial will include detailed example problems that demonstrate how the analytical techniques are to be applied, and their limitations. An overview of key elements of the materials, fabrication sections, along with a discussion of special construction techniques will be included in the tutorial. This will also include an overview of fatigue calculations and life assessment.

**TECHNOLOGY DEMONSTRATION FORUM**

**Monday, July 17, 8:30 am – 5:45 pm; and Tuesday, July 18, 8:30 am – 5:45 pm**  
*Grand Promenade, Conference Center*

The Technology Demonstration Forum will be held on Monday, July 17th, and Tuesday, July 18th. Vendors and Sponsors will present and discuss their capabil-

ities, equipment, and services on the Grand Promenade of the Hilton Waikoloa Conference Center. For additional information, please contact Dr. Carl E. Jaske, Det Norske Veritas (USA), Inc., at [cejasje@forhonor.com](mailto:cejasje@forhonor.com); or Mr. James F. Cory, Jr., Siemens PLM Software, at [james.cory@siemens.com](mailto:james.cory@siemens.com).

## EPRI DISSIMILAR WELDS IN HIGH TEMPERATURE APPLICATIONS WORKSHOP

**Thursday, July 20, 8:30 am – 5:45 pm; and Friday, July 21, 8:30 am – 12:15 pm**  
Kohala 4, Conference Center

The need to balance cost and performance means that in most high temperature plants there will be the need to transition from one alloy to another within the pressure boundary. There is a very large range of choices available to designers when considering details of these joints. Because different approaches are used, the in-service life of Dissimilar Metal Welds (DMWs) has been very variable. This variability creates uncertainty and this is problematic for many reasons. Firstly, post-construction life management activities are typically based on a reasonable expectation of in-service performance (i.e. when a DMW will fail). Secondly, particularly for DMWs in piping and vessels, a key performance issue is how components fail. Issues of leak or break are frequently assessed using a component damage tolerance approach.

The range of applications and materials used in DMWs has recently increased because of the widespread use of advanced steels and other high temperature alloys. The greater range of material combinations has further complicated assessment of in-service performance. The increased variability in performance is because behavior is not only sensitive to details of design, fabrication, and operation but also, in the case of tempered martensitic steels, there is a metallurgical risk factor to consider. Failures have been observed in DMWs between 9Cr CSEF steels and austenitic stainless steels that have been welded using a nickel-base filler metal.

The present Workshop offers the opportunity to review current approaches, issues and solutions for the use of 'well engineered' dissimilar joints. Sessions will review design considerations and fabrication techniques which are discussing currently considered best practice for DMWs. State of knowledge general application guidelines which can increase weld performance will be presented. Improved performance will consider lifetime (i.e., when the DMW will fail) and damage tolerance (i.e., how the DMW will fail). It is apparent that the present lack of consensus on these issues means that almost unlimited possibilities exist in DMW construction. Fitness for service issues for existing plants need to address DMW issues on a case-by-case basis. When remediation is required it is important sound engineering principles are applied to the requirements of each specific application.

## SOCIAL PROGRAMS and TOURS

### Conference-Wide Reception

**Monday, July 17, 6:15 pm – 8:00 pm**

*Grand Promenade/Lagoon Lanai, Conference Center*

All who registered 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. All student authors who participate in the 25th Rudy Scavuzzo Student Paper Symposium and Competition are invited to present their posters.

**No charge for registered conference participants and guests.**

**Pu'uhonua O Hōnaunau National Historical Park & Kona Joes Coffee**  
**Monday, July 17, 9:00 am – 3:00 pm (lunch on your own)**

Extending along the lava flats of the Kona Coast, Pu'uhonua O Hōnaunau National Historical Park is home to some of the most significant traditional Hawaiian sites in the Hawaiian archipelago. One of the most prominent features of the park is the Pu'uhonua or place of refuge which is enclosed by the Great Wall, a massive 965 foot long masonry wall. Serving as a sanctuary in ancient times for defeated warriors, noncombatants, and those who violated the kapu (sacred laws), the Pu'uhonua O Hōnaunau remains a most sacred place to those who step foot on its grounds. The protected waters of Hōnaunau Bay combined with the availability of water from brackish springs provided the ideal location for the ali'i-Hawaiian royalty-whom established important residential and ceremonial sites nearby, an area known today as the Royal Grounds. For several centuries, the Pu'uhonua,



the Royal Grounds and adjacent areas formed one of the primary religious and political centers within the traditional district of Kona.

Kona Joe is the world's first trellised coffee plantation. They grow their own coffee like wine, and their goal is to farm, process, and roast the world's finest Kona Coffee. They firmly believe you will love it. Their award winning coffee is grown, processed, and roasted in the USA.

**Tickets: \$55 per person**

**Hamakua Macadamia Nut Co., Shopping in Hawi, and Visit King Kamehameha Statue**

**Tuesday, July 18, 9:00 am – 1:00 pm**

In 1977, the President and Co-Owner Richard Schnitzler came to Hawai'i from Michigan, to work for Theo H. Davies & Co. sugar operations. From sugar, he moved into macadamia nuts and over the next 12 years worked with some of the largest macadamia nut producers in the state, before founding his own enterprise, Hamakua Macadamia Nut Company, in 1994. Richard and Edmund are absolutely committed to providing 100% Hawaiian macadamia nuts, 100% of the time, in ways that are economically efficient and environmentally responsible.

Stroll through the peaceful haven of Hawi, North Kohala's biggest little town, best known as the bicycle turnaround for the annual Ironman World Championship held every October. This historic town, set in the green northern tip of the island, was once the busy hub of North Kohala's now defunct sugar industry. Today, Hawi is home to a handful of charming art galleries, boutiques and restaurants set in colorful and lively plantation buildings. You'll find everything here from handmade jewelry and crafts to homemade fudge and 100% Kona coffee. The Bamboo Restaurant & Gallery was once voted best restaurant on Hawaii Island and is a great stop for a fresh island style meal. Beyond Hawi is the town of Kapaau, home of the original King Kamehameha Statue.

**Tickets: \$40 per person**

## CONFERENCE INFORMATION

### Technical Sessions and Programs

All technical sessions will be held in the meeting area of the hotel. 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 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 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 back cover of this program.

**Rudy Scavuzzo Student Paper Symposium and 25th Annual Student Paper Competition**

**Monday, July 17, 8:30 am – 10:15 am, 2:00 pm – 3:45 pm, and 4:00 pm – 5:45 pm; and Tuesday, July 18, 8:30 am – 12:15 pm**



## Badge Required for all Events

Please wear your badge for admission to all Conference activities.  
Your badge also provides a helpful introduction to other Conference attendees.

*Student Paper Competition in Waikoloa Suite 3*

**Monday, July 17, 8:30 am – 10:15 am, and 2:00 pm – 3:45 pm**

*Student Paper Symposium in Waikoloa Suite 2*

The 2017 Rudy Scavuzzo Student Paper Symposium and 25th Annual Student Paper Competition is sponsored by the PVPD Senate. Daniel T. Peters, PVP Senate President, will conduct the sessions, together with the Student Symposium and Competition representatives from each PVP Technical Committee. The Senate Review Committee will identify the outstanding Finalist undergraduate and graduate student papers in two categories: the BS/MS level and the Ph.D. level. Finalist papers will be judged on written technical content (70%) and presentation effectiveness (30%). A \$1,500 award will be made to each of the presenting Student Competition Finalist authors during the Honors and Awards Assembly on Wednesday, July 19th. In addition, in each category (i.e., BS/MS and Ph.D.), \$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 Assembly.

### Technical Committee Meetings

**Monday, July 17, 12:15 pm – 1:45 pm; and Tuesday, July 18, 12:15 pm – 1:45 pm**

The Pressure Vessels & Piping Division Technical Committees will meet during the noon break on Monday, July 17, and Tuesday, July 18. Visitors are encouraged to attend and take an active part in PVP committee activities. All committee meetings, schedules, and rooms are listed on Page 11.

### PVP Division Honors and Awards Assembly and Dinner

**Wednesday, July 19, 5:00 pm – 10:00 pm**

*Monarchy Ballroom, Conference Center*

The Honors and Awards Assembly, honoring all Division Award Recipients and the 2017 ASME S. Y. Zamrik PVP Medalist, Mr. Mahendra D. Rana, will be held on Wednesday, July 19, from 5:00 pm until 10:00 pm, in the Monarchy Ballroom. Throughout the evening there will be Luau styled entertainment provided by the Hilton Waikoloa Entertainment Team. 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 17 – Thursday, July 20, 7:30 am – 8:15 am**

*Monarchy Ballroom, Conference Center*

Authors, Panelists, Session Developers, Chairs, and Vice-Chairs are requested to attend a breakfast briefing in the Monarchy Ballroom, Conference Center on Monday through Thursday, at 7:30 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 presentations for their session on a single computer either before or at the Authors' Breakfast.

### Registration Hours

*Grand Promenade, Conference Center*

Located in the Grand Promenade, Conference Center, the ASME registration desk 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 16	8:00 am – 6:00 pm
Monday, July 17	7:30 am – 4:00 pm
Tuesday, July 18	7:30 am – 4:00 pm

Wednesday, July 19

7:30 am – 3:00 pm

Thursday, July 20

7:30 am – 3:00 pm

### On-Site Registration Fees

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

	Full Registration*	One Day Registration**
ASME Member	\$975	\$800
Author/Panelist	\$975	\$800
Session Chair	\$975	\$800
Session Vice Chair	\$975	\$800
Coop. Soc. Member***	\$975	\$800
Non-Member****	\$1,100	\$900
ASME Life Member†	\$300	\$300
ASME Member Student (Non-Author) ‡	\$300	\$300
ASME Member Student (Author) ‡	\$300	\$300
Student Non-Member (Author or Non-Author) ‡	\$400	\$400
Guest/Spouse ††	N/C	N/C

\* Full Registration fees include admission to all technical sessions, coffee breaks, Conference-Wide Reception, one (1) ticket for the Honors and Awards Assembly and Dinner, and a Conference CD

\*\* 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 Assembly and Dinner, and a Conference CD.

‡ Student Registration Fees include admission to all technical sessions, coffee breaks, Conference-Wide Reception, and a Conference CD. Students not in the Student Paper Competition will be required to purchase a ticket to attend the Honors and Awards Assembly and Dinner.

†† Guests wishing to attend the Honors and Awards Assembly Dinner will be required to purchase a ticket. Guests wishing to attend the Guest Breakfast are required to purchase a ticket (\$10) for each day they wish to do so.

### Cooperating Societies

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

### ASME Event Connect App

The ASME Event Connect app will allow you to network with your peers, plan your itinerary, receive news updates and more. To download the ASME Event Connect app to your mobile device with IOS (IOS 8 & 9), Android (Version 4.1 and up) or Windows Mobile (Windows 8 Mobile) operating system, go to <https://www.asme.org/events/pvp/about/asmeeventconnect>. For devices operating Microsoft Windows, Apple macOS or Blackberry OS, the ASME Event Connect web-based version must be used. When accessing the ASME Event Connect app via your mobile device, standard data rates may apply. Free Wi Fi access will be available to attendees at the conference venue.

### 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 one CD containing all the technical papers presented at the Conference.

A *Download Station* will be available at the *Registration Desk for Conference Registrants* who wish to copy Conference CD content to a digital device that is not equipped with a CD player. It is recommended that attendees supply their own USB memory stick, which needs to have a capacity of 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 two to three 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 conferences are submitted for abstracting and indexing to Scopus, Compendex, ISI Conference Proceedings Citations Index, and to 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 Jamie Hart at [HartJE@asme.org](mailto:HartJE@asme.org) with 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 deductible.

#### **Guest/Family Programs**

Guests and family members of registrants are welcome to the Guest Programs that include: *Pu'uuhonua O Hōnaunau National Historical Park & Kona Joes Coffee* tour (Monday), the *Conference Wide Reception at the Grand Promenade/Lagoon Lanai* of the *Hilton Waikoloa Village Conference Center* (Monday evening), and *Hamakua Macadamia Nut Co., Shopping in Hawi, and Visit King Kamehameha Statue* tour (Tuesday). There will be a Guest Breakfast on Monday through Thursday from 7:30 am to 10:30 am in the Palm Terrace located between the Conference Center and the Palace Tower. Please note that the tours and breakfast 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.

#### **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 can then be picked up on Thursday at the registration desk.

#### **Publishing Conference Papers in the ASME Journal of Pressure Vessel Technology**

Technical papers presented at the ASME PVP 2017 Conference are published in the form of the ASME Conference Proceedings on a CD. 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* (i.e., the *Journal*), 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, and manuscripts should be submitted to the address below. Manuscripts should be prepared according to the Journal guidelines, which can be found at the ASME web site at: <http://journaltool.asme.org/Content/index.cfm>.

Dr. Young W. Kwon, Editor  
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**PVP 2017 COMMITTEE MEETINGS**

<b>Date/Time</b>	<b>Meeting</b>	<b>Room</b>	<b>Responsible Person</b>
<b>Sunday, July 16, 2017</b>			
8:30 am – 12:30 pm	PVP Division Leadership Team	Kona 5	D. Scarth
1:30 pm – 2:30 pm	PVPD Senate Operations Committee	Kona 5	D. Peters
<b>Monday, July 17, 2017</b>			
8:30 am – 10:15 am	PVPD Professional Development	Kona 4	D. Stang
12:15 pm – 1:45 pm	PVPD Codes and Standards Technical Committee	Kona 4	R. Cipolla
12:15 pm – 1:45 pm	PVPD Fluid-Structure Interaction Technical Committee	Kona 3	C. Giannopapa/T. Taniguchi
12:15 pm – 1:45 pm	PVPD Operations, Applications and Components Technical Committee	Kohala 4	M. Feldman/G. Bezdikian
12:15 pm – 1:45 pm	PVPD Design and Analysis Technical Committee	Kona 5	R. Baliga
2:00 pm – 3:45 pm	PVPD International Coordination Committee	Kona 4	X.-K. Zhu
<b>Tuesday, July 18, 2017</b>			
8:30 am – 10:15 am	PVPD Communications Committee	Kona 4	H. Bouzid
8:30 am – 12:15 pm	NDPD Executive Committee	Kona 5	S. Mohanty
10:30 am – 12:15 pm	PVP2017/2018 Program Committee	Kona 4	P. Mertiny
12:15 pm – 1:45 pm	PVPD Materials and Fabrication Technical Committee	Kona 5	M. Brongers
12:15 pm – 1:45 pm	PVPD Seismic Engineering Technical Committee	Kona 3	T. Taniguchi/F. Paolacci
12:15 pm – 1:45 pm	PVPD High Pressure Technology Technical Committee	Kona 4	K. Simpson
12:15 pm – 1:45 pm	PVPD Computer Technology and Bolted Joints Technical Committee	Kohala 4	W. Reinhardt
2:00 pm – 3:45 pm	PVPD Honors and Awards Committee	Kona 4	T. Seipp
<b>Wednesday, July 19, 2017</b>			
8:30 am – 10:15 am	JPVT Editors	Kona 4	Y. Kwon
12:45 pm – 3:45 pm	Subgroup High Pressure Vessels Working Group on Design (BPV VIII-3)	Kona 4	D. Peters/A. Maslowski
<b>Thursday, July 20, 2017</b>			
8:30 am – 12:15 pm	PVP Division Leadership Team	Kona 5	M. Younan
8:30 am – 5:45 pm	Subgroup High Pressure Vessels (BPV VIII-3)	Kona 4	D. Peters/A. Maslowski
12:30 pm – 3:45 pm	PVPD General Committee	Kona 5	M. Younan
4:00 pm – 5:45 pm	PVPD Conference Evaluation	Kona 5	P. Mertiny/M. Feldman



## CALL FOR PAPERS



2018 ASME Pressure Vessels & Piping Conference  
Abstracts Due — November 6, 2017

JOIN US IN PRAGUE AT THE 2018 ASME PVP CONFERENCE  
JULY 15-19, 2018 AT THE HILTON PRAGUE  
PRAGUE, CZECH REPUBLIC

Set your sights on the 2018 PVP Conference where we will promote excellence in the global pressure vessel and piping industry. Serving the PVP industry for more than 50 years, the PVP Conference has proven to be an outstanding opportunity to exchange ideas and meet colleagues in an international setting. As a recognized forum with participants from more than 40 countries in Europe, Africa, the Middle East, Asia, the Americas and Oceania islands, there is no better time or place to create and advance PVP technologies for our global community. The ASME PVP Division is sponsoring this 2018 conference in cooperation with the ASME NDPD Division.

### PAPER & PANEL SESSIONS

More than 180 sessions are planned including workshops and tutorials, a Technology Demonstration Forum and the 26th Rudy Scavuzzo Student Paper Symposium and Competition. General topics are:

- Codes & Standards
- Computer Technology & Bolted Joints
- Design & Analysis
- Fluid Structure Analysis
- High Pressure Technology
- Materials & Fabrication
- Operations, Applications & Components
- Seismic Engineering
- Non-Destructive Examination
- 26th Rudy Scavuzzo Student Paper Symposium & Competition

### SCHEDULE FOR SUBMISSION\*

- **November 6, 2017** Abstracts are due
- November 27, 2017 Abstract acceptance notification
- February 5, 2018 Draft papers due
- March 5, 2018 Peer review comments returned to authors
- April 2, 2018 Copyright Agreement Form (for each paper) due
- April 9, 2018 Final manuscripts in ASME format for publication due

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

### FOR MORE INFORMATION

Please visit the 2018 PVP Conference website at [www.asmeconferences.org/PVP2018/](http://www.asmeconferences.org/PVP2018/). Technical paper abstracts must be submitted electronically through the website.

#### PVP Conference Chair:

##### Pierre Mertiny

University of Alberta  
Department of Mechanical Engineering  
Edmonton, Alberta, Canada  
[pmertiny@ualberta.ca](mailto:pmertiny@ualberta.ca)

#### PVP Technical Program Chair:

##### Hakim Bouzid

École de Technologie Supérieure  
Department of Mechanical Engineering  
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## SESSION TITLES BY SESSION BLOCK

Sessions are arranged in Session Blocks in the format X.YZ, where: X indicates the Day, Y indicates the Session Block, and Z indicates the Conference Session Room. Conference Session Rooms are as follows: A = Kohala 1; B = Kohala 2; C = Kohala 3; D = King's 1; E = King's 2; F = King's 3; G = Queen's 4; H = Queen's 5; I = Queen's 6; J = Kona 1; K = Kona 2; L = Kona 3; M = Waikoloa Suite 1; N = Waikoloa Suite 2; O = Waikoloa Suite 3; P = *Not Used*; Q = Kohala 4; R = *Not Used*; S = Grand Promenade; T = *Not Used*. The parenthetical designations are the Technical Committee session references.

The Technical Committee and other acronyms used are shown below:

- CS = Codes & Standards
- CT = Computer Technology & Bolted Joints
- DA = Design & Analysis
- EPRI = EPRI Creep-Fatigue Workshop
- FSI = Fluid-Structure Interaction
- HT = High Pressure Technology
- MF = Materials & Fabrication
- NDPD = ASME NDE, Diagnosis and Prognosis Division
- OAC = Operations Applications, & Components
- SE = Seismic Engineering
- SPC = Rudy Scavuzzo Student Paper Symposium & Student Paper Competition
- TW = Technical Tutorials

All sessions are sponsored by the indicated Technical Committee unless specifically noted in the daily listing of individual sessions beginning on page 17.

### Sunday, July 16, 2017

#### Block 0.2: Sunday, July 16, 2017 (1:00 pm – 3:00 pm)

- 0.2C (TW-2-1) BUSINESS PLANNING FOR ENGINEERS  
 0.2Q (TW-2-2) PROCESS AND BENEFITS OF ASME PRESSURE TECHNOLOGY CODES & STANDARDS DEVELOPMENT

#### Block 0.3: Sunday, July 16, 2017 (3:30 pm – 4:30 pm)

- 0.3Q (TW-2-3) EARLY CAREER ENGINEERS FORUM

### Monday, July 17, 2017

#### Block 1.1: Monday, July 17, 2017 (8:30 am – 10:15 am)

- 1.1A (DA-16-1) INTRODUCTION & LIFE CYCLE MANAGEMENT STRATEGIES  
 1.1B (FSI-2-1) FIV DESIGN FOR INDUSTRY I (SPECIAL SESSION IN MEMORY OF M.K. AU YANG)  
 1.1C (CS-7-1) ASME SECTION III—RECENT DEVELOPMENTS  
 1.1D (HT-2-1) IMPULSIVELY LOADED VESSELS  
 1.1E (CS-1-1) STRUCTURAL INTEGRITY OF PRESSURE COMPONENTS—I  
 1.1F (MF-19-1) CREEP AND CREEP-FATIGUE INTERACTION—I  
 1.1G (MF-2-1) APPLICATION OF FRACTURE MECHANICS IN FAILURE ASSESSMENT—I  
 1.1H (HT-1-1) DESIGN, ANALYSIS, AND LIFE PREDICTION OF HIGH-PRESSURE VESSELS AND EQUIPMENT  
 1.1I (DA-10-1) GASKETS AND JOINT INTEGRITY  
 1.1J (MF-2-6) FUEL CLADDING CHARACTERIZATION, COHESIVE ZONE MODELING, AND CRACK GROWTH IN WELD  
 1.1K (CS-8-1) HYDROGEN EFFECTS ON MATERIALS BEHAVIOR  
 1.1L (SE-1-1) EARTHQUAKE RESISTANCE AND SEISMIC MARGIN  
 1.1M (HT-3-1) HIGH PRESSURE VESSEL & PIPING LIFE ASSESSMENT ISSUES  
 1.1N (SPC-2-3) STUDENT PAPER SYMPOSIUM—PHD—I  
 1.1O (SPC-1-1) STUDENT PAPER COMPETITION—MS/BS—I  
 1.1Q (MF-23-1) ADVANCED SENSOR TECHNOLOGIES FOR MONITORING STRUCTURAL INTEGRITY  
 1.1S (TW-4-1) TECHNOLOGY DEMONSTRATION FORUM

#### Block 1.2: Monday, July 17, 2017 (10:30 am – 12:15 pm)

- 1.2P (TW-3-1) OPENING CEREMONY AND PLENARY LECTURES  
 1.2S (TW-4-2) TECHNOLOGY DEMONSTRATION FORUM

#### Block 1.3: Monday, July 17, 2017 (2:00 pm – 3:45 pm)

- 1.3A (DA-16-2) OPERATIONAL INFLUENCES ON THE COKE DRUM LIFE CYCLE  
 1.3B (FSI-2-2) FIV DESIGN FOR INDUSTRY—II  
 1.3C (CS-7-2) ASME SECTION III—RECENT DEVELOPMENTS, ELEVATED TEMPERATURE  
 1.3D (HT-2-2) FLUID TRANSIENT AND EXPLOSION LOADINGS  
 1.3E (CS-1-2) STRUCTURAL INTEGRITY OF PRESSURE COMPONENTS—II  
 1.3F (MF-19-2) CREEP AND CREEP-FATIGUE INTERACTION—II  
 1.3G (MF-2-2) APPLICATION OF FRACTURE MECHANICS IN FAILURE ASSESSMENT—II  
 1.3H (OAC-6-1) LIFE CYCLE MANAGEMENT OF REFINERY PRESSURE VESSELS—WELDING & FABRICATION  
 1.3I (DA-10-2) HEAT EXCHANGER JOINT INTEGRITY  
 1.3J (MF-34-1) SNF CANISTER OVERVIEW & NONDESTRUCTIVE INSPECTION  
 1.3K (MF-3-1) HYDROGEN INFRASTRUCTURE  
 1.3L (SE-2-1) SEISMIC ISOLATION—I  
 1.3M (HT-6-2) DESIGN AND ANALYSIS OF HIGH-PRESSURE EQUIPMENT FOR OIL & GAS EXPLORATION AND PRODUCTION  
 1.3N (SPC-2-4) STUDENT PAPER SYMPOSIUM—PHD—II  
 1.3O (SPC-1-2) STUDENT PAPER COMPETITION—MS/BS—II  
 1.3Q (TW-1-1) THE USE OF COMPUTATIONAL FLUID DYNAMICS IN DESIGN (PART 1)  
 1.3S (TW-4-3) TECHNOLOGY DEMONSTRATION FORUM

#### Block 1.4: Monday, July 17, 2017 (4:00 pm – 5:45 pm)

- 1.4A (DA-16-3) ANALYSIS AND REPAIRS OF COKE DRUM SKIRTS  
 1.4B (FSI-2-3) FIV DESIGN FOR INDUSTRY—III  
 1.4C (CS-7-3) ASME SECTION III—RECENT DEVELOPMENTS, ELEVATED TEMPERATURE  
 1.4D (FSI-6-1) IMPACT AND BLAST LOADINGS  
 1.4E (CS-1-3) STRUCTURAL INTEGRITY OF PRESSURE COMPONENTS—III  
 1.4F (MF-19-3) CREEP AND CREEP-FATIGUE INTERACTION—III  
 1.4G (MF-2-3) APPLICATION OF FRACTURE MECHANICS IN FAILURE ASSESSMENT—III  
 1.4H (OAC-6-2) LIFE CYCLE MANAGEMENT OF REFINERY PRESSURE VESSELS—FITNESS FOR SERVICE  
 1.4I (DA-10-3) JOINT ASSEMBLY CONSIDERATIONS  
 1.4J (MF-34-2) SNF CANISTER STRUCTURAL INTEGRITY ASSESSMENTS  
 1.4K (MF-3-2) DEVELOPMENT OF METHODS FOR EVALUATING MATERIALS FOR HYDROGEN SERVICE  
 1.4L (SE-2-3) SEISMIC ISOLATION II  
 1.4M (HT-5-3) 20TH ANNIVERSARY OF BPVC SECTION VIII DIVISION 3—HOW WE GOT HERE AND WHERE WE ARE GOING  
 1.4N (FSI-1-1) LEAKS AND CRACKS  
 1.4O (SPC-1-3) STUDENT PAPER COMPETITION—PHD—I  
 1.4Q (TW-1-2) THE USE OF COMPUTATIONAL FLUID DYNAMICS IN DESIGN (PART 2)  
 1.4S (TW-4-4) TECHNOLOGY DEMONSTRATION FORUM

### Tuesday, July 18, 2017

#### Block 2.1: Tuesday, July 18, 2017 (8:30 am – 10:15 am)

- 2.1A (DA-16-4) COKE DRUM REPAIRS—MATERIALS AND WELDING ASPECTS  
 2.1B (FSI-2-4) PIPING & ACOUSTICS—I  
 2.1C (CS-10-1) RECENT DEVELOPMENTS IN JAPANESE FITNESS-FOR-SERVICE RULES



- 2.1D (FSI-6-2) FLUID TRANSIENT AND BLAST LOADINGS
- 2.1E (MF-25-1) ASIAN PROGRAM IN STRUCTURAL INTEGRITY—I
- 2.1F (MF-18-1) FATIGUE AND FRACTURE OF WELDS AND HEAT AFFECTED ZONES—I
- 2.1G (MF-2-4) APPLICATION OF FRACTURE MECHANICS IN FAILURE ASSESSMENT—V
- 2.1H (OAC-6-3) LIFE CYCLE MANAGEMENT OF REFINERY PRESSURE VESSELS—OPERATION & MAINTENANCE
- 2.1I (CT-1-1) DESIGN AND ANALYSIS OF BOLTED JOINTS
- 2.1J (OAC-4-2) STRUCTURAL TESTING AND ANALYSIS
- 2.1K (MF-3-3) STAINLESS STEELS FOR HYDROGEN SERVICE—I
- 2.1L (SE-3-1) DAMPING AND VIBRATION CONTROL—I
- 2.1M (HT-5-2) PANEL SESSION ON SEC VIII, DIV 3 INDUSTRY USE, GAPS, AND NEEDS
- 2.1N (FSI-1-2) CFD AND FSI
- 2.1O (SPC-1-4) STUDENT PAPER COMPETITION—PHD—II
- 2.1Q (TW-1-3) FITNESS-FOR-SERVICE (FFS) PROCEDURES FOR EVALUATION OF DAMAGE OR DEFECTS IN PRESSURIZED EQUIPMENT USING API 579-1/ASME FFS-1 (PART 1)
- 2.1S (TW-4-5) TECHNOLOGY DEMONSTRATION FORUM

**Block 2.2: Tuesday, July 18, 2017 (10:30 am – 12:15 pm)**

- 2.2A (DA-16-5) NOVEL APPROACHES TO COKE DRUM LIFE CYCLE MANAGEMENT
- 2.2B (FSI-2-5) FIV IN TUBE ARRAYS—I
- 2.2C (CS-11-1) EXTREME PRESSURE EQUIPMENT
- 2.2D (MF-15-1) RECENT DEVELOPMENTS IN COMPOSITE MATERIALS
- 2.2E (MF-25-2) ASIAN PROGRAMS IN STRUCTURAL INTEGRITY—II
- 2.2F (CS-2-1) FATIGUE AND RATCHETING ISSUES IN PRESSURE VESSEL AND PIPING DESIGN
- 2.2G (DA-12-1) FRACTURE—I
- 2.2H (OAC-6-4) DEGRADATION MECHANISMS AND MITIGATION
- 2.2I (CT-2-1) ELEVATED TEMPERATURE BEHAVIOUR OF BOLTED FLANGE JOINTS
- 2.2J (OAC-4-4) AGING MANAGEMENT FOR EXTENDED STORAGE AND TRANSPORTATION OF SPENT (USED) FUEL
- 2.2K (MF-3-5) STEELS FOR HYDROGEN SERVICE
- 2.2L (SE-3-2) DAMPING AND VIBRATION CONTROL—II
- 2.2M (HT-5-1) PANEL SESSION ON SEC VIII, DIV 3 HISTORY
- 2.2N (FSI-1-3) GAS AND LIQUID
- 2.2O (DA-2-1) DESIGN & ANALYSIS OF PIPING AND COMPONENTS—I
- 2.2Q (TW-1-4) FITNESS-FOR-SERVICE (FFS) PROCEDURES FOR EVALUATION OF DAMAGE OR DEFECTS IN PRESSURIZED EQUIPMENT USING API 579-1/ASME FFS-1 (PART 2)
- 2.2S (TW-4-6) TECHNOLOGY DEMONSTRATION FORUM

**Block 2.3: Tuesday, July 18, 2017 (2:00 pm – 3:45 pm)**

- 2.3A (DA-16-6) CLOSING SESSION: WHAT'S NEXT FOR THE INDUSTRY?
- 2.3B (FSI-2-6) AXIAL FLOW FSI / FUEL VIBRATION
- 2.3C (CS-11-2) FAILURE ANALYSIS OF ENGINEERING STRUCTURE—I
- 2.3D (MF-15-2) COMPOSITE SYSTEMS FOR PRESSURE VESSELS AND PIPING
- 2.3E (MF-5-1) EUROPEAN PROGRAMS IN STRUCTURAL INTEGRITY—I
- 2.3F (CS-21-1) FATIGUE MONITORING AND RELATED ASSESSMENT METHODS—I
- 2.3G (DA-12-2) FRACTURE—II
- 2.3H (OAC-6-6) LIFE CYCLE MANAGEMENT (LCM) FOR HYDROPROCESSING REACTORS
- 2.3I (CT-3-1) TIGHTNESS AND FUGITIVE EMISSIONS OF BOLTED FLANGE JOINTS
- 2.3J (OAC-4-3) PACKAGING MATERIALS AND COMPONENTS
- 2.3K (MF-3-6) HYDROGEN COMPATIBILITY OF PRESSURE VESSELS
- 2.3L (SE-3-3) DAMPING AND VIBRATION CONTROL—III
- 2.3M (HT-6-1) PANEL SESSION ON DISCUSSION OF API 17TR8 REQUIREMENTS AS RELATED TO ASME STANDARDS
- 2.3N (FSI-1-4) CORROSION, FATIGUE AND IMPACT
- 2.3O (DA-2-2) DESIGN & ANALYSIS OF PIPING AND COMPONENTS—II
- 2.3Q (TW-1-5) FATIGUE ASSESSMENT OF WELDMENTS (PART 1)

- 2.3S (TW-4-7) TECHNOLOGY DEMONSTRATION FORUM

**Block 2.4: Tuesday, July 18, 2017 (4:00 pm – 5:45 pm)**

- 2.4A (NDP-1-1) EMERGING NDE AND RELIABILITY TECHNIQUES AND APPLICATIONS
- 2.4B (FSI-2-7) PIPING & ACOUSTICS—II
- 2.4C (CS-11-3) EXAMPLE OF ENGINEERING FAILURE ANALYSIS IN CHINA
- 2.4D (MF-16-1) PLASTIC AND COMPOSITE PIPE
- 2.4E (MF-17-1) PROBABILISTIC ASSESSMENT OF FAILURE
- 2.4F (CS-3-1) ENVIRONMENTAL FATIGUE ISSUES—I
- 2.4G (CS-22-1) MASTER CURVE FRACTURE TOUGHNESS AND OTHER SMALL SPECIMEN MECHANICAL PROPERTIES—I
- 2.4H (OAC-8-1) AGEING MANAGEMENT AND LICENSE RENEWAL
- 2.4I (CT-4-1) ASSEMBLY OF BOLTED FLANGE JOINTS
- 2.4J (OAC-4-1) THERMAL AND STRUCTURAL ANALYSIS
- 2.4K (MF-4-1) RESIDUAL STRESS MEASUREMENTS, WELD REPAIR AND ADVANCED WELDING TECHNIQUES
- 2.4L (SE-9-1) MULTI-HAZARDS AND MARGINS
- 2.4M (MF-12-1) PIPELINE INTEGRITY—NUMERICAL SIMULATION AND EXPERIMENTAL TESTING
- 2.4N (FSI-1-5) NUCLEAR POWER PLANT FIRES AND EXPLOSIONS
- 2.4O (DA-2-3) DESIGN & ANALYSIS OF PIPING AND COMPONENTS—III
- 2.4Q (TW-1-6) FATIGUE ASSESSMENT OF WELDMENTS (PART 2)
- 2.4S (TW-4-8) TECHNOLOGY DEMONSTRATION FORUM

**Wednesday, July 19, 2017**

**Block 3.1: Wednesday, July 19, 2017 (8:30 am – 10:15 am)**

- 3.1A (NDP-1-2) EMERGING NDE AND PROGNOSTIC TECHNIQUES AND APPLICATIONS
- 3.1B (FSI-2-8) FIV IN TUBE ARRAYS II
- 3.1C (CS-11-4) FAILURE ANALYSIS OF ENGINEERING STRUCTURE
- 3.1D (OAC-6-5) APPLICATIONS OF NON-METALLIC MATERIALS
- 3.1E (CS-9-1) MASTER CURVE BASED FRACTURE TOUGHNESS MODELS AND PARTIAL STRUCTURAL FACTOR DEVELOPMENT
- 3.1F (CS-3-2) ENVIRONMENTAL FATIGUE ISSUES—II
- 3.1G (CS-22-2) MASTER CURVE FRACTURE TOUGHNESS AND OTHER SMALL SPECIMEN MECHANICAL PROPERTIES—II
- 3.1H (OAC-1-1) RELIABILITY AND LIFE CYCLE MANAGEMENT
- 3.1I (CT-8-1) THREADED FASTENER
- 3.1J (OAC-5-1) DESIGN, ANALYSIS, MODELING AND PERFORMANCE OF VALVES AND PUMPS
- 3.1K (MF-4-2) WELD RESIDUAL STRESS SIMULATIONS INCLUDING RECOVERY OF STRESSES AND UNCERTAINTY QUANTIFICATION
- 3.1L (SE-12-1) ADVANCED SEISMIC EVALUATION AND CODE I ; JSME SEISMIC CODE ACTIVITY
- 3.1M (MF-12-2) PIPELINE INTEGRITY—WELDING TECHNOLOGY AND WELDS ASSESSMENT
- 3.1N (DA-4-1) INELASTIC, NONLINEAR, AND LIMIT LOAD ANALYSIS—I
- 3.1O (DA-2-4) DESIGN & ANALYSIS OF PIPING AND COMPONENTS—IV
- 3.1Q (TW-1-7) ASME SECTION VIII, DIVISION 3 ALTERNATIVE RULES FOR CONSTRUCTION OF HIGH PRESSURE VESSELS (PART 1)

**Block 3.2: Wednesday, July 19, 2017 (10:30 am – 12:15 pm)**

- 3.2A (NDP-2-1) TECHNIQUES AND APPLICATIONS FOR PLANT COMPONENTS
- 3.2B (FSI-2-9) FLUTTER, VIV AND ACOUSTICS
- 3.2C (CS-11-5) DEVELOPMENTS OF CHINESE CODES AND STANDARDS
- 3.2D (DA-18-1) COMPOSITE MATERIALS AND STRUCTURES
- 3.2E (CS-15-2) PROBABILISTIC AND RISK-INFORMED METHODS FOR STRUCTURAL INTEGRITY ASSESSMENT—II
- 3.2F (CS-3-3) ENVIRONMENTAL FATIGUE ISSUES—III
- 3.2G (CS-22-3) MASTER CURVE FRACTURE TOUGHNESS AND OTHER SMALL SPECIMEN MECHANICAL PROPERTIES—III
- 3.2H (OAC-1-2) INSPECTION AND EVALUATION FOR COMPONENT ASSESSMENT



- 3.2I (CT-10-1) NEW AND EMERGING METHODS OF ANALYSIS AND APPLICATIONS
- 3.2J (OAC-3-1) MONITORING, DIAGNOSTICS AND INSPECTION
- 3.2K (MF-7-1) MATERIALS AND TECHNOLOGIES FOR NUCLEAR POWER PLANTS—I
- 3.2L (SE-12-2) ADVANCED SEISMIC EVALUATION AND CODE II ; ADVANCED INELASTIC ANALYSIS METHOD
- 3.2M (MF-21-1) ADDITIVE MANUFACTURING ONE MECHANICAL PROPERTIES
- 3.2N (DA-4-2) INELASTIC, NONLINEAR, AND LIMIT LOAD ANALYSIS—II
- 3.2O (DA-2-5) DESIGN & ANALYSIS OF PIPING AND COMPONENTS—V
- 3.2Q (TW-1-8) ASME SECTION VIII, DIVISION 3 ALTERNATIVE RULES FOR CONSTRUCTION OF HIGH PRESSURE VESSELS (PART 2)

**Block 3.3: Wednesday, July 19, 2017 (2:00 pm – 3:45 pm)**

- 3.3A (DA-5-1) STRESS CLASSIFICATION AND DESIGN BY ANALYSIS METHODOLOGIES
- 3.3B (FSI-2-10) FIV & FLUTTER
- 3.3C (CS-11-6) FAILURE ANALYSIS OF ENGINEERING STRUCTURE—II
- 3.3D (DA-8-1) FITNESS FOR SERVICE EVALUATIONS
- 3.3E (CS-15-1) PROBABILISTIC AND RISK-INFORMED METHODS FOR STRUCTURAL INTEGRITY ASSESSMENT—I
- 3.3F (CS-3-4) ENVIRONMENTAL FATIGUE ISSUES—IV
- 3.3G (CS-23-1) HYDROGEN FLAKES ASSESSMENT IN THE RPV'S
- 3.3H (OAC-2-1) TESTING AND QUALIFICATION ON DIFFERENT MATERIALS
- 3.3I (CT-12-1) EXPLICIT AND IMPLICIT FINITE ELEMENT ANALYSIS
- 3.3J (DA-20-1) SPECIAL CONSIDERATIONS IN THE DESIGN AND ANALYSIS OF SUPPORTS, RESTRAINTS, AND WELDED ATTACHMENTS
- 3.3K (MF-7-2) MATERIALS AND TECHNOLOGIES FOR NUCLEAR POWER PLANTS—II
- 3.3L (SE-4-1) STRUCTURAL DYNAMICS IN SEISMIC ENGINEERING
- 3.3M (MF-21-2) ADDITIVE MANUFACTURING TWO
- 3.3N (DA-11-1) CFD IN DESIGN AND ANALYSIS
- 3.3O (DA-2-6) DESIGN & ANALYSIS OF PIPING AND COMPONENTS—VI
- 3.3Q (MF-14-1) LEAK-BEFORE-BREAK

**Thursday, July 20, 2017**

**Block 4.1: Thursday, July 20, 2017 (8:30 am – 10:15 am)**

- 4.1A (DA-1-1) DESIGN AND ANALYSIS OF PRESSURE VESSELS PER THE ASME CODE
- 4.1B (FSI-2-11) FIV IN TUBE ARRAYS III (TUBE-SUPPORT INTERACTION)
- 4.1C (CS-38-1) IMPROVEMENT OF FLAW CHARACTERIZATION RULES IN FITNESS-FOR-SERVICE CODES
- 4.1D (CS-6-1) API 579/ASME CODE FITNESS-FOR-SERVICE ACTIVITIES
- 4.1E (CS-31-1) ASSESSMENT OF FATIGUE AND FRACTURE—A PROBABILISTIC PERSPECTIVE (MAINTAINING INTEGRITY OF COMPONENTS)
- 4.1F (CS-3-5) ENVIRONMENTAL FATIGUE ISSUES—V
- 4.1G (MF-30-1) BRITTLE FRACTURE OF CARBON STEEL FITTINGS, FLANGES, AND PIPING—I
- 4.1H (DA-10-4) INTERNATIONAL LIAISON AND PCC-1 APPENDIX A SESSION—I
- 4.1I (CS-19-1) INTEGRITY OF CAST STAINLESS STEEL PIPE—I
- 4.1J (MF-11-1) INTEGRITY ISSUES IN SCC AND CORROSION FATIGUE
- 4.1K (MF-7-3) MATERIALS AND TECHNOLOGIES FOR NUCLEAR POWER PLANTS—III
- 4.1L (SE-5-1) SEISMIC DAMAGE ASSESSMENT AND HEALTH MONITORING
- 4.1M (MF-21-3) WELDING AND JOINING TECHNIQUES
- 4.1N (DA-7-1) THERMAL STRESSES AND ELEVATED TEMPERATURE DESIGN—I
- 4.1O (DA-15-1) EVALUATION AND COUNTERMEASURE FOR BDBE—I
- 4.1Q (EPRI-1) SESSION 1—KEYNOTE PRESENTATIONS

**Block 4.2: Thursday, July 20, 2017 (10:30 am – 12:15 pm)**

- 4.2A (DA-1-2) ADDITIONAL CONSIDERATIONS FOR THE DESIGN AND ANALYSIS OF PRESSURE VESSELS
- 4.2B (FSI-2-12) PIPING & ACOUSTICS—III
- 4.2C (CS-14-1) REPAIR, REPLACEMENT AND MITIGATION FOR FITNESS-FOR-SERVICE RULES—I
- 4.2D (MF-6-1) FITNESS FOR SERVICE AND FAILURE ASSESSMENT—I
- 4.2E (OAC-1-4) REGULATORY VIEWS ON THE USE OF PROBABILISTIC FRACTURE MECHANICS ASSESSMENTS IN THE NUCLEAR INDUSTRY
- 4.2F (CS-3-6) ENVIRONMENTAL FATIGUE ISSUES—VI
- 4.2G (MF-30-2) BRITTLE FRACTURE OF CARBON STEEL FITTINGS, FLANGES, AND PIPING—II
- 4.2H (DA-10-5) INTERNATIONAL LIAISON AND PCC-1 APPENDIX A SESSION—II
- 4.2I (CS-19-2) INTEGRITY OF CAST STAINLESS STEEL PIPE—II
- 4.2J (MF-33-1) 3D CRACK GROWTH SIMULATIONS USING FEA
- 4.2K (MF-7-4) MATERIALS AND TECHNOLOGIES FOR NUCLEAR POWER PLANTS—IV
- 4.2L (SE-6-1) SEISMIC ANALYSIS AND DESIGN OF PIPING SYSTEMS—I
- 4.2M (MF-21-4) STAINLESS STEELS AND NI-BASE ALLOYS
- 4.2N (DA-7-2) THERMAL STRESSES AND ELEVATED TEMPERATURE DESIGN—II
- 4.2O (DA-15-2) EVALUATION AND COUNTERMEASURE FOR BDBE—II
- 4.2Q (EPRI-2) SESSION 2—DESIGN AND FABRICATION

**Block 4.3: Thursday, July 20, 2017 (2:00 pm – 3:45 pm)**

- 4.3A (DA-1-3) OPTIMIZATION AND BENCH-MARKING IN THE DESIGN AND ANALYSIS OF PRESSURE VESSELS AND HEAT EXCHANGERS
- 4.3C (CS-14-2) REPAIR, REPLACEMENT AND MITIGATION FOR FITNESS-FOR-SERVICE RULES—II
- 4.3D (MF-6-2) FITNESS FOR SERVICE AND FAILURE ASSESSMENT—II
- 4.3E (CS-41-1) UPDATES TO THE 2017 EDITION OF THE ASME BOILER AND PRESSURE VESSEL CODE—PART I
- 4.3F (DA-3-1) FATIGUE I—MEMORIAL SESSION FOR FERNAND ELLYIN
- 4.3G (CS-9-2) ASME SECTION XI CODE ACTIVITIES
- 4.3H (CS-25-1) INTEGRITY OF REACTOR PRESSURE VESSELS AND INTERNALS FOR CODES
- 4.3I (CS-12-1) RECENT DEVELOPMENTS IN EUROPEAN CODES AND STANDARDS
- 4.3K (MF-9-1) STRESS INTENSITY FACTOR SOLUTIONS
- 4.3L (SE-6-2) SEISMIC ANALYSIS AND DESIGN OF PIPING SYSTEMS—II
- 4.3M (MF-21-5) THERMOMECHANICAL TREATMENT AND HOT ISOSTATIC PRESSING
- 4.3N (DA-9-1) PIPING AND EQUIPMENT DYNAMICS—I
- 4.3O (DA-17-1) COMPANY STANDARDS AND DESIGN PHILOSOPHY
- 4.3Q (EPRI-3) SESSION 3—DISSIMILAR WELDS IN FERRITIC STEELS

**Block 4.4: Thursday, July 20, 2017 (4:00 pm – 5:45 pm)**

- 4.4A (DA-1-4) THERMO-MECHANICAL DESIGN AND ANALYSIS OF PRESSURE VESSELS AND HEAT EXCHANGERS
- 4.4D (MF-6-3) FITNESS FOR SERVICE AND FAILURE ASSESSMENT—III
- 4.4E (CS-41-2) UPDATES TO THE 2017 EDITION OF THE ASME BOILER AND PRESSURE VESSEL CODE—PART II
- 4.4F (DA-3-3) FATIGUE—II
- 4.4L (SE-8-1) SEISMIC EVALUATION OF SYSTEMS, STRUCTURES AND COMPONENTS
- 4.4N (DA-9-2) PIPING AND EQUIPMENT DYNAMICS—II
- 4.4Q (EPRI-4) SESSION 4—DISSIMILAR WELDS BETWEEN FERRITIC AND AUSTENITIC STEELS

**Friday, July 21, 2017**

**Block 5.1: Friday, July 21, 2017 (8:30 am – 10:15 am)**

- 5.1Q (EPRI-5) SESSION 5—CASE STUDIES 1; IN SERVICE EXPERIENCE

**Block 5.2: Friday, July 21, 2017 (10:30 am – 12:15 pm)**  
5.2Q (EPRI-6) SESSION 6—CASE STUDIES 2; IN SERVICE EXPERIENCE

## DAILY SESSION LISTING

Sessions are arranged in Session Blocks in the format X.YZ, where: X indicates the Day, Y indicates the Session Block, and Z indicates the Conference Session Room. Conference Session Rooms are as follows: A = Kohala 1; B = Kohala 2; C = Kohala 3; D = King's 1; E = King's 2; F = King's 3; G = Queen's 4; H = Queen's 5; I = Queen's 6; J = Kona 1; K = Kona 2; L = Kona 3; M = Waikoloa Suite 1; N = Waikoloa Suite 2; O = Waikoloa Suite 3; P = *Not Used*; Q = Kohala 4; R = *Not Used*; S = Grand Promenade; T = *Not Used*. The parenthetical designations are the Technical Committee session references.

The Technical Committee and other acronyms used are shown below:

- CS = Codes & Standards
- CT = Computer Technology & Bolted Joints
- DA = Design & Analysis
- EPRI = Electric Power Research Institute Creep-Fatigue Workshop
- FSI = Fluid-Structure Interaction
- HT = High Pressure Technology
- MF = Materials & Fabrication
- NDPD = ASME NDE, Diagnosis and Prognosis Division
- OAC = Operations Applications, & Components
- SE = Seismic Engineering
- SPC = Rudy Scavuzzo Student Paper Symposium & Student Paper Competition
- TW = Technical Tutorials

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

### SUNDAY, JULY 16

#### Block 0.2: Sunday, July 16, 2017 (1:00 pm – 3:00 pm)

##### SESSION 0.2C (TW-2-1)

Sunday, July 16, 1:00 pm – 3:00 pm, Kohala 3

##### BUSINESS PLANNING FOR ENGINEERS

Developed by: D. L. Stang, Omax Corporation, Kent, WA, USA  
Presented by: A. Reich, Streamline Automation, LLC/Vital Metrix, Inc.

##### SESSION 0.2Q (TW-2-2)

##### PROCESS AND BENEFITS OF ASME PRESSURE TECHNOLOGY CODES & STANDARDS DEVELOPMENT

Sunday, July 16, 1:00 pm – 3:00 pm, Kohala 4

Developed by: D. L. Stang, Omax Corporation, Kent, WA, USA  
Presented by: W. Bees, PVPD Senate; C. Rodery, BP p.l.c., League City, TX, USA; M. Rana, Consultant, Niantic, CT, USA

#### Block 0.3: Sunday, July 16, 2017 (3:30 pm – 4:30 pm)

##### SESSION 0.3Q (TW-2-3)

Sunday, July 16, 2017, 3:30 pm – 4:30 pm, Kohala 4

##### EARLY CAREER ENGINEERS FORUM

Developed by: A. Dermenjian, AAD Independent Operations, Arlington Heights, IL, USA  
Chair: D. L. Stang, Omax Corporation, Kent, WA, USA  
Presented by: A. Dermenjian, AAD Independent Operations, Arlington Heights, IL, USA

### MONDAY, JULY 17

#### Block 1.1: Monday, July 17, 2017, (8:30 am – 10:15 am)

##### SESSION 1.1A (DA-16-1)

Monday, July 17, 8:30 am – 10:15 am, Kohala 1

##### INTRODUCTION & LIFE CYCLE MANAGEMENT STRATEGIES

2nd International Symposium on Coke Drum Life Cycle Management—Sponsored by Design & Analysis Technical Committee

Developed by: C. Rodery, BP p.l.c., League City, TX, USA; K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA; J. Penso, Shell Projects and Technology, Houston, TX, USA

Chair: C. Rodery, BP p.l.c., League City, TX, USA

Co-Chair: K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

##### PVP2017-65895: API 934G—DESIGN, FABRICATION, OPERATIONAL EFFECTS, INSPECTION, ASSESSMENT AND REPAIR OF COKE DRUMS AND PERIPHERAL COMPONENTS IN DELAYED COKING UNITS (Presentation Only)

J. Penso, Shell Projects and Technology, Houston, TX, USA

##### PVP2017-65868: DEFORMATION BASED COKE DRUM LIFE ASSESSMENTS (Presentation Only)

K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA; J. Bedoya, Stress Engineering Services Inc., Houston, TX, USA; G. Garic, Stress Engineering Services Inc., Metairie, LA, USA

##### PVP2017-65903: ASSESSMENT, MITIGATION, MANAGEMENT AND EXTENSION OF COKE DRUM LIFE THROUGH EQUIPMENT HEALTH MONITORING SYSTEMS AND ON LINE INSPECTION

A. Seijas, Phillips 66 Company, Houston, TX, USA; J. Bedoya, Stress Engineering Services Inc., Houston, TX, USA; A. Stoller, Stress Engineering Services Inc., Mason, OH, USA; O. Perez, Phillips 66, Carson, CA, USA; L. Marcano, Phillips 66, Wilmington, CA, USA

##### PVP2017-65066: A SUCCESSFUL STRATEGY FOR MANAGING THE MECHANICAL INTEGRITY OF COKE DRUMS

P. DuPlessis, Suncor Energy, Calgary, AB, Canada; M. Samman, Houston Engineering Solutions, LLC, Houston, TX, USA

##### SESSION 1.1B (FSI-2-1)

Monday, July 17, 8:30 am – 10:15 am, Kohala 2

##### FIV DESIGN FOR INDUSTRY I (SPECIAL SESSION IN MEMORY OF M.K. AU YANG)

##### Symposium of Flow-Induced Vibration—Sponsored by Fluid-Structure Interaction Technical Committee

Developed by: N. Mureithi, Polytechnique Montreal, Montreal, QC, Canada

Chair: D. S. Weaver, McMaster University, Hamilton, ON, Canada

Co-Chair: N. Mureithi, Polytechnique Montreal, Montreal, QC, Canada

##### PVP2017-65219: EXPERIMENTAL AND NUMERICAL STUDIES OF FLUID-STRUCTURE INTERACTION (Presentation Only)

Y. Kwon, Naval Postgraduate School, Monterey, CA, USA

##### PVP2017-65272: FRETTING-WEAR DAMAGE DUE TO VIBRATION IN NUCLEAR AND PROCESS EQUIPMENT

M. Pettigrew, Ecole Polytechnique—Montreal, Deep River, ON, Canada; M. Yetisir, N. J. Fisher, B. A. W. Smith, C. E. Taylor, Canadian Nuclear Laboratories, Chalk River, ON, Canada

##### PVP2017-65529: NON-PROPRIETARY APPLICATION OF ASME CODE SECTION III APPENDIX N TO SONGS REPLACEMENT STEAM GENERATORS

R. D. Blevins, Independent Consultant, San Diego, CA, USA

##### PVP2017-65162: STUDY ON THE STREAM-WISE FLUIDELASTIC INSTABILITY OF ROTATED SQUARE ARRAYS OF CIRCULAR CYLINDERS SUBJECTED ON CROSS-FLOW

T. Nakamura, T. Tsujita, Osaka Sangyo University, Daito, Osaka, Japan

##### SESSION 1.1C (CS-7-1)

##### ASME SECTION III—RECENT DEVELOPMENTS

##### Symposium on Recent Developments in International Codes and Standards—Sponsored by Codes & Standards Technical Committee

Monday, July 17, 8:30 am – 10:15 am, Kohala 3

Developed by: T.-L. Sham, Argonne National Laboratory, Lemont, IL, USA

Chair: R. Barnes, Anric, Etobicoke, ON, Canada

Co-Chair: T.-L. Sham, Argonne National Laboratory, Lemont, IL, USA

##### PVP2017-65399: TECHNICAL BASIS FOR CONVERSION OF NON-MANDA-



**TORY APPENDIX F OF SECTION III OF THE ASME BOILER AND PRESSURE VESSEL CODE TO A MANDATORY APPENDIX—PART I: APPENDIX REWRITE**

J. Wen, Jensen Hughes, Independence, OH, USA; S. McKillop, MPR Associates, Alexandria, VA, USA; T. Adams, Jensen Hughes, Independence, OH, USA; R. Keating, MPR Associates, Inc., Alexandria, VA, USA

**PVP2017-65400: TECHNICAL BASIS FOR CONVERSION OF NON-MANDATORY APPENDIX F OF SECTION III OF THE ASME BOILER AND PRESSURE VESSEL CODE TO A MANDATORY APPENDIX—PART II: ASSOCIATED CODE BOOK UPDATES**

S. McKillop, MPR Associates, Alexandria, VA, USA; J. Wen, Jensen Hughes, Independence, OH, USA; R. Keating, MPR Associates, Inc., Alexandria, VA, USA; T. Adams, Jensen Hughes, Independence, OH, USA

**PVP2017-65309: TECHNICAL BASIS FOR PROPOSED ASME CODE CASE BASED ON N-513 FOR HIGHER PRESSURE APPLICATIONS**

R. McGill, Structural Integrity Associates, San Jose, CA, USA; R. Janowiak, Exelon, Hoffman Estates, IL, USA; E. Houston, Structural Integrity Associates, Inc., Centennial, CO, USA; D. J. Shim, Structural Integrity Associates, San Jose, CA, USA

**PVP2017-65943: RELAXATION OF EXEMPTION REQUIREMENT OF PWHT FOR SA-508 GRADE 1A, BY CONSIDERING SURFACE WELDING RESIDUAL STRESS AS EVALUATED BY INSTRUMENTED INDENTATION TESTING METHOD**

J. Kim, J. S. Lee, S. Choi, J. Kim, D. Kwon, Seoul National University, Seoul, Korea (Republic)

**PVP2017-65994: ASME CODES AND STANDARDS V&V COMMITTEE—DEVELOPMENT OF STANDARDS FOR VERIFICATION, VALIDATION AND UNCERTAINTY ASSESSMENTS IN MODELING AND SIMULATION**

C. Freitas, Southwest Research Institute, San Antonio, TX, USA

**SESSION 1.1D (HT-2-1)**

*Monday, July 17, 8:30 am – 10:15 am, King's 1*

**IMPULSIVELY LOADED VESSELS**

Developed by: M. Edel, Baker Engineering and Risk Consultants, San Antonio, TX, USA; D. Gross, Dominion Engineering, Reston, VA, USA; H. Levine, Thornton Tomasetti, Cupertino, CA, USA

Chair: M. Edel, Baker Engineering and Risk Consultants, San Antonio, TX, USA

Co-Chair: D. Gross, Dominion Engineering, Reston, VA, USA

**PVP2017-65173: SELECTION OF BOLT PRELOAD FOR IMPULSIVELY LOADED VESSELS**

T. A. Duffey, TA Duffey, Consulting Engineer, Tijeras, NM, USA; J. E. D. Hess, Los Alamos National Laboratory, Los Alamos, NM, USA

**PVP2017-65391: EDS CONTAINMENT VESSEL TNT EQUIVALENCE TESTING**

J. Stoffleth, Sandia National Laboratories, Albuquerque, NM, USA; R. W Crocker, B. Haroldsen, Sandia National Laboratories, Livermore, CA, USA

**PVP2017-65976: NUMERICAL STUDY OF AN IMPULSIVELY LOADED VESSEL CONTAINING DOUBLE VERSUS SINGLE CLOSURE BOLT PATTERNS**

J. E. D. Hess, Los Alamos National Laboratory, Los Alamos, NM, USA

**PVP2017-65232: FAILURE ANALYSIS OF VESSEL COVER UNDER INTERNAL PRESSURE IMPULSE**

S. Yang, Q. Dong, L. Zhang, Institute of Chemical Materials, China Academy of Engineering Physics, Mianyang, Sichuan, China

**SESSION 1.1E (CS-1-1)**

*Monday, July 17, 8:30 am – 10:15 am, King's 2*

**STRUCTURAL INTEGRITY OF PRESSURE COMPONENTS—I**

**Symposium on Structural Integrity—Co-Sponsored by Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: M. Benson, U.S. Nuclear Regulatory Commission, Rockville, MD, USA; S. Xu, Kinectrics Inc., Toronto, ON, Canada

Chair: M. Benson, U.S. Nuclear Regulatory Commission, Rockville, MD, USA

Co-Chair: J. C. Jin, Canadian Nuclear Safety Commission, Ottawa, ON, Canada

**PVP2017-65090: CURRENT STATUS OF THE CHARACTERIZATION OF RPV**

**MATERIALS HARVESTED FROM THE DECOMMISSIONED ZION UNIT 1 NUCLEAR POWER PLANT**

T. M. Rosseel, M. Sokolov, X. Chen, R. Nanstad, Oak Ridge National Laboratory, Oak Ridge, TN, USA

**PVP2017-65141: SAFETY MARGIN OPTIMISATION BY PROBABILISTIC ANALYSIS**

L. Stefanini, F. Blom, NRG, Petten, Netherlands

**PVP2017-65263: LEAPOR—A COMPUTER CODE FOR LEAKAGE-RATE CALCULATIONS FOR CRACKS IN COOLING WATER PIPING SYSTEMS**

P. T. Williams, B. R. Bass, T. Dickson, H. Klasky, Oak Ridge National Laboratory, Oak Ridge, TN, USA

**PVP2017-65304: RSE-M NUCLEAR IN-SERVICE INSPECTION CODE-A SET OF MODERN FLAW EVALUATION RULES (Presentation Only)**

C. Faidy, CF Integrity Engineering, Tassin, France

**SESSION 1.1F (MF-19-1)**

*Monday, July 17, 8:30 am – 10:15 am, King's 3*

**CREEP AND CREEP-FATIGUE INTERACTION—I**

**Symposium on Fatigue Issues—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: C. M. Davies, Imperial College London, London, United Kingdom; R. Dennis, Frazer-Nash Consultancy, Avon, United Kingdom; H. Qian, GE Gas Power Systems, Windsor, CT, USA

Chair: C. M. Davies, Imperial College London, London, United Kingdom

Co-Chair: K. Tarnowski, The University of Sheffield, Sheffield, United Kingdom

**PVP2017-65080: DIRECT METHOD ON CREEP FATIGUE DAMAGE ASSESSMENT CONSIDERING FULL CREEP-CYCLIC PLASTICITY INTERACTION**

D. Barbera, H. Chen, University of Strathclyde, Glasgow, Scotland; W. Luan, East China University of Science and Technology, Shanghai, China

**PVP2017-65241: MICROSTRUCTURAL EVALUATION OF 9CR-3W-3CO-ND-B HEAT-RESISTANT STEEL (SAVE12AD) AFTER LONG-TERM CREEP DEFORMATION**

T. Hamaguchi, H. Okada, S. Kurihara, Nippon Steel & Sumitomo Metal Corporation, Amagasaki, Japan; H. Hirata, Nippon Steel & Sumitomo Metal Corporation, Futtsu, Japan; M. Yoshizawa, Nippon Steel & Sumitomo Metal Corporation, Düsseldorf, Germany

**PVP2017-65296: SELECTION OF REPRESENTATIVE STRESS FUNCTION UNDER MULTIAXIAL STRESS STATE CONDITION FOR CREEP**

M. S. Haque, C. M. Stewart, The University of Texas at El Paso, El Paso, TX, USA

**PVP2017-65689: EFFECTS OF CREEP DEFORMATION MODEL OF GR. 91 STEEL AT 600 OC ON CREEP FRACTURE MECHANICS PARAMETERS**

M. G. Won, Sungkyunkwan University, Suwon, Korea (Republic); N.-S. Huh, Seoul National University of Science and Technology, Seoul, Korea (Republic); H.-Y. Lee, W.-G. Kim, Korea Atomic Energy Research Institute, Daejeon, Korea (Republic); J. B. Choi, Sungkyunkwan University, Kyungi-do, Korea (Republic)

**SESSION 1.1G (MF-2-1)**

*Monday, July 17, 8:30 am – 10:15 am, Queen's 4*

**APPLICATION OF FRACTURE MECHANICS IN FAILURE ASSESSMENT—I**

**Symposium on Fracture Mechanics and Analysis—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: P.-S. Lam, Savannah River National Laboratory, Aiken, SC, USA

Chair: P.-S. Lam, Savannah River National Laboratory, Aiken, SC, USA

Co-Chair: H. Coules, University of Bristol, Bristol, United Kingdom

**PVP2017-65351: ASSESSMENT OF DEFECTIVE STUDS: PART 1—FEATURES TESTING OF STUD MATERIAL UNDER LOW CONSTRAINT DUCTILE TEARING**

P. James, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom; M. Jackson, Rolls Royce, Derby, Derbyshire, United Kingdom; P. Birkett, C. Madew, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom

**PVP2017-65353: ASSESSMENT OF DEFECTIVE STUDS: PART 2—SIMPLIFIED ASSESSMENT OF STUDS ALLOWING FOR LOW CONSTRAINT CONDITIONS**

P. James, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom; M. Jack-

son, Rolls Royce, Derby, Derbyshire, United Kingdom; C. Madew, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom

**PVP2017-65441: FRACTURE TOUGHNESS VARIATION WITH FLAW DEPTH IN VARIOUS SPECIMEN GEOMETRIES AND ROLE OF CONSTRAINT IN MATERIAL FRACTURE RESISTANCE**

Y. Hioe, S. Kalyanam, G. Wilkowski, S. Pothana, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA; J. Martin, BMPC, Schenectady, NY, USA

**PVP2017-66221: ELASTIC-PLASTIC FRACTURE ANALYSIS OF A REACTOR PRESSURE VESSEL SUBJECTED TO PRESSURIZED THERMAL SHOCK**

H. Guo, Z. Wang, Jiangsu University, Zhenjiang, Jiangsu, China; P.-S. Lam, Savannah River National Laboratory, Aiken, SC, USA

**SESSION 1.1H (HT-1-1)**

*Monday, July 17, 8:30 am – 10:15 am, Queen's 5*

**DESIGN, ANALYSIS, AND LIFE PREDICTION OF HIGH-PRESSURE VESSELS AND EQUIPMENT**

**Symposium on Life Cycle Management—Co-Sponsored by High-Pressure Technology and Operations, Applications & Components Technical Committees**

Developed by: K. Karpanan, FMC Technologies Inc., Houston, TX, USA; K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

Chair: K. Karpanan, FMC Technologies Inc., Houston, TX, USA

Co-Chair: K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

**PVP2017-65111: AN EXPERIMENTAL SETUP FOR DETERMINING THE FAILURE LOCUS OF ASME TUBULAR PRESSURE VESSEL STEEL GRADES**

I. Barsoum, M. Al-Khaled, The Petroleum Institute, Abu Dhabi, United Arab Emir.

**PVP2017-65258: FRACTURE ASSESSMENTS OF HIGH PRESSURE VESSEL COMPONENTS HAVING LONGITUDINAL HOLES**

Y. Xu, Dupont Performance Materials, Wilmington, DE, USA; K.-J. Young, Dupont Engineering, Wilmington, DE, USA

**PVP2017-65223: HIGH PRESSURE TUBING MATERIAL PERFORMANCE REVIEW**

K. D. Warren, A&A Machine & Fabrication, LLC, LaMarque, TX, USA

**PVP2017-65652: DEEP-HOLE-DRILLING OF HIGH PRESSURE TUBES—PROCESS STABILITY AND THE INFLUENCE OF ECCENTRICITY ON AUTO-FRETTAGE AND HEAT TRANSFER**

H. Maderbacher, M. Poelzl, BHD T GmbH, Kapfenberg, Austria

**PVP2017-65840: DISRUPTING THE METALLICS DOMAIN IN PRESSURE VESSEL AND PIPING MANUFACTURE-ADVANCED MANUFACTURING IN THE OIL AND GAS SECTOR**

J. G. Rafferty, D. Gill, R. Kapur, TechnipFMC Inc., Dunfermline, Fife, United Kingdom

**SESSION 1.1I (DA-10-1)**

*Monday, July 17, 8:30 am – 10:15 am, Queen's 6*

**GASKETS AND JOINT INTEGRITY**

Developed by: W. Brown, Integrity Engineering Solutions, Dunsborough, WA, Australia; C. Rodery, BP p.l.c., League City, TX, USA

Chair: W. Brown, Integrity Engineering Solutions, Dunsborough, WA, Australia

Co-Chair: C. Rodery, BP p.l.c., League City, TX, USA

**PVP2017-65439: DETERMINATION OF TARGET BOLT TENSION FOR FLANGES WITH LENS GASKETS**

G. Van Zyl, SABIC, Jubail, Saudi Arabia

**PVP2017-65507: ACCEPTABLE LEVELS OF CORROSION FOR PRESSURE BOUNDARY BOLTED JOINTS**

W. Brown, S. Long, Integrity Engineering Solutions, Dunsborough, WA, Australia

**PVP2017-65371: ASME B16.20 SPIRAL WOUND GASKETS PERFORMANCE TESTING**

J. Veiga, Teadit Industria e Comercio Ltda, Rio De Janeiro, Brazil; S. Hamilton, Hex Technology, Austin, TX, USA; J. Baulch, Teadit North America, Pasadena, TX, USA

**PVP2017-66232: ON THE USE OF GASKET FACTORS, FLANGE CALCULATION AND QUALIFIED ASSEMBLY TO REDUCE FUGITIVE EMISSIONS (Presentation Only)**

F. Schoeckle, M. Schaaf, AMTEC GmbH, Lauffen, Germany

**SESSION 1.1J (MF-2-6)**

*Monday, July 17, 8:30 am – 10:15 am, Kona 1*

**FUEL CLADDING CHARACTERIZATION, COHESIVE ZONE MODELING, AND CRACK GROWTH IN WELD**

**Symposium on Aging Management and Structural Integrity for Spent Nuclear Fuel Dry Cask Storage and Transportation Systems—Co-Sponsored by Materials & Fabrication and Operations, Applications & Components Technical Committees**

Developed by: J. Wang, H. Jiang, Oak Ridge National Laboratory, Oak Ridge, TN, USA

Chair: H. Jiang, Oak Ridge National Laboratory, Oak Ridge, TN, USA

Co-Chair: A. Duncan, Savannah River National Laboratory, Aiken, SC, USA

**PVP2017-66173: CRACK GROWTH EVALUATION OF REMNANT FLAWS UNDERNEATH AN EXCAVATE AND WELD REPAIR**

F. Ku, Structural Integrity Associates, San Jose, CA, USA; S. McCracken, Electric Power Research Institute, Harrisburg, NC, USA

**PVP2017-65185: EXPANDING PLUG WEDGE TEST FOR EVALUATING HOOP TENSILE PROPERTIES OF FUEL CLADDING**

H. Jiang, J. Wang, Oak Ridge National Laboratory, Oak Ridge, TN, USA

**PVP2017-65022: CRACK EXTENSIONS IN COMPACT TENSION SPECIMENS OF HYDRIDED IRRADIATED ZR-2.5NB MATERIALS USING COHESIVE ZONE MODEL**

S. Wu, S.-J. Sung, J. Pan, University of Michigan, Ann Arbor, MI, USA; P.-S. Lam, Savannah River National Laboratory, Aiken, SC, USA; D. Scarth, Kinectrics Inc., Toronto, ON, Canada

**PVP2017-65021: PREDICTIONS OF CRACK EXTENSIONS IN ARC-SHAPED SPECIMENS OF AUSTENITIC STAINLESS STEELS WITH AND WITHOUT CHARGED HYDROGEN USING COHESIVE ZONE MODEL (Presentation Only)**

S. Wu, S.-J. Sung, J. Pan, University of Michigan, Ann Arbor, MI, USA; P.-S. Lam, Savannah River National Laboratory, Aiken, SC, USA; P. Korinko, Savannah River National Laboratory, Aiken, SC, USA

**SESSION 1.1K (CS-8-1)**

*Monday, July 17, 8:30 am – 10:15 am, Kona 2*

**HYDROGEN EFFECTS ON MATERIALS BEHAVIOR**

Developed by: S. Xu, Kinectrics Inc., Toronto, ON, Canada; C. San Marchi, Sandia National Laboratories, Livermore, CA, USA

Chair: S. Xu, Kinectrics Inc., Toronto, ON, Canada

Co-Chair: F. Iwamatsu, Hitachi, Ltd., Ibaraki, Japan

**PVP2017-65723: THE EFFECT OF HYDROGEN ON RUBBER IN HIGH PRESSURE HYDROGEN (Presentation Only)**

S. H. Nahm, S. K. Jeon, Korea Research Institute of Standards and Science, Daejeon, Korea (Republic); O. H. Kwon, Pukyong National University, Busan, Korea (Republic); U. B. Baek, S.-W. Baek, Korea Research Institute of Standards and Science, Daejeon, Korea (Republic)

**PVP2017-65885: POLYMER BEHAVIOUR IN CYCLIC HIGH PRESSURE ENVIRONMENTS AT TEMPERATURES RELEVANT TO THEIR USAGE IN THE HYDROGEN INFRASTRUCTURE (Presentation Only)**

N. C. Menon, A. Kruienza, Sandia National Laboratories, Livermore, CA, USA

**PVP2017-65532: EXCELLENT RESISTANCE TO HYDROGEN EMBRITTLEMENT OF HIGH-STRENGTH COPPER-BASED ALLOY**

Y. Ogawa, J. Yamabe, H. Matsunaga, S. Matsuoka, Kyushu University, Fukuoka, Japan

**PVP2017-66250: CURRENT STATUS OF EVALUATION AND SELECTING OF MATERIALS TO BE USED FOR HYDROGEN REFUELING STATION EQUIPMENT IN JAPAN**

H. Kobayashi, Tokyo Institute of Technology, Tokyo, Japan; T. Sano, The High Pressure Gas Safety Institute of Japan; Machida-shi, Tokyo, Japan; H. Kobayashi, Japan Petroleum Energy Center, Minato-Ku Tokyo, Japan; S. Matsuoka, Kyushu University, Fukuoka, Japan; H. Tsujigami, Iwatani Corporation, Hyogo-ken, Japan

**SESSION 1.1L (SE-1-1)**

*Monday, July 17, 8:30 am – 10:15 am, Kona 3*

**EARTHQUAKE RESISTANCE AND SEISMIC MARGIN**

Developed by: A. Maekawa, The Kansai Electric Power Co. Inc., Fukui, Japan; T. Taniguchi, Tottori University, Tottori, Japan; I. Nakamura, National Research Institute for Earth Science and Disaster Resilience, Ibaraki, Japan

Chair: I. Nakamura, National Research Institute for Earth Science and Disaster Resilience, Ibaraki, Japan

Co-Chair: T. Taniguchi, Tottori University, Tottori, Japan

**PVP2017-65140: DYNAMICS MODELING AND ANALYSIS OF RIVETED MAIN-FRAME COMPUTER STRUCTURE**

B. Notohardjono, S. Canfield, R. Ecker, IBM Corp, Poughkeepsie, NY, USA

**PVP2017-65524: SEISMIC RESPONSE ANALYSIS OF FLEXIBLE DRAIN SYSTEM INTO EXTERNAL FLOATING ROOF STORAGE TANKS**

G. Bernard, TechnipFMC, Le Trait, France; D. Vera, TechnipFMC, Rueil Malmaison, France; W. K. Lim, TechnipFMC, Singapore, Singapore

**PVP2017-65600: SEISMIC TEST RESULT OF MOTOR OPERATED VALVE ACTUATORS FOR NUCLEAR POWER PLANT**

N. Kojima, Toshiba Corporation, Yokohama, Japan; Y. Tsutsumi, Chubu Electric Power Co., Inc., Nagoya, Aichi, Japan; K. Nishino, Y. Watanabe, K. Yonekura, Toshiba Corporation, Yokohama, Japan

**PVP2017-65602: SEISMIC TEST RESULTS OF THE MAIN STEAM SAFETY RELIEF VALVES FOR JAPANESE BOILING WATER REACTOR NUCLEAR POWER PLANTS**

K. Nishino, Toshiba Corporation, Yokohama, Japan; Y. Tsutsumi, Chubu Electric Power Co., Inc., Nagoya, Aichi, Japan; K. Yonekura, N. Kojima, Y. Watanabe, Toshiba Corporation, Yokohama, Japan

**SESSION 1.1M (HT-3-1)**

*Monday, July 17, 8:30 am – 10:15 am, Waikoloa Suite 1*

**HIGH PRESSURE VESSEL & PIPING LIFE ASSESSMENT ISSUES**

Developed by: C. Tipple, Structural Integrity Associates, Centennial, CO, USA; C. Becht V, Becht Engineering Co., Inc., Liberty Corner, NJ, USA

Chair: C. Becht V, Becht Engineering Co., Inc., Liberty Corner, NJ, USA

Co-Chair: C. Tipple, Structural Integrity Associates, Centennial, CO, USA

**PVP2017-65663: WELDING TECHNOLOGY IMPROVEMENT FOR 2 1/4 CR 1 MO 1/4 V HEAVY WALL LOW ALLOY STEELS**

F. Fusari, P. Marangoni, S. Alberini, M. Musti, Bellei Energy CPE, Mantova, Italy  
**PVP2017-65773: STUDY OF CRACK-FACE PRESSURE EFFECT ON WELD FATIGUE LIFE CALCULATIONS USING STRUCTURAL STRESS METHOD FOR THICK-WALL VESSELS (Presentation Only)**

K.-J. Young, Dupont Engineering, Wilmington, DE, USA; Y. Xu, Dupont Performance Materials, Wilmington, DE, USA

**PVP2017-65770: FRACTURE MECHANICS ANALYSIS OF CLAD SUBSEA EQUIPMENT IN SOUR HPHT CONDITIONS**

C. Holtam, R. Saraswat, DNV GL, Katy, TX, USA; R. Thodla, DNV GL, Dublin, OH, USA

**PVP2017-66163: SURFACE STRESS ANALYSIS OF THE INTERNAL CORRODED PIPES UNDER EXTERNAL PRESSURE**

Z. Chen, X. Shen, H. Ye, S. Yan, Z. Jin, Zhejiang University, Hangzhou, Zhejiang, China

**SESSION 1.1N (SPC-2-3)**

*Monday, July 17, 8:30 am – 10:15 am, Waikoloa Suite 2*

**STUDENT PAPER SYMPOSIUM—PHD—I**

Developed by: V. P. Janzen, Canadian Nuclear Laboratories, Chalk River, ON, Canada

Chair: V. P. Janzen, Canadian Nuclear Laboratories, Chalk River, ON, Canada

Co-Chair: P. James, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom

**PVP2017-65737: AN HOMOGENISATION METHOD FOR A FSI PROBLEM: APPLICATION TO A TUBE BUNDLE ROW**

G. Artini, D. Broc, CEA Saclay, Gif-sur-Yvette, France

**PVP2017-65442: SIMPLIFIED ANALYSIS OF THE ROCKING MOTION OF A CYLINDRICAL TANK FOCUSING ON THE ROLE OF DYNAMIC FORCES INVOLVED IN ROCKING-BULGING INTERACTION**

M. D'Amico, T. Taniguchi, Tottori University, Tottori, Japan; T. Nakashima, Jip Techno-science, Yao, Japan

**PVP2017-65350: PREDICTION OF THE TEMPERATURE DEPENDENCE ON FRACTURE TOUGHNESS BY NEW STRESS DISTRIBUTION SCALING METHOD**

K. Ishihara, T. Hamada, Kobelco Research Institute, Inc., Kobe, Hyogo, Japan; T. Meshii, University of Fukui, Fukui, Japan

**PVP2017-65297: A NOVEL METAMODELING APPROACH FOR TIME-TEMPERATURE PARAMETER MODELS**

M. S. Haque, C. Ramirez, C. M. Stewart, The University of Texas at El Paso, El Paso, TX, USA

**SESSION 1.1O (SPC-1-1)**

*Monday, July 17, 8:30 am – 10:15 am, Waikoloa Suite 3*

**STUDENT PAPER COMPETITION—BS/MS—I**

Developed by: K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

Chair: K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

Co-Chair: H. Qian, General Electric, Avon, CT, USA

**PVP2017-65746: ASSESSMENT OF AIRCRAFT CRASH TO CONTAINMENT AND ITS EFFECTS ON REACTOR CAVITY AND MAJOR COMPONENT**

J. M. Sim, Y. Chang, Kyung Hee University, Kyunggi-do, Korea (Republic)

**PVP2017-65337: SHAKEDOWN LIMITS FOR HILLSIDE NOZZLES IN CYLINDRICAL VESSELS**

A. K. Bakry, C. A. Saleh; M. M. Megahed, Cairo University, Giza, Egypt

**PVP2017-65278: DEVELOPMENT OF A PROFILE MATCHING CRITERIA TO MODEL DENTS IN PIPELINES USING FINITE ELEMENT ANALYSIS**

J. Woo, University of Alberta, Edmonton, AB, Canada; M. Kainat, Enbridge Liquid Pipelines, Edmonton, AB, Canada; S. Adeeb, University of Alberta, Edmonton, AB, Canada

**PVP2017-65580: EXPERIMENTAL INVESTIGATION ON ADHESIVE BONDED JOINTS OF CARBON FIBER COMPOSITE LAMINATES CONTAINING DISBOND DEFECT**

P. Qiu, J. Shi, J. Zheng, Zhejiang University, Hangzhou, Zhejiang, China

**PVP2017-65714: STUDY ON THE ROCKING VIBRATION INDUCED IN THREE-DIMENSIONAL SEISMIC ISOLATION SYSTEM (Presentation Only)**

N. Tomita, S. Fujita, Tokyo Denki University, Tokyo, Japan

**SESSION 1.1Q (MF-23-1)**

*Monday, July 17, 8:30 am – 10:15 am, Kohala 4*

**ADVANCED SENSOR TECHNOLOGIES FOR MONITORING STRUCTURAL INTEGRITY**

Developed by: L. Yu, University of South Carolina, Columbia, SC, USA; C. Lissenden, Penn State University, University Park, PA, USA; P.-S. Lam, Savannah River National Laboratory, Aiken, SC, USA

Chair: L. Yu, University Of South Carolina, Columbia, SC, USA

Co-Chair: A. Duncan, Savannah River National Laboratory, Aiken, SC, USA

**PVP2017-65940: ON-LINE CONDITION MONITORING OF FRICTION STIR SPOT WELDING TOOL USING VIBRATION MEASUREMENTS**

F. Al-Badour, A. Mahgoub, A. Bazoune, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia; A.R. Shuaib, Arizona State University, Tempe, AZ, USA; N. Merah, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia

**PVP2017-66074: SIMULATION OF LAMB WAVE PROPAGATION USING EXCITATION POTENTIALS**

M. F. Haider, V. Giurgiutiu, B. Lin, L. Yu, University of South Carolina, Columbia, SC, USA

**PVP2017-66200: ACOUSTIC EMISSION SENSING IN NUCLEAR FACILITIES (Presentation Only)**

S. Howden, B. Lin, T. Knight, L. Yu, University of South Carolina, Columbia, SC, USA

**SESSION 1.1S (TW-4-1)**

*Monday, July 17, 8:30 am – 10:15 am, Grand Promenade*

**TECHNOLOGY DEMONSTRATION FORUM—I**

Developed by: C. Jaske, HSI Group, Inc., Torrance, CA, USA; J. F. Cory, Jr., Siemens PLMS Software, Milford, OH, USA



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**Block 1.2: Monday, July 17, 2017 (10:30 am – 12:15 pm)**

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**SESSION 1.2P (TW-3-1)**

*Monday, July 17, 10:30 am – 12:15 pm, Monarchy*

**PLENARY SESSION**

Developed by: M. Younan, American University in Cairo, Cairo, Egypt

**LARGE SCALE METAL WIRE + ARC ADDITIVE MANUFACTURE FOR PIPES AND PRESSURE VESSELS**

S. Williams, Cranfield University, Cranfield, United Kingdom

**HIGH PERFORMANCE COMPUTING AND BIG DATA THE PARENTS OF THE DIGITAL TWIN**

T. Kurfess, Georgia Institute of Technology, Atlanta, GA, USA

**SESSION 1.2S (TW-4-2)**

*Monday, July 17, 10, 10:30 am – 12:15 pm, Grand Promenade*

**TECHNOLOGY DEMONSTRATION FORUM 2**

Developed by: C. Jaske, HSI Group, Inc., Torrance, CA, USA; J. F. Cory, Jr., Siemens PLMS Software, Milford, OH, USA

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**Block 1.3: Monday, July 17, 2017 (2:00 pm – 3:45 pm)**

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**SESSION 1.3A (DA-16-2)**

*Monday, July 17, 2:00 pm – 3:45 pm, Kohala 1*

**OPERATIONAL INFLUENCES ON THE COKE DRUM LIFE CYCLE**

**2nd International Symposium on Coke Drum Life Cycle Management—Sponsored by Design & Analysis Technical Committee**

Developed by: C. Rodery, BP p.l.c., League City, TX, USA; K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA; J. Penso, Shell Projects and Technology, Houston, TX, USA

Chair: J. Penso, Shell Projects and Technology, Houston, TX, USA

Co-Chair: J. Bedoya, Stress Engineering Services Inc., Houston, TX, USA

**PVP2017-65875: A STATISTICAL APPROACH TO EVALUATING SINGLE SIDE INLET VS DUAL INLET TEMPERATURE DISTRIBUTIONS IN COKE DRUMS**

J. Penso, Shell Projects and Technology, Houston, TX, USA; J. Bedoya, Stress Engineering Services Inc., Houston, TX, USA; A. Stoller, Stress Engineering Services Inc., Mason, OH, USA; R. Boswell, Stress Engineering Services Inc., Houston, TX, USA

**PVP2017-65415: ASSESSMENT OF THE INFLUENCE OF CENTRAL AND LATERAL FEED INJECTION SYSTEMS ON THE REMAINING LIFE OF A COKE DRUM**

G. A. Vivas, A. J. Moret, R. E. Bello, PDVSA Intevep, Los Teques, Miranda, Venezuela; L. M. Melian, PDVSA Petrocedeno, Jose, Anzoategui, Venezuela; J. R. Carmona, Statoil International A.S, Jose, Anzoategui, Venezuela

**PVP2017-65182: FEED ENTRY SYSTEMS FOR THE MODERN DELAYED COKING UNIT (Presentation Only)**

S. Beeston, Amec Foster Wheeler, Houston, TX, USA; R. Lah, Critical Flow Solutions, Sandy, UT, USA

**PVP2017-65060: THE SIGNIFICANCE OF COKE RESISTANCE IN COKE DRUM FAILURES**

M. Samman, Houston Engineering Solutions, LLC, Houston, TX, USA; B. Doerksen, Bechtel Hydrocarbon Technology Solutions, Inc., Houston, TX, USA

**PVP2017-65699: NUMERICAL ANALYSIS OF TRANSIENT TEMPERATURE FIELD AND THERMAL STRESS OF COKE DRUM WITH 1.25CR-0.5MO STEEL BASED ON ITERATIVE ALGORITHM**

Z. Lu, X. Chen, Z. Fan, J. Dong, J. Zhu, Hefei General Machinery Research Institute, Hefei, China

**SESSION 1.3B (FSI-2-2)**

*Monday, July 17, 2:00 pm – 3:45 pm, Kohala 2*

**FIV DESIGN FOR INDUSTRY—II**

**Symposium of Flow-Induced Vibration—Sponsored by Fluid-Structure Interaction Technical Committee**

Developed by: M. Pettigrew, Ecole Polytechnique–Montreal, Deep River, ON, Canada; V. P. Janzen, Canadian Nuclear Laboratories, Chalk River, ON, Canada

Chair: M. Pettigrew, Ecole Polytechnique–Montreal, Deep River, ON, Canada

Co-Chair: V. P. Janzen, Canadian Nuclear Laboratories, Chalk River, ON, Canada

**PVP2017-66218: REVIEW OF THE AP1000 PWR COMPREHENSIVE VIBRATION ASSESSMENT PROGRAM (Presentation Only)**

G. Meyer, Westinghouse Electric Company, Cranberry Township, PA, USA; R. Vollmer, Westinghouse Electric Company, State College, PA, USA; G. Banyay, Westinghouse, Ellwood City, PA, USA; J. Koether, A. Walker, Westinghouse, Cranberry Township, PA, USA

**PVP2017-66067: FLOW-INDUCED VIBRATION AND FRETTING-WEAR DESIGN GUIDANCE FOR NUCLEAR STEAM GENERATORS AND HEAT EXCHANGERS—AN UPDATE (Presentation Only)**

V. P. Janzen, Canadian Nuclear Laboratories, Chalk River, ON, Canada; M. Pettigrew, Ecole Polytechnique–Montreal, Deep River, ON, Canada

**PVP2017-65901: THE EFFECTS OF TUBE ARRAY GEOMETRY ON FLUID-ELASTIC INSTABILITY IN HEAT EXCHANGER TUBE ARRAYS IN CROSS FLOW**

M. Hassan, University of Guelph, Guelph, ON, Canada; D. S. Weaver, McMaster University, Hamilton, ON, Canada

**PVP2017-65780: TOWARDS A PRACTICAL QUASI-STEADY MODEL BASED ANALYSIS METHOD FOR FLUIDELASTIC INSTABILITY IN STEAM GENERATORS (Presentation Only)**

N. Mureithi, S. Olala, Polytechnique Montreal, Montreal, QC, Canada

**SESSION 1.3C (CS-7-2)**

*Monday, July 17, 2:00 pm – 3:45 pm, Kohala 3*

**ASME SECTION III—RECENT DEVELOPMENTS, ELEVATED TEMPERATURE Symposium on Recent Developments in International Codes and Standards—Sponsored by Codes & Standards Technical Committee**

Developed by: T.-L. Sham, Argonne National Laboratory, Lemont, IL, USA

Chair: T.-L. Sham, Argonne National Laboratory, Lemont, IL, USA

Co-Chair: M. C. Messner, Argonne National Laboratory, Lemont, IL, USA

**PVP2017-65455: COMBINED LOAD AND DISPLACEMENT CONTROLLED TESTING TO SUPPORT DEVELOPMENT OF SIMPLIFIED COMPONENT DESIGN RULES FOR ELEVATED TEMPERATURE SERVICE**

Y. Wang, Oak Ridge National Laboratory, Oak Ridge, TN, USA; R. Jetter, RI Jetter Consulting, Pebble Beach, CA, USA; M. C. Messner, S. Mohanty, T.-L. Sham, Argonne National Laboratory, Lemont, IL, USA

**PVP2017-65418: VERIFICATION OF THE EPP CODE CASE FOR STRAIN LIMITS EVALUATIONS BY INELASTIC ANALYSIS METHOD**

M. C. Messner, T.-L. Sham, Argonne National Laboratory, Lemont, IL, USA; R. Jetter, RI Jetter Consulting, Pebble Beach, CA, USA

**PVP2017-65102: A DESIGN BASED APPROACH TO MATERIAL SELECTION FOR ADVANCED HIGH TEMPERATURE REACTOR COMPONENTS**

T.-L. Sham, Argonne National Laboratory, Lemont, IL, USA; R. Jetter, RI Jetter Consulting, Pebble Beach, CA, USA

**PVP2017-65457: PRESSURIZED CREEP-FATIGUE TESTING OF ALLOY 617 USING SIMPLIFIED MODEL TEST METHOD**

Y. Wang, Oak Ridge National Laboratory, Oak Ridge, TN, USA; R. Jetter, RI Jetter Consulting, Pebble Beach, CA, USA; T.-L. Sham, Argonne National Laboratory, Lemont, IL, USA

**PVP2017-65515: THE USE OF ASTM POWDER METALLURGICAL SPECIFICATIONS WITHIN ASME BOILER AND PRESSURE VESSEL CODE (Presentation Only)**

D. Rahoi, CCM 2000, Iron Mountain, MI, USA

**SESSION 1.3D (HT-2-2)**

*Monday, July 17, 2:00 pm – 3:45 pm, King's 1*

**FLUID TRANSIENT AND EXPLOSION LOADINGS**

Developed by: D. Gross, Dominion Engineering, Reston, VA, USA; M. Edel, Baker Engineering and Risk Consultants, San Antonio, TX, USA; H. Levine, Thornton Tomasetti, Cupertino, CA, USA

Chair: D. Gross, Dominion Engineering, Reston, VA, USA

Co-Chair: M. Edel, Baker Engineering and Risk Consultants, San Antonio, TX, USA

**PVP2017-65145: PRESSURE VESSEL AND PIPING HAZARD ANALYSIS METHODS COMPARISON**

M. Edel, D. Ketchum, O. Rodriguez, Baker Engineering and Risk Consultants, San Antonio, TX, USA

**PVP2017-65032: GASEOUS DEFLAGRATION IN PIPING PART 1: EXPERIMENTAL OBSERVATIONS**

T. Ligon, D. Gross, Dominion Engineering, Inc., Reston, VA, USA; J. Minichiello, Bechtel National, Inc., Richland, WA, USA

**PVP2017-65033: GASEOUS DEFLAGRATION IN PIPING PART 2: PROPOSED METHODS AND CODE ACCEPTANCE CRITERIA**

J. Minichiello, Bechtel National, Inc., Richland, WA, USA; T. Ligon, D. Gross, Dominion Engineering, Inc., Reston, VA, USA

**PVP2017-65231: INFLUENCE OF DEFECT DISTRIBUTION ON DYNAMIC ELASTIC BUCKLING OF RINGS UNDER INTERNAL UNIFORMLY-DISTRIBUTED PRESSURE PULSE**

Q. Dong, Institute of Chemical Materials, China Academy of Engineering Physics, Mianyang, Sichuan, China; S. Yang, L. Zhang, Institute of Chemical Materials, China Academy of Engineering Physics, Mianyang, Sichuan, China

**PVP2017-65250: COMPUTATION OF FLUID THRUST FORCE FROM THE PRESSURE RELEASE TANK OF NUCLEAR POWER PLANT PRESSURIZER**

F.-R. Xiong, N. Jiang, Nuclear Power Institute of China, Chengdu, Sichuan, China

**SESSION 1.3E (CS-1-2)**

*Monday, July 17, 2:00 pm – 3:45 pm, King's 2*

**STRUCTURAL INTEGRITY OF PRESSURE COMPONENTS—II**

**Symposium on Structural Integrity—Co-Sponsored by Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: M. Benson, Nuclear Regulatory Commission, Rockville, MD, USA, S. Xu, Kinectrics Inc., Toronto, ON, Canada

Chair: F. Iwamatsu, Hitachi, Ltd., Ibaraki, Japan

Co-Chair: M. Benson, Nuclear Regulatory Commission, Rockville, MD, USA

**PVP2017-65345: CREEP ANALYSIS FOR PRESSURIZED COMPONENTS UNDER CREEP CONDITIONS BASED ON ISOCHRONOUS STRESS-STRAIN CURVE AND ELASTIC-PERFECTLY PLASTIC MATERIAL MODEL**

J.-G. Gong, Q.-W. Xia, F.-Z. Xuan, East China University of Science and Technology, Shanghai, China

**PVP2017-65458: DESIGN OF THREADED CLOSURES FOR HIGH PRESSURE SCREW PLUG HEAT EXCHANGERS DESIGNED TO ASME SECTION VIII DIV. 2**

H. K. Sippy, Tema India Ltd., Mumbai, Maharashtra, India; D. Chandiramani, Independent Consultant, Mumbai, India

**PVP2017-65520: EFFECT OF NOZZLE DIMENSIONS ON THE STRESSES IN COMPENSATED OPENINGS IN CYLINDRICAL SHELLS—A COMPARATIVE STUDY OF ASME SECTION VIII DIVISION 2 AND PD 5500**

D. Chandiramani, Independent Consultant, Mumbai, India; S. Gopalakrishnan, A. Mathkar, Lloyd's Register Asia, Thane-West, India

**PVP2017-65859: COMMENTARY ON RECENT CHANGES IN ASME B31.3 POST WELD HEAT TREATMENT REQUIREMENTS AND THE EFFECTIVENESS OF WELD PREHEAT**

P. E. Prueter, K. Smith, B. Macejko, The Equity Engineering Group, Inc., Shaker Heights, OH, USA; K. Shipley, The Equity Engineering Group, Inc., Twinsburg, OH, USA

**SESSION 1.3F (MF-19-2)**

*Monday, July 17, 2:00 pm – 3:45 pm, King's 3*

**CREEP AND CREEP-FATIGUE INTERACTION—II**

**Symposium on Fatigue Issues—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: C. M. Davies, Imperial College London, London, United Kingdom; R. Dennis, Frazer-Nash Consultancy, Avon, United Kingdom; H. Qian, GE Gas Power Systems, Windsor, CT, USA

Co-Chair: C. M. Davies, Imperial College London, London, United Kingdom

Chair: H. Chen, University of Strathclyde, Glasgow, Scotland

**PVP2017-65685: EXPERIMENTAL DETERMINATION OF ELASTIC AND PLASTIC LLD RATES DURING CREEP CRACK GROWTH TESTING**

K. Tarnowski, The University of Sheffield, Sheffield, United Kingdom; C. M. Davies,

K. Nikbin, Imperial College London, London, United Kingdom; D. Dean, EDF Energy Generation, Gloucester, United Kingdom

**PVP2017-65816: GUIDELINES TO THE ASSESSMENT OF CREEP RUPTURE RELIABILITY FOR 316SS USING THE LARSON-MILLER TIME-TEMPERATURE PARAMETER MODEL**

C. Ramirez, M. S. Haque, C. M. Stewart, The University of Texas at El Paso, El Paso, TX, USA

**PVP2017-65900: EVALUATION OF STRESS INCREASE CAUSED BY GEOMETRIC IMPERFECTIONS IN LONGITUDINALLY-WELDED HOT REHEAT STEAM PIPING OF MOD. 9CR-1MO STEEL**

H. Shigeyama, Y. Takahashi, M. Yaguchi, Central Research Institute of Electric Power Industry, Yokosuka, Japan

**PVP2017-65388: CREEP PROPERTY DETERMINATION OF WELDMENTS USING DIGITAL IMAGE CORRELATION (Presentation Only)**

C. M. Davies, J. Ahn, M. Nasser, T. J. Dunnett, Imperial College London, London, United Kingdom

**SESSION 1.3G (MF-2-2)**

*Monday, July 17, 2:00 pm – 3:45 pm, Queen's 4*

**APPLICATION OF FRACTURE MECHANICS IN FAILURE ASSESSMENT—II**

**Symposium on Fracture Mechanics and Analysis—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: A.-H. I. Mourad, United Arab Emirates University, Al Ain, United Arab Emir.; P.-S. Lam, Savannah River National Laboratory, Aiken, SC, USA; G. H. B. Donato, Centro Universitário da FEI, Sao Paulo, Brazil

Chair: A.-H. I. Mourad, United Arab Emirates University, Al Ain, United Arab Emir.

Co-Chair: Y. Chao, University of South Carolina, Columbia, SC, USA

**PVP2017-65358: FRACTURE MECHANICS AT ELEVATED LOADING RATES IN THE DUCTILE TO BRITTLE TRANSITION REGION**

U. Mayer, University of Stuttgart, Stuttgart, Baden-Württemberg, Germany; T. Reichert, J. Tlatlik, Fraunhofer Institute for Mechanics of Materials, Freiburg, Germany

**PVP2017-65459: FABRICATION AND WEAR ANALYSIS OF ALUMINIUM MATRIX COMPOSITE REINFORCED BY SIC MICRO AND NANO PARTICLES**

A. H. Idrisi, A.-H. I. Mourad, United Arab Emirates University, Al Ain, United Arab Emir.

**PVP2017-65460: TRIBOLOGICAL ANALYSIS OF THERMAL SPRAY COATINGS OF NI AND AL<sub>2</sub>O<sub>3</sub> WITH DISPERSION OF SOLID LUBRICANTS IN WEAR MODES**

J. V. Christy, A.-H. I. Mourad, United Arab Emirates University, Al Ain, United Arab Emir.; S. Tiwari, Shri G S Institute of Tech & Sc., Indore, India

**PVP2017-65510: CONSIDERATION OF YIELD DISCONTINUITY IN THE ELASTIC-PLASTIC FRACTURE ANALYSIS OF CIRCUMFERENTIALLY FLAWED PIPES**

L. Wang, Brunel University London & NSIRC, Uxbridge, United Kingdom; E. Eren, TWI Ltd. & NSIRC, Cambridge, United Kingdom; B. Wang, Brunel University London & NSIRC, Uxbridge, United Kingdom; G. Wu, TWI Ltd. & NSIRC, Cambridge, United Kingdom

**SESSION 1.3H (OAC-6-1)**

*Monday, July 17, 2:00 pm – 3:45 pm, Queen's 5*

**LIFE CYCLE MANAGEMENT OF REFINERY PRESSURE VESSELS—WELDING & FABRICATION**

**Symposium on Life Cycle Management—Co-Sponsored by High-Pressure Technology and Operations, Applications & Components Technical Committees**

Developed by: A. Yasutomi, The Japan Steel Works, Ltd., Hokkaido, Japan; L. Antalfy, Fluor, Sugar Land, TX, USA; B. Millet, Fluor, Inc., Pasadena, TX, USA

Chair: B. Millet, Fluor, Inc., Pasadena, TX, USA

Co-Chair: A. Yasutomi, The Japan Steel Works, Ltd., Hokkaido, Japan; L. Antalfy, Fluor, Sugar Land, TX, USA

**PVP2017-65446: HOW AN EXPERIENCED FABRICATOR CAN PROVIDE SUPPORT TO SITE ACTIVITIES TO UPGRADE EXISTING UNITS TO NEW OPER-**

## ATIONAL REQUIREMENTS

L. Sabattoli, S. Poddighe, ATB Riva Calzoni S.p.A., Roncadelle, Brescia, Italy  
**PVP2017-65640: WELDING CONSUMABLES FOR 2.25CR-1MO-V REFINING REACTORS**

H. Takauchi, Kobe Steel, Ltd., Fujisawa, Kanagawa, Japan; T. Nakanishi, Kobe Steel, Ltd., Takasago-City, Kobe, Japan; H. Nako, Kobe Steel, Ltd., Kobe-City, Hyogo, Japan

**PVP2017-65569: ULTRASONIC TESTING AND PHOTOGRAPHIC IMAGING SYSTEM FOR TUBE TO TUBE SHEET WELD OF HEAT EXCHANGER**

M. Abe, Hitachi Zosen Corporation, Kumamoto, Japan; J. Murakami, Nichizo Tech Inc., Osaka, Japan; N. Shinmura, Nichizo Tech Inc., Kumamoto, Japan

## SESSION 1.3I (DA-10-2)

*Monday, July 17, 2:00 pm – 3:45 pm, Queen's 6*

### HEAT EXCHANGER JOINT INTEGRITY

Developed by: W. Brown, Integrity Engineering Solutions, Dunsborough, WA, Australia; G. Van Zyl, SABIC, Jubail, Saudi Arabia

Chair: W. Brown, Integrity Engineering Solutions, Dunsborough, WA, Australia

Co-Chair: G. Van Zyl, SABIC, Jubail, Saudi Arabia

**PVP2017-65550: QUANTIFYING BOLT RELAXATION DURING HIGH TEMPERATURE OPERATION**

W. Brown, T.-Y. Lim, Integrity Engineering Solutions, Dunsborough, WA, Australia

**PVP2017-65610: EFFECTS OF PARTIAL COOLING ON TIGHTNESS OF HEAT EXCHANGER GIRTH FLANGE**

K. Takahashi, T. Miyashita, S. Kataoka, Y. Uno, T. Sato, JGC Corporation, Yokohama, Japan

**PVP2017-65826: DETERMINATION OF TEMPERATURE LIMITS FOR HEAT EXCHANGER JOINT ASSEMBLED OF SOLID STAINLESS TUBESHEET WITH GIRTH FLANGES**

B. Y. Mohamed, M. A Hamdy, T.I. Eid, Enppi, Cairo, Egypt

**PVP2017-65528: TIGHTENING BOLTS NEAR TO YIELD: FURTHER ANALYSIS OF THE EFFECTS ON MECHANICAL PROPERTIES (Presentation Only)**

R. Noble, Asset55 Ltd., Hebburn, Tyne and Wear, United Kingdom

## SESSION 1.3J (MF-34-1)

*Monday, July 17, 2:00 pm – 3:45 pm, Kona 1*

### SNF CANISTER OVERVIEW & NONDESTRUCTIVE INSPECTION

Symposium on Aging Management and Structural Integrity for Spent Nuclear Fuel Dry Cask Storage and Transportation Systems—Co-Sponsored by Materials & Fabrication and Operations, Applications & Components Technical Committees

Developed by: C. Lissenden, Penn State University, University Park, PA, USA; R. Sindelar, Savannah River National Laboratory, Aiken, SC, USA

Chair: R. Jones, Savannah River National Laboratory, Aiken, SC, USA

Co-Chair: P.-S. Lam, Savannah River National Laboratory, Aiken, SC, USA

**PVP2017-66247: CONTAINER FOR COMMERCIAL SPENT NUCLEAR FUEL**

R. Jones, J. Carter, Savannah River National Laboratory, Aiken, SC, USA

**PVP2017-65920: ROBOTIC INSPECTION SYSTEM FOR SPENT NUCLEAR FUEL STORAGE CANIST (Presentation Only)**

C. Lissenden, S. Choi, H. Cho, Penn State University, University Park, PA, USA; I. Jovanovic, University of Michigan, Ann Arbor, MI, USA; A. Motta, Penn State University, University Park, PA, USA

**PVP2017-65926: ELECTROMAGNETIC ACOUSTIC TRANSDUCER (EMAT) DEVELOPMENT FOR NONDESTRUCTIVE INSPECTION OF SPENT NUCLEAR FUEL STORAGE CANISTERS**

H. Cho, S. Choi, Penn State University, University Park, PA, USA; M. Lindsey, Structural Integrity Associates, State College, PA, USA; C. Lissenden, Penn State University, University Park, PA, USA

## SESSION 1.3K (MF-3-1)

*Monday, July 17, 2:00 pm – 3:45 pm, Kona 2*

### HYDROGEN INFRASTRUCTURE

Developed by: C. San Marchi, Sandia National Laboratories, Livermore, CA, USA

Chair: C. San Marchi, Sandia National Laboratories, Livermore, CA, USA

Co-Chair: M. Schwarz, University of Stuttgart, Stuttgart, Germany  
**PVP2017-66203: OVERVIEW OF U.S. DOE'S FUEL CELL TECHNOLOGIES OFFICE AND REMAINING R&D CHALLENGES (Presentation Only)**

W. James, U.S. Department of Energy, Washington, DC, USA

**PVP2017-65435: A CASE STUDY ON COOLING PIPE OF PRE-COOLER USED FOR 70 MPA HYDROGEN STATION**

S. Okazaki, S. Hamada, Kyushu University, Fukuoka, Japan; H. Itoga, Hydrogen Energy Test and Research Center, Itoshima, Fukuoka, Japan; M. Nakamura, H. Matsunaga, Kyushu University, Fukuoka, Fukuoka, Japan

**PVP2017-65155: INTRODUCTION OF THE SCENARIO HOW TO USE WELDING JOINTS SAFELY IN HIGH PRESSURIZED HYDROGEN GAS**

H. Fukumoto, H. Kobayashi, S. Oshima, K. Kawamata, Japan Petroleum Energy Center, Minato-Ku Tokyo, Japan

**PVP2017-65671: RECENT PROGRESS ON INTERPRETATION OF TENSILE DUCTILITY LOSS FOR VARIOUS AUSTENITIC STAINLESS STEELS WITH EXTERNAL AND INTERNAL HYDROGEN**

O. Takakuwa, J. Yamabe, H. Matsunaga, Kyushu University, Fukuoka, Japan; Y. Furuya, National Institute for Materials Science, Tsukuba-shi, Japan; S. Matsuoka, Kyushu University, Fukuoka, Fukuoka, Japan

## SESSION 1.3L (SE-2-1)

*Monday, July 17, 2:00 pm – 3:45 pm, Kona 3*

### SEISMIC ISOLATION—I

Developed by: S. Fujita, Tokyo Denki University, Tokyo, Japan; O. Furuya, Tokyo Denki University, Saitama, Japan

Chair: S. Fujita, Tokyo Denki University, Tokyo, Japan

Co-Chair: O. Furuya, Tokyo Denki University, Saitama, Japan

**PVP2017-65549: RESEARCH AND DEVELOPMENT OF THREE DIMENSIONAL SEISMIC ISOLATION SYSTEM UTILIZED CONED-DISC-SPRINGS WITH RUBBER BEARINGS**

T. Miyagawa, Japan Atomic Power Company, Tokyo, Japan; T. Watakabe, T. Yamamoto Japan Atomic Energy Agency, Ibaraki, Japan; T. Fukasawa, S. Okamura, Mitsubishi FBR Systems, Shibuya-Ku, Tokyo, Japan

**PVP2017-65557: DEVELOPMENT ON RUBBER BEARINGS FOR SODIUM-COOLED FAST REACTOR (PART 6): PROPOSAL OF NEW TYPE OF HYS-TERESIS MODEL FOR ULTIMATE BEHAVIOR**

T. Fukasawa, S. Okamura, Mitsubishi FBR Systems, Shibuya-Ku, Tokyo, Japan; T. Yamamoto, T. Watakabe, Japan Atomic Energy Agency, Oarai, Higashi-Ibaraki, Ibaraki, Japan

**PVP2017-65655: DEVELOPMENT ON RUBBER BEARINGS FOR SODIUM-COOLED FAST REACTOR (PART 5) NON-LINEAR ANALYTICAL MODELS FOR THICK RUBBER BEARING**

T. Hirotsu, Shimizu Corporation, Tokyo, Japan; T. Mori, Bridgestone Corporation, Yokohama, Kanagawa, Japan; T. Fukasawa, S. Okamura, Mitsubishi FBR Systems, Shibuya-Ku, Tokyo, Japan; T. Yamamoto, Japan Atomic Energy Agency, Oarai, Higashi-Ibaraki, Ibaraki, Japan

**PVP2017-65593: EXPERIMENT VERIFICATION OF SEISMIC ISOLATION DEVICE HAVING CHARGING FUNCTION**

T. Yamaguchi, N. Miura, H. Nakakoji, A. Sone, Kyoto Institute of Technology, Kyoto, Japan

## SESSION 1.3M (HT-6-2)

*Monday, July 17, 2:00 pm – 3:45 pm, Waikoloa Suite 1*

### DESIGN AND ANALYSIS OF HIGH-PRESSURE EQUIPMENT FOR OIL & GAS EXPLORATION AND PRODUCTION

Developed by: K. Karpanan, FMC Technologies Inc., Houston, TX, USA

Chair: K. Karpanan, FMC Technologies Inc., Houston, TX, USA

Co-Chair: M. Shavandi, DNV GL, Katy, TX, USA

**PVP2017-65594: A STUDY ON THE INFLUENCE OF SEA WATER CONVECTIVE HEAT TRANSFER COEFFICIENT IN DESIGN VERIFICATION OF SUBSEA HPHT EQUIPMENT**

A. Sepelhi, S. Harbert, D. Holberry, OneSubsea, Houston, TX, USA

**PVP2017-65772: DEVELOPMENT OF A NOVEL TEST METHOD TO CHARACTERIZE MATERIAL PROPERTIES IN CORROSIVE ENVIRONMENTS FOR SUBSEA HPHT DESIGN**



R. Thodla, DNV GL, Dublin, OH, USA; C. Holtam, R. Saraswat, DNV GL, Katy, TX, USA

**PVP2017-66243: LOAD MONITORING AND CONDITION ASSESSMENT OF HIGH PRESSURE—HIGH TEMPERATURE (HPHT) SUBSEA FACILITIES**

M. Shavandi, F. Tang, DNV GL, Katy, TX, USA

**SESSION 1.3N (SPC-2-4)**

*Monday, July 17, 2:00 pm – 3:45 pm, Waikoloa Suite 2*

**STUDENT PAPER SYMPOSIUM—PHD—II**

Developed by: F. Paolacci, University Roma Tre, Rome, Italy

Chair: F. Paolacci, University Roma Tre, Rome, Italy

Co-Chair: T. Hassan, North Carolina State University, Raleigh, NC, USA

**PVP2017-65072: OPTIMIZING MAINTENANCE STRATEGY OF A REACTOR PRESSURE VESSEL USING 3D-CFD AND FEM BASED PROBABILISTIC PRESSURIZED THERMAL SHOCK ANALYSIS**

X. Ruan, T. Nakasuji, K. Morishita, Kyoto University, Uji, Japan

**PVP2017-65635: FAILURE MODE MAP OF PIPES UNDER DYNAMIC LOADINGS**

M. A. Al Bari, R. Sakemi, N. Kasahara, University of Tokyo, Tokyo, Japan

**PVP2017-65270: PRACTICAL DESIGN OF A HIGH FREQUENCY PHASED-ARRAY ACOUSTIC MICROSCOPE PROBE—A PRELIMINARY STUDY**

J. N. Kim, R. L. Tutwiler, J. A. Todd, Pennsylvania State University, University Park, PA, USA

**PVP2017-65432: THE FATIGUE THRESHOLD COMPUTATION OF STEEL IN HYDROGEN ENVIRONMENT BY SHAKEDOWN ANALYSIS**

S. Huang, Z. Chen, W. Su, Zhejiang University, Hangzhou, Zhejiang, China

**SESSION 1.3O (SPC-1-2)**

*Monday, July 17, 2:00 pm – 3:45 pm, Waikoloa Suite 3*

**STUDENT PAPER COMPETITION—BS/MS—II**

Developed by: R. Noble, Asset55 Ltd., Hebburn, Tyne and Wear, United Kingdom

Chair: R. Noble, Asset55 Ltd., Hebburn, Tyne and Wear, United Kingdom

Co-Chair: Y. Shoji, YS Corporation LLC, Tokyo, Japan

**PVP2017-65561: STUDY ON ULTIMATE BEHAVIOR OF BASE-ISOLATED LAYER IN NUCLEAR FACILITY FOR CLIFF-EDGES EFFECT**

K. Imamura, Tokyo City University, Hiratuka City, Tokyo, Japan; O. Furuya, Tokyo Denki University, Saitama, Japan; K. Goda, Ohtsu Chemical Co., Ltd., Osaka, Japan

**PVP2017-65175: MULTIAXIAL FATIGUE IN DRILL PIPES UNDER NON-PROPORTIONAL LOADING**

N. Helmy, M. Younan, American University in Cairo, Cairo, Egypt

**PVP2017-65473: EMBEDDED ELECTRODE SENSOR ARRAY FOR STRUCTURAL HEALTH MONITORING OF PIPELINE SYSTEMS**

J. Weber, Georgia Institute of Technology, Atlanta, GA, USA; J. Shi, Zhejiang University, Hangzhou, Zhejiang, China; C. Zhang, Georgia Institute of Technology, Atlanta, GA, USA

**PVP2017-65322: VISUALIZATION OF THERMAL FATIGUE DAMAGE DISTRIBUTION WITH SIMPLIFIED STRESS RANGE CALCULATIONS**

J. Miura, T. Fujioka, Y. Shindo, Toyo University, Saitama, Japan

**PVP2017-65109: DESIGN OF A DESKTOP TYPE VIBRATION ISOLAOR SUPPORTED BY FOUR AIR SPRINGS HAVING RESERVOIR TANKS**

Y. Baba, K. Onishi, T. Asami, University of Hyogo, Himeji, Hyogo, Japan

**SESSION 1.3Q (TW-1-1)**

*Monday, July 17, 2:00 pm – 3:45 pm, Kohala 4*

**THE USE OF COMPUTATIONAL FLUID DYNAMICS IN DESIGN (PART 1)**

Developed by: D. L. Stang, Omax Corporation, Kent, WA, USA

Chair: D. L. Stang, Omax Corporation, Kent, WA, USA

Presented by: S. McGuffie, M. Porter, Porter McGuffie, Inc., Lawrence, KS, USA

**SESSION 1.3S (TW-4-3)**

*Monday, July 17, 2:00 pm – 3:45 pm, Grand Promenade*

**TECHNOLOGY DEMONSTRATION FORUM—III**

Developed by: C. Jaske, HSI Group, Inc., Torrance, CA, USA; J. F. Cory, Jr., Siemens PLMS Software, Milford, OH, USA

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**Block 1.4: Monday, July 17, 2017 (4:00 pm – 5:45 pm)**

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**SESSION 1.4A (DA-16-3)**

*Monday, July 17, 4:00 pm – 5:45 pm, Kohala 1*

**ANALYSIS AND REPAIRS OF COKE DRUM SKIRTS**

**2nd International Symposium on Coke Drum Life Cycle Management—Sponsored by Design & Analysis Technical Committee**

Developed by: C. Rodery, BP p.l.c, League City, TX, USA; K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA; A.-H. I. Mourad, United Arab Emirates University, Al Ain, United Arab Emirates; J. Penso, Shell Projects and Technology, Houston, TX, USA

Chair: K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

Co-Chair: A.-H. I. Mourad, United Arab Emirates University, Al Ain, United Arab Emirates

**PVP2017-65807: A COMPARATIVE STUDY OF THE THERMAL-MECHANICAL BEHAVIOR AND FATIGUE LIFE PREDICTIONS OF DIFFERENT COKE DRUM SUPPORT SKIRT DESIGNS**

P. E. Prueter, M. Bifano, S. R. Kummari, The Equity Engineering Group, Inc., Shaker Heights, OH, USA; B. Hantz IV, Valero Energy Corp., San Antonio, TX, USA

**PVP2017-65077: INTRODUCTION TO ACTUAL FIELD REPAIR FOR SKIRT ATTACHMENT PORTION IN COKE DRUM**

T. Murakami, Y. Shishido, Sumitomo Heavy Industries Process Equipment Co., Ltd., Saijo, Ehime, Japan; M. Yoshimoto, Sumitomo Heavy Industries Process Equipment Co. Ltd., Saijo, Ehime, Japan

**PVP2017-65161: WELD REPAIR OF C, CR-MO COKEDRUMS (& PRESSURE VESSELS) WITHOUT PWHT**

A. Kaye, Canadian Natural Resources Ltd., Fort McMurray, AB, Canada; P. Lester, D. Barborak, AZZ WSI, Norcross, GA, USA

**PVP2017-65264: FATIGUE LIFE/RELIABILITY CONSIDERATION DURING FIELD REPAIR OF COKE DRUM/PIPING**

T. S. Chadda, Amec Foster Wheeler, Houston, TX, USA; A. Umakanthan, Reliance Industries Limited, Navi Mumbai, India

**SESSION 1.4B (FSI-2-3)**

*Monday, July 17, 4:00 pm – 5:45 pm, Kohala 2*

**FIV DESIGN FOR INDUSTRY—III**

**Symposium of Flow-Induced Vibration—Sponsored by Fluid-Structure Interaction Technical Committee**

Developed by: D. S. Weaver, McMaster University, Hamilton, ON, Canada; M. Pettigrew, Ecole Polytechnique—Montreal, Deep River, ON, Canada

Co-Chair: N. Mureithi, Polytechnique Montreal, Montreal, QC, Canada

Chair: R. D. Blevins, Independent Consultant, San Diego, CA, USA

**PVP2017-66158: EXPERIMENTAL DAMPING OF A HEAT EXCHANGE TUBE WITH A LARGE NUMBER OF SUPPORTS IN AIR AND WATER**

T. J. Park, C.-H. Ha, M. K. Cho, Doosan Heavy Industries and Construction Company, Changwon, Korea (Republic); H. S. Kang, K. Lee, Korea Atomic Energy Research Institute, Deajeon, Korea (Republic)

**PVP2017-65207: RESEARCH ON TWO-PHASE FLOW INDUCED VIBRATION CHARACTERISTICS OF U-TUBE BUNDLE**

N. Jiang, L. Gao, X. Huang, F. Zang, F.-R. Xiong, Nuclear Power Institute of China, Chengdu, China

**PVP2017-65812: FLOW INDUCED VIBRATION INDUCED FATIGUE OF STRUCTURES PLACED IN A TWO-PHASE GAS/LIQUID FLOW**

P. Diwakar, C. Thomas, Bechtel Corp, Houston, TX, USA; A. Prakash, Bechtel Nuclear Security & Environmental, San Ramon, CA, USA

**PVP2017-65268: TWO WAY COUPLED FIELDS MULTI-PHYSICS MODELING IS INVESTIGATED AS AN ADDITIONAL APPROACH TO ADDRESS FLUID ELASTIC INSTABILITY (Presentation Only)**

M. Breach, US Nuclear Regulatory Commission, Rockville, MD, USA; G. Banyay,



Westinghouse, Ellwood City, PA, USA; Y. Wong, US Nuclear Regulatory Commission, Rockville, MD, USA

### SESSION 1.4C (CS-7-3)

Monday, July 17, 4:00 pm – 5:45 pm, Kohala 3

**ASME SECTION III—RECENT DEVELOPMENTS, ELEVATED TEMPERATURE Symposium on Recent Developments in International Codes and Standards—Sponsored by Codes & Standards Technical Committee**

Developed by: T.-L. Sham, Argonne National Laboratory, Lemont, IL, USA

Chair: T.-L. Sham, Argonne National Laboratory, Lemont, IL, USA

Co-Chair: H. Wang, Oak Ridge National Laboratory, Oak Ridge, TN, USA

**PVP2017-65754: CURRENT STATUS OF THE ASME MATERIALS PROPERTIES DATABASE DEVELOPMENT**

W. Ren, L. Lin, Oak Ridge National Laboratory, Oak Ridge, TN, USA

**PVP2017-66069: TECHNICAL BACKGROUND FOR ALLOY 617 TIME DEPENDENT ALLOWABLE STRESSES**

J. Wright, N. Lybeck, Idaho National Laboratory, Idaho Falls, ID, USA; R. Swindeman, Cromtech Inc., Oak Ridge, TN, USA; R. Jetter, RI Jetter Consulting, Pebble Beach, CA, USA; T.-L. Sham, Argonne National Laboratory, Lemont, IL, USA

**PVP2017-65274: DEVELOPMENT OF SOFTWARE FOR THE IMPLEMENTATION OF ELASTIC AND SIMPLIFIED INELASTIC RULES FOR DESIGN OF CLASS A NUCLEAR COMPONENTS IN ELEVATED TEMPERATURE SERVICE**

M. Swindeman, Stress Engineering Services Inc., Mason, OH, USA; T.-L. Sham, Argonne National Laboratory, Lemont, IL, USA; R. Jetter, RI Jetter Consulting, Pebble Beach, CA, USA

**PVP2017-66070: TECHNICAL BACKGROUND FOR ALLOY 617 ISOCHRONOUS STRESS STRAIN CURVES (Presentation Only)**

N. Lybeck, Idaho National Laboratory, Idaho Falls, ID, USA; T.-L. Sham, Argonne National Laboratory, Lemont, IL, USA; J. Wright, Idaho National Laboratory, Idaho Falls, ID, USA; R. Swindeman, Cromtech Inc., Oak Ridge, TN, USA; R. Jetter, RI Jetter Consulting, Pebble Beach, CA, USA

### SESSION 1.4D (FSI-6-1)

Monday, July 17, 4:00 pm – 5:45 pm, King's 1

**IMPACT AND BLAST LOADINGS**

Developed by: D. Gross, Dominion Engineering, Reston, VA, USA; M. Edel, Baker Engineering and Risk Consultants, San Antonio, TX, USA; H. Levine, Thornton Tomasetti, Cupertino, CA, USA; K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

Chair: D. Gross, Dominion Engineering, Reston, VA, USA

Co-Chair: M. Edel, Baker Engineering and Risk Consultants, San Antonio, TX, USA

**PVP2017-65517: MODELING OF HYPERVELOCITY IMPACT EXPERIMENTS USING GAMMA-SPH TECHNIQUE**

J. Limido, Impetus, Grenade, France; B. O'Toole, University of Nevada Las Vegas, Las Vegas, NV, USA; M. Trabia, S. Roy, R. Jennings, University of Nevada, Las Vegas, Las Vegas, NV, USA

**PVP2017-66110: NUMERICAL SIMULATION OF TORNADO MISSILE IMPACT ON STEEL STACKS**

G. Antaki, Becht Engineering Co., Inc., Aiken, SC, USA; R. Gilada, Luminant, Cleburne, TX, USA; D. Pease, Becht Engineering, Chino Valley, AZ, USA

**PVP2017-65186: EVALUATION OF BLAST LOADS FROM PIPE RUPTURES**

J. Geng, J. K. Thomas, Baker Engineering and Risk Consultants, Inc., San Antonio, TX, USA

**PVP2017-65205: BLAST RESILIENT DESIGN OF INFRASTRUCTURE SUBJECTED TO GROUND THREATS**

S. Salem, M. Campidelli, W. El-Dakhkhni, M. Tait, McMaster University, Hamilton, ON, Canada

### SESSION 1.4E (CS-1-3)

Monday, July 17, 4:00 pm – 5:45 pm, King's 2

**STRUCTURAL INTEGRITY OF PRESSURE COMPONENTS—III**

**Symposium on Structural Integrity—Co-Sponsored by Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: S. Xu, Kinectrics Inc., Toronto, ON, Canada; M. Benson, U.S. Nuclear Regulatory Commission, Rockville, MD, USA

Chair: K. Nikbin, Imperial College London, London, United Kingdom

Co-Chair: S. Xu, Kinectrics Inc., Toronto, ON, Canada

**PVP2017-66272: THERMAL ANALYSIS OF GIRTH WELDED JOINTS OF DIS-SIMILAR METALS IN PIPES WITH VARYING CLAD THICKNESSES**

B. Kogo, B. Wang, L. Wrobel, M. Chizari, Brunel University London, London, Middlesex, United Kingdom

**PVP2017-65108: STEAM GENERATOR GRADE P91 STEEL COMPONENTS CREEP-ASSESSMENT THROUGH A PROCEDURE FOR THE ITALIAN CODE APPLICATION AND COMPARISON WITH THE ECCC RECOMMENDATIONS, AMERICAN STANDARD**

O. Grisolia, INAIL, Rome, Italy, L. Scano, Studio Scano Associato, Udine, UD, Italy

**PVP2017-65521: A COMPARATIVE STUDY OF CONCENTRICALLY AND ECCENTRICALLY PIERCED FLAT UNSTAYED HEADS**

D. Chandiramani, Independent Consultant, Mumbai, India; S. Gopalakrishnan, A. Mathkar, Lloyd's Register Asia, Thane, Maharashtra, India; S. Nawandar, Fluor Daniel India Pvt Ltd., Gurgaon, Haryana, India

### SESSION 1.4F (MF-19-3)

Monday, July 17, 4:00 pm – 5:45 pm, King's 3

**CREEP AND CREEP-FATIGUE INTERACTION—III**

**Symposium on Fatigue Issues—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: C. M. Davies, Imperial College London, London, United Kingdom; R. Dennis, Frazer-Nash Consultancy, Avon, United Kingdom

Chair: C. M. Davies, Imperial College London, London, United Kingdom

Co-Chair: R. Dennis, Frazer-Nash Consultancy, Avon, United Kingdom

**PVP2017-65495: EXPERIMENTAL AND NUMERICAL INVESTIGATION ON CREEP CRACK GROWTH BEHAVIOR OF BRAZED JOINT**

Y. Luo, W. Jiang, China University of Petroleum (East China), Qingdao, China

**PVP2017-65908: COMPARATIVE CREEP LIFE EVALUATION OF HR3C USING CREEP DAMAGE MODELS**

S.-J. Kang, H. Lee, M. Kim, J. B. Choi, Sungkyunkwan University, Kyungi-do, Korea (Republic)

**PVP2017-65849: UNIFIED VISCOPLASTIC MODEL COUPLED WITH DAMAGE FOR EVALUATION OF CREEP-FATIGUE OF GRADE 91 STEEL**

N. Islam, North Carolina State University, Raleigh, NC, USA; D. Dewees, Babcock & Wilcox, Barberton, OH, USA; T. Hassan, North Carolina State University, Raleigh, NC, USA

**PVP2017-65389: MEAN STRESS RELAXATION PROCESS OF 9-12% CR STEEL AT HIGH TEMPERATURE: INTERNAL STRESSES AND DISLOCATION PATTERNS**

P. Zhao, F.-Z. Xuan, D.-L. Wu, East China University of Science and Technology, Shanghai, China

### SESSION 1.4G (MF-2-3)

Monday, July 17, 4:00 pm – 5:45 pm, Queen's 4

**APPLICATION OF FRACTURE MECHANICS IN FAILURE ASSESSMENT—III**

**Symposium on Fracture Mechanics and Analysis—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: G. H. B. Donato, Centro Universitário da FEI, Sao Paulo, Brazil; A. Jesus, University of Porto, Porto, Portugal

Chair: P. Doddihal, Kinectrics Inc., Toronto, ON, Canada

Co-Chair: L. Xue, Thinkviewer LLC, Sugar Land, TX, USA

**PVP2017-65024: WIDE RANGE COMPLIANCE SOLUTIONS FOR VARIOUS FRACTURE TEST SPECIMENS USING CRACK MOUTH OPENING DIS-PLACEMENT**

C. Ruggieri, R. Souza, University of Sao Paulo, Sao Paulo, SP, Brazil

**PVP2017-65406: IMPROVED ELASTIC COMPLIANCE EQUATION AND ITS INVERSE SOLUTION FOR COMPACT TENSION SPECIMENS**

X.-K. Zhu, Edison Welding Institute, Columbus, OH, USA

**PVP2017-65860: NEW METHOD FOR MESH SIZE SENSITIVITY MITIGATION IN NUMERICAL SIMULATION OF DUCTILE FRACTURE (Presentation Only)**

L. Xue, Thinkviewer LLC, Sugar Land, TX, USA

**PVP2017-66096: PREDICTION OF DUCTILE MATERIAL FAILURE BY USING INNOVATIVE DAMAGE MECHANICS CONCEPTS**

S. Schaffrath, M. Feldmann, V. Brinzel, D. Novokshanov, S. Münstermann, RWTH Aachen University, Aachen, NRW, Germany

### SESSION 1.4H (OAC-6-2)

Monday, July 17, 4:00 pm – 5:45 pm, Queen's 5

#### LIFE CYCLE MANAGEMENT OF REFINERY PRESSURE VESSELS—FITNESS FOR SERVICE

**Symposium on Life Cycle Management—Co-Sponsored by High-Pressure Technology and Operations, Applications & Components Technical Committees**

Developed by: T. Tahara, T&T Technology, Saitama Pref, Japan; H. Takauchi, Kobe Steel, Ltd., Fujisawa, Kanagawa, Japan

Chair: T. Tahara, T&T Technology, Saitama Pref, Japan

Co-Chair: H. Takauchi, Kobe Steel, Ltd., Fujisawa, Kanagawa, Japan

#### PVP2017-65160: EFFECTS OF NUT THINNING DUE TO CORROSION ON THE SEALING PERFORMANCE IN BOLTED FLANGE JOINTS UNDER INTERNAL PRESSURE (Presentation Only)

T. Kikuchi, Idemitsu Kosan Co., Ltd., Chiba, Japan; H. Tsuji, D. Tsurumi, Tokyo Denki University, Tokyo, Japan

#### PVP2017-65194: REMAINING LIFE ASSESSMENT OF AN EXTERNAL PRESSURE VESSEL IN CREEP RANGE AND INSPECTION FINDINGS

Y. Ishizaki, F. Yonekawa, T. Yumoto, T. Suzuki, S. Hijikawa, Idemitsu Kosan Co., Ltd., Chiba, Japan

#### PVP2017-65346: SERVICEABILITY ASSESSMENT FOR SAFE OPERATION OF HYDROPROCESSING REACTORS BY FFS (LEVEL 3 ASSESSMENT OF CRACK-LIKE FLAWS) (Presentation Only)

A. Yasutomi, The Japan Steel Works, Ltd., Hokkaido, Japan

#### PVP2017-65805: A FRACTURE MECHANICS-BASED APPROACH TO ESTABLISH MINIMUM PRESSURIZATION TEMPERATURE ENVELOPES

P. E. Prueter, S. R. Kummari, D. Osage, The Equity Engineering Group, Inc., Shaker Heights, OH, USA

### SESSION 1.4I (DA-10-3)

Monday, July 17, 4:00 pm – 5:45 pm, Queen's 6

#### JOINT ASSEMBLY CONSIDERATIONS

Developed by: W. Brown, Integrity Engineering Solutions, Dunsborough, WA, Australia; R. Noble, Asset55 Ltd., Hebburn, Tyne and Wear, United Kingdom

Chair: R. Noble, Asset55 Ltd., Hebburn, Tyne and Wear, United Kingdom

Co-Chair: G. Van Zyl, SABIC, Jubail, Saudi Arabia

#### PVP2017-65993: A HISTORY OF THE TARGET TORQUE VALUES FROM ASME PCC-1 AND FUTURE DIRECTION

C. Rodery, BP p.l.c, League City, TX, USA

#### PVP2017-65506: FACTORS INFLUENCING NUT FACTOR TEST RESULTS

S. Long, W. Brown, Integrity Engineering Solutions, Dunsborough, WA, Australia

#### PVP2017-65800: DETERMINING ACCURACY AND REPEATABILITY OF TORQUE THROUGH POWERED EQUIPMENT

S. Hamilton, Hex Technology, Austin, TX, USA; B. Hantz IV, Valero Energy Corp., San Antonio, TX, USA; J. Wright, CHS, McPherson, KS, USA

#### PVP2017-65087: STUDY OF REACTOR INTERNAL BOLT BEHAVIORS UNDER LATERAL LOADS

Y.J. Gao, S. Feng, Q. Yu, Shanghai Nuclear Engineering Research & Design Institute, Shanghai, China; B. Chen, Zhejiang University of Technology, Hangzhou, China; S. Lin, Shanghai Nuclear Engineering Research & Design Institute, Shanghai, China

### SESSION 1.4J (MF-34-2)

Monday, July 17, 4:00 pm – 5:45 pm, Kona 1

#### SNF CANISTER STRUCTURAL INTEGRITY ASSESSMENTS

**Symposium on Aging Management and Structural Integrity for Spent Nuclear Fuel Dry Cask Storage and Transportation Systems—Co-Sponsored by Materials & Fabrication and Operations, Applications & Components Technical Committees**

Developed by: P.-S. Lam, Savannah River National Laboratory, Aiken, SC, USA; Y.-J. Kim, Korea University, Seoul, Korea (Republic); A. Jesus, University of Porto, Faculty of Engineering, Porto, Portugal

Chair: A. Duncan, Savannah River National Laboratory, Aiken, SC, USA

Co-Chair: R. Jones, Savannah River National Laboratory, Aiken, SC, USA

#### PVP2017-66055: BOUNDING SURFACE FLAW CONFIGURATION SUSCEPTIBLE TO STRESS CORROSION CRACKING UNDER WELDING RESIDUAL STRESS IN A MULTIPLE-PURPOSE CANISTER

P.-S. Lam, R. Sindelar, A. Duncan, J. Carter, Savannah River National Laboratory, Aiken, SC, USA

#### PVP2017-66105: CRACK GROWTH RATE TESTING WITH INSTRUMENTED BOLT-LOAD COMPACT TENSION SPECIMENS UNDER CHLORIDE-INDUCED STRESS CORROSION CRACKING CONDITIONS IN SPENT NUCLEAR FUEL CANISTERS

A. Duncan, P.-S. Lam, R. Sindelar, J. Carter, Savannah River National Laboratory, Aiken, SC, USA

#### PVP2017-65968: RETARDATION EFFECT OF CYCLIC OVERLOAD ON STRESS CORROSION CRACK GROWTH IN STAINLESS STEEL

T. Saito, T. Hayashi, M. Itow, C. Narazaki, Toshiba Corporation, Yokohama, Kanagawa, Japan

#### PVP2017-66152: SPENT FUEL CANISTER PROBABILISTIC CONFINEMENT INTEGRITY ASSESSMENT

J. Broussard, Dominion Engineering, Inc., Reston, VA, USA; S. Chu, Electric Power Research Institute, San Francisco, CA, USA; K. Fuhr, Dominion Engineering, Inc., Reston, VA, USA

### SESSION 1.4K (MF-3-2)

Monday, July 17, 4:00 pm – 5:45 pm, Kona 2

#### DEVELOPMENT OF METHODS FOR EVALUATING MATERIALS FOR HYDROGEN SERVICE

Developed by: C. San Marchi, Sandia National Laboratories, Livermore, CA, USA

Chair: K. Nibur, Hy-Performance Materials Testing, LLC., Bend, OR, USA

Co-Chair: U. B. Baek, Korea Research Institute of Standards and Science, Daejeon, Korea (Republic)

#### PVP2017-65505: EVALUATION OF THE INTERNAL HYDROGEN-INDUCED THRESHOLD STRESS INTENSITY FACTOR IN 2.25CR-1MO STEELS DETERMINED BY THE OFFSET POTENTIAL DROP METHOD

S. Konosu, Ibaraki University, Hitachi, Ibaraki, Japan; T. Inoue, Nippon Steel & Sumitomo Metal Corporation, Futtsu, Chiba, Japan; Y. Murakami, JFE Steel Corporation, Kawasaki, Japan

#### PVP2017-66121: SCANNING KELVIN PROBE FORCE MICROSCOPY STUDY OF HYDROGEN DISTRIBUTION AND EVOLUTION IN DUPLEX STAINLESS STEEL

B. An, National Institute of Advanced Industrial Science and Technology, Tsukuba, Ibaraki, Japan; Z. Hua, Zhejiang University, Hangzhou, Zhejiang, China; T. Iijima, National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan; C. Gu, J. Zheng, Zhejiang University, Hangzhou, Zhejiang, China

#### PVP2017-66185: HYDROGEN EFFECT ON THE DEFORMATION BEHAVIOR OF AUSTENITIC STAINLESS STEELS INVESTIGATED BY NANOINDENTATION

L. Zhang, Y. Hong, J. Zheng, Zhejiang University of Technology, Hangzhou, China; B. An, National Institute of Advanced Industrial Science and Technology, Tsukuba, Ibaraki, Japan; C. Zhou, Zhejiang University of Technology, Hangzhou, Zhejiang, China

#### PVP2017-66136: APPLICATION OF SMALL PUNCH TEST METHOD TO SCREENING GAS HYDROGEN EMBRITTLEMENT BEHAVIORS IN STRUCTURAL STEELS (Presentation Only)

H.-S. Shin, K.-O. Bae, Andong National University, Andong, Gyeongbuk, Korea (Republic); H. M. Lee, J.-S. Park, S. H. Nahm, Korea Research Institute of Standards and Science, Daejeon, Korea (Republic)

### SESSION 1.4L (SE-2-3)

Monday, July 17, 4:00 pm – 5:45 pm, Kona 3

#### SEISMIC ISOLATION—II

Developed by: O. Furuya, Tokyo Denki University, Saitama, Japan; T. Matsuoka, Meiji University, Kawasaki, Kanagawa, Japan

Chair: O. Furuya, Tokyo Denki University, Saitama, Japan

Co-Chair: T. Matsuoka, Meiji University, School of Science and Technology, Kawasaki, Japan

**PVP2017-65156: FUZZY SEMI-ACTIVE CONTROL OF MULTI-DEGREE-OF-FREEDOM STRUCTURE USING MAGNETORHEOLOGICAL ELASTOMERS**

X. B. Nguyen, T. Komatsuzaki, Y. Iwata, H. Asanuma, Kanazawa University, Kanazawa, Ishikawa, Japan

**PVP2017-65922: VARIABLE INERTIA DAMPER USING MR FLUID—PART II: IMPROVEMENT OF INERTIA EFFECT**

T. Matsuoka, N. Abe, Meiji University, Kawasaki, Kanagawa, Japan; K. Hiramoto, Niigata University, Niigata, Japan; K. Sunakoda, Akita University, Saitama, Japan

**PVP2017-66262: RECENT EXPERIMENTAL STUDIES TO ASSESS THE ULTIMATE FAILURE CRITERIA & FAILURE PROBABILITIES OF PIPES IN SEISMICALLY ISOLATED NPPS IN KOREA (Presentation Only)**

D. Hahm, M. K. Kim, Korea Atomic Energy Research Institute, Daejeon, Korea (Republic)

**PVP2017-65713: IMPROVEMENT OF SEISMIC RESISTANCE PERFORMANCE OF THERMAL POWER PLANTS BY APPLYING VIBRATION CONTROL DAMPERS**

K. Fushimi, S. Fujita, Tokyo Denki University, Tokyo, Japan; K. Minagawa, Saitama Institute of Technology, Saitama, Japan

**SESSION 1.4M (HT-5-3)**

*Monday, July 17, 4:00 pm – 5:45 pm, Waikoloa Suite 1*

**20TH ANNIVERSARY OF BPVC SECTION VIII DIVISION 3—HOW WE GOT HERE AND WHERE WE ARE GOING**

**Symposium on 20th Anniversary of ASME BPVC Section VIII Div. 3—Sponsored by High Pressure Technology Technical Committee**

Developed by: A. Maslowski, ASME, New York, NY, USA

Chair: A. Maslowski, ASME, New York, NY, USA

Co-Chair: K. Karpanan, FMC Technologies Inc., Houston, TX, USA

**PVP2017-66082: DEVELOPMENT OF JAPANESE HIGH PRESSURE VESSEL STANDARD HPIS C106 WITH ASME SECTION VIII DIVISION 3**

S. Terada, Kobe Steel, Ltd., Takasago, Hyogo, Japan

**PVP2017-65119: OVERVIEW OF REVISIONS TO THE ASME BOILER AND PRESSURE VESSEL CODE SECTION VIII DIVISION 3 FOR THE 2017 EDITION AND THE NEAR FUTURE**

D. Peters, Structural Integrity Associates, Edinboro, PA, USA; A. Maslowski, ASME, New York, NY, USA; G. Mital, Flow International Corp, Kent, WA, USA

**PVP2017-66021: ADOPTION OF THE COMPOSITE REINFORCED PRESSURE VESSELS (CRPV) INTO THE ASME BPV CODE**

R. Biel, Lord & Biel, LLC, Cypress, TX, USA; G. Cano, Transcanada Pipelines, Calgary, AB, Canada

**SESSION 1.4N (FSI-1-1)**

*Monday, July 17, 4:00 pm – 5:45 pm, Waikoloa Suite 2*

**LEAKS AND CRACKS**

Developed by: J. C. Jo, Pusan National University, Busan, Korea (Republic); A. Tijsseling, TU Eindhoven, Eindhoven, Netherlands; C. S. Martin, Georgia Institute of Technology, South Dennis, MA, USA

Chair: J. C. Jo, Pusan National University, Busan, Korea (Republic)

Co-Chair: A. Tijsseling, TU Eindhoven, Eindhoven, Netherlands

**PVP2017-65360: INVESTIGATION OF LEAKAGE RATES IN PRESSURE RETAINING PIPING**

F. E. Silber, X. Schuler, S. Weihe, University of Stuttgart, Stuttgart, Baden-Württemberg, Germany; S. Schmid, Institute of Nuclear Technology and Energy Systems, Stuttgart, Germany; R. Kulenovic, University of Stuttgart, Stuttgart, Baden-Württemberg, Germany

**PVP2017-65404: SURFACE ROUGHNESS 3D MODELLING AND ITS ASSOCIATION WITH LEAK TIGHTNESS FOR A METAL-TO-METAL CONTACTING SURFACE**

A. Anwar, W. Dempster, Y. Gorash, D. Nash, University of Strathclyde, Glasgow, Scotland

**PVP2017-66153: MONITORING CRACK PROPAGATION OF HIGH PRESSURE AND HIGH TEMPERATURE COMPONENTS BY MULTIPHYSICS NUMERICAL ANALYSIS APPROACH**

H. A. Moghaddam, P. Mertiny, University of Alberta, Edmonton, AB, Canada

**SESSION 1.4O (SPC-1-3)**

*Monday, July 17, 4:00 pm – 5:45 pm, Waikoloa Suite 3*

**STUDENT PAPER COMPETITION—PHD—I**

Developed by: Y. Shoji, YS Corporation LLC, Tokyo, Japan

Chair: Y. Shoji, YS Corporation LLC, Tokyo, Japan

Co-Chair: R. Noble, Asset55 Ltd., Hebburn, Tyne and Wear, United Kingdom

**PVP2017-65097: DUCTILE DAMAGE ASSESSMENT USING CONTINUUM DAMAGE MECHANICS AND METHODOLOGY FOR HIGH STRAIN-RATE DAMAGE ANALYSIS**

A. Sancho, P. A. Hooper, C. M. Davies, Imperial College London, London, United Kingdom

**PVP2017-65383: FRACTURE TOUGHNESS TESTING OF A LOW ALLOY STRUCTURAL STEEL USING NON-STANDARD BEND SPECIMENS AND AN EXPLORATORY APPLICATION TO DETERMINE THE REFERENCE TEMPERATURE,  $T_0$**

V. S. Barbosa, C. Ruggieri, University of Sao Paulo, Sao Paulo, Brazil

**PVP2017-65403: 3D MICRO-MACRO FLUID-STRUCTURE MODEL OF PRESSURE RELIEF VALVE LEAK TIGHTNESS**

A. Anwar, W. Dempster, Y. Gorash, University of Strathclyde, Glasgow, Scotland

**PVP2017-65453: AN ANALYTICAL APPROACH FOR STRAIN ANALYSIS OF BURIED STEEL PIPELINE IN MINING SUBSIDENCE AREAS**

M. Xia, H. Zhang, China University of Petroleum, Beijing, China

**SESSION 1.4Q (TW-1-2)**

*Monday, July 17, 4:00 pm – 5:45 pm Kohala 4*

**THE USE OF COMPUTATIONAL FLUID DYNAMICS IN DESIGN (PART 2)**

Developed by: D. L. Stang, Omax Corporation, Kent, WA, USA

Chair: D. L. Stang, Omax Corporation, Kent, WA, USA

Presented by: S. McGuffie, M. Porter, Porter McGuffie, Inc., Lawrence, KS, USA

**SESSION 1.4S (TW-4-4)**

*Monday, July 17, 4:00 pm – 5:45 pm, Grand Promenade*

**TECHNOLOGY DEMONSTRATION FORUM 4**

Developed by: C. Jaske, HSI Group, Inc., Torrance, CA, USA; J. F. Cory, Jr., Siemens PLMS Software, Milford, OH, USA

**TUESDAY, JULY 18**

**Block 2.1: Tuesday, July 18, 2017 (8:30 am – 10:15 am)**

**SESSION 2.1A (DA-16-4)**

*Tuesday, July 18, 8:30 am – 10:15 am, Kohala 1*

**COKE DRUM REPAIRS—MATERIALS AND WELDING ASPECTS**

**2nd International Symposium on Coke Drum Life Cycle Management—Sponsored by Design & Analysis Technical Committee**

Developed by: C. Rodery, BP p.l.c, League City, TX, USA; K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA; J. Penso, Shell Projects and Technology, Houston, TX, USA

Chair: J. Bedoya, Stress Engineering Services Inc., Houston, TX, USA

Co-Chair: A. Kaye, Canadian Natural Resources Ltd., Fort McMurray, AB, Canada

**PVP2017-65412: ASSESSMENT OF THE INFLUENCE OF THE USE OF WELD OVERLAY AS A REPAIR METHOD ON THE STRESS LEVEL OF BULGED SECTIONS OF COKE DRUMS**

G. A. Vivas, A. J. Moret, R. E. Bello, PDVSA Intevep, Los Teques, Miranda, Venezuela; L. M. Melian, PDVSA Petrocedaño, Jose, Anzoátegui, Venezuela; E. D. Araque, CIA Inspection, Hannon, ON, Canada

**PVP2017-66118: JAGGED CRACKING IN THE HEAT-AFFECTED ZONE OF WELD OVERLAY ON COKE DRUM CLADDING**

Y. Suzuk, Suncor Energy Inc., Calgary, AB, Canada; L. Li, University of Alberta, Edmonton, AB, Canada; M. M. Garcia, D. Ting, S. Yuen, Suncor Energy Inc., Calgary, AB, Canada



**PVP2017-65914: MICROSTRUCTURAL CHARACTERIZATION OF BASE MATERIAL AND HEAT AFFECTED ZONES OF SERVICED AND NON-SERVICED COKE DRUMS (Presentation Only)**

S. Romo, J.P. Oliveira, The Ohio State University, Columbus, OH, USA; J. Bedoya, Stress Engineering Services Inc., Houston, TX, USA; D. Barborak, AZZ WSI, Norcross, GA, USA; J. Penso, Shell Projects and Technology, Houston, TX, USA

**PVP2017-65918: LOW-CYCLE FATIGUE THERMO-MECHANICAL TESTING FOR COKE DRUM SERVICE (Presentation Only)**

S. Romo, J.P. Oliveira, The Ohio State University, Columbus, OH, USA; J. Bedoya, Stress Engineering Services Inc., Houston, TX, USA; D. Barborak, AZZ WSI, Norcross, GA, USA; J. Penso, Shell Projects and Technology, Houston, TX, USA

**SESSION 2.1B (FSI-2-4)**

*Tuesday, July 18, 8:30 am – 10:15 am, Kohala 2*

**PIPING & ACOUSTICS—I**

**Symposium of Flow-Induced Vibration—Sponsored by Fluid-Structure Interaction Technical Committee**

Developed by: S. Ziada, McMaster University, Hamilton, ON, Canada; A. Mohany, University of Ontario Institute of Technology, Oshawa, ON, Canada

Chair: H. Goyder, Cranfield University, Swindon, United Kingdom

Co-Chair: A. Mohany, University of Ontario Institute of Technology, Oshawa, ON, Canada

**PVP2017-65189: EXPANSION OF MULTI-PURPOSE STEAM FACILITY AND APPLICATION TO ACOUSTIC RESONANCE IN A CLOSED SIDE BRANCH INVESTIGATING EFFECTS OF STATIC PRESSURE UNDER WET STEAM FLOW**  
Y. Uchiyama, R. Morita, Central Research Institute of Electric Power Industry, Yokosuka-Shi, Kanagawa, Japan

**PVP2017-65244: CONSIDERATIONS IN STEAM PIPING DESIGN FOR PREVENTION OF AN ACOUSTIC RESONANCE AT A CLOSED SIDE BRANCH**  
R. Morita, Y. Uchiyama, F. Inada, Central Research Institute of Electric Power Industry, Yokosuka-Shi, Kanagawa, Japan; S. Takahashi, Hitachi, Ltd., Hitachi, Japan

**PVP2017-65732: ACOUSTICAL CHARACTERISTICS OF SINGLE AND TWO-PHASE HORIZONTAL PIPE FLOW THROUGH AN ORIFICE**

S. Belfroid, TNO, Delft, Netherlands

**PVP2017-65933: TOWARDS UNDERSTANDING TWO-PHASE FLOW-INDUCED VIBRATION OF PIPING STRUCTURE WITH FLOW RESTRICTING ORIFICES**

O. Bamidele, W. Ahmed, M. Hassan, University of Guelph, Guelph, ON, Canada

**SESSION 2.1C (CS-10-1)**

*Tuesday, July 18, 8:30 am – 10:15 am, Kohala 3*

**RECENT DEVELOPMENTS IN JAPANESE FITNESS-FOR-SERVICE RULES Symposium on Recent Developments in International Codes and Standards—Sponsored by Codes & Standards Technical Committee**

Developed by: D. Rudland, U.S. Nuclear Regulatory Commission, Frederick, MD, USA; Y. Li, Japan Atomic Energy Agency, Ibaraki-Ken, Japan  
Chair: D. Rudland, U.S. Nuclear Regulatory Commission, Frederick, MD, USA

Co-Chair: Y. Li, Japan Atomic Energy Agency, Ibaraki-Ken, Japan; S. Asada, Mitsubishi Heavy Industries, Ltd., Kobe, Japan; N. Miura, Central Research Institute of Electric Power Industry, Yokosuka, Japan

**PVP2017-66183: SENSITIVITY ANALYSIS OF CRACK SHAPE ON SCREENING PARAMETER IN JSME FFS RULES FOR NUCLEAR POWER PLANTS**  
N. Miura, Central Research Institute of Electric Power Industry, Yokosuka, Japan; K. Hojo, Mitsubishi Heavy Industries Ltd., Kobe, Japan

**PVP2017-65314: SCREENING CRITERIA OF FRACTURE ASSESSMENT METHODS FOR PIPES HAVING A CIRCUMFERENTIAL SURFACE FLAW**  
H. Machida, T. Kato, Tepco Systems Corporation, Tokyo, Japan

**PVP2017-66092: CLOSED-FORM STRESS INTENSITY FACTOR SOLUTIONS FOR DEEP SURFACE FLAWS IN PLATES**  
K. Azuma, Y. Li, K. Hasegawa, Japan Atomic Energy Agency, Ibaraki-Ken, Japan; S. Xu, Kinectrics Inc., Toronto, ON, Canada

**PVP2017-65958: BENCHMARK ANALYSES USING PROBABILISTIC FRACTURE MECHANICS ANALYSIS CODES PASCAL AND FAVOR (Presentation**

Only)

K. Arai, J. Katsuyama, Y. Li, Japan Atomic Energy Agency, Ibaraki-Ken, Japan

**SESSION 2.1D (FSI-6-2)**

*Tuesday, July 18, 8:30 am – 10:15 am, King's 1*

**FLUID TRANSIENT AND BLAST LOADINGS**

Developed by: M. Edel, Baker Engineering and Risk Consultants, San Antonio, TX, USA; D. Gross, Dominion Engineering, Reston, VA, USA; H. Levine, Thornton Tomasetti, Cupertino, CA, USA; K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

Chair: M. Edel, Baker Engineering and Risk Consultants, San Antonio, TX, USA

Co-Chair: D. Gross, Dominion Engineering, Reston, VA, USA

**PVP2017-65146: APPLICATION OF ONE-DIMENSIONAL HYDROGEN EVENT PRESSURE PULSE PROPAGATION AND DIMINISHMENT MODEL TO ANALYSIS AND DESIGN OF HANFORD WTP PIPING**

A. Pellman, J. Collin, Dominion Engineering Inc., Reston, VA, USA; J. Minichiello, Bechtel National, Inc., Richland, WA, USA

**PVP2017-65187: BLAST WALL SHIELDING EFFECTIVENESS**

J. Geng, J. K. Thomas, Baker Engineering and Risk Consultants, Inc., San Antonio, TX, USA

**PVP2017-65301: RESILIENCE ASSESSMENT OF MASONRY WALLS UNDER EXPLOSIVE LOADING**

M. Campidelli, W. El-Dakhakhni, M. Tait, McMaster University, Hamilton, ON, Canada; W. Mekky, Bruce Power, Tiverton, ON, Canada

**PVP2017-65234: INVESTIGATION ON THE LOADING CHARACTERISTICS IN PROOF UNITS**

L. Zhang, Q. Dong, S. Yang, Institute of Chemical Materials, China Academy of Engineering Physics, Mianyang, China

**SESSION 2.1E (MF-25-1)**

*Tuesday, July 18, 8:30 am – 10:15 am, King's 2*

**ASIAN PROGRAM IN STRUCTURAL INTEGRITY—I**

**Symposium on Structural Integrity—Co-Sponsored by Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: G. Qian, Paul Scherrer Institute, Villigen-Psi, Switzerland; Y. Chao, University of South Carolina, Columbia, SC, USA; P.-S. Lam, Savannah River National Laboratory, Aiken, SC, USA; S. B. Leen, National University of Ireland Galway, Galway, Ireland

Chair: G. Qian, Paul Scherrer Institute, Villigen-Psi, Switzerland

Co-Chair: Y. Chao, University of South Carolina, Columbia, SC, USA

**PVP2017-65979: CONSTRAINT ASSESSMENT FOR SPECIMENS TESTED UNDER UNIAXIAL AND BIAXIAL LOADING CONDITIONS**

Y. Cao, Shanghai Nuclear Engineering Research and Design Institute, Shanghai, China; G. Qian, Paul Scherrer Institute, Villigen-Psi, Switzerland; Y. He, Shanghai Nuclear Engineering Research and Design Institute, Shanghai, China; Y. Chao, University of South Carolina, Columbia, SC, USA; M. Niffenegger, Paul Scherrer Institute, Villigen, Switzerland

**PVP2017-66202: FRACTURE MECHANICS ANALYSES OF EMBEDDED CRACKS UNDER PTS AND EFFECTS OF RESIDUAL STRESSES**

G. Qian, Paul Scherrer Institute, Villigen-Psi, Switzerland; V.F. González-Albuixech, CIIM Universitat Politècnica de València, Valencia, Spain; M. Niffenegger, Paul Scherrer Institute, Villigen, Switzerland

**PVP2017-65484: ESTIMATION OF Q345R FRACTURE TOUGHNESS BASED ON MASTER CURVE**

L. Gui, X. Tong, B. Shou, H. Yu, China Special Equipment Inspection and Research Institute, Beijing, China

**PVP2017-65129: ROOM TEMPERATURE CREEP BEHAVIOR AND ITS EFFECT ON TENSILE PROPERTIES IN CP-TI**

L. Chang, C. Zhou, X.-H. He, Nanjing Tech University, Nanjing, China

**SESSION 2.1F (MF-18-1)**

*Tuesday, July 18, 8:30 am – 10:15 am, King's 3*

**FATIGUE AND FRACTURE OF WELDS AND HEAT AFFECTED ZONES—I**

**Symposium on Fatigue Issues—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: M. Kerr, Naval Nuclear Laboratory, Niskayuna, NY, USA; D. J.

Shim, Structural Integrity Associates, San Jose, CA, USA  
Chair: M. Kerr, Naval Nuclear Laboratory, Niskayuna, NY, USA  
Co-Chair: D. J. Shim, Structural Integrity Associates, San Jose, CA, USA  
**PVP2017-65422: HOT TAPPING IN OIL REFINERIES—CORROSION AND MATERIAL CONCERNS**

C. Shargay, Fluor Enterprises Inc., Aliso Viejo, CA, USA; K. Daru, Fluor Enterprises, Inc., Sugar Land, TX, USA; J. Desai, Fluor Daniel India PVT. Limited, New Delhi, Haryana, India

**PVP2017-65541: WELDABILITY EVALUATION OF FILLER METALS FOR DIS-SIMILAR METAL WELD OF ALLOY 230 TO GRADE P91 STEEL**

C. M. Sarich, B. Alexandrov, A. Benatar, The Ohio State University, Columbus, OH, USA; J. Penso, Shell Projects and Technology, Houston, TX, USA; J. L. Kovacich, The Ohio State University, Columbus, OH, USA

**PVP2017-65794: PREDICTIONS OF ICHAZ TENSILE RESPONSE IN GTAW PROCESS FOR 9CR STEELS**

P. Mac Ardghail, R. A. Barrett, N. Harrison, S. B. Leen, National University of Ireland Galway, Galway, Ireland

**PVP2017-65947: SIMULATION OF FATIGUE CRACK INITIATION IN HEAT AFFECTED ZONE MICROSTRUCTURE USING CRYSTAL-PLASTICITY FINITE ELEMENT METHOD**

T. Hiraide, S. Igi, T. Tagawa, R. Ikeda, JFE Steel Corporation, Chiba, Chiba, Japan; S. Tsutsumi, Osaka University, Ibaraki, Osaka, Japan

**PVP2017-65540: COMPARATIVE EVALUATION OF HIGH TEMPERATURE SERVICE PROPERTIES IN ALLOY 230 WELDS. SUSCEPTIBILITY TO SOLIDIFICATION AND STRESS RELIEF CRACKING (Presentation Only)**

S. Suh, B. Alexandrov, A. Benatar, The Ohio State University, Columbus, OH, USA; J. Penso, Shell Projects and Technology, Houston, TX, USA

## **SESSION 2.1G (MF-2-4)**

*Tuesday, July 18, 8:30 am – 10:15 am, Queen's 4*

**APPLICATION OF FRACTURE MECHANICS IN FAILURE ASSESSMENT—V Symposium on Fracture Mechanics and Analysis—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: P. Doddihai, D. Scarth, Kinectrics Inc., Toronto, ON, Canada

Chair: P. Doddihai, Kinectrics Inc., Toronto, ON, Canada

Co-Chair: C. Liu, Kinectrics Inc., Toronto, ON, Canada

**PVP2017-66194: ENGINEERING PROCESS-ZONE MODEL FOR EVALUATION OF STRUCTURAL STRENGTH OF FUEL CHANNEL ANNULUS SPACERS IN CANDU NUCLEAR REACTORS**

D. Scarth, S. Xu, C. Liu, Kinectrics Inc., Toronto, ON, Canada

**PVP2017-66192: DEVELOPMENT OF CLOSED-FORM RELATIONS FOR STRESS INTENSITY FACTORS AND OPENING DISPLACEMENTS FOR EVALUATION OF STRUCTURAL STRENGTH OF ANNULUS SPACERS IN CANDU NUCLEAR REACTORS (Presentation Only)**

L. Gutkin, C. Liu, D. Scarth, Kinectrics Inc., Toronto, ON, Canada

**PVP2017-66193: IMPROVED ENGINEERING PROCESS-ZONE MODEL FOR EVALUATION OF STRUCTURAL STRENGTH OF ANNULUS SPACERS IN CANDU NUCLEAR REACTORS**

C. Liu, L. Gutkin, D. Scarth, Kinectrics Inc., Toronto, ON, Canada

**PVP2017-66051: FRACTURE INITIATION IN COMPACT TENSION SPECIMENS OF HYDRIDED IRRADIATED ZR-2.5NB MATERIALS WITH SPLIT CIRCUMFERENTIAL HYDRIDES**

S.-J. Sung, J. Pan, University of Michigan, Ann Arbor, MI, USA; P.-S. Lam, Savannah River National Laboratory, Aiken, SC, USA; D. Scarth, Kinectrics Inc., Toronto, ON, Canada

**PVP2017-66052: FRACTURE INITIATION IN PRESSURE TUBE SPECIMENS OF HYDRIDED IRRADIATED ZR-2.5NB MATERIALS WITH SPLIT CIRCUMFERENTIAL HYDRIDES**

S.-J. Sung, J. Pan, University of Michigan, Ann Arbor, MI, USA; P.-S. Lam, Savannah River National Laboratory, Aiken, SC, USA; D. Scarth, Kinectrics Inc., Toronto, ON, Canada

## **SESSION 2.1H (OAC-6-3)**

*Tuesday, July 18, 8:30 am – 10:15 am, Queen's 5*

**LIFE CYCLE MANAGEMENT OF REFINERY PRESSURE VESSELS—OPERATION & MAINTENANCE**

**Symposium on Life Cycle Management—Co-Sponsored by High-Pressure Technology and Operations, Applications & Components Technical Committees**

Developed by: T. Tahara, T&T Technology, Saitama Pref, Japan; Y. Ishizaki, Idemitsu Kosan Co., Ltd., Chiba, Japan; B. Millet, Fluor, Inc., Pasadena, TX, USA

Chair: B. Millet, Fluor, Inc., Pasadena, TX, USA

Co-Chair: Y. Ishizaki, Idemitsu Kosan Co., Ltd., Chiba, Japan

**PVP2017-65468: AN ICME APPLICATION TO ASSESS THE FUTURE-SERVICE CAPABILITIES OF A THERMAL DAMAGED PRESSURE VESSEL (Presentation Only)**

Y.-P. Yang, EWI, Columbus, OH, USA; G. Jung, Shell Global Solutions, Houston, TX, USA; J. Penso, Shell Projects and Technology, Houston, TX, USA; W. Mohr, EWI, Columbus, OH, USA

**PVP2017-65461: REACTOR DAMAGE CATEGORIZATION AND DAMAGE REPAIR**

L. Antalffy, Fluor, Sugar Land, TX, USA; A. Yasutomi, The Japan Steel Works, Ltd., Hokkaido, Japan; T. Tahara, T&T Technology, Saitama Pref, Japan; A. Rajguru, Fluor Enterprises, Inc., Sugar Land, TX, USA; B. Millet, Fluor, Inc., Pasadena, TX, USA

**PVP2017-65642: A REMEDIATION OF FLAWS IN STAINLESS STEEL CLADDING ON HYDROPROCESSING REACTORS**

T. Tahara, T&T Technology, Saitama Pref, Japan; A. Yasutomi, The Japan Steel Works, Ltd., Hokkaido, Japan; M. Sakata, JGC Corp., Yokohama, Kanagawa Pref., Japan; K. Sakata, Chiyoda Corp., Yokohama, Kanagawa Pref., Japan

## **SESSION 2.1I (CT-1-1)**

*Tuesday, July 18, 8:30 am – 10:15 am, Queen's 6*

**DESIGN AND ANALYSIS OF BOLTED JOINTS**

Developed by: T. Sawa, Hiroshima University, Tokyo, Japan; A.-H. Bouzid, École de Technologie Supérieure, Montreal, QC, Canada

Chair: T. Sawa, Hiroshima University, Tokyo, Japan

Co-Chair: A.-H. Bouzid, École de Technologie Supérieure, Montreal, QC, Canada

**PVP2017-65624: AN ESTIMATION OF THE LOAD FACTOR AND THE SEALING PERFORMANCE EVALUATION OF BOLTED PIPE FLANGE CONNECTIONS WITH GASKETS UNDER INTERNAL PRESSURE**

T. Sawa, Hiroshima University, Tokyo, Japan; K. Sato, Nippon Valqua Industries, Ltd., Gojo, Japan

**PVP2017-65332: FEM STRESS ANALYSIS AND MECHANICAL CHARACTERISTICS OF BOLTED PIPE FLANGE CONNECTIONS WITH PTFE BLENDED GASKETS SUBJECTED TO EXTERNAL BENDING MOMENTS AND INTERNAL PRESSURE**

K. Sato, Nippon Valqua Industries, Ltd., Gojo, Japan; T. Sawa, Hiroshima University, Tokyo, Japan; R. Morimoto, Mitsubishi Chemical Corporation, Okayama, Japan; T. Kobayashi, National Institute of Technology, Numazu College, Numazu, Shizuoka, Japan

**PVP2017-65062: EFFECT OF MATERIAL ANISOTROPY ON THE STRUCTURAL INTEGRITY OF COMPOSITE BOLTED FLANGED JOINTS**

A. K. Vafadar, A.-H. Bouzid, École de Technologie Supérieure, Montreal, QC, Canada; A. Ngo, École de Technologie Supérieure, Montréal, QC, Canada

**PVP2017-66229: DETERMINATION OF THE GASKET STRESS DISTRIBUTION**  
M. Schaaf, AMTEC GmbH, Lauffen, Germany

## **SESSION 2.1J (OAC-4-2)**

*Tuesday, July 18, 8:30 am – 10:15 am, Kona 1*

**STRUCTURAL TESTING AND ANALYSIS**

**Symposium on Aging Management and Structural Integrity for Spent Nuclear Fuel Dry Cask Storage and Transportation Systems—Co-Sponsored by Materials & Fabrication and Operations, Applications & Components Technical Committees**

Developed by: S. Hensel, Savannah River Nuclear Solutions, Aiken, SC, USA

Chair: S. Hensel, Savannah River Nuclear Solutions, Aiken, SC, USA

Co-Chair: P. Blanton, Savannah River Nuclear Solutions, Aiken, SC, USA

**PVP2017-65373: TESTING AND NUMERICAL SIMULATION OF ELASTOMERS—FROM SPECIMEN TESTS TO SIMULATION OF SEAL BEHAVIOR**

## UNDER ASSEMBLY CONDITIONS

M. Weber, U. Zencker, D. Wolff, M. Jaunich, A. Koemmling, Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany

### **PVP2017-65668: DROP TESTING OF A CONTAINER FOR THE STORAGE, TRANSPORT AND DISPOSAL OF INTERMEDIATE LEVEL WASTE**

T. Quercetti, K. Müller, Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany; M. Johnson, T. Tait, Croft Associates Ltd., Culham, Abingdon, United Kingdom; C.-F. Tso, Arup, London, United Kingdom

### **PVP2017-65731: INFLUENCE OF IMPACT ANGLE AND REAL TARGET PROPERTIES ON DROP TEST RESULTS OF CUBIC CONTAINERS**

U. Zencker, L. Qiao, H. Voelzke, Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany

### **PVP2017-66084: COMPARISON BETWEEN TEST AND ANALYSIS FOR SPENT NUCLEAR FUEL TRANSPORTATION CASK**

W. Choi, S. Cho, K.-S. Seo, K.-S. Bang, J.-C. Lee, Korea Atomic Energy Research Institute, Daejeon, Korea (Republic)

## SESSION 2.1K (MF-3-3)

*Tuesday, July 18, 8:30 am – 10:15 am, Kona 2*

### **STAINLESS STEELS FOR HYDROGEN SERVICE—I**

Developed by: C. San Marchi, Sandia National Laboratories, Livermore, CA, USA

Chair: J. Yamabe, Kyushu University, Fukuoka, Japan

Co-Chair: W. James, U.S. Department of Energy, Washington, DC, USA

### **PVP2017-65603: TEMPERATURE EFFECTS ON FRACTURE THRESHOLDS OF HYDROGEN PRECHARGED STAINLESS STEEL WELDS**

J. Ronevich, C. San Marchi, D. Balch, Sandia National Laboratories, Livermore, CA, USA

### **PVP2017-65978: NOTCHED FATIGUE OF AUSTENITIC ALLOYS IN HYDROGEN**

K. Nibur, Hy-Performance Materials Testing, LLC., Bend, OR, USA; J. Foulk, Sandia National Laboratories, Livermore, CA, USA; P. J. Gibbs, C. San Marchi, Sandia National Laboratories, Livermore, CA, USA

### **PVP2017-65450: FATIGUE LIFE PROPERTIES OF CIRCUMFERENTIALLY-NOTCHED AUSTENITIC STAINLESS STEEL TYPE 304 IN HYDROGEN GAS**

N. Nagaishi, Industrial Technology Center of SAGA, Saga, Japan; M. Yoshikawa, S. Okazaki, H. Matsunaga, J. Yamabe, Kyushu University, Fukuoka, Japan

### **PVP2017-65988: TENSILE AND FATIGUE BEHAVIOR OF AN AUSTENITIC STAINLESS CRNI-STEEL AT 10 MPA HYDROGEN GAS ATMOSPHERE**

M. Schwarz, E. Sattler, S. Zickler, S. Weihe, University of Stuttgart, Stuttgart, Baden-Württemberg, Germany

## SESSION 2.1L (SE-3-1)

*Tuesday, July 18, 8:30 am – 10:15 am, Kona 3*

### **DAMPING AND VIBRATION CONTROL—I**

Developed by: K. Minagawa, Saitama Institute of Technology, Saitama, Japan

Chair: K. Minagawa, Saitama Institute of Technology, Saitama, Japan

Co-Chair: A. Casimiro Caputo, Roma Tre University, Rome, Italy

### **PVP2017-65592: RESEARCH AND DEVELOPMENT OF VISCOUS FLUID DAMPERS FOR IMPROVEMENT OF SEISMIC RESISTANCE OF THERMAL POWER PLANTS PART 1 FUNDAMENTAL ANALYSIS AND COMPONENT TEST**

G. Tanaka, Oiles Corp, Tochigi, Japan; K. Minagawa, Saitama Institute of Technology, Saitama, Japan; K. Aida, Mitsubishi Hitachi Power Systems, Ltd., Kure-Shi, Japan; S. Fujita, Tokyo Denki University, Tokyo, Japan

### **PVP2017-65628: RESEARCH AND DEVELOPMENT OF VISCOUS FLUID DAMPERS FOR IMPROVEMENT OF SEISMIC RESISTANCE OF THERMAL POWER PLANTS PART 2 EVALUATION OF LIFETIME**

K. Aida, Mitsubishi Hitachi Power Systems, Ltd., Kure-Shi, Japan; K. Minagawa, Saitama Institute of Technology, Saitama, Japan; G. Tanaka, Oiles Corp, Tochigi, Japan; S. Fujita, Tokyo Denki University, Tokyo, Japan

### **PVP2017-65638: RESEARCH AND DEVELOPMENT OF VISCOUS FLUID DAMPERS FOR IMPROVEMENT OF SEISMIC RESISTANCE OF THERMAL POWER PLANTS PART 3 EVALUATION OF VIBRATION CONTROL PERFORMANCE**

K. Minagawa, Saitama Institute of Technology, Saitama, Japan; K. Aida, Mitsubishi Hitachi Power Systems, Ltd., Kure-Shi, Japan; G. Tanaka, Oiles Corp, Tochigi,

Japan; S. Fujita, Tokyo Denki University, Tokyo, Japan

### **PVP2017-66167: LAMINATED TYPE ISOLATION DEVICE FOR LIGHT WEIGHT STRUCTURE USING URETHANE ELASTOMER**

K. Goda, K. Ishihana, Ohtsu Chemical Co., Ltd., Takaishi, Osaka, Japan; O. Furuya, Tokyo Denki University, Saitama, Japan; K. Imamura, Tokyo City University, Hiratuka City, Tokyo, Japan

## SESSION 2.1M (HT-5-2)

*Tuesday, July 18, 8:30 am – 10:15 am, Waikoloa Suite 1*

### **PANEL SESSION ON SEC VIII, DIV 3 INDUSTRY USE, GAPS, AND NEEDS Symposium on 20th Anniversary of ASME BPVC Section VIII Div. 3—Sponsored by High Pressure Technology Technical Committee**

Developed by: A. Maslowski, ASME, New York, NY, USA

Chair: A. Maslowski, ASME, New York, NY, USA

Co-Chair: J.R. Sims, Becht Engineering Co., Inc., Liberty Corner, NJ, USA

*Panelists:*

H. Maderbacher, BHDT GmbH, Kapfenberg, Austria

M. Poelzl, BHDT GmbH, Kapfenberg, Austria

K.-J. Young, Dupont Engineering, Wilmington, DE, USA

## SESSION 2.1N (FSI-1-2)

*Tuesday, July 18, 8:30 am – 10:15 am, Waikoloa Suite 2*

### **CFD AND FSI**

Developed by: A. Tijsseling, TU Eindhoven, Eindhoven, Netherlands; J. C. Jo, Pusan National University, Busan, Korea (Republic); C. S. Martin, Georgia Institute of Technology, South Dennis, MA, USA

Chair: A. Tijsseling, TU Eindhoven, Eindhoven, Netherlands

Co-Chair: J. C. Jo, Pusan National University, Busan, Korea (Republic)

### **PVP2017-65143: NUMERICAL SIMULATION OF A HIGHLY COMPRESSED SATURATED WATER FLASHING FLOW**

J. C. Jo, J. J. Jeong, B. Yun, Pusan National University, Busan, Korea (Republic); F. Moody, Consultant, Turlock, CA, USA

### **PVP2017-65601: NUMERICAL ANALYSIS OF FLOW-INDUCED VIBRATION OF LARGE DIAMETER PIPE WITH SHORT ELBOW**

S. Takaya, Japan Atomic Energy Agency, Ibaraki, Japan; T. Fujisaki, NDD, Ibaraki, Japan; Masaaki Tanaka, Japan Atomic Energy Agency, Ibaraki, Japan

### **PVP2017-66106: REVIEW OF SCALING DISTORTIONS FOR INTEGRAL SYSTEM TESTS**

P. Lien, US Nuclear Regulatory Commission, Rockville, MD, USA

### **PVP2017-65700: FLUID FLOW BEHAVIOUR DURING FREE VIBRATIONS OF A MONO-HEXAGON ASSEMBLY: VALIDATION OF 3-D NAVIER-STOKES MODEL IN CAST3M WITH EXPERIMENTS ON PISE-1A**

Q. Zhou, J.-P. Magnaud, CEA Saclay, Gif-sur-Yvette, France; A. Monavon, Université Pierre et Marie Curie, Paris, France; B. Cariteau, CEA Saclay, Gif-sur-Yvette, France

## SESSION 2.1O (SPC-1-4)

*Tuesday, July 18, 8:30 am – 10:15 am, Waikoloa Suite 3*

### **STUDENT PAPER COMPETITION—PHD—II**

Developed by: B. Li, AMEC Foster Wheeler, Toronto, ON, Canada

Chair: B. Li, AMEC Foster Wheeler, Toronto, ON, Canada

Co-Chair: K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

### **PVP2017-65693: EVALUATION OF WELD HOMOGENIZATION SCHEMES BASED ON PLASTIC LOADS OF SINGLE EDGE NOTCHED TENSION (SE(T)) TESTING**

S. Naib, W. De Waele, S. Hertelé, Universiteit Gent, Zwijnaarde, Belgium

### **PVP2017-65583: AN IMPROVED CONTINUUM DAMAGE CONSTITUTIVE MODEL FOR CREEP DEFORMATION OF CAST 20CR32NI1NB STEEL**

X. Guo, J. Gong, L. Geng, Nanjing Tech University, Nanjing, China

### **PVP2017-65339: INFLUENCE OF INHOMOGENEOUS MICROSTRUCTURE OF MULTI-PASS WELD METAL ON CREEP BEHAVIOR OF CROSS-WELD SPECIMEN BASED ON FINITE ELEMENT METHOD**

B. Yang, F.-Z. Xuan, East China University of Science and Technology, Shanghai, China

### **PVP2017-65604: THEORETICAL ANALYSIS OF FREE VIBRATIONS BASED ON A NEW HIGH ORDER SHELL THEORY FOR CYLINDRICAL SHELLS CON-**



## VEYING FLUID

M. Ji, K. Inaba, Tokyo Institute of Technology, Tokyo, Japan

### SESSION 2.1Q (TW-1-3)

Tuesday, July 18, 8:30 am – 10:15 am, Kohala 4

#### FITNESS-FOR-SERVICE (FFS) PROCEDURES FOR EVALUATION OF DAMAGE OR DEFECTS IN PRESSURIZED EQUIPMENT USING API 579-1/ASME FFS-1 (PART 1)

Developed by: D. L. Stang, Omax Corporation, Kent, WA, USA  
Chair: D. L. Stang, Omax Corporation, Kent, WA, USA  
Presented by: P. E. Prueter, B. Macejko, The Equity Engineering Group, Inc., Shaker Heights, OH, USA

### SESSION 2.1S (TW-4-5)

Tuesday, July 18, 8:30 am – 10:15 am, Grand Promenade

#### TECHNOLOGY DEMONSTRATION FORUM—V

Developed by: C. Jaske, HSI Group, Inc., Torrance, CA, USA; J. F. Cory, Jr., Siemens PLMS Software, Milford, OH, USA

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## Block 2.2: Tuesday, July 18, 2017 (10:30 am – 12:15 pm)

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### SESSION 2.2A (DA-16-5)

Tuesday, July 18, 10:30 am – 12:15 pm, Kohala 1

#### NOVEL APPROACHES TO COKE DRUM LIFE CYCLE MANAGEMENT 2nd International Symposium on Coke Drum Life Cycle Management—Sponsored by Design & Analysis Technical Committee

Developed by: C. Rodery, BP p.l.c., League City, TX, USA; K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA; J. Penso, Shell Projects and Technology, Houston, TX, USA  
Chair: M. Samman, Houston Engineering Solutions, LLC, Houston, TX, USA  
Co-Chair: T. S. Chadda, Amec Foster Wheeler, Houston, TX, USA

#### PVP2017-65222: EXTENDING DRUM LIFE WHILE INCREASING THROUGHPUT IN A DELAYED COKING UNIT

K. Kirkpatrick, L. Antalfy, B. Millet, G. Miller, Fluor Enterprises, Houston, TX, USA

#### PVP2017-65414: FATIGUE ASSESSMENT OF A BULGED COKE DRUM

G. A. Vivas, A. J. Moret, R. E. Bello, PDVSA Intevep, Los Teques, Miranda, Venezuela; L. M. Melian, PDVSA Petrocedeño, Jose, Anzoátegui, Venezuela; E. D. Araque, CIA Inspection, Hannon, ON, Canada

#### PVP2017-65098: REMEDIATION OF PRESSURE VESSELS; LIFTING & TILTING LARGE DRUMS

A. Kaye, Canadian Natural Resources Ltd., Fort McMurray, AB, Canada

#### PVP2017-65870: ASSESSMENT OF THE CRITICAL TILTING ANGLE OF A COKE DRUM VESSEL SUBJECT TO SEISMIC LOADING

J. Penso, Shell Projects and Technology, Houston, TX, USA; J. Bedoya, S. Bouse, S. Ramamoorthy, Stress Engineering Services Inc., Houston, TX, USA

### SESSION 2.2B (FSI-2-5)

Tuesday, July 18, 10:30 am – 12:15 pm, Kohala 2

#### FIV IN TUBE ARRAYS—I

#### Symposium of Flow-Induced Vibration—Sponsored by Fluid-Structure Interaction Technical Committee

Developed by: T. Nakamura, Osaka Sangyo University, Daito, Osaka, Japan; N. Mureithi, Polytechnique Montreal, Montreal, QC, Canada; A. Mohany, University of Ontario Institute of Technology, Oshawa, ON, Canada

Chair: D. Broc, CEA Saclay, Gif-sur-Yvette, France

Co-Chair: V. P. Janzen, Canadian Nuclear Laboratories, Chalk River, ON, Canada

#### PVP2017-66166: EXPERIMENTAL STUDY ABOUT TWO-PHASE DAMPING RATIO ON A TUBE BUNDLE SUBJECTED TO TWO-PHASE FLOW

W. G. Sim, Hannam University, Daejeon, Korea (Republic); K. S. Kim, Kongju National University, Chunan, Korea (Republic); B. Dagdan, Hannam University, Taejeon, Korea (Republic)

#### PVP2017-65511: REPRODUCING FLUID ELASTIC COUPLING FORCES ON

## A U-TUBE WITH A HYBRID TESTING APPROACH

V. Lhuillier, Electricite de France, Palaiseau, France

#### PVP2017-65585: COUPLED VIBRATION RESEARCH FOR CYLINDERS IN HEAT EXCHANGER BASED ON NONCONTACT-MEASUREMENT AND ACOUSTIC FLUID-SOLID INTERACTION SIMULATIONS

W. Tan, H. Wu, Z. Yang, Z. Li, L. Liu, Tianjin University, Tianjin, China

#### PVP2017-65179: IDENTIFICATION OF TWO-PHASE FLOW PATTERNS USING SUPPORT VECTOR CLASSIFICATION

I. Benito, N. Mureithi, Polytechnique Montreal, Montreal, QC, Canada

### SESSION 2.2C (CS-11-1)

Tuesday, July 18, 10:30 am – 12:15 pm, Kohala 3

#### EXTREME PRESSURE EQUIPMENT

#### Symposium on Recent Developments in International Codes and Standards—Sponsored by Codes & Standards Technical Committee

Developed by: J. Zheng, Zhejiang University, Hangzhou, China

Chair: J. Zheng, Zhejiang University, Hangzhou, China

Co-Chair: J. Shi, Zhejiang University, Hangzhou, Zhejiang, China

#### PVP2017-65100: EXPERIMENTAL INVESTIGATION AND FINITE ELEMENT ANALYSIS ON COLD STRETCHING FOR AUSTENITIC STAINLESS PRESSURE VESSELS

Y. Han, K. Wang, Ningbo University of Technology, Cixi, Ningbo, China

#### PVP2017-65577: MOLECULAR DYNAMICS SIMULATION OF H-ACTIVATED NANO-VOIDS MIGRATION AND GROWTH

Y. Zheng, Z. Zhang, G. Cheng, Xi'an Jiaotong University, Xi'an, Shaanxi, China; F.-Z. Xuan, Z. Wang, East China University of Science & Technology, Shanghai, China

#### PVP2017-65582: THE ADSORPTION STUDY OF HYDROGEN ON IRON AND VANADIUM

M. He, Z. Zhang, G. Cheng, Xi'an Jiaotong University, Xi'an, Shaanxi, China

#### PVP2017-66220: INVASION OF HYDROGEN INTO ALPHA-Fe: A MOLECULAR DYNAMICS STUDY

X. Li, T. Cui, Y. Zhao, J. Zheng, P. Xu, Zhejiang University, Hangzhou, Zhejiang, China

### SESSION 2.2D (MF-15-1)

Tuesday, July 18, 10:30 am – 12:15 pm, King's 1

#### RECENT DEVELOPMENTS IN COMPOSITE MATERIALS

#### International Symposium on Composite Systems for Pressure Vessels and Piping—Co-Sponsored by Design & Analysis, Materials & Fabrication and Operations, Applications & Components Technical Committees

Developed by: M. Uddin, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA; P. Mertiny, University of Alberta, Edmonton, AB, Canada

Chair: M. Uddin, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA

Co-Chair: P. Mertiny, University of Alberta, Edmonton, AB, Canada

#### PVP2017-65698: CURRENT APPROACHES TO FITNESS FOR SERVICE OF FRP IN CHEMICAL HANDLING APPLICATIONS

P. Khaladkar, PECT Consulting, Hockessin, DE, USA

#### PVP2017-65969: INTEGRATED COMPUTATIONAL TOOLS FOR THE ACCELERATED DEVELOPMENT OF TRADITIONAL AND MULTIFUNCTIONAL COMPOSITES STRUCTURES

J. Baur, Air Force Research Laboratory, Wright-Patterson AFB, OH, USA; D. Hartl, Texas A&M University, College Station, TX, USA; G. Frank, R. Bradford, University of Dayton Research Institute, Dayton, OH, USA; G. Huff, Texas A&M University, College Station, TX, USA

#### PVP2017-66281: MATERIAL, MANUFACTURING AND TEST RESULTS FOR HIGH-TEMPERATURE FIBER-REINFORCED POLYMER STRUCTURES FOR NMR RESERVOIR SURVEILLANCE AND OTHER OILFIELD APPLICATIONS

P. Mertiny, University of Alberta, Edmonton, AB, Canada; M. Bashar, Shawcor, Calgary, AB, Canada; T. Yakimoski, Baker Hughes, Calgary, AB, Canada; A. Hammami, Shawcor, Toronto, ON, Canada

### SESSION 2.2E (MF-25-2)

Tuesday, July 18, 10:30 am – 12:15 pm, King's 2

#### ASIAN PROGRAM IN STRUCTURAL INTEGRITY—II

**Symposium on Structural Integrity—Co-Sponsored by Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: Y. Chao, University of South Carolina, Columbia, SC, USA; G. Qian, Paul Scherrer Institute, Villigen-Psi, Switzerland; P.-S. Lam, Savannah River National Laboratory, Aiken, SC, USA

Chair: Y. Liu, Tsinghua University, Beijing, Beijing, China

Co-Chair: G. Qian, Paul Scherrer Institute, Villigen-Psi, Switzerland

**PVP2017-65479: MICROSTRUCTURE AND TOUGHNESS OF T92 STEEL AGING AT 700?**

G. Baolan, X. Tong, China Special Equipment Inspection and Research Institute, Beijing, China

**PVP2017-65672: THEORETICAL ANALYSIS AND ENGINEERING IMPLICATIONS FOR THE HIGH ORDER TERM SOLUTIONS OF THE MODE II TYPE CREEP CRACK**

Y. Dai, Y. Liu, Tsinghua University, Beijing, China; Y. Chao, University of South Carolina, Columbia, SC, USA

**PVP2017-65738: CALCULATION OF AXIAL THERMAL EXPANSION FOR A 1000MW NUCLEAR STEAM TURBINE HIP CASING**

Z. Mei, H. Zhang, D. Xie, Y. Guo, X. Hou, Wuhan University, Wuhan, Hubei, China

**PVP2017-65656: ON A PLASTIC LIMIT LOADS OF COMPLEX-CRACKED PIPES WITH WELDS OVERLAY USING FINITE ELEMENT LIMIT ANALYSES**

D.-S. Jeon, N.-S. Huh, Seoul National University of Science and Technology, Seoul, Korea (Republic)

**SESSION 2.2F (CS-2-1)**

*Tuesday, July 18, 10:30 am – 12:15 pm, King's 3*

**FATIGUE AND RATCHETING ISSUES IN PRESSURE VESSEL AND PIPING DESIGN**

**Symposium on Fatigue Issues—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: W. Reinhardt, Candu Energy Inc., Mississauga, ON, Canada; R. Adibiasl, AMEC Foster Wheeler, Toronto, ON, Canada

Chair: D. Metzger, SNC, Mississauga, ON, Canada

Co-Chair: R. Adibiasl, AMEC Foster Wheeler, Toronto, ON, Canada

**PVP2017-66008: THERMAL STRESS RATCHET CHECK IN PIPING ANALYSIS**

R. Adibi-Asl, M. Noban, E. Chen, Amec Foster Wheeler, Toronto, ON, Canada

**PVP2017-66112: COMPARISON OF METHODS FOR STRUCTURAL STRESS DETERMINATION ACC. TO EN 13445-3 ANNEX NA**

R. Trieglaff, TÜV NORD EnSys GmbH & Co. KG, Hamburg, Germany; J. Rudolph, AREVA GmbH, Erlangen, Bavaria, Germany; M. Beckert, TÜV NORD EnSys GmbH & Co. KG, Hamburg, Germany; F. Hauser, Technische Hochschule Nürnberg Georg Simon Ohm, Nürnberg, Germany

**PVP2017-66240: ALTERNATIVE APPROACHES FOR ASME CODE SIMPLIFIED ELASTIC PLASTIC ANALYSIS**

S. Ranganath, XGEN Engineering, San Jose, CA, USA; N. Palm, Electric Power Research Institute, Washington, PA, USA

**SESSION 2.2G (DA-12-1)**

*Tuesday, July 18, 10:30 am – 12:15 pm, Queen's 4*

**FRACTURE—I**

**Symposium on Fracture Mechanics and Analysis—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: S. Finneran, DNV GL - Materials Advisory Services, Dublin, OH, USA; S. Kataoka, JGC Corporation, Yokohama, Japan

Chair: S. Finneran, DNV GL - Materials Advisory Services, Dublin, OH, USA

Co-Chair: S. Kataoka, JGC Corporation, Yokohama, Japan

**PVP2017-65042: CORRELATION OF FRACTOGRAPHIC EXAMINATIONS WITH NUMERICAL CALCULATIONS REGARDING DYNAMIC FRACTURE**

J. Tlatlik, T. Reichert, Fraunhofer Institute for Mechanics of Materials, Freiburg, Baden-Württemberg, Germany

**PVP2017-65311: APPLICATION OF SDS METHOD TO PREDICT FRACTURE TOUGHNESS TEMPERATURE DEPENDENCY OF A533B STEEL**

T. Meshii, K. Ishihara, H. Nakano, University of Fukui, Fukui-city, Fukui, Japan

**PVP2017-65132: AN INVESTIGATION OF I-II MIXED MODE STRUCTURES WITH STOP HOLE TECHNIQUE BASED ON EXTENDED FINITE ELEMENT METHOD**

X.-T. Miao, C. Zhou, X.-H. He, Nanjing Tech University, Nanjing, Jiangsu, China

**SESSION 2.2H (OAC-6-4)**

*Tuesday, July 18, 10:30 am – 12:15 pm, Queen's 5*

**DEGREDDATION MECHANISMS AND MITIGATION**

**Symposium on Life Cycle Management—Co-Sponsored by High-Pressure Technology and Operations, Applications & Components Technical Committees**

Developed by: A. Cheta, Qatar Shell GTL, Doha, Qatar

Chair: A. Cheta, Qatar Shell GTL, Doha, Qatar

Co-Chair: Y. Shoji, YS Corporation LLC, Tokyo, Japan

**PVP2017-65046: CRUDE FURNACE CREEP ASSESSMENT AND HIGH TEMPERATURE DEGRADATION**

G. Lee, Royal Dutch Shell, Kuala Lumpur, Malaysia; O. Kwon, Quest Integrity NZL Ltd., Wellington, New Zealand; Z. Ramli, Z. M. Afifi, Hengyuan Refining Company, Port Dickson, Malaysia

**PVP2017-65709: RESEARCH PROGRESS OF HIGH TEMPERATURE NAPHTHENIC ACID CORROSION RULES AND PREVENTION METHODS IN PETRO-CHEMICAL PLANTS**

Y. Lv, X. Chen, Hefei General Machinery Research Institute, Hefei, Anhui, China; Z. Chen, Zhejiang University, Hangzhou, Zhejiang, China

**PVP2017-66127: INVESTIGATION OF BURST PRESSURE IN T-JOINTS WITH WALL-THINNING BY USING FEA**

A. Yamaguchi, National Institute of Occupational Safety and Health, Japan, Tokyo, Japan

**PVP2017-65317: UPPER SHELF ENERGY PREDICTION MODEL FOR IRRADIATED REACTOR VESSEL STEELS**

T. Ogawa, Toshiba Corporation, Yokohama, Kanagawa, Japan; J. B. Hall, B. E. Mays, Westinghouse, Pittsburgh, PA, USA; T. Hardin, Electric Power Research Institute, Palo Alto, CA, USA

**PVP2017-65276: OPTIMIZATION OF THE RECEIPT AND DELIVERY SCHEDULES FOR A TRANSFER TANK FARM OF PRODUCTS PIPELINE NETWORK**

L. Wang, C. Wu, L. Zuo, Y. Huang, H. Chen, China University of Petroleum-Beijing, Beijing, Beijing, China

**SESSION 2.2I (CT-2-1)**

*Tuesday, July 18, 10:30 am – 12:15 pm, Queen's 6*

**ELEVATED TEMPERATURE BEHAVIOUR OF BOLTED FLANGE JOINTS**

Developed by: J. Veiga, Teadit Industria e Comercio Ltda, Rio De Janeiro, Brazil; Y. Omiya, Okayama University, Okayama, Japan

Chair: J. Baulch, Teadit North America, Pasadena, TX, USA

Co-Chair: A. Bausman, VSP Technologies, Kingsport, TN, USA

**PVP2017-65027: OXIDATION INHIBITED GRAPHITE: WHAT IS IT?**

B. Hantz IV, Valero Energy Corp., San Antonio, TX, USA

**PVP2017-65765: STUDY OF HIGH-TEMPERATURE RELAXATION USING LOAD INDICATING BOLTS (Presentation Only)**

R. Flocken, Valley Forge & Bolt Mfg. Co., Phoenix, AZ, USA; G. Jung, Shell Global Solutions, Houston, TX, USA

**PVP2017-65758: COMPONENT TESTING AND NUMERICAL CALCULATION OF A BOLTED HIGH TEMPERATURE POWER PLANT PIPE FLANGE CONNECTION UNDER COMPLEX, NEAR-SERVICE LOADS**

B. Leibing, A. Klenk, M. Seidenfuss, University of Stuttgart, Stuttgart, Baden-Württemberg, Germany

**PVP2017-65271: CHARACTERISATION OF POLYTETRAFLUOROETHYLENE AND FIBER BASED GASKETS UNDER CREEP AND THERMAL RATCHETING**

R. P. K. Jeya, A.-H. Bouzid, École de Technologie Supérieure, Montreal, QC, Canada

**SESSION 2.2J (OAC-4-4)**

*Tuesday, July 18, 10:30 am – 12:15 pm, Kona 1*

**AGING MANAGEMENT FOR EXTENDED STORAGE AND TRANSPORTATION OF SPENT (USED) FUEL**

**Symposium on Aging Management and Structural Integrity for Spent Nu-**

**clear Fuel Dry Cask Storage and Transportation Systems—Co-Sponsored by Materials & Fabrication and Operations, Applications & Components Technical Committees**

Developed by: Z. Han, Argonne National Laboratory, Lemont, IL, USA; H. Voelzke, Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany

Chair: Z. Han, Argonne National Laboratory, Lemont, IL, USA

Co-Chair: H. Voelzke, Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany

**PVP2017-66139: SENSOR REQUIREMENTS FOR DETECTION AND CHARACTERIZATION OF STRESS CORROSION CRACKING IN WELDED STAINLESS STEEL CANISTERS (Presentation Only)**

S. Chatzidakis, Oak Ridge National Laboratory, Oak Ridge, TN, USA

**PVP2017-66241: AGING MANAGEMENT FOR EXTENDED LONG-TERM DRY STORAGE OF SPENT NUCLEAR FUEL AND TRANSPORTATION (Presentation Only)**

Y. Liu, Z. Han, D. Diercks, M. Nutt, Argonne National Laboratory, Argonne, IL, USA

**PVP2017-66260: REGULATORY BASIS FOR DRY SPENT NUCLEAR FUEL STORAGE CANISTER INSPECTIONS (Presentation Only)**

B. Gutherman, Gutherman Technical Services, Shamong, NJ, USA; R. McCullum, The Nuclear Energy Institute, Washington, DC, USA

**PVP2017-66270: ADVANCED MANUFACTURING FOR THE DEPARTMENT OF ENERGY STANDARDIZED CANISTER (Presentation Only)**

S. Birk, Battelle Energy Alliance, Idaho Falls, ID, USA; D. Clark, DEClark Welding Engineering, PLLC, Idaho Falls, ID, USA

**PVP2017-65064: INTERIM SAFE STORAGE OF RADIOACTIVE MATERIALS AT THE SAVANNAH RIVER SITE**

L. Kyriazidis, S. Hensel, J. Jordan, Savannah River Nuclear Solutions, Aiken, SC, USA

**SESSION 2.2K (MF-3-5)**

*Tuesday, July 18, 10:30 am – 12:15 pm, Kona 2*

**STEELS FOR HYDROGEN SERVICE**

Developed by: C. San Marchi, Sandia National Laboratories, Livermore, CA, USA

Chair: J. Ronevich, Sandia National Laboratories, Livermore, CA, USA

Co-Chair: H. Matsunaga, Kyushu University, Fukuoka, Japan

**PVP2017-66273: EFFECT OF HYDROGEN ON FATIGUE-CRACK GROWTH OF A FERRITIC-PEARLITIC LOW CARBON STEEL**

A. Nagao, JFE Steel Corporation, Kawasaki, Kanagawa, Japan; S. Wang, University of Wisconsin-Madison, Madison, WI, USA; K. Nygren, M. Dadfarnia, P. Sofronis, University of Illinois at Urbana-Champaign, Urbana, IL, USA; I. Robertson, University of Wisconsin-Madison, Madison, WI, USA

**PVP2017-65907: FATIGUE CRACK GROWTH BEHAVIOR OF AUTOFRET-TAGED HYDROGEN PRESSURE VESSEL MADE OF LOW ALLOY STEEL**

Y. Wada, Y. Yanagisawa, The Japan Steel Works, Muroran, Japan

**PVP2017-65726: EVALUATION OF HYDROGEN EMBRITTLEMENT OF CR-MO LOW ALLOY STEEL BY SSRT WITH CATHODICALLY CHARGED SPECIMEN**

D. Tsurumi, H. Saito, H. Tsuji, Tokyo Denki University, Tokyo, Japan

**PVP2017-65542: HYDROGEN-ASSISTED DEGRADATION OF A HIGH-STRENGTH STAINLESS STEEL WITH A NEWLY-DEVELOPED ALUMINUM-BASED COATING IN HIGH-PRESSURE HYDROGEN-GAS ENVIRONMENT**

J. Yamabe, T. Awane, O. Takakuwa, S. Matsuoka, Kyushu University, Fukuoka, Japan

**PVP2017-65630: EFFECTS OF PLASTIC STRAIN ON HYDROGEN DESORPTION OF AUSTENITIC STEELS (Presentation Only)**

E. J. Song, S.-W. Baek, U. B. Baek, S. H. Nahm, Korea Research Institute of Standards and Science, Daejeon, Korea (Republic)

**SESSION 2.2L (SE-3-2)**

*Tuesday, July 18, 10:30 am – 12:15 pm, Kona 3*

**DAMPING AND VIBRATION CONTROL—II**

Developed by: F. Paolacci, University Roma Tre, Rome, Italy

Chair: F. Paolacci, University Roma Tre, Rome, Italy

Co-Chair: T. Taniguchi, Tottori University, Tottori, Japan

**PVP2017-65047: ON-SITE VIBRATION TEST FOR MEASURING DAMPING RATIO OF PWR REACTOR COOLANT LOOP**

T. Ishiguro, The Kansai Electric Power Co., Inc., Mikata, Fukui, Japan; T. Numata, The Kansai Electric Power Co., Inc., Ohi, Fukui, Japan; N. Goshima, Mitsubishi Heavy Industries, Ltd., Kobe, Hyogo, Japan; M. Monde, Mitsubishi Heavy Industries, Ltd., Takasago, Hyogo, Japan; H. Fuyama, Mitsubishi Heavy Industries, Ltd., Kobe, Hyogo, Japan

**PVP2017-65192: INERTIA MASS DAMPER AND ITS APPLICATION**

K. Sunakoda, Akita University, Saitama, Japan; I. Yamazaki, Sanwa Tekki Corporation, Utsunomiya, Japan

**PVP2017-65497: EXPERIMENTAL STUDY OF FULL SCALE BUCKLING RESTRAINED BRACE WITH INSPECTION WINDOWS**

C.-S. Tsai, H.-C. Su, Feng Chia University, Taichung, Taiwan; T. C. Chiang, Earthquake Proof System, Inc., Taichung, Taiwan

**PVP2017-65894: DESIGN OF SERIES MULTIPLE TUNED MASS DAMPERS FOR RESPONSE CONTROL OF ASYMMETRIC BUILDINGS**

J.-F. Wang, J.-C. Li, National United University, Miaoli, Taiwan; C.-C. Lin, National Chung-hsing University, Taichang, Taiwan

**SESSION 2.2M (HT-5-1)**

*Tuesday, July 18, 10:30 am – 12:15 pm, Waikoloa Suite 1*

**PANEL SESSION ON SEC VIII, DIV 3 HISTORY**

**Symposium on 20th Anniversary of ASME BPVC Section VIII Div. 3—Sponsored by High Pressure Technology Technical Committee**

Developed by: A. Maslowski, ASME, New York, NY, USA

Chair: A. Maslowski, ASME, New York, NY, USA

Co-Chair: J. R. Sims, Becht Engineering Co., Inc., Liberty Corner, NJ, USA; D. Peters, Structural Integrity Associates, Edinboro, PA, USA

*Panelists:*

J. R. Sims, Becht Engineering Co., Inc., Liberty Corner, NJ, USA

D. Peters, Structural Integrity Associates, Edinboro, PA, USA

J. Kapp, Materials, Wynantskill, NY, USA

S. Terada, Kobe Steel, Ltd., Takasago, Hyogo, Japan

**SESSION 2.2N (FSI-1-3)**

*Tuesday, July 18, 10:30 am – 12:15 pm, Waikoloa Suite 2*

**GAS AND LIQUID**

Developed by: J. C. Jo, Pusan National University, Busan, Korea (Republic); A. Tijsseling, TU Eindhoven, Eindhoven, Netherlands; C. S. Martin, Georgia Institute of Technology, South Dennis, MA, USA

Chair: J. C. Jo, Pusan National University, Busan, Korea (Republic)

Co-Chair: A. Tijsseling, TU Eindhoven, Eindhoven, Netherlands

**PVP2017-65471: IMPULSIVELY-GENERATED PRESSURE TRANSIENTS AND STRAINS IN A CYLINDRICAL FLUID-FILLED TUBE TERMINATED BY A CONVERGING SECTION**

J.-C. Veilleux, J. Shepherd, California Institute of Technology, Pasadena, CA, USA

**PVP2017-65755: ANALYTICAL SOLUTIONS FOR LIQUID SLUGS AND PIGS TRAVELING IN PIPELINES WITH ENTRAPPED GAS**

A. Tijsseling, TU Eindhoven, Eindhoven, Netherlands; Q. Hou, Tianjin University, Tianjin, China; Z. Bozkus, Middle East Technical University, Ankara, Turkey

**PVP2017-66020: EXPERIMENTAL STUDY OF THE DYNAMIC RESPONSE OF PARTIALLY FILLED PIPES FOCUSED ON NATURAL FREQUENCIES AND MODE SHAPES**

O. de la Torre, National University of Ireland Galway, Galway, Ireland; X. Escaler, Universitat Politècnica De Catalunya, Barcelona, Spain; J. Goggins, National University of Ireland Galway, Galway, Ireland

**PVP2017-65736: DYNAMIC INSTABILITY ANALYSIS OF A SPRING-LOADED PRESSURE SAFETY VALVE CONNECTED TO PIPE BY USING CFD METHOD**

F. Zheng, X. Song, W. Sun, Dalian University of Technology, Dalian, China

**SESSION 2.2O (DA-2-1)**

*Tuesday, July 18, 10:30 am – 12:15 pm, Waikoloa Suite 3*

**DESIGN AND ANALYSIS OF PIPING AND COMPONENTS—I**

Developed by: B. Li, AMEC Foster Wheeler, Toronto, ON, Canada; K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

Chair: B. Li, AMEC Foster Wheeler, Toronto, ON, Canada



Co-Chair: K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

**PVP2017-65025: ACOUSTIC VIBRATION INDUCED FATIGUE IN WELDED PIPE SUPPORTS**

Y. Liu, Bechtel, Sugar Land, TX, USA; P. Diwakar, Bechtel Corp, Houston, TX, USA; D. Lin, Bechtel Oil, Gas & Chemicals, Inc., Houston, TX, USA; M. Jaouhari, Bechtel Corporation, Sugar Land, TX, USA; A. Prakash, Bechtel Nuclear Security & Environmental, San Ramon, CA, USA

**PVP2017-65026: STRESS EFFECT ON PIPE BENDS OF TRIMMED ELBOW BASED ON ASME B31**

Y. Liu, L. Shen, P. Diwakar, M. Jaouhari, P. Patel, Bechtel Oil, Gas & Chemicals, Inc., Houston, TX, USA

**PVP2017-65043: VIBRATION TESTING OF COMPRESSION JOINTS**

P. Hirschberg, Structural Integrity Associates, San Jose, CA, USA; M. Sindelar, Lokring Technology, Willoughby, OH, USA; M. Kassar, Exelon Generation, Warrenville, IL, USA; R. Haupt, Pressure Piping Engineering Associates Inc., Foster City, CA, USA

**PVP2017-65053: FATIGUE ANALYSIS OF SMALL BORE FULL ENCIRCLEMENT SLEEVE AND SOCKET WELDS**

M. Jones, A. Harris, J. Wilson, Rolls Royce Plc, Derby, United Kingdom

**PVP2017-65237: NUMERICAL -EXPERIMENTAL STUDY ON THE EROSION-CAVITATION WEAR OF COAL OIL SLURRY VALVE**

Z. Zheng, G. Ou, H. Jin, Zhejiang Sci-Tech University, Hangzhou, China

**SESSION 2.2Q (TW-1-4)**

*Tuesday, July 18, 10:30 am – 12:15 pm, Kohala 3*

**FITNESS-FOR-SERVICE (FFS) PROCEDURES FOR EVALUATION OF DAMAGE OR DEFECTS IN PRESSURIZED EQUIPMENT USING API 579-1/ASME FFS-1 (PART 2)**

Developed by: D. L. Stang, Omax Corporation, Kent, WA, USA

Chair: D. L. Stang, Omax Corporation, Kent, WA, USA

Presented by: P. E. Prueter, B. Macejko, The Equity Engineering Group, Inc., Shaker Heights, OH, USA

**SESSION 2.2S (TW-4-6)**

*Tuesday, July 18, 10:30 am – 12:15 pm, Grand Promenade*

**TECHNOLOGY DEMONSTRATION FORUM—VI**

Developed by: C. Jaske, HSI Group, Inc., Torrance, CA, USA; J. F. Cory, Jr., Siemens PLMS Software, Milford, OH, USA

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**Block 2.3: Tuesday, July 18, 2017 (2:00 pm – 3:45 pm)**

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**SESSION 2.3A (DA-16-6)**

*Tuesday, July 18, 2:00 pm – 3:45 pm, Kohala 1*

**CLOSING SESSION: WHAT'S NEXT FOR THE INDUSTRY?**

**2nd International Symposium on Coke Drum Life Cycle Management—Sponsored by Design & Analysis Technical Committee**

Developed by: C. Rodery, BP p.l.c, League City, TX, USA; K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

Chair: C. Rodery, BP p.l.c, League City, TX, USA

Co-Chair: B. Hantz IV, Valero Energy Corp., San Antonio, TX, USA; J. Taagepera, Chevron ETC, Richmond, CA, USA

**SESSION 2.3B (FSI-2-6)**

*Tuesday, July 18, 2:00 pm – 3:45 pm, Kohala 2*

**AXIAL FLOW FSI/FUEL VIBRATION**

**Symposium of Flow-Induced Vibration—Sponsored by Fluid-Structure Interaction Technical Committee**

Developed by: P. Moussou, IMSIA, Palaiseau, France; C. Meskill, Trinity College, Dublin, Ireland

Chair: P. Moussou, IMSIA, Palaiseau, France

Co-Chair: Woo Gun Sim, Hannam University, Daejeon, Korea (Republic)

**PVP2017-65045: CONFINEMENT DEPENDENCY ON ADDED STIFFNESS EFFECT ON A FUEL ASSEMBLY UNDER AXIAL FLOW**

G. Ricciardi, CEA Cadarache, St Paul les Durance, France

**PVP2017-65172: CONSTRUCTION OF DYNAMIC MODEL OF PLANAR AND ROCKING MOTION FOR FREE STANDING SPENT FUEL RACK**

K. Sakamoto, R. Kan, A. Takai, S. Kaneko, University of Tokyo, Tokyo, Japan

**PVP2017-65242: CRITICAL FLOW VELOCITY FOR A STATIC INSTABILITY OF PARALLEL-PLATE FUEL ASSEMBLIES (Presentation Only)**

H. S. Kang, K. Lee, C. W. Shin, H. J. Kim, T. Kwon, Korea Atomic Energy Research Institute, Deajeon, Korea (Republic)

**PVP2017-65664: FLUID DAMPING IN FUEL ASSEMBLIES**

P. Moussou, IMSIA, Palaiseau, France; A. Guilloux, EDF, Palaiseau, France; G. Ricciardi, E. Boccaccio, CEA Cadarache, St Paul les Durance, France

**PVP2017-65967: SIMULATION OF THE INTERACTION BETWEEN A SLENDER FLEXIBLE CYLINDER AND AN AXIAL HIGH-SPEED AIR FLOW**

J. Degroote, I. Hertens, A. Osman, J. Vierendeels, Ghent University, Ghent, Belgium

**SESSION 2.3C (CS-11-2)**

*Tuesday, July 18, 2:00 pm – 3:45 pm, Kohala 3*

**FAILURE ANALYSIS OF ENGINEERING STRUCTURE—I**

**Symposium on Recent Developments in International Codes and Standards—Sponsored by Codes & Standards Technical Committee**

Developed by: G. Jia, The General Administration of Quality Supervision, Inspection and Quarantine, Beijing, China

Chair: G. Jia, The General Administration of Quality Supervision, Inspection and Quarantine, Beijing, China

Co-Chair: G. Deng, China Special Equipment Inspection and Research Institution, Beijing, China

**PVP2017-65018: OIL STORAGE TANK SETTLEMENT ASSESSMENT BASED ON STANDARD AND FINITE ELEMENT ANALYSES**

L. Shi, X. Wang, Fushun Research Institute of Petroleum and Petrochemicals, SINOPEC, Fushun, China; J. Shuai, K. Xu, China University of Petroleum-Beijing, Beijing, China; M. Li, Fushun Research Institute of Petroleum and Petrochemicals, SINOPEC, Fushun, China

**PVP2017-65092: STUDY ON NUMERICAL SIMULATION OF GAS-SOLID EROSION FOR FEED TYPE TEE**

Z. Fang, China Special Equipment Inspection and Research Institute, Beijing, China; W. Hu, China University of Petroleum-Beijing, Beijing, China; D. Liu, G. Li, China Special Equipment Inspection and Research Institute, Beijing, China

**PVP2017-65279: THE RESEARCH OF THE FITNESS-FOR-SERVICE ASSESSMENT ON STEELS FOR PRESSURE VESSEL SUBJECTED TO FIRE DAMAGE: METALLURGICAL ANALYSIS AND THE INFLUENCE ON PERFORMANCE DEGRADATION**

B. Li, W. Shu, X. Tang, Y. Zuo, Shanghai Institute of Special Equipment Inspection and Technical Research, Shanghai, China

**PVP2017-65687: ON-LINE MONITORING AND WARNING OF IMPORTANT IN-SERVICE PRESSURE EQUIPMENT BASED ON CHARACTERISTIC SAFETY PARAMETERS**

X. Chen, T. Yang, Z. Fan, Y. Lv, Hefei General Machinery Research Institute, Hefei, Anhui, China

**PVP2017-66162: SIGNAL ANALYSIS AND PROCESSING FOR MAGNETIC FLUX LEAKAGE INSPECTION DEVICE FOR UNDERGROUND STORAGE TANK**

Z. Ling, M. Zheng, M. Wang, W. Guo, W. Tan, Zhejiang Provincial Special Equipment Inspection and Research Institute, Hangzhou, China

**SESSION 2.3D (MF-15-2)**

*Tuesday, July 18, 2:00 pm – 3:45 pm, King's 1*

**COMPOSITE SYSTEMS FOR PRESSURE VESSELS AND PIPING**

**International Symposium on Composite Systems for Pressure Vessels and Piping—Co-Sponsored by Design & Analysis, Materials & Fabrication and Operations, Applications & Components Technical Committees**

Developed by: M. Uddin, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA; P. Mertiny, University of Alberta, Edmonton, AB, Canada

Chair: M. Uddin, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA

Co-Chair: P. Mertiny, University of Alberta, Edmonton, AB, Canada

**PVP2017-65209: PERFORMANCE OF ALL-POLYPROPYLENE COMPOSITES**

## AT LNG TEMPERATURES

B. Atli-Veltin, TNO, Delft, Netherlands

### **PVP2017-66075: RELATING ASME FLAW EVALUATION TO ASME TASK GROUP ON CARBON FIBER REPAIRS**

T. J. Jimenez, Fiberwrap, San Diego, CA, USA; E. Houston, Structural Integrity Associates, Inc., Centennial, CO, USA; N. Meyer, Fyfe Company, San Diego, CA, USA

### **PVP2017-66076: INTERNAL REPAIR OF BURIED PIPES WITH CFRP COMPOSITES**

R. Ojdrovic, Simpson Gumpertz & Heger, Waltham, MA, USA; A. Pridmore, Structural Technologies, Columbia, MD, USA

### **PVP2017-66129: APPLICATION OF CFRP FOR STEEL PIPELINE UPGRADES AT SURRY POWER STATION**

J. Sealey, Surry Power Station, Smithfield, VA, USA; A. Pridmore, Structural Technologies, Columbia, MD, USA; R. Ojdrovic, Simpson Gumpertz & Heger, Waltham, MA, USA; L. Gordon, Dominion Surry Power Station, Surry, VA, USA

## SESSION 2.3E (MF-5-1)

*Tuesday, July 18, 2:00 pm – 3:45 pm, King's 2*

### **EUROPEAN PROGRAMS IN STRUCTURAL INTEGRITY—I**

#### **Symposium on Structural Integrity—Co-Sponsored by Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: P. James, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom; E. Keim, T. Nicak, AREVA, Erlangen, Germany; D. Moinereau, Electricite De France, Moret-sur-Loing F-77818, France

Chair: A. Horn, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom

Co-Chair: S. Blasset, AREVA GmbH, Erlangen, Germany

### **PVP2017-65283: AGE 60+—APPLICABILITY OF AGEING RELATED DATA BASES AND METHODOLOGIES FOR ENSURING SAFE OPERATION OF LWR BEYOND 60 YEARS**

M. Brumovsky, UJV Rez a.s., Rez, Czech Republic; S. Ortner, UK National Nuclear Lab, Abingdon, United Kingdom

### **PVP2017-65757: A NUMERICAL STUDY ON FRACTURE TOUGHNESS OF CANDU PRESSURE TUBE**

T. Nicak, AREVA, Erlangen, Germany; B. Wasiluk, Canadian Nuclear Safety Commission, Kanata, ON, Canada; E. Keim, AREVA, Erlangen, Germany

### **PVP2017-65762: TECHNICAL BASIS FOR CHARACTERIZATION OF MULTIPLE CLOSELY SEPARATED FLAWS LOCATED IN DIFFERENT PLANES**

S. Blasset, T. Nicak, E. Keim, R. Tiete, F. Obermeier, AREVA GmbH, Erlangen, Germany

## SESSION 2.3F (CS-21-1)

*Tuesday, July 18, 2:00 pm – 3:45 pm, King's 3*

### **FATIGUE MONITORING AND RELATED ASSESSMENT METHODS—I**

#### **Symposium on Fatigue Issues—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: J. Rudolph, AREVA GmbH, Erlangen, Bavaria, Germany

Chair: J. Rudolph, AREVA GmbH, Erlangen, Bavaria, Germany

Co-Chair: S. Bergholz, AREVA GmbH, Erlangen, Bavaria, Germany; T. Gilman, Structural Integrity Associates, Inc., San Jose, CA, USA

### **PVP2017-66072: STRUCTURAL HEALTH MONITORING FOR CONVENTIONAL POWER PLANTS—SOLUTIONS FOR OPERATIONAL CHALLENGES**

J. Rudolph, AREVA GmbH, Erlangen, Bavaria, Germany; S. Bergholz, AREVA GmbH, Erlangen, Bavaria, Germany

### **PVP2017-66190: A SCREENING METHODOLOGY TO RAPIDLY REDUCE ILI DATA, VISUALISE AND DETERMINE MOST DETRIMENTAL DEFECTS IN PIPELINES**

N. Larrosa, The University of Manchester, Manchester, United Kingdom; P. L. Crespo, University of Malaga, Malaga, Spain; R. A. Ainsworth, The University of Manchester, Manchester, United Kingdom

### **PVP2017-65678: STRESS LINEARIZATION CONCEPTS AND RESTRICTIONS IN ELASTIC DESIGN BY ANALYSIS**

D. Mackenzie, University of Strathclyde, Glasgow, Scotland

### **PVP2017-66090: A STUDY FOR EVALUATING LOCAL DAMAGE TO REINFORCED CONCRETE PANELS SUBJECTED TO OBLIQUE IMPACT OF DE-**

## FORMABLE PROJECTILE

A. Nishida, Y. Ohta, H. Tsubota, Y. Li, Japan Atomic Energy Agency, Ibaraki-Ken, Japan

## SESSION 2.3G (DA-12-2)

*Tuesday, July 18, 2:00 pm – 3:45 pm, Queen's 4*

### **FRACTURE—II**

#### **Symposium on Fracture Mechanics and Analysis—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: S. Kataoka, JGC Corporation, Yokohama, Japan; S. Finneran, DNV GL - Materials Advisory Services, Dublin, OH, USA

Chair: S. Kataoka, JGC Corporation, Yokohama, Japan

Co-Chair: S. Finneran, DNV GL - Materials Advisory Services, Dublin, OH, USA

### **PVP2017-65575: APPLICATION OF THE EXTENDED FINITE ELEMENT METHOD (XFEM) TO SIMULATE CRACK PROPAGATION IN PRESSURIZED STEEL PIPES**

M. Lin, S. Agbo, J. J. R. Cheng, University of Alberta, Edmonton, AB, Canada; N. Yoosef-Ghods, Enbridge Pipelines Inc., Edmonton, AB, Canada; S. Adeeb, University of Alberta, Edmonton, AB, Canada

### **PVP2017-65745: BENCHMARK OF NUMERICAL PREDICTIONS OF STRESS INTENSITY FACTORS: FINITE ELEMENTS AND EXTENDED-FINITE ELEMENTS METHODS**

R. Lacroix, A. Caron, S. Dischert, P. Conraux, ESI Group, Lyon, France; H. Deschanel, AREVA NP, Lyon, France

### **PVP2017-65962: RECENT DEVELOPMENTS OF FRACTURE MECHANICS TOOLS FOR NOZZLE CORNERS**

A. Blouin, S. Chapuliot, S. Marie, A. Jaubert, S. Courtin, AREVA NP, Paris la Defense, France

## SESSION 2.3H (OAC-6-6)

*Tuesday, July 18, 2:00 pm – 3:45 pm, Queen's 5*

### **LIFE CYCLE MANAGEMENT (LCM) FOR HYDROPROCESSING REACTORS**

#### **Symposium on Life Cycle Management—Co-Sponsored by High-Pressure Technology and Operations, Applications & Components Technical Committees**

Developed by: T. Tahara, T&T Technology, Saitama Pref, Japan; L. Sabattoli, ATB Riva Calzoni S.p.A., Roncadelle, Brescia, Italy; L. Antaffy, Fluor, Sugar Land, TX, USA

Chair: T. Tahara, T&T Technology, Saitama Pref, Japan

Co-Chair: L. Sabattoli, ATB Riva Calzoni S.p.A., Roncadelle, Brescia, Italy

#### **Panelists:**

T. Tahara, Seikowave KK., Fujimino., Saitama Pref., Japan

S. Terada, Kobe Steel, Ltd., Takasago, Hyogo, Japan

A. Yasutomi, The Japan Steel Works, Ltd., Hokkaido, Japan

G. Buchheim, Becht Engineering Co., Inc., Kihei, HI, USA

## SESSION 2.3I (CT-3-1)

*Tuesday, July 18, 2:00 pm – 3:45 pm, Queen's 6*

### **TIGHTNESS AND FUGITIVE EMISSIONS OF BOLTED FLANGE JOINTS**

Developed by: T. Kobayashi, National Institute of Technology, Numazu College, Numazu, Shizuoka, Japan; S. Nagata, Toyo Engineering Corporation, Chiba, Japan

Chair: T. Kobayashi, National Institute of Technology, Numazu College, Numazu, Shizuoka, Japan

Co-Chair: S. Nagata, Toyo Engineering Corporation, Chiba, Japan

### **PVP2017-65420: GASKET TIGHTNESS: AN EXPLORATION OF ACHIEVABLE TIGHTNESS IN ASME B16.5 STANDARD FLANGES FOR VARIOUS GASKET TECHNOLOGIES**

A. Bausman, VSP Technologies, Kingsport, TN, USA; D. Rice, VSP Technologies, Leland, NC, USA; A. F. Waterland, III, VSP Technologies, Prince George, VA, USA

### **PVP2017-65734: EXPLORING M & Y GASKET FACTORS AND THEIR DEGREE OF CORRELATION WITH PROPOSED PVRC GASKET FACTORS**

D. Rice, VSP Technologies, Leland, NC, USA; A. Fitzgerald Waterland, III, VSP Technologies, Prince George, VA, USA; A. Bausman, VSP Technologies, Kingsport, TN, USA

**PVP2017-65017: PREDICTING LEAK RATE OF GASSES THROUGH PACKING SEALS WITH DIFFERENT ANALYTICAL APPROACHES**

A. Aweimer, A.-H. Bouzid, M. Kazemina, École de Technologie Supérieure, Montreal, QC, Canada

**PVP2017-65887: A DETAILED PROPOSAL FOR AN OXIDATION TEST FOR GRAPHITE IN GASKETS**

S. Bond, FLEXITALLIC, Houston, TX, USA

**PVP2017-65010: OXIDATION STUDY OF GRAPHITE AT VARYING TEMPERATURES (Presentation Only)**

R. Taylor, Lamons, Houston, United Kingdom; Kris Kolb, Lamons Gasket Co., Houston, TX, USA

**SESSION 2.3J (OAC-4-3)**

*Tuesday, July 18, 2:00 pm – 3:45 pm, Kona 1*

**PACKAGING MATERIALS AND COMPONENTS**

Developed by: M. Weber, Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany

Chair: M. Weber, Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany

Co-Chair: J. Jordan, Savannah River Nuclear Solutions, Aiken, SC, USA

**PVP2017-65364: COMPARISON OF EXPERIMENTAL RESULTS AND NUMERICAL SIMULATIONS OF PENETRATION TESTS WITH DAMPING CONCRETE**

R. Scheidemann, L. Qiao, K. Müller, Federal Institute for Materials Research and Testing, Berlin, Germany

**PVP2017-65697: DEVELOPMENT OF A MATERIAL MODEL FOR THE CRUSH OF SPRUCE WOOD**

M. Neumann, G. Eisenacher, T. Schönfelder, F. Wille, Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany

**PVP2017-66195: THE SAVY-4000 MEETING THE CHALLENGE FOR WORKER SAFETY (Presentation Only)**

T. Stone, P. Smith, Los Alamos National Laboratory, Los Alamos, NM, USA

**PVP2017-65822: ADAPTATION OF AN AIR TRANSPORT PACKAGE DESIGN FOR PRESSURE RETAINING VESSELS (Presentation Only)**

P. Blanton, Savannah River Nuclear Solutions, Aiken, SC, USA; K. Eberl, Savannah River National Laboratory, Aiken, SC, USA

**SESSION 2.3K (MF-3-6)**

*Tuesday, July 18, 2:00 pm – 3:45 pm, Kona 2*

**HYDROGEN COMPATIBILITY OF PRESSURE VESSELS**

Developed by: C. San Marchi, Sandia National Laboratories, Livermore, CA, USA

Chair: P. Bortot, TenarisDalmine, Dalmine (BG) Italy, Italy

Co-Chair: Y. Wada, The Japan Steel Works, Ltd., Hokkaido, Japan

**PVP2017-65247: HYDROGEN EMBRITTLEMENT SUSCEPTIBILITY OF CLAD STEEL PIPES**

L. Jemblie, The Norwegian University of Science and Technology, Trondheim, Norway; V. Olden, B. Nyhus, SINTEF Materials and Chemistry, Trondheim, Norway; O. M. Akselsen, The Norwegian University of Science and Technology, Trondheim, Norway

**PVP2017-65498: THE REVISED HTHA SUSCEPTIBILITY METHOD ON RISK ASSESSMENT OF HYDROGENATION REACTORS CONCERNING THE EFFECTS OF AUSTENITIC STAINLESS OVERLAY**

J. Zhao, Nanjing Tech University, Nanjing, Jiangsu Province, China

**PVP2017-65040: EFFECT OF UNCONTROLLED HYDROGEN INJECTION ON SCC SUSCEPTIBILITY OF 304L STEEL IN HIGH TEMPERATURE WATER**

A. L. Medina-Almazán, Instituto Nacional de Investigaciones Nucleares, Ocoyoacac, Mexico; G. Galicia-Aguilar, Instituto de Ingeniería/Universidad Veracruzana, Boca del Rio, Veracruz, Mexico; J. C. Zenteno-Suárez, C. Arganis-Juárez, N. López-García, Instituto Nacional de Investigaciones Nucleares, Ocoyoacac, Mexico

**PVP2017-65556: DEVELOPMENT FOR MANUFACTURE OF REFINING REACTORS MADE OF 9CR-1MO-V STEEL**

T. Nakanishi, S. Terada, M. Yamada, I. Maeda, T. Ikeuchi, Kobe Steel, Ltd., Takasago, Hyogo, Japan

**PVP2017-66099: THE EUROPEAN FUNDED PROJECT MATHRYCE: A SUMMARY OF THE RESULTS AND RELATED STANDARDIZATION ACTIVITIES (Presentation Only)**

P. Bortot, M. E. Cristea, Dalmine S.p.A, Dalmine (BG), Italy

**SESSION 2.3L (SE-3-3)**

*Tuesday, July 18, 2:00 pm – 3:45 pm, Kona 3*

**DAMPING AND VIBRATION CONTROL—III**

Developed by: K. Minagawa, Saitama Institute of Technology, Saitama, Japan

Chair: K. Aida, Mitsubishi Hitachi Power Systems, Ltd., Kure-Shi, Japan

Co-Chair: K. Minagawa, Saitama Institute of Technology, Saitama, Japan

**PVP2017-65334: GA-OPTIMIZED FUZZY LOGIC CONTROL OF MULTI-DEGREE FREEDOM STRUCTURE UNDER SEISMIC EXCITATION**

T. P. Huu, A. Sone, N. Miura, Kyoto Institute of Technology, Kyoto, Japan

**PVP2017-65493: PRECISE OPTIMIZATION OF THREE-ELEMENT TYPE DYNAMIC VIBRATION ABSORBER (MINIMIZATION OF MAXIMUM AMPLITUDE MAGNIFICATION FACTOR)**

O. Nishihara, Kyoto University, Kyoto, Japan

**PVP2017-65707: DESIGN METHOD OF SEMI-ACTIVE CONTROL SYSTEMS MINIMIZING THE ERROR BETWEEN THE CONTROLLED SIGNALS OF THE SEMI-ACTIVE AND ITS REFERENCE ACTIVE CONTROL SYSTEMS**

K. Hiramoto, Niigata University, Niigata, Japan; T. Matsuoka, Meiji University, Kawasaki, Kanagawa, Japan; K. Sunakoda, Akita University, Saitama, Japan

**SESSION 2.3M (HT-6-1)**

*Tuesday, July 18, 2:00 pm – 3:45 pm, Waikoloa Suite 1*

**PANEL SESSION ON DISCUSSION OF API 17TR8 REQUIREMENTS AS RELATED TO ASME STANDARDS**

Developed by: J. Kaculi, Dril-Quip Inc., Houston, TX, USA

Chair: J. Kaculi, Dril-Quip Inc., Houston, TX, USA

Co-Chair: D. Peters, Structural Integrity Associates, Edinboro, PA, USA

*Panelists:*

D. Peters, Structural Integrity Associates, Inc., Edinboro, PA, USA

Man Pham, Anadarko, The Woodlands, TX, USA

J. Kaculi, Dril-Quip Inc., Houston, TX, USA

**SESSION 2.3N (FSI-1-4)**

*Tuesday, July 18, 2:00 pm – 3:45 pm, Waikoloa Suite 2*

**CORROSION, FATIGUE AND IMPACT**

Developed by: A. Tijsseling, TU Eindhoven, Eindhoven, Netherlands; J. C. Jo, Pusan National University, Busan, Korea (Republic); C. S. Martin, Georgia Institute of Technology, South Dennis, MA, USA; K. Inaba, Tokyo Institute of Technology, Tokyo, Japan

Chair: A. Tijsseling, TU Eindhoven, Eindhoven, Netherlands

Co-Chair: J. C. Jo, Pusan National University, Busan, Korea (Republic)

**PVP2017-65154: INVESTIGATION OF FLOW STRUCTURE TO PREVENT THERMAL FATIGUE IN A DOWNWARD BRANCH PIPE WITH A CLOSED END**

K. Miyoshi, A. Nakamura, Institute of Nuclear Safety System, Inc., Fukui, Japan

**PVP2017-65359: IMPROVEMENT OF FAC MAINTENANCE PROGRAM ISSUED FROM BRT-CICERO—VIA CFD CALCULATIONS (Presentation Only)**

E. Gipon, S. Trevin, M.-P. Moutrille, EDF DTG, Grenoble, France

**PVP2017-65606: THERMO-MECHANICAL LOADING OF FULL-SCALE WELDED PIPING COMPONENTS IN HIGH TEMPERATURE WATER ENVIRONMENT**

M. C. Kammerer, X. Schuler, R. Kulenovic, M. Zhou, E. Laurien, University of Stuttgart, Stuttgart, Baden-Württemberg, Germany

**PVP2017-65823: NON-REFLECTING BOUNDARIES FOR SMOOTHED PARTICLE HYDRODYNAMICS MODELING HYPERVELOCITY IMPACTS (Presentation Only)**

C. Giannopapa, Eindhoven University of Technology, Eindhoven, Netherlands

**SESSION 2.3O (DA-2-2)**

*Tuesday, July 18, 2:00 pm – 3:45 pm, Waikoloa Suite 3*

**DESIGN AND ANALYSIS OF PIPING AND COMPONENTS—II**

Developed by: K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

Chair: K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

Co-Chair: B. Li, AMEC Foster Wheeler, Toronto, ON, Canada

**PVP2017-65818: INVESTIGATION OF SMOOTH PIPE BENDS UNDER THE**



## EFFECT OF IN-PLANE BENDING

D. Abdulhameed, J. J. R. Cheng, University of Alberta, Edmonton, AB, Canada; M. Martens, TransCanada PipeLines, Calgary, AB, Canada; S. Adee, University of Alberta, Edmonton, AB, Canada

## PVP2017-65797: TARGET RELIABILITY INDEX FOR LOAD AND RESISTANCE FACTOR DESIGN OF CLASS 2 CARBON STEEL PIPES

K. Avriithi, R. Mendoza, University of Houston-Downtown, Houston, TX, USA

## PVP2017-65333: BENCHMARKING OF EXPLICIT DYNAMIC FINITE ELEMENT ANALYSIS FOR STORAGE AND TRANSPORTATION CASKS UNDER IMPACT LOADING CONDITIONS

S. Yoshida, T. Okamoto, Tepco Systems Corporation, Koto-Ku, Japan; S. Takagi, Tokyo Electric Power Company Holdings, Tokyo, Japan

## PVP2017-65096: DESIGN MODIFICATION TO MITIGATE THE REACTOR INNER ZONE INLET HEADER TEMPERATURE IN A CANDU REACTOR

B. Li, AMEC Foster Wheeler, Toronto, ON, Canada; P. Tang, Bruce Power, Tiverton, ON, Canada; K. Khan, AMEC Foster Wheeler Nuclear Canada, Toronto, ON, Canada; A. Bhatia, Bruce Power, Tiverton, ON, Canada

## SESSION 2.3Q (TW-1-5)

Tuesday, July 18, 2:00 pm – 3:45 pm, Kohala 4

### FATIGUE ASSESSMENT OF WELDMENTS (PART 1)

Developed by: D. L. Stang, Omax Corporation, Kent, WA, USA

Chair: D. L. Stang, Omax Corporation, Kent, WA, USA

Presented by: P. Dong, University of Michigan, Ann Arbor, MI, USA; M. J. Doré, TWI Ltd., Cambridge, UK

## SESSION 2.3S (TW-4-7)

Tuesday, July 18, 2:00 pm – 3:45 pm, Grand Promenade

### TECHNOLOGY DEMONSTRATION FORUM—VII

Developed by: C. Jaske, HSI Group, Inc., Torrance, CA, USA; J. F. Cory, Jr., Siemens PLMS Software, Milford, OH, USA

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## Block 2.4: Tuesday, July 18, 2017 (4:00 pm – 5:45 pm)

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## SESSION 2.4A (NDPD-1-1)

Tuesday, July 18, 4:00 pm – 5:45 pm, Kohala 1

### EMERGING NDE AND RELIABILITY—TECHNIQUES AND APPLICATIONS

Developed by: V. Agarwal, Idaho National Laboratory, Idaho Falls, ID, USA; S. Dugan, University of Stuttgart, Stuttgart, Baden-Württemberg, Germany; M. Spies, Fraunhofer Institute for Non-destructive Testing, Saarbruecken, Germany

Chair: V. Agarwal, Idaho National Laboratory, Idaho Falls, ID, USA

Co-Chair: J. Oka, Los Alamos National Laboratory, Los Alamos, NM, USA

## PVP2017-65474: ASSESSING ADVANCED TEST REACTOR PROCESS STATES USING ACOUSTIC MEASUREMENT INFRASTRUCTURE

V. Agarwal, J. A., Smith, Idaho National Laboratory, Idaho Falls, ID, USA

## PVP2017-66191: INITIAL THERMAL TESTING OF THE PIPE OVER-PACK CONTAINER WITH A COMBUSTIBLE WASTE MATRIX FOR LOS ALAMOS NATIONAL LABORATORY

J. Oka, T. Stone, P. Smith, M. Caviness, M. Croce, Los Alamos National Laboratory, Los Alamos, NM, USA

## PVP2017-65523: DEFORMATION ANALYSIS OF DENTED PIPELINES VIA SURFACE INTERPOLATION

C. Okoloekwe, University of Alberta, Edmonton, AB, Canada; M. Kainat, D. Langer, S. Hassani, Enbridge Liquid Pipelines, Edmonton, AB, Canada; J. J. R. Cheng, University of Alberta, Edmonton, AB, Canada

## PVP2017-65306: MULTISENSOR DEGRADATION DATA FUSION AND REMAINING LIFE PREDICTION

E. Elsayed, C. Wang, J. Cabrera, K. Li, Rutgers University, Piscataway, NJ, USA

## PVP2017-66236: A NOVEL DEFECT LOCATION METHOD FOR PLATE-LIKE STRUCTURE BY USING FORWARD-SCATTERING WAVE AND FUZZY C-MEANS CLUSTERING

S. Chen, S. Zhou, Y. Li, L. Zhang, East China University of Science and Technology, Shanghai, China

## SESSION 2.4B (FSI-2-7)

Tuesday, July 18, 4:00 pm – 5:45 pm, Kohala 2

### PIPING & ACOUSTICS—II

#### Symposium of Flow-Induced Vibration—Sponsored by Fluid-Structure Interaction Technical Committee

Developed by: A. Mohany, University of Ontario Institute of Technology, Oshawa, ON, Canada; M. Hassan, University Of Guelph, Guelph, ON, Canada

Chair: A. Mohany, University of Ontario Institute of Technology, Oshawa, ON, Canada

Co-Chair: S. Belfroid, TNO, Delft, Netherlands

## PVP2017-65298: AEROACOUSTIC SOURCE OF MULTIPLE CAVITIES AND PREDICTION OF SELF-EXCITED OSCILLATIONS

A. Shaaban, S. Ziada, McMaster University, Hamilton, ON, Canada

## PVP2017-65402: NATURAL FREQUENCIES AND DAMPING OF A FULL-SCALE PIPE LOOP IN AIR AND WATER

H. Goyder, Cranfield University, Swindon, United Kingdom

## PVP2017-65405: FLOW-INDUCED NOISE OF PERFORATED PLATES AT OBLIQUE ANGLES OF INCIDENCE

P. Vanoostveen, McMaster University, Mount Hope, ON, Canada; S. Ziada, McMaster University, Hamilton, ON, Canada

## PVP2017-65692: COMBUSTION OSCILLATION IN GAS TURBINE COMBUSTOR FOR FUEL MIXTURE OF HYDROGEN AND NATURAL GAS

A. Uemichi, I. Kanetsuki, S. Kaneko, The University of Tokyo, Tokyo, Japan

## SESSION 2.4C (CS-11-3)

Tuesday, July 18, 4:00 pm – 5:45 pm, Kohala 3

### EXAMPLE OF ENGINEERING FAILURE ANALYSIS IN CHINA

#### Symposium on Recent Developments in International Codes and Standards—Sponsored by Codes & Standards Technical Committee

Developed by: X. Chen, Hefei General Machinery Research Institute, Hefei, Anhui, China

Chair: X. Chen, Hefei General Machinery Research Institute, Hefei, Anhui, China

Co-Chair: Z. Fan, Hefei General Machinery Research Institute, Hefei, China

## PVP2017-65282: FITNESS-FOR-SERVICE ASSESSMENT ON PRESSURE PIPING OF GRADE X70 PIPELINE STEEL (API SPEC.5L) AFTER EXPOSURE TO FIRE

Y. Zuo, W. Shu, X. Tang, B. Li, Shanghai Institute of Special Equipment Inspection and Technical Research, Shanghai, China

## PVP2017-65492: CASE STUDY OF SHAKEDOWN EVALUATION OF A SHELL WITH A NOZZLE BASED ON ELASTIC-PLASTIC ANALYSIS

J. Shen, Wison Engineering Co., Ltd., Shanghai, China; H. Peng, Tsinghua University, Beijing, China; L. Wan, Sinopec Engineering Incorporation, Beijing, China; Y. Tang, Wison Engineering Co., Ltd., Shanghai, China; Y. Liu, Tsinghua University, Beijing, China

## PVP2017-65632: STRESS ANALYSIS AND OPTIMIZATION RESEARCH FOR CLAD STEEL TUBE SHEET IN DIFFERENT TUBE PATTERNS

K. Wang, Z. Liu, W. Xu, G. Tan, Y. Wang, Zhengzhou University, Zhengzhou, Henan province, China

## PVP2017-65651: CORROSION BEHAVIOR OF X70 PIPELINE STEEL AND CORROSION RATE PREDICTION UNDER THE COMBINATION OF CORROSIVE MEDIUM AND APPLIED PRESSURE

K. Li, W. Wu, G. Cheng, Y. Li, H. Hu, Xi'an Jiaotong University, Xi'an, China

## PVP2017-66172: LOAD AND RESISTANCE FACTOR DESIGN OF DUAL CRITERION AGAINST GROSS PLASTIC DEFORMATION AND COLLAPSE

C.-H. Duan, X.-X. Li, Beijing University of Chemical Technology, Beijing, China; Y. Sun, HuaLu Engineering & Technology Co., Ltd., Shaanxi, China; M. Lu, Tsinghua University, Beijing, China

## SESSION 2.4D (MF-16-1)

Tuesday, July 18, 4:00 pm – 5:45 pm; King's 1

### PLASTIC AND COMPOSITE PIPE

#### International Symposium on Composite Systems for Pressure Vessels and Piping—Co-Sponsored by Design & Analysis, Materials & Fabrication and Operations, Applications & Components Technical Committees

Developed by: S. Kalyanam, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA; P. Rush, MPR Associates, Alexandria, VA, USA

Chair: S. Kalyanam, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA

Co-Chair: P. Rush, MPR Associates, Alexandria, VA, USA

**PVP2017-65591: RELATIVE INFLUENCE OF SOIL STIFFNESS AND ELBOW GEOMETRY ON BURIED PIPING THERMAL STRESSES**

M. P. H. Marohl, G. Frazee, T. Musto, Sargent & Lundy LLC, Chicago, IL, USA

**PVP2017-65990: EVALUATION OF ASME CLASS 3 HDPE FLANGED JOINTS**

T. Musto, G. Frazee, M. P. H. Marohl, Sargent & Lundy, L.L.C., Chicago, IL, USA

**PVP2017-66146: ACCEPTANCE LIMITS FOR SUBSURFACE VOIDS IN HDPE PIPING**

P. Rush, MPR Associates, Alexandria, VA, USA; D. Scarth, Kinectrics Inc., Toronto, ON, Canada; D. Munson, Consultant, Honolulu, HI, USA

**SESSION 2.4E (MF-17-1)**

*Tuesday, July 18, 4:00 pm – 5:45 pm; King's 2*

**PROBABILISTIC ASSESSMENT OF FAILURE**

**Symposium on Probabilistic Assessments and Risk Management—Co-Sponsored by Codes & Standards, Materials & Fabrication and Operations, Applications & Components Technical Committees**

Developed by: S. Xu, Kinectrics Inc., Toronto, ON, Canada; K. Nikbin, Imperial College London, London, United Kingdom

Chair: J. C. Jin, Canadian Nuclear Safety Commission, Ottawa, ON, Canada

Co-Chair: K. Nikbin, Imperial College London, London, United Kingdom

**PVP2017-65989: PROPOSED APPROACH OF SCENARIO ANALYSIS USING A PROBABILISTIC CODE**

C. Sallaberry, R. Kurth, F. Brust, E. Kurth, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA

**PVP2017-65991: SENSITIVITY ANALYSIS FOR XLPR ACCEPTANCE TESTING**

C. Sallaberry, R. Kurth, F. Brust, E. Kurth, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA

**PVP2017-65255: ASSESSMENT OF A STRESS-FREE TEMPERATURE MODEL FOR RESIDUAL STRESSES IN SURFACE CLADDING OF A REACTOR PRESSURE VESSEL**

B. R. Bass, P. T. Williams, T. Dickson, H. Klasky, Oak Ridge National Laboratory, Oak Ridge, TN, USA

**SESSION 2.4F (CS-3-1)**

*Tuesday, July 18, 4:00 pm – 5:45 pm; King's 3*

**ENVIRONMENTAL FATIGUE ISSUES—I**

**Symposium on Fatigue Issues—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: S. Asada, Mitsubishi Heavy Industries, Ltd., Kobe, Japan; S. Mohanty, Argonne National Laboratory, Lemont, IL, USA; C. Faidy, CF Integrity Engineering, Tassin, France; H. Mehta, GE Hitachi Nuclear Engineering, San Jose, CA, USA

Chair: S. Asada, Mitsubishi Heavy Industries, Ltd., Kobe, Japan

Co-Chair: H. Mehta, GE Hitachi Nuclear Engineering, San Jose, CA, USA

**PVP2017-65006: OVERVIEW OF INTERNATIONAL IMPLEMENTATION OF ENVIRONMENTAL FATIGUE (UPDATE)**

F. H. E. De Haan-de Wilde, NRG, Petten, Netherlands, F. Blom, NRG, Petten, Netherlands

**PVP2017-65302: CODIFIED FATIGUE CURVES FOR NUCLEAR AND NON-NUCLEAR PRESSURE EQUIPMENT (Presentation Only)**

C. Faidy, CF Integrity Engineering, Tassin, France; J. Rudolph, AREVA GmbH, Erlangen, Bavaria, Germany

**PVP2017-66242: FATIGUE LIMIT IN THE ASME CODE FATIGUE DESIGN CURVES FOR AUSTENITIC AND FERRITE STEELS**

S. Ranganath, XGEN Engineering, San Jose, CA, USA; H. Mehta, GE Hitachi Nuclear Engineering, San Jose, CA, USA; J. Hosler, Electric Power Research Institute, Charlotte, NC, USA; N. Palm, Electric Power Research Institute, Washington, PA, USA

**PVP2017-65257: COMPLEX LOW-CYCLE FATIGUE DAMAGE ASSESSMENT**

**OF COMPONENTS AND PIPING OF NUCLEAR POWER PLANT TYPE WWER**  
L. Vıcek, L. Junek, Institute of Applied Mechanics Brno, Ltd., Brno, Czech Republic

**SESSION 2.4G (CS-22-1)**

*Tuesday, July 18, 4:00 pm – 5:45 pm; Queen's 4*

**MASTER CURVE FRACTURE TOUGHNESS AND OTHER SMALL SPECIMEN MECHANICAL PROPERTIES—I**

**Symposium on Fracture Mechanics and Analysis—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: W. Server, ATI Consulting, Black Mountain, NC, USA; M. Yamamoto, Central Research Institute of Electric Power Industry, Yokosuka, Kanagawa, Japan

Chair: W. Server, ATI Consulting, Black Mountain, NC, USA

Co-Chair: M. Yamamoto, Central Research Institute of Electric Power Industry, Yokosuka, Kanagawa, Japan

**PVP2017-65083: EVALUATION OF WEIBULL PARAMETERS BY DIFFERENT SMALL PUNCH TESTS SAMPLES BASED ON BEREMIN MODEL**

K. Guan, L. Guo, M. Fu, East China University of Science and Technology, Shanghai, China

**PVP2017-65174: EMBRITTLEMENT TREND CURVES FOR FRACTURE TOUGHNESS OF 15KH2MFAA TYPE STEEL**

M. Brumovsky, M. Kytka, R. Kopriva, UJV Rez a.s., Rez, Czech Republic

**PVP2017-65396: EUROPEAN STANDARD ON SMALL PUNCH TESTING OF METALLIC MATERIALS**

M. Bruchhausen, European Commission, Joint Research Centre, Petten, Netherlands, E. Altstadt, Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany; T. Austin, European Commission, Joint Research Centre, Petten, Netherlands, P. Dymacek, Institute of Physics of Materials Academy of Sciences of the Czech Republic, Brno, Czech Republic; S. Holmström, European Commission, Joint Research Centre, Petten, Netherlands

**PVP2017-65518: APPLICATION OF MASTER CURVE APPROACH TO SURVEILLANCE TEST DATA FOR WWER-1000 REACTOR PRESSURE VESSELS**

V. Revka, L. Chyrko, Institute for Nuclear Research, Kyiv, Ukraine

**PVP2017-65982: LARGE SA-508 CLASS 2 NOZZLE FORGING NEAR-SURFACE FRACTURE TOUGHNESS**

J. B. Hall, Westinghouse, Pittsburgh, PA, USA; B. E. Mays, Westinghouse, Pittsburgh, PA, USA; M. DeVan, AREVA, Lynchburg, VA, USA

**SESSION 2.4H (OAC-8-1)**

*Tuesday, July 18, 4:00 pm – 5:45 pm; Queen's 5*

**AGEING MANAGEMENT AND LICENSE RENEWAL**

**Symposium on Life Cycle Management—Co-Sponsored by High-Pressure Technology and Operations, Applications & Components Technical Committees**

Developed by: G. Bezdikian, Georges Bezdikian Consulting, Le Vesinet, France; G. Young, Entergy Services Inc., Russellville, AR, USA

Chair: G. Bezdikian, Georges Bezdikian Consulting, Le Vesinet, France

Co-Chair: G. Young, Entergy Services Inc., Russellville, AR, USA

**PVP2017-65934: PROBABILISTIC STRUCTURAL ANALYSIS FOR AGING MANAGEMENT OF REACTOR INTERNALS BOLTING**

G. Troyer, C. Waskey, S. Fyfitz, J. Somers, AREVA, Lynchburg, VA, USA

**PVP2017-65998: ICE FUEL DEBRIS COLLECTION METHOD AT FUKUSHIMA DAIICHI NUCLEAR POWER PLANT (Presentation Only)**

H. Morishige, Fukushima Nuclear Accident Countermeasures Review Group, Kobe, Hyogo, Japan; Y. Yamashiki, Kyoto University, Kyoto, Kyoto, Japan

**PVP2017-65395: MEASUREMENT OF INDIRECT PARAMETERS TO ESTIMATE THE RESIDUAL STRAIN IN 304L STAINLESS STEELS (Presentation Only)**

C. Arganis-Juárez, Instituto Nacional de Investigaciones Nucleares, Ocoyoacac, Mexico, Mexico; A. K. Arias-Alcántara, Universidad Nacional Autónoma de México, Mexico City, Ciudad de Mexico, Mexico

**PVP2017-65769: SWELLING OF VVER-1000 CORE BAFFLE: NUMERICAL MODELING AND DIRECT MEASUREMENT OF ITS GEOMETRICAL DIMENSIONS**

A. Oryniak, I. Orynyak, IPP-Centre Ltd., Kiev, Ukraine

## SESSION 2.4I (CT-4-1)

Tuesday, July 18, 4:00 pm – 5:45 pm. Queen's 6

### ASSEMBLY OF BOLTED FLANGE JOINTS

Developed by: A. Bausman, VSP Technologies, Kingsport, TN, USA; D. Rice, VSP Technologies, Leland, NC, USA

Chair: A. Bausman, VSP Technologies, Kingsport, TN, USA

Co-Chair: D. Rice, VSP Technologies, Leland, NC, USA

### PVP2017-65639: FLOATING HEAD HEAT EXCHANGER JOINT—REVIEW AND SOLUTION TO HYDROTEST FAILURES (Presentation Only)

R. Noble, Asset55 Ltd., Hebburn, Tyne and Wear, United Kingdom

### PVP2017-65701: INTRODUCTION OF GASKET TESTING PROTOCOLS IN THE NEW RCC-M® F7000 REVISION PROPOSAL

H. Lejeune, C. Boulben, Cetim, Nantes, France

### PVP2017-66252: VBA APP FOR THE CALCULATION OF OPTIMAL TIGHTENING SEQUENCES FOR RING TYPE JOINTS

I. Coria, M. Abasolo, J. Aguirrebeitia, I. Heras, University of the Basque Country, Bilbao, Vizcaya, Spain

### PVP2017-66275: ANALYTICAL MODELLING OF ELASTIC INTERACTION IN BOLTED FLANGE GASKETED JOINTS

L. Zhu, Xi'an Jiaotong University, Xi'an, China; A.-H. Bouzid, École de Technologie Supérieure, Montreal, QC, Canada; J. Hong, Xi'an Jiaotong University, Xi'an, Shaanxi, China

## SESSION 2.4J (OAC-4-1)

Tuesday, July 18, 4:00 pm – 5:45 pm. Kona 1

### THERMAL AND STRUCTURAL ANALYSIS

Developed by: M. Neumann, Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany

Chair: M. Neumann, Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany

Co-Chair: M. Weber, Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany

### PVP2017-65054: LIFE EXTENSION OF THE 9975 PACKAGE AS A STORAGE CONTAINER: THERMAL ANALYSIS

B. Kiflu, Savannah River Nuclear Solutions, Aiken, SC, USA; S. Hensel, Savannah River Nuclear Solutions, Aiken, SC, USA

### PVP2017-65218: THERMAL ASPECTS OF SAFETY ANALYSIS FOR SHIPMENT OF WEST VALLEY MELTER

J. Laurinat, J. England, M. Kesterson, E. Ketusky, Savannah River National Laboratory, Aiken, SC, USA; C. Mckeel, Savannah River Nuclear Solutions, Aiken, SC, USA

### PVP2017-65721: BEHAVIOR OF WOOD FILLED IMPACT LIMITERS DURING THE IAEA THERMAL TEST

M. Feldkamp, M. Erenberg, M. Nehrig, C. Bletzer, A. Musloff, Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany

### PVP2017-65880: DEVELOPMENT OF RADIOACTIVE MATERIAL SHIPPING/STORAGE CONTAINER O-RING ACCEPTANCE CRITERIA FOLLOWING LONG TERM AGING (Presentation Only)

J. Johnson, Savannah River Nuclear Solutions, North Augusta, SC, USA; E. Skidmore, Savannah River National Laboratory, Aiken, SC, USA; C. Mckeel, Savannah River Nuclear Solutions, Aiken, SC, USA

## SESSION 2.4K (MF-4-1)

Tuesday, July 18, 4:00 pm – 5:45 pm. Kona 2

### RESIDUAL STRESS MEASUREMENTS, WELD REPAIR AND ADVANCED WELDING TECHNIQUES

Developed by: D. Rudland, U.S. Nuclear Regulatory Commission, Frederick, MD, USA; E. Keim, AREVA, Erlangen, Germany

Chair: D. Rudland, U.S. Nuclear Regulatory Commission, Frederick, MD, USA

Co-Chair: E. Keim, AREVA, Erlangen, Germany

### PVP2017-65466: DEVELOPMENT OF WELD RESIDUAL STRESS MEASUREMENT METHOD FOR PRIMED STEELS

Y.-P. Yang, EW, Columbus, OH, USA; T. D. Huang, H. Rucker, Ingalls, Pascagoula, MS, USA; W. Zhang, The Ohio State University, Columbus, OH, USA; M. Harbison, Ingalls, Pascagoula, MS, USA

## PVP2017-66180: A REVIEW OF WELDING RESEARCH WITHIN THE NEW NUCLEAR MANUFACTURING (NNUMAN) PROGRAMME

M. Smith, A. Vasileiou, D. Rathod, J. Francis, N. Irvine, The University of Manchester, Manchester, United Kingdom

### PVP2017-65165: ANALYSIS AND OPTIMIZATION OF THE DEEP-HOLE DRILLING TECHNIQUE IN MEASURING COMPLEX RESIDUAL STRESS

G. Zheng, State Power Investment Corporation Central Research Institute, Beijing, China; S. Hossain, Military Technological College, Muscat, Oman; F. Shen, State Power Investment Corporation Central Research Institute, Beijing, China; C. Truman, University of Bristol, Bristol, United Kingdom

## SESSION 2.4L (SE-9-1)

Tuesday, July 18, 4:00 pm – 5:45 pm. Kona 3

### MULTI-HAZARDS AND MARGINS

Developed by: C. Petropoulos, Sargent & Lundy, LLC, Chicago, IL, USA

Chair: C. Petropoulos, Sargent & Lundy, LLC, Chicago, IL, USA

Co-Chair: A. Casimiro Caputo, Roma Tre University, Rome, Italy

### PVP2017-65137: ON THE USE OF PROPER FRAGILITY MODELS FOR SEISMIC QUANTITATIVE RISK ASSESSMENT OF PROCESS PLANTS IN SEISMIC PRONE AREAS

S. Alessandri, A. C. Caputo, D. Corritore, R. Giannini, F. Paolacci, Roma Tre University, Rome, Italy

### PVP2017-65464: A METHOD TO ESTIMATE PROCESS PLANT SEISMIC RESILIENCE

A. C. Caputo, F. Paolacci, University Roma Tre, Rome, Italy

### PVP2017-65465: NUMERICAL SIMULATION OF SEISMIC RISK AND LOSS PROPAGATION EFFECTS IN PROCESS PLANTS. AN OIL REFINERY CASE STUDY

A. C. Caputo, A. Vigna, University Roma Tre, Roma, Italy

### PVP2017-65588: RELATIVE INFLUENCE OF OFFSET SPACING AND TRANSDUCER SUPPORT LOCATION ON BURIED PIPING SEISMIC STRESSES

G. Frazee, M. P. H. Marohl, T. Musto, Sargent & Lundy LLC, Chicago, IL, USA

## SESSION 2.4M (MF-12-1)

Tuesday, July 18, 4:00 pm – 5:45 pm. Waikoloa Suite 1

### PIPELINE INTEGRITY—NUMERICAL SIMULATION AND EXPERIMENTAL TESTING

Developed by: D.-Y. Park, CanmetMATERIALS, Natural Resources Canada, Calgary, AB, Canada; X.-K. Zhu, Edison Welding Institute, Columbus, OH, USA

Chair: D.-Y. Park, CanmetMATERIALS, Natural Resources Canada, Calgary, AB, Canada

Co-Chair: M. Paredes, Massachusetts Institute of Technology, Cambridge, MA, USA

### PVP2017-65407: EFFECT OF FINITE STRAINS AND RESIDUAL STRESSES ON PATH INDEPENDENCE OF J-INTEGRAL FOR DUCTILE CRACKS

X.-K. Zhu, Edison Welding Institute, Columbus, OH, USA; T. McLaughy, EW, Columbus, OH, USA

### PVP2017-65236: EXPRESSION OF A GENERIC FULL-RANGE TRUE STRESS-TRUE STRAIN MODEL FOR PIPELINE STEELS USING THE PRODUCT-LOG (OMEGA) FUNCTION

O. Ndubuaku, University of Alberta, Edmonton, AB, Canada; M. Martens, TransCanada PipeLines, Calgary, AB, Canada; J. J. R. Cheng, S. Adeeb, University of Alberta, Edmonton, AB, Canada

### PVP2017-65177: EFFECTS OF NOTCH ACUITY ON FRACTURE TOUGHNESS MEASUREMENTS

D.-Y. Park, J.-P. Gravel, CanmetMATERIALS, Natural Resources Canada, Calgary, AB, Canada; D.-M. Duan, TransCanada, Calgary, AB, Canada

### PVP2017-66036: MODELING OF CRACK PROPAGATION IN DEFECTIVE X100 LINE PIPES (Presentation Only)

M. Paredes, Massachusetts Institute of Technology, Cambridge, MA, USA; A. Nonn, OTH-Regensburg, Regensburg, Germany; T. Wierzbicki, Massachusetts Institute of Technology, Cambridge, MA, USA

## SESSION 2.4N (FSI-1-5)

Tuesday, July 18, 4:00 pm – 5:45 pm. Waikoloa Suite 2

### NUCLEAR POWER PLANT FIRES AND EXPLOSIONS



Developed by: J. C. Jo, Pusan National University, Busan, Korea (Republic); A. Tijsseling, TU Eindhoven, Eindhoven, Netherlands; C. S. Martin, Georgia Institute of Technology, South Dennis, MA, USA  
Chair: J. C. Jo, Pusan National University, Busan, Korea (Republic)  
Co-Chair: A. Tijsseling, TU Eindhoven, Eindhoven, Netherlands  
**PVP2017-66285: NUCLEAR POWER PLANT FIRES AND EXPLOSIONS, I, PLANT DESIGNS AND HYDROGEN IGNITION**  
R. Leishear, Leishear Engineering, LLC., Aiken, SC, USA  
**PVP2017-66278: NUCLEAR POWER PLANT FIRES AND EXPLOSIONS, II, HYDROGEN IGNITION OVERVIEW**  
R. Leishear, Leishear Engineering, LLC., Aiken, SC, USA  
**PVP2017-66284: NUCLEAR POWER PLANT FIRES AND EXPLOSIONS, III, HAMAOKA PIPING EXPLOSION**  
R. Leishear, Leishear Engineering, LLC., Aiken, SC, USA  
**PVP2017-66279: NUCLEAR POWER PLANT FIRES AND EXPLOSIONS, IV, WATER HAMMER IGNITION MECHANISMS**  
R. Leishear, Leishear Engineering, LLC., Aiken, SC, USA

### **SESSION 2.40 (DA-2-3)**

*Tuesday, July 18, 4:00 pm – 5:45 pm, Waikoloa Suite 3*

#### **DESIGN AND ANALYSIS OF PIPING AND COMPONENTS—III**

Developed by: K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA  
Chair: K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA  
Co-Chair: S. Iyer, Candu Energy, Mississauga, ON, Canada

#### **PVP2017-65382: EVALUATION OF THE REACTION MOMENT OF METAL BELLOWS EXPANSION JOINTS SUBJECTED TO ANGULAR MOVEMENTS**

J. Veiga, Teadit Industria e Comercio Ltda, Rio De Janeiro, Brazil; N. Kavanagh, Teadit Juntas Ltda, Campinas, SP, Brazil

#### **PVP2017-66113: ASME PRESSURE DESIGN OF CLASS 1 PIPE BENDS USING ELASTIC-PLASTIC FEA**

U. Abdelsalam, Amec Foster Wheeler - Nuclear Canada, Toronto, ON, Canada; A. Glover, Bruce Power, Toronto, ON, Canada; D. Vijay, Amec Foster Wheeler - Nuclear Canada, Toronto, ON, Canada

#### **PVP2017-65997: A METHOD FOR OPTIMIZING PIPE ROUTES AND LOCATIONS FOR GEOTHERMAL STEAM GATHERING SYSTEMS TO MINIMIZE COST AND VISUAL EFFECTS**

M. Jonsson, L. Magnusdottir, University of Iceland, Reykjavik, Iceland  
**PVP2017-65578: INVESTIGATION ON ACOUSTIC PROPAGATION OF ULTRASOUND IN POLYETHYLENE PIPE USED IN NUCLEAR POWER PLANT**  
X. Sheng, D. Hou, J. Zheng, Zhejiang University, Hangzhou, Zhejiang, China

### **SESSION 2.4Q (TW-1-6)**

*Tuesday, July 18, 4:00 pm – 5:45 pm, Kohala 4*

#### **FATIGUE ASSESSMENT OF WELDMENTS (PART 2)**

Developed by: D. L. Stang, Omax Corporation, Kent, WA, USA  
Chair: D. L. Stang, Omax Corporation, Kent, WA, USA  
Presented by: P. Dong, University of Michigan, Ann Arbor, MI, USA; M. J. Doré, TWI Ltd., Cambridge, UK

### **SESSION 2.4S (TW-4-8)**

*Tuesday, July 18, 4:00 pm – 5:45 pm, Grand Promenade*

#### **TECHNOLOGY DEMONSTRATION FORUM—VIII**

Developed by: C. Jaske, HSI Group, Inc., Torrance, CA, USA; J. F. Cory, Jr., Siemens PLMS Software, Milford, OH, USA

## **WEDNESDAY, JULY 19**

### **Block 3.1: Wednesday, July 19, 2017 (8:30 am – 10:15 am)**

### **SESSION 3.1A (NDPD-1-2)**

*Wednesday, July 19, 8:30 am – 10:15 am, Kohala 1*

#### **EMERGING NDE AND PROGNOSTIC TECHNIQUES AND APPLICATIONS**

Developed by: V. Agarwal, Idaho National Laboratory, Idaho Falls, ID, USA  
Chair: V. Agarwal, Idaho National Laboratory, Idaho Falls, ID, USA  
Co-Chair: S. Dugan, University of Stuttgart, Stuttgart, Baden-Württemberg, Germany

#### **PVP2017-65051: APPLICATION OF COMPUTED TOMOGRAPHY FOR THE EXAMINATION OF PRESSURE RETAINING NUCLEAR PLANT COMPONENTS**

R. Gratton, J. Wilson, K. Skuse, Rolls-Royce Plc, Bristol, United Kingdom  
**PVP2017-65964: APPLICATION OF COMPUTED RADIOGRAPHY IN PRESSURE VESSEL WELDS: ASME SEC V REQUIREMENTS & RECOMMENDATIONS OF ASTM E2007**

S. Saha, Intertek Inspec, Sharjah, Sharjah, United Arab Emir.  
**PVP2017-65215: DEVELOPMENT AND DELIVERY OF EDDY CURRENT SURFACE EXAMINATION PER ASME SEC XI, APPENDIX IV (Presentation Only)**  
N. Farenbaugh, Curtiss-Wright, Hutchinson, MN, USA

**PVP2017-66149: REAL TIME CORROSION DETECTION OF REBAR REINFORCED BY USING EMBEDDABLE FIBER OPTIC ULTRASOUND SENSOR**  
X. Wang, C. Du, S. Bi, University of Massachusetts, Lowell, MA, USA; J. O. Twumasi, UMass Lowell, Lowell, MA, USA; Q. Tang, University of Massachusetts, Lowell, MA, USA

#### **PVP2017-65178: LEAK DETECTION IN PRESSURE VESSELS USING ULTRASONIC TECHNIQUES**

G. R. Piazzetta, R. C. C. Fleisch, A. L. S. Pacheco, Universidade Federal de Santa Catarina, Florianopolis, Santa Catarina, Brazil

### **SESSION 3.1B (FSI-2-8)**

*Wednesday, July 19, 8:30 am – 10:15 am, Kohala 2*

#### **FIV IN TUBE ARRAYS—II**

#### **Symposium of Flow-Induced Vibration—Sponsored by Fluid-Structure Interaction Technical Committee**

Developed by: M. Hassan, University of Guelph, Guelph, ON, Canada; T. Nakamura, Osaka Sangyo University, Daito, Osaka, Japan

Chair: M. Hassan, University of Guelph, Guelph, ON, Canada  
Co-Chair: M. Pettigrew, Ecole Polytechnique-Montreal, Deep River, ON, Canada

#### **PVP2017-65019: RESEARCH ON CROSS FLOW INDUCED VIBRATION OF FLEXIBLE TUBE BUNDLE**

Z. Feng, W. Zhang, Y. Zhang, F. Zang, H. Qi, Nuclear Power Institute of China, Chengdu, China

#### **PVP2017-65342: MODAL ANALYSIS OF A TRIANGULAR-PITCH BUNDLE SUBJECTED TO TWO-PHASE CROSS-FLOW**

E. Deri, EDF, Chatou, France  
**PVP2017-65349: NUMERICAL EXPERIMENT ON TWO-PHASE FLOW BEHAVIORS IN TUBE BUNDLE GEOMETRY FOR DIFFERENT MIXTURES**

W. Benguigui, E. Deri, J. Lavieville, S. Mimouni, E. Longatte, EDF, Paris, France  
**PVP2017-66068: INVESTIGATIONS OF IN-PLANE FLUIDELASTIC INSTABILITY IN A MULTI-SPAN U-BEND TEST RIG—TESTS IN AIR-FLOW**

P. Feenstra, T. Sawadogo, B. A. W. Smith, V. P. Janzen, Canadian Nuclear Laboratories, Chalk River, ON, Canada; H. Cothron, Electric Power Research Institute, Hixson, TN, USA

### **SESSION 3.1C (CS-11-4)**

*Wednesday, July 19, 8:30 am – 10:15 am, Kohala 3*

#### **FAILURE ANALYSIS OF ENGINEERING STRUCTURE**

#### **Symposium on Recent Developments in International Codes and Standards—Sponsored by Codes & Standards Technical Committee**

Developed by: G. Cheng, Z. Zhang, Xi'an Jiaotong University, Xi'an, Shaanxi, China

Chair: G. Cheng, Xi'an Jiaotong University, Xi'an, Shaanxi, China  
Co-Chair: Z. Zhang, Xi'an Jiaotong University, Xi'an, Shaanxi, China

#### **PVP2017-65613: EFFECT OF MECHANICAL MODEL ON LIMIT LOAD ANALYSIS OF HIGH PRESSURE HEATER TUBESHEET**

Y. Du, X. Tang, Shanghai Institute of Special Equipment Inspection and Technical Research, Shanghai, China; J. Wang, Z. Yang, Y. Ren, Shanghai Electric Power Generation Equipment Co. Ltd., Shanghai, China

#### **PVP2017-65617: NUMERICAL SIMULATION OF TEMPERATURE FIELD AND RESIDUAL STRESS IN MULTI-PASS WELDS IN 2.25CR-1MO-0.25V STEEL**

## PLATE AND COMPARISON WITH EXPERIMENTAL MEASUREMENTS

M. Qin, G. Cheng, Z. Zhang, Q. Li, Xi'an Jiaotong University, Xi'an, Shaanxi, China; J. Zhang, Lanzhou LS Heavy Equipment Co., Ltd., Lanzhou, Gansu, China  
**PVP2017-65629: NUMERICAL SIMULATION OF THE FOUR-ROLL BENDING PROCESS FOR 2.25CR-1MO-0.25V THICK-PLATE AT ELEVATED TEMPERATURE**

Y. Wang, G. Cheng, Z. Zhang, Y. Li, Xi'an Jiaotong University, Xi'an, Shaanxi, China; J. Zhang, Lanzhou LS Heavy Equipment Co., Ltd., Lanzhou, Gansu, China  
**PVP2017-65684: INVESTIGATION OF FRACTURE TOUGHNESS OF HEAT AFFECTED ZONE OF 2.25CR-1MO-0.25V STEEL PRESSURE EQUIPMENT**

W. Wu, Y. Song, M. Chai, Z. Zhang, G. Cheng, Xi'an Jiaotong University, Xi'an, Shaanxi, China  
**PVP2017-65957: NUMERIC STUDY ON PROPELLANT LEAKAGE IN ATMOSPHERIC ENVIRONMENT**

D. Ma, W. Tan, Z. Zhang, Xi'an Jiaotong University, Xi'an, Shaanxi, China

## SESSION 3.1D (OAC-6-5)

*Wednesday, July 19, 8:30 am – 10:15 am, King's 1*

### APPLICATIONS OF NON-METALLIC MATERIALS

**International Symposium on Composite Systems for Pressure Vessels and Piping—Co-Sponsored by Design & Analysis, Materials & Fabrication and Operations, Applications & Components Technical Committees**

Developed by: A. Cheta, Qatar Shell GTL, Doha, Qatar; Y. Shoji, YS Corporation LLC, Tokyo, Japan

Chair: A. Cheta, Qatar Shell GTL, Doha, Qatar

Co-Chair: Y. Shoji, YS Corporation LLC, Tokyo, Japan

### PVP2017-65224: ADVANCED APPLICATIONS FOR HDPE PIPES

W. Long, Performance Pipe, Plano, TX, USA

### PVP2017-65421: MULTIPLE PURPOSES OF REFRACTORY LININGS IN SULFUR RECOVERY UNITS

C. Shargay, V. Wong, T. Tajalli, Fluor Enterprises, Inc., Aliso Viejo, CA, USA

### PVP2017-65833: ASME CODE CASE N-770 IN ACTION: THE FIRST US APPLICATION OF MITSUBISHI'S WATER JET PEENING TECHNOLOGY TO MITIGATE PWSCC IN REACTOR VESSEL AND BOTTOM MOUNTED NOZZLES (Presentation Only)

S. Baumgartner, G. Martin, Mitsubishi Nuclear Energy Systems, Charlotte, NC, USA

## SESSION 3.1E (CS-9-1)

*Wednesday, July 19, 8:30 am – 10:15 am, King's 2*

### MASTER CURVE BASED FRACTURE TOUGHNESS MODELS AND PARTIAL STRUCTURAL FACTOR DEVELOPMENT

**Symposium on Probabilistic Assessments and Risk Management—Co-Sponsored by Codes & Standards, Materials & Fabrication and Operations, Applications & Components Technical Committees**

Developed by: M. Kirk, Nuclear Regulatory Commission, Rockville, MD, USA; M. A. Erickson, Phoenix Engineering Associates, Inc., Claremont, NH, USA

Chair: K. Wallin, VTT Technical Research Centre of Finland Ltd., Espoo, Finland

Co-Chair: M. Kirk, Nuclear Regulatory Commission, Rockville, MD, USA

### PVP2017-66147: DIRECT USE OF FRACTURE TOUGHNESS FOR FLAW EVALUATIONS OF PRESSURE BOUNDARY MATERIALS IN SECTION XI, DIVISION 1, CLASS 1 FERRITIC STEEL COMPONENTS

M. A. Erickson, Phoenix Engineering Associates, Inc., Claremont, NH, USA; M. Kirk, Nuclear Regulatory Commission, Rockville, MD, USA

### PVP2017-66148: DEVELOPMENT OF A PARTIAL STRUCTURAL FACTOR APPROACH FOR DIRECT FRACTURE TOUGHNESS IMPLEMENTATION INTO THE ASME BOILER AND PRESSURE VESSEL CODE

M. A. Erickson, Phoenix Engineering Associates, Inc., Claremont, NH, USA; M. Kirk, Nuclear Regulatory Commission, Rockville, MD, USA

### PVP2017-66204: EVALUATION OF PARTIAL SAFETY FACTORS FOR DESIGN OF EXTERNALLY PRESSURIZED CYLINDERS AND DEFECT ASSESSMENT OF PIPES (Presentation Only)

N.-S. Huh, Seoul National University of Science and Technology, Seoul, Korea (Republic)

### PVP2017-66280: LARGE DATASET ASSESSMENT OF THE UPPER SHELF

## MASTER CURVE MODEL

M. Kirk, Nuclear Regulatory Commission, Rockville, MD, USA; M. A. Erickson, Phoenix Engineering Associates, Inc., Claremont, NH, USA; R. Link, US Naval Academy, Annapolis, MD, USA

## SESSION 3.1F (CS-3-2)

*Wednesday, July 19, 8:30 am – 10:15 am, King's 3*

### ENVIRONMENTAL FATIGUE ISSUES—II

**Symposium on Fatigue Issues—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: S. Asada, Mitsubishi Heavy Industries, Ltd., Kobe, Japan; S. Mohanty, Argonne National Laboratory, Lemont, IL, USA; H. Mehta, GE Hitachi Nuclear Engineering, San Jose, CA, USA; C. Faidy, CF Integrity Engineering, Tassin, France

Chair: H. Mehta, GE Hitachi Nuclear Engineering, San Jose, CA, USA

Co-Chair: C. Faidy, CF Integrity Engineering, Tassin, France

### PVP2017-65563: ANALYSIS OF ENVIRONMENTAL FATIGUE CRACK GROWTH BEHAVIOR OF TYPE 347 STAINLESS STEELS UNDER SIMULATED PWR WATER CONDITIONS

S. Hong, K.-D. Min, S.-H. Jeon, B. Lee, Korea Atomic Energy Research Institute, Daejeon, Korea (Republic)

### PVP2017-65256: INCEFA-PLUS (INCREASING SAFETY IN NPPS BY COVERING GAPS IN ENVIRONMENTAL FATIGUE ASSESSMENT)

K. Mottershead, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom; S. Cicero, University of Cantabria, Santander, Spain; M. Bruchhausen, European Commission, Joint Research Centre, Petten, Netherlands, T. Metais, EDF, Villeurbanne, France; D. R. Tice, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom

### PVP2017-65367: ASME CODE-CASE PROPOSAL TO EXPLICITLY QUANTIFY THE INTERACTION BETWEEN THE PWR ENVIRONMENT AND COMPONENT SURFACE FINISH

T. Metais, EDF, Villeurbanne, France; S. Courtin, L. de Baglion, AREVA, Ile-de-France, France; C. Gourdin, CEA, Gif-sur-Yvette, France; J.-C. le Roux, EDF R&D, Moret-sur-Loing, France

### PVP2017-66030: MODELS FOR CALCULATING THE EFFECT OF ENVIRONMENT ON FATIGUE LIFE (FEN) FOR COMPLEX WAVEFORMS AND/OR NON-ISOTHERMAL CONDITIONS

C. Currie, A. Morley, Rolls-Royce Plc, Derby, Derbyshire, United Kingdom; N. Platts, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom; M. Twite, K. Wright, Rolls-Royce Plc, Derby, United Kingdom

## SESSION 3.1G (CS-22-2)

*Wednesday, July 19, 8:30 am – 10:15 am, Queen's 4*

### MASTER CURVE FRACTURE TOUGHNESS AND OTHER SMALL SPECIMEN MECHANICAL PROPERTIES—II

**Symposium on Fracture Mechanics and Analysis—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: M. Yamamoto, Central Research Institute of Electric Power Industry, Yokosuka, Kanagawa, Japan; W. Server, ATI Consulting, Black Mountain, NC, USA

Chair: J. B. Hall, Westinghouse, Pittsburgh, PA, USA

Co-Chair: W. Server, ATI Consulting, Black Mountain, NC, USA; E. Lucon, Protiro Inc., Boulder, CO, USA

### PVP2017-65568: FRACTURE TOUGHNESS EVALUATION OF NEUTRON-IRRADIATED REACTOR PRESSURE VESSEL STEEL USING MINIATURE-C(T) SPECIMENS

Y. Ha, T. Tobita, H. Takamizawa, Y. Nishiyama, Japan Atomic Energy Agency, Tokai-Mura, Ibaraki-Ken, Japan

### PVP2017-65904: USE OF MINI-CT SPECIMENS FOR FRACTURE TOUGHNESS CHARACTERIZATION OF LOW UPPER-SHELF LINDE 80 WELD

M. Sokolov, Oak Ridge National Laboratory, Oak Ridge, TN, USA

### PVP2017-66085: THE MASTER CURVE FRACTURE TOUGHNESS EVALUATION OF IRRADIATED PLATE MATERIAL JRQ USING MINIATURE-C(T) SPECIMENS

M. Yamamoto, Central Research Institute of Electric Power Industry, Yokosuka, Kanagawa, Japan

**PVP2017-66206: APPLICABILITY OF MINIATURE C(T) SPECIMEN TO FRACTURE TOUGHNESS EVALUATION FOR THE IRRADIATED JAPANESE REACTOR PRESSURE VESSEL STEEL**

T. Sugihara, Nuclear Development Corporation, Tokai-mura, Japan; T. Hirota, H. Sakamoto, K. Yoshimoto, Mitsubishi Heavy Industries, Ltd., Takasago, Japan; K. Tsutsumi, Mitsubishi Heavy Industries, Ltd., Kobe, Japan

**SESSION 3.1H (OAC-1-1)**

*Wednesday, July 19, 8:30 am – 10:15 am, Queen's 5*

**RELIABILITY AND LIFE CYCLE MANAGEMENT**

**Symposium on Life Cycle Management—Co-Sponsored by High-Pressure Technology and Operations, Applications & Components Technical Committees**

Developed by: A. Reich, Streamline Automation LLC, Huntsville, AL, USA; H. Watson, Savannah River National Laboratory, Aiken, SC, USA

Chair: A. Reich, Streamline Automation LLC, Huntsville, AL, USA

Co-Chair: H. Watson, Savannah River National Laboratory, Aiken, SC, USA

**PVP2017-65105: APPLICATION OF PARTIAL SAFETY FACTORS FOR FITNESS-FOR-SERVICE ASSESSMENT OF PRESSURE EQUIPMENT WITH LOCAL METAL LOSS**

T. Kaida, Rabigh Refining & Petrochemical Co., Rabigh, Saudi Arabia; S. Sakai, University of Tokyo, Tokyo, Japan

**PVP2017-65408: BAYESIAN ANALYSIS OF EXPERT ELICITATION RESPONSES FOR LIFE CYCLE MANAGEMENT REPLACEMENT PROBABILITY ESTIMATES**

J. Cluever, LPI, Inc., Richland, WA, USA; T. C. Esselman, LPI, Inc., Amesbury, MA, USA; S. Harvey, Electric Power Research Institute, Charlotte, NC, USA

**PVP2017-65821: CONSIDERATIONS FOR THE USE OF PROBABILISTIC ASSESSMENTS IN REGULATORY DECISION MAKING RELATED TO PRESSURE BOUNDARY COMPONENT AGING**

B. Carroll, J. C. Jin, Canadian Nuclear Safety Commission, Ottawa, ON, Canada

**PVP2017-65180: PERFORMANCE EVALUATION OF A RESPIRATOR VORTEX COOLING DEVICE**

A. Elizondo, Savannah River National Laboratory, Aiken, SC, USA; R. Iacovone, Savannah River Nuclear Solutions, Aiken, SC, USA

**SESSION 3.1I (CT-8-1)**

*Wednesday, July 19, 8:30 am – 10:15 am, Queen's 6*

**THREADED FASTENER**

Developed by: S. Nassar, University of Oakland, Northhill, CA, USA; T. Fukuoka, Kobe University, Kobe, Japan

Chair: W. Reinhardt, SNC Lavalin Nuclear Inc., Mississauga, ON, Canada

Co-Chair: T. Fukuoka, Kobe University, Kobe, Japan

**PVP2017-65061: EVALUATION OF MECHANICAL BEHAVIOR OF TAPER PIPE THREADS IN THE TIGHTENING PROCESS BY FINITE ELEMENT ANALYSIS AND ELEMENTARY THEORY OF SOLID MECHANICS**

T. Fukuoka, Y. Hirai, Kobe University, Kobe, Japan

**PVP2017-65118: A CASE STUDY FOR THE LOW FIDELITY MODELING OF THREADED FASTENERS SUBJECT TO TENSILE LOADINGS AT LOW AND HIGH STRAIN RATES**

J. Mersch, J. Smith, E. P. Johnson, Sandia National Laboratories, Albuquerque, NM, USA

**PVP2017-65261: THE EFFECTS OF LOW TEMPERATURE CARBON DIFFUSION TREATED FASTENERS ON THREAD GALLING RESISTANCE**

K. P. Clark, VSP Technologies, Prince George, VA, USA

**PVP2017-65291: THE EFFECTIVENESS OF NON-LOOSENING FASTENERS**

Y. Shoji, YS Corporation LLC, Tokyo, Japan

**SESSION 3.1J (OAC-5-1)**

*Wednesday, July 19, 8:30 am – 10:15 am, Kona 1*

**DESIGN, ANALYSIS, MODELING AND PERFORMANCE OF VALVES AND PUMPS**

Developed by: L. I. Ezekoye, Ezekoye Engineering Services LLC, Pittsburgh, PA, USA; M. Brumovsky, UJV Rez a.s., Rez, Czech Republic

Chair: L. I. Ezekoye, Ezekoye Engineering Services LLC, Pittsburgh, PA, USA

Co-Chair: M. Brumovsky, UJV Rez a.s., Rez, Czech Republic

**PVP2017-65031: ANALYSING EFFECT OF VARIOUS PARAMETERS ON MAXIMUM SURGE PRESSURE IN A PIPELINE AND DECIDING GOVERNING PARAMETER USING STATISTICAL APPROACH (Presentation Only)**

P. Joshi, Aker Solutions, Mumbai, India

**PVP2017-66269: CHECK VALVE FLOW AND DISK LIFT SIMULATION USING CFD**

L. I. Ezekoye, Ezekoye Engineering Services LLC, Pittsburgh, PA, USA; R. Farrell, M. Rain, Flowserve Corporation, Raleigh, NC, USA

**PVP2017-65251: SEVERE SERVICE VALVES: FACTORS FOR SELECTION (Presentation Only)**

S. Allen, P. van Oudenaren, Bray International, Houston, TX, USA

**PVP2017-66040: LONG TERM OPERATION OF SAFETY VALVES AT PRESSURES NEAR THE SET PRESSURE**

L. I. Ezekoye, Ezekoye Engineering Services LLC, Pittsburgh, PA, USA; B. S. Gordon, J. W. Boufford, Westinghouse Electric Company, Cranberry Township, PA, USA; T. W. Beagen, Pentair Valves & Controls, Mansfield, MA, USA

**SESSION 3.1K (MF-4-2)**

*Wednesday, July 19, 8:30 am – 10:15 am, Kona 2*

**WELD RESIDUAL STRESS SIMULATIONS INCLUDING RECOVERY OF STRESSES AND UNCERTAINTY QUANTIFICATION**

Developed by: E. Keim, AREVA, Erlangen, Germany; D. Rudland, U.S. Nuclear Regulatory Commission, Frederick, MD, USA

Chair: E. Keim, AREVA, Erlangen, Germany

Co-Chair: D. Rudland, U.S. Nuclear Regulatory Commission, Frederick, MD, USA

**PVP2017-65552: METHODS FOR UNCERTAINTY QUANTIFICATION AND COMPARISON OF WELD RESIDUAL STRESS MEASUREMENTS AND PREDICTIONS**

J. Lewis, D. Brooks, Sandia National Laboratories, Albuquerque, NM, USA; M. Benson, U.S. Nuclear Regulatory Commission, Rockville, MD, USA

**PVP2017-66104: FINITE ELEMENT ANALYSIS OF WELD RESIDUAL STRESS AND FLAW GROWTH IN A THICK-WALLED PRESSURIZED SAFETY NOZZLE WITH MECHANICAL STRESS IMPROVEMENT PROCESS APPLICATION**

G. Facco, P. Raynaud, M. Benson, U.S. Nuclear Regulatory Commission, Rockville, MD, USA

**PVP2017-66137: EXPERIMENTAL INVESTIGATION OF INCONEL 600 HARDENING RECOVERY**

A. Andrieu, EDF, Moret-sur-Loing, France; F. Rossillon, EDF SEPTEN, Villeurbanne, France; G. Rolland, EDF, Ecuelles, France; D. Albrecht, EDF, Villeurbanne, France; S. Hendili, Electricité de France, Chatou, France

**SESSION 3.1L (SE-12-1)**

*Wednesday, July 19, 8:30 am – 10:15 am, Kona 3*

**ADVANCED SEISMIC EVALUATION AND CODE I; JSME SEISMIC CODE ACTIVITY**

Developed by: A. Maekawa, The Kansai Electric Power Co. Inc., Fukui, Japan; I. Nakamura, National Research Institute for Earth Science and Disaster Resilience, Ibaraki, Japan; Y. Li, Japan Atomic Energy Agency, Ibaraki-Ken, Japan

Chair: A. Nishida, Japan Atomic Energy Agency, Ibaraki, Japan

Co-Chair: O. Furuya, Tokyo Denki University, Saitama, Japan

**PVP2017-65166: SEISMIC QUALIFICATION OF PIPING SYSTEMS BY DETAILED INELASTIC RESPONSE ANALYSIS PART 1-A CODE CASE FOR PIPING SEISMIC EVALUATION BASED ON DETAILED INELASTIC RESPONSE ANALYSIS**

M. Morishita, Japan Atomic Energy Agency, Ibaraki, Japan; A. Otani, IHI Corporation, Yokohama, Japan; T. Watakabe, Japan Atomic Energy Agency, Ibaraki, Japan; I. Nakamura, National Research Institute for Earth Science and Disaster Resilience, Ibaraki, Japan; T. Shibutani, Yokohama National University, Yokohama, Japan

**PVP2017-65190: SEISMIC QUALIFICATION OF PIPING SYSTEMS BY DETAILED INELASTIC RESPONSE ANALYSIS, PART 2- A GUIDELINE FOR PIPING SEISMIC INELASTIC RESPONSE ANALYSIS**

A. Otani, IHI Corporation, Yokohama, Japan; T. Shibutani, Yokohama National University, Yokohama, Japan; M. Morishita, Japan Atomic Energy Agency, Ibaraki,



Japan; I. Nakamura, National Research Institute for Earth Science and Disaster Resilience, Ibaraki, Japan; T. Watakabe, Japan Atomic Energy Agency, Ibaraki, Japan

**PVP2017-65316: SEISMIC QUALIFICATION OF PIPING SYSTEMS BY DETAILED INELASTIC RESPONSE ANALYSIS PART 3—VARIATION IN ELASTIC-PLASTIC ANALYSIS RESULTS ON CARBON STEEL PIPES FROM THE BENCHMARK ANALYSES AND THE PARAMET**

I. Nakamura, National Research Institute for Earth Science and Disaster Resilience, Ibaraki, Japan; A. Otani, IHI Corporation, Yokohama, Japan; M. Morishita, Japan Atomic Energy Agency, Ibaraki, Japan; M. Shiratori, Yokohama National University, Yokohama, Japan; T. Watakabe, Japan Atomic Energy Agency, Ibaraki, Japan

**PVP2017-65324: SEISMIC QUALIFICATION OF PIPING SYSTEMS BY DETAILED INELASTIC RESPONSE ANALYSIS PART 4—SECOND ROUND BENCHMARK ANALYSES WITH STAINLESS STEEL PIPING COMPONENTS TEST**

T. Watakabe, Japan Atomic Energy Agency, Ibaraki, Japan; I. Nakamura, National Research Institute for Earth Science and Disaster Resilience, Ibaraki, Japan; A. Otani, IHI Corporation, Yokohama, Japan; M. Morishita, Japan Atomic Energy Agency, Ibaraki, Japan; T. Shibutani, Yokohama National University, Yokohama, Japan

**SESSION 3.1M (MF-12-2)**

*Wednesday, July 19, 8:30 am – 10:15 am, Waikoloa Suite 1*

**PIPELINE INTEGRITY—WELDING TECHNOLOGY AND WELDS ASSESSMENT**

Developed by: X.-K. Zhu, Edison Welding Institute, Columbus, OH, USA  
Chair: X.-K. Zhu, Edison Welding Institute, Columbus, OH, USA  
Co-Chair: M. Paredes, Massachusetts Institute of Technology, Cambridge, MA, USA

**PVP2017-65819: HOT TAP FITTINGS—TO EXTRUDE OR FABRICATE**

T. McKone, G. Cooper, TD Williamson, Tulsa, OK, USA

**PVP2017-65379: AN OVERVIEW OF TIME DEPENDENT CRACK GROWTH MODELS USED FOR ERW SEAM WELD ANALYSES**

R. Olson, B. A. Young, J. O'Brian, Battelle Memorial Institute, Columbus, OH, USA

**PVP2017-66038: WELDING OF INTERNALLY CLAD X65 PIPES WITH PRECIPITATION STRENGTHENED NI-BASED FILLER METALS**

G. Penso, B. Alexandrov, The Ohio State University, Columbus, OH, USA

**PVP2017-65148: STUDY ON GAS METAL ARC WELDING OF TWO X80 STEELS WITH DIFFERENT COMPOSITIONS**

Z. Huang, J. Xu, H. Wang, Wuhan Iron and Steel (Group) Company, Wuhan, Hubei, China

**SESSION 3.1N (DA-4-1)**

*Wednesday, July 19, 8:30 am – 10:15 am, Waikoloa Suite 2*

**INELASTIC, NONLINEAR AND LIMIT LOAD ANALYSIS—I**

Developed by: R. Baliga, Advent Engineering Services, San Ramon, CA, USA; D. Vlaicu, Ontario Power Generation, Pickering, ON, Canada  
Chair: R. Baliga, Advent Engineering Services, San Ramon, CA, USA  
Co-Chair: D. Vlaicu, Ontario Power Generation, Pickering, ON, Canada

**PVP2017-65171: FULL SCALE BLASTING TEST AND FINITE ELEMENT ANALYSIS OF NOZZLE REPAIR PIPELINE**

X. Wu, J. Shuai, China University of Petroleum, Beijing, China

**PVP2017-65184: PLASTIC LOADS FOR CONICAL SHELLS SUBJECTED TO INTERNAL PRESSURE AND AXIAL TENSION**

J. Blachut, University of Liverpool, Liverpool, United Kingdom; D. Sala, AGH University of Science and Technology, Krakow, Poland

**PVP2017-65489: FEASIBILITY OF REDUCED-SIZE SPINNING-CYLINDER SPECIMENS FOR PRESSURISED THERMAL SHOCK TESTING**

H. Coules, P. Orrock, C. Truman, University of Bristol, Bristol, United Kingdom

**PVP2017-65760: CYLINDER AXIAL CRACK REFERENCE STRESS COMPARISON USING ELASTIC-PLASTIC FEA 3D CRACK MESH J-INTEGRAL VALUES**

G. Thorwald, Quest Integrity Group, Boulder, CO, USA; P. Vargas, Chevron Energy Technology Company, Houston, TX, USA

**PVP2017-65390: EXPERIMENTAL AND NUMERICAL INVESTIGATIONS OF EXFOLIATED GRAPHITE SEALS**

E. Viéville, H. Laurent, G. Rio, Université Bretagne Sud, Lorient, France; B. Omnès, H. Lejeune, Cetim, Nantes, France

**SESSION 3.1O (DA-2-4)**

*Wednesday, July 19, 8:30 am – 10:15 am, Waikoloa Suite 3*

**DESIGN AND ANALYSIS OF PIPING AND COMPONENTS—IV**

Developed by: S. Iyer, Candu Energy, Mississauga, ON, Canada  
Chair: S. Iyer, Candu Energy, Mississauga, ON, Canada  
Co-Chair: B. Li, AMEC Foster Wheeler, Toronto, ON, Canada

**PVP2017-65481: ENVIRONMENTAL FATIGUE EVALUATION FOR INTERFACE OF DISSIMILAR METAL WELDED PIPING**

D. G. Lee, D. Kim, K.-J. Yang, J. H. Lee, S. C. Jang, KEPCO E&C, Gimcheon, Korea (Republic)

**PVP2017-65488: SHORT-TERM MECHANICAL ANALYSIS OF POLYETHYLENE PIPE REINFORCED BY WINDING STEEL WIRES USING STEEL WIRE SPIRAL STRUCTURAL FINITE ELEMENT MODEL**

J. Shi, Wuhan Institute of Technology, Wuhan, China; J. Shi, Zhejiang University, Hangzhou, Zhejiang, China; H. Chen, Y. He, Q. Wang, Wuhan Institute of Technology, Wuhan, China

**PVP2017-65114: FAILURE ANALYSIS OF A LARGE KNIFE GATE VALVE SUBJECTED TO MULTIAXIAL LOADING**

I. Barsoum, The Petroleum Institute, Abu Dhabi, United Arab Emir.; A. Muñoz, Mott MacDonald, Abu Dhabi, United Arab Emir.

**PVP2017-65144: EFFECTS OF SOIL DISPLACEMENT RATE AND COMPLEX LOADING ON SOIL-PIPE INTERACTION—A PHYSICAL PROTOTYPE MODEL**

C. K. Wong, R. G. Wan, R. C. K. Wong, University of Calgary, Calgary, AB, Canada

**SESSION 3.1Q (TW-1-7)**

*Wednesday, July 19, 8:30 am – 10:15 am, Kohala 4*

**ASME SECTION VIII, DIVISION 3 ALTERNATIVE RULES FOR CONSTRUCTION OF HIGH PRESSURE VESSELS (PART 1)**

Developed by: D. L. Stang, Omax Corporation, Kent, WA, USA

Chair: D. L. Stang, Omax Corporation, Kent, WA, USA

Presented by: D. T. Peters, Structural Integrity Associates, Edinboro, PA, USA

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**Block 3.2: Wednesday, July 19, 2017 (10:30 am – 12:15 pm)**

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**SESSION 3.2A (NDPD-2-1)**

*Wednesday, July 19, 10:30 am – 12:15 pm, Kohala 1*

**TECHNIQUES AND APPLICATIONS FOR PLANT COMPONENTS**

Developed by: S. Dugan, University of Stuttgart, Stuttgart, Baden-Württemberg, Germany; M. Spies, Fraunhofer Institute for Non-destructive Testing, Saarbruecken, Germany

Chair: S. Dugan, University of Stuttgart, Stuttgart, Baden-Württemberg, Germany

Co-Chair: V. Agarwal, Idaho National Laboratory, Idaho Falls, ID, USA

**PVP2017-65855: IMPROVING ULTRASONIC EXAMINATION PROCEDURES FOR DETECTION OF THERMAL FATIGUE**

J. Spanner, Electric Power Research Institute, Charlotte, NC, USA

**PVP2017-65963: APPLICATION OF ULTRASONIC PHASED ARRAY TECHNIQUE FOR A BOILER DRUM MEETING THE REQUIREMENTS OF ASME SEC I**

S. Saha, Intertek Inspec, Sharjah, Sharjah, United Arab Emir.

**PVP2017-66210: ULTRASONIC INSPECTION OF DISSIMILAR METAL WELDS FOR PROBABILISTIC RELIABILITY ASSESSMENT OF PIPE WELDS**

S. Dugan, A. Jüngert, University of Stuttgart, Stuttgart, Baden-Württemberg, Germany

**PVP2017-65191: IMAGE ANALYSIS OF INDICATIONS IN FILLET WELDING BY PHASED ARRAY ULTRASONIC TECHNIQUE**

Y. Zhang, Y. Yang, Shanghai Institute of Special Equipment Inspection and Technical Research, Shanghai, China; Q. Li, Shanghai Power Erection NO.1 Company, Shanghai, China; L. Chen, Shanghai Institute of Special Equipment Inspection and Technical Research, Shanghai, China

**PVP2017-66124: ULTRASONIC INSPECTION TECHNIQUE FOR INSIDE PRESSURIZED PIPE ELBOWS**

C. Miao, W. Guo, X. Du, Z. Ling, Zhejiang Provincial Special Equipment Inspection and Research Institute, Hangzhou, China

### SESSION 3.2B (FSI-2-9)

Wednesday, July 19, 10:30 am – 12:15 pm; Kohala 2

#### FLUTTER, VIV AND ACOUSTICS

**Symposium of Flow-Induced Vibration—Sponsored by Fluid-Structure Interaction Technical Committee**

Developed by: L. Baranyi, University of Miskolc, Miskolc-Egyetemvaros, Hungary; N. Mureithi, Polytechnique Montreal, Montreal, QC, Canada  
Chair: G. Ricciardi, CEA Cadarache, St Paul les Durance, France  
Co-Chair: K. Anami, Osaka Electro-Communication University, Neyagawa, Osaka, Japan

#### PVP2017-65470: EFFECT OF SECONDARY MOTION ON HYDRODYNAMICS OF A CYLINDER OSCILLATING IN STILL FLUID

L. Baranyi, University of Miskolc, Miskolc-Egyetemvaros, Hungary; E. Konstantinidis, University of Western Macedonia, Kozani, Greece

#### PVP2017-65565: STUDY ON THE RELATION BETWEEN SIDE RATIOS OF RECTANGULAR CROSS SECTIONS AND SECONDARY VORTICES AT TRAILING EDGE IN MOTION-INDUCED VORTEX EXCITATION

K. Matsuda, K. Kato, K. Arise, H. Ishii, Kyushu Institute of Technology, Kitakyushu, Fukuoka, Japan

#### PVP2017-65913: PHASE CHARACTERISTICS OF VORTEX SHEDDING FROM TUBE BANKS ON ACOUSTIC RESONANCE

H. Hamakawa, S. Hino, Oita University, Oita, Japan; E. Nishida, Shonan Institute of Technology, Fujisawa Kanagawa, Japan; E. Kurihara, Oita University, Oita, Japan

#### PVP2017-65431: BENDING-TORSIONAL FLUTTER OF A SLENDER WEB IN A CROSS FLOW

K. Hiroaki, N. Kawai, M. Watanabe, Aoyama Gakuin University, Sagami, Japan

#### PVP2017-65525: HEAT TRANSFER ENHANCEMENT IN THREE-DIMENSIONAL FLOW PAST A HYDROPHOBIC CYLINDER FOR HEAT EXCHANGER APPLICATIONS

M. Mastrolalos, L. Kaihtsis, National Technical University of Athens, Zografou, Greece

### SESSION 3.2C (CS-11-5)

Wednesday, July 19, 10:30 am – 12:15 pm; Kohala 3

#### DEVELOPMENTS OF CHINESE CODES AND STANDARDS

**Symposium on Recent Developments in International Codes and Standards—Sponsored by Codes & Standards Technical Committee**

Developed by: Y. Liu, Tsinghua University, Beijing, China  
Chair: Y. Liu, Tsinghua University, Beijing, China  
Co-Chair: J. Shen, Wison Engineering Co., Ltd., Shanghai, China

#### PVP2017-65052: COMPARISON ABOUT STANDARDS OF FIBER-REINFORCED PLASTIC PRESSURE VESSELS BETWEEN CHINA AND AMERICA

Y. Yang, W. Shu, X. Luo, X. Wen, J. Si, Shanghai Institute of Special Equipment Inspection and Technical Research, Shanghai, China

#### PVP2017-65430: INVESTIGATION OF PARTIAL SAFETY FACTOR APPROACH FOR FLAW ASSESSMENT PROCEDURE IN CHINESE FFS CODE

Z. Han, G. Xie, S. Shao, Z. Li, China Special Equipment Inspection and Research Institute, Beijing, China

#### PVP2017-65695: NUMERICAL SIMULATION OF LOCAL POST WELD HEAT TREATMENT BY ELECTRIC HEATING METHOD OF PRESSURE EQUIPMENT

L. Sun, F. Ji, X. Wang, G. Deng, China Special Equipment Inspection and Research Institute, Beijing, China; L. Cheng, SINOPEC Nanjing Chemical Industries Co., Ltd., Nanjing, Jiangsu, China

#### PVP2017-65712: A SIMPLIFIED CALCULATION METHOD FOR THE WALL TEMPERATURES OF PRESSURE VESSELS WITH INSULATING LAYERS

F. Ji, G. Deng, L. Sun, J. Yang, H. Suo, China Special Equipment Inspection and Research Institute, Beijing, Beijing, China

#### PVP2017-65906: NUMERICAL AND EXPERIMENTAL RESEARCH ON PIPELINE MAGNETIC FLUX LEAKAGE TESTING WITH INSPECTION DEVICE OF VARIABLE DIAMETERS

Y. Liu, W. Hong, Y. Xiangyue, H. Chengdai, W. Xinhua, Hangzhou Special Equipment Inspection and Research Institute, Hangzhou, China

### SESSION 3.2D (DA-18-1)

Wednesday, July 19, 10:30 am – 12:15 pm, King's 1

#### COMPOSITE MATERIALS AND STRUCTURES

**International Symposium on Composite Systems for Pressure Vessels and Piping—Co-Sponsored by Design & Analysis, Materials & Fabrication and Operations, Applications & Components Technical Committees**

Developed by: P. Mertiny, University of Alberta, Edmonton, AB, Canada  
Chair: P. Mertiny, University of Alberta, Edmonton, AB, Canada  
Co-Chair: M. Uddin, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA

#### PVP2017-65265: COMPUTATIONAL INVESTIGATION OF COMPOSITE REPAIR MATERIALS PREVENTIVE EFFECTS ON WRINKLE BENDS FATIGUE FAILURE

M. Kiani, T. Mally, R. Walker, E. Locke, Citadel Technologies, Tulsa, OK, USA

#### PVP2017-65764: IMPACT OF DIFFERENT ENVIRONMENTAL CONDITIONS ON THE THERMOMECHANICAL CHARACTERISTICS OF COMPACTED AND NON-COMPACTED PLAIN WEAVE LAMINATED COMPOSITES

M. H. Al Kuwaiti, A.-H. I. Mourad, United Arab Emirates University, Al Ain, United Arab Emir.

#### PVP2017-65813: COMPARISON OF FULL-SCALE AND COUPON FATIGUE TESTING FOR COMPOSITE REPAIRS (Presentation Only)

I. A. Alnaser, M. W. Keller, The University of Tulsa, Tulsa, OK, USA

#### PVP2017-65888: ADDITIVE MANUFACTURING OF PRESSURE VESSELS (WITH PLATING)

B. P. McNelly, R. L. Hooks, W. R. Setzler, C. S. Hughes, Johns Hopkins University, Laurel, MD, USA

#### PVP2017-65366: COMPOSITE FIBRE REINFORCED PIPE ELBOWS SUBJECT TO COMBINED LOADING

D. Camilleri, B. Ellul, University of Malta, Msida, Malta

#### PVP2017-65365: FIBRE REINFORCED COMPOSITE PRESSURE VESSEL HEADS SUBJECT TO EXTERNAL PRESSURE

M. Muscat, D. Camilleri, B. Ellul, University of Malta, Msida, Malta

### SESSION 3.2E (CS-15-2)

Wednesday, July 19, 10:30 am – 12:15 pm, King's 2

#### PROBABILISTIC AND RISK-INFORMED METHODS FOR STRUCTURAL INTEGRITY ASSESSMENT—II

**Symposium on Probabilistic Assessments and Risk Management—Co-Sponsored by Codes & Standards, Materials & Fabrication and Operations, Applications & Components Technical Committees**

Developed by: D. Rudland, U.S. Nuclear Regulatory Commission, Frederick, MD, USA; S. Xu, Kinectrics Inc., Toronto, ON, Canada  
Chair: D. Rudland, U.S. Nuclear Regulatory Commission, Frederick, MD, USA

Co-Chair: Y. Li, Japan Atomic Energy Agency, Ibaraki-Ken, Japan

#### PVP2017-65921: GUIDELINE ON PROBABILISTIC FRACTURE MECHANICS ANALYSIS FOR JAPANESE REACTOR PRESSURE VESSELS

J. Katsuyama, Japan Atomic Energy Agency, Ibaraki, Japan; K. Osakabe, Mizuho Information & Research Institute, Chiyoda, Tokyo, Japan; S. Uno, Y. Li, Japan Atomic Energy Agency, Ibaraki, Japan; S. Yoshimura, The University of Tokyo, Tokyo, Japan

#### PVP2017-65950: VERIFICATION METHODOLOGY AND RESULTS OF PROBABILISTIC FRACTURE MECHANICS CODE PASCAL3

K. Masaki, Y. Miyamoto, K. Osakabe, Mizuho Information & Research Institute, Chiyoda, Tokyo, Japan; S. Uno, Japan Atomic Energy Agency, Tokai-mura, Japan; J. Katsuyama, Japan Atomic Energy Agency, Ibaraki, Japan

#### PVP2017-66003: PROBABILISTIC FRACTURE MECHANICS ANALYSIS MODELS FOR JAPANESE REACTOR PRESSURE VESSELS

K. Lu, J. Katsuyama, S. Uno, Y. Li, Japan Atomic Energy Agency, Naka-Gun, Japan

#### PVP2017-66004: VERIFICATION OF PROBABILISTIC FRACTURE MECHANICS ANALYSIS CODE PASCAL THROUGH BENCHMARK ANALYSES WITH FAVOR

Y. Li, S. Uno, J. Katsuyama, Japan Atomic Energy Agency, Ibaraki, Japan; T. Dickson, Oak Ridge National Laboratory, Oak Ridge, TN, USA; M. Kirk, Nuclear Regulatory Commission, Rockville, MD, USA

### SESSION 3.2F (CS-3-3)

Wednesday, July 19, 10:30 am – 12:15 pm, King's 3

#### ENVIRONMENTAL FATIGUE ISSUES—III

Symposium on Fatigue Issues—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees

Developed by: S. Asada, Mitsubishi Heavy Industries, Ltd., Kobe, Japan; H. Mehta, GE Hitachi Nuclear Engineering, San Jose, CA, USA; C. Faidy, CF Integrity Engineering, Tassin, France; S. Mohanty, Argonne National Laboratory, Lemont, IL, USA

Chair: S. Asada, Mitsubishi Heavy Industries, Ltd., Kobe, Japan

Co-Chair: T. Metals, EDF, Villeurbanne, France

#### PVP2017-65876: FATIGUE MODELING OF 508 LAS UNDER VARIABLE AMPLITUDE LOADING: A MECHANISTIC BASED ANALYTICAL APPROACH

B. Barua, S. Mohanty, W. Soppet, S. Majumdar, K. Natesan, Argonne National Laboratory, Lemont, IL, USA

#### PVP2017-65890: IS IT POSSIBLE TO GET-RID OF S-N CURVE FOR FATIGUE EVALUATION?: A FULLY MECHANISTIC MODEL OF 316SS REACTOR STEEL FOR FATIGUE LIFE EVALUATION

B. Barua, S. Mohanty, W. Soppet, S. Majumdar, K. Natesan, Argonne National Laboratory, Lemont, IL, USA

#### PVP2017-66077: TIME/CYCLE-DEPENDENT MATERIAL MODELS FOR 316 SS—316 SS SIMILAR METAL WELDS: A PRESENTATION BASED ON AN ARGONNE PUBLICATION (Presentation Only)

S. Mohanty, W. Soppet, S. Majumdar, K. Natesan, Argonne National Laboratory, Lemont, IL, USA

#### PVP2017-66078: STRESS ANALYSIS OF A PRESSURIZED WATER REACTOR PRESSURE VESSEL UNDER GRID-LOAD-FOLLOWING CONDITIONS: A PRESENTATION BASED ON AN ARGONNE PUBLICATION (Presentation Only)

S. Mohanty, W. Soppet, S. Majumdar, K. Natesan, Argonne National Laboratory, Lemont, IL, USA

### SESSION 3.2G (CS-22-3)

Wednesday, July 19, 10:30 am – 12:15 pm, Queen's 4

#### MASTER CURVE FRACTURE TOUGHNESS AND OTHER SMALL SPECIMEN MECHANICAL PROPERTIES—III

Symposium on Fracture Mechanics and Analysis—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees

Developed by: M. Yamamoto, Central Research Institute of Electric Power Industry, Yokosuka, Kanagawa, Japan; W. Server, ATI Consulting, Black Mountain, NC, USA

Chair: M. Yamamoto, Central Research Institute of Electric Power Industry, Yokosuka, Kanagawa, Japan

Co-Chair: M. Sokolov, Oak Ridge National Laboratory, Oak Ridge, TN, USA

#### PVP2017-65259: COST-EFFECTIVE ALTERNATIVES TO CONVENTIONAL CHARPY TESTS FOR MEASURING THE IMPACT TOUGHNESS OF VERY-HIGH-TOUGHNESS STEELS

E. Lucon, Protiro Inc., Boulder, CO, USA

#### PVP2017-65792: THE EFFECT OF SPECIMEN SIZE FOR THE P91 STEEL AT ELEVATED AND HIGH TEMPERATURES

L. Stratil, F. Siska, H. Hadraba, S. Fintova, T. Mrna, Academy of Sciences of the Czech Republic, Brno, Czech Republic

#### PVP2017-66174: LOW CYCLE FATIGUE TESTS WITH THE USE OF MINIATURIZED TEST SPECIMENS

J. Dzigan, R. Prochazka, P. Konopik, Comtes FHT, Dobruška, Czech Republic

### SESSION 3.2H (OAC-1-2)

Wednesday, July 19, 10:30 am – 12:15 pm, Queen's 5

#### INSPECTION AND EVALUATION FOR COMPONENT ASSESSMENT

Developed by: H. Watson, Savannah River National Laboratory, Aiken, SC, USA; A. Reich, Streamline Automation LLC, Huntsville, AL, USA

Chair: H. Watson, Savannah River National Laboratory, Aiken, SC, USA

Co-Chair: A. Reich, Streamline Automation LLC, Huntsville, AL, USA

#### PVP2017-65030: EFFICIENT FITTING PROCEDURE FOR CORROSION RATE DISTRIBUTION IN VIEW OF RELIABILITY ANALYSIS

S. Sakai, University of Tokyo, Tokyo, Japan; T. Kaida, Rabigh Refining & Petrochemical Co., Rabigh, Saudi Arabia

#### PVP2017-65169: AN INTEGRATION METHOD FOR ASSESSING THE OPERATIONAL RELIABILITY OF UNDERGROUND GAS STORAGE IN DEPLETED RESERVOIR

W. Yu, Y. Min, China University of Petroleum-Beijing, Beijing, China; W. Huang, China National Petroleum Corporation, Beijing, China; K. Wen, Y. Zhang, China University of Petroleum-Beijing, Beijing, China

#### PVP2017-65641: RELIABILITY PREDICTION OF LONG-DISTANCE TRANSMISSION PIPELINES WITH 3PE COATING WITH DELAY TIME CONCEPTS

X. Li, H. Hu, G. Cheng, Y. Li, Xi'an Jiaotong University, Xi'an, Shaanxi, China; C. Yin, CNPC Tubular Goods Research Institute, Xi'an, China

#### PVP2017-65500: APPLICATION OF MODEL-BASED CONDITION MONITORING TO THE HUMAN CARDIOVASCULAR SYSTEM

A. Reich, Streamline Automation LLC, Huntsville, AL, USA; J. Heym, Vital Metrix, Inc., Huntsville, AL, USA

### SESSION 3.2I (CT-10-1)

Wednesday, July 19, 10:30 am – 12:15 pm, Queen's 6

#### NEW AND EMERGING METHODS OF ANALYSIS AND APPLICATIONS

Developed by: Y. Park, New Mexico State University, Las Cruces, NM, USA; S. Meunier, EDF R&D, Moret-sur-Loing, France

Chair: Y. Park, New Mexico State University, Las Cruces, NM, USA

Co-Chair: S. Meunier, EDF R&D, Moret-sur-Loing, France

#### PVP2017-65093: THE CORRELATION ANALYSIS OF THE BIG DATA FOR PIPELINE DEFECTS

H. Zhang, L. Zhang, S. Dong, China University of Petroleum, Beijing, China

#### PVP2017-65730: ON THE INFLUENCE OF FLOWS IN CLEARANCES FOR THERMAL SHOCKS IN A GLOBE VALVE

S. Meunier, J. Ferrari, J.-F. Rit, J.-P. Mathieu, D. Hersant, EDF, Moret-sur-Loing, France

#### PVP2017-65845: EAM POTENTIAL FOR HYDROGEN STORAGE APPLICATION

Y. Park, New Mexico State University, Las Cruces, NM, USA; I. Hijazi, Marshall University, Huntington, WV, USA

#### PVP2017-66235: ANALYSIS OF TENSION AND BENDING RESPONSE TO CHARACTERIZE ELASTIC-PLASTIC MATERIAL BEHAVIOR

D. Metzger, SNC, Mississauga, ON, Canada; W. Reinhardt, Candu Energy Inc., Mississauga, ON, Canada

### SESSION 3.2J (OAC-3-1)

Wednesday, July 19, 10:30 am – 12:15 pm, Kona 1

#### MONITORING, DIAGNOSTICS AND INSPECTION

Developed by: M. Brumovsky, UJV Rez a.s., Rez, Czech Republic

Chair: I. Ezekoye, Westinghouse, Cranberry Township, PA, USA

Co-Chair: R. Kopriva, UJV Rez a.s., Rez, Czech Republic

#### PVP2017-65055: ONLINE CREEP-FATIGUE MONITORING OF CYCLIC OPERATION IN A COAL-FIRED POWER PLANT

S. Rosinski, K. Coleman, Electric Power Research Institute, Charlotte, NC, USA; M. Berasi, Structural Integrity Associates, Uniontown, OH, USA; C. Carney, Structural Integrity Associates, San Jose, CA, USA; U. Woerz, Structural Integrity Associates, Huntersville, NC, USA

#### PVP2017-65620: KEY TECHNOLOGY AND APPLICATION OF VISUAL INSPECTION OF BURIED POLYETHYLENE PIPELINE

S. Wang, X. Tang, P. Song, B. Ren, Y. Qian, Shanghai Institute of Special Equipment Inspection and Technical Research, Shanghai, China

#### PVP2017-65253: A STUDY ON THE BALL INDENTATION TEST FOR LINEAR HARDENING METALS

T. Zhang, W. Wang, A. Li, Shandong University, Jinan, Shandong, China

#### PVP2017-66141: RECAPTURING NET POSITIVE SUCTION HEAD (NPSH) MARGINS IN BOILING WATER REACTOR EMERGENCY CORE COOLING SYSTEMS

A. Bilanin, Continuum Dynamics, Inc., Ewing, NJ, USA; A. Kaufman, W. Bilanin, Continuum Dynamics Inc., Ewing, NJ, USA

### SESSION 3.2K (MF-7-1)

Wednesday, July 19, 10:30 am – 12:15 pm, Kona 2



## **MATERIALS AND TECHNOLOGIES FOR NUCLEAR POWER PLANTS—I**

Developed by: W. Ren, Oak Ridge National Laboratory, Oak Ridge, TN, USA  
Chair: W. Ren, Oak Ridge National Laboratory, Oak Ridge, TN, USA  
Co-Chair: R. Nanstad, Oak Ridge National Laboratory, Oak Ridge, TN, USA  
**PVP2017-65007: IRRADIATION INDUCED CHANGES IN MECHANICAL AND MICROSTRUCTURAL PROPERTIES OF THE HIGH FLUX REACTOR VESSEL: UPDATE OF THE RESULTS FROM 2014 AND 2015 SURVEILLANCE TEST CAMPAIGNS**

M. Kolluri, F. H. E De Haan-de Wilde, H. S. Nolles, A. J. M. de Jong, F. A. van den Berg, NRG, Petten, Netherlands

**PVP2017-65202: PROACTIVE IN-SITU WELDING STRESS CONTROL FOR LASER REPAIR WELDING OF IRRADIATED AUSTENITIC MATERIALS**

J. Chen, Oak Ridge National Laboratory, Oak Ridge, TN, USA; J. Tatman, Electric Power Research Institute, Charlotte, NC, USA; Z. Chen, University of Tennessee, Knoxville, TN, USA; Z. Feng, Oak Ridge National Laboratory, Oak Ridge, TN, USA; G. Frederick, Electric Power Research Institute, Charlotte, NC, USA

**PVP2017-65984: IRRADIATION EFFECTS ON MECHANICAL PROPERTIES AT HIGH FLUENCE FOR COMMERCIAL REACTOR PRESSURE VESSEL SURVEILLANCE MATERIALS (Presentation Only)**

R. Nanstad, J. Robertson, Oak Ridge National Laboratory, Oak Ridge, TN, USA; G R. Odette, N. Almirall, University of California, Santa Barbara, Santa Barbara, CA, USA; M. Sokolov, Oak Ridge National Laboratory, Oak Ridge, TN, USA

**PVP2017-65307: THE EPRI PWR SUPPLEMENTAL SURVEILLANCE PROGRAM (PSSP) FINAL DESIGN AND IMPLEMENTATION**

W. Server, ATI Consulting, Black Mountain, NC, USA; B. Burgos, T. Hardin, Electric Power Research Institute, Palo Alto, CA, USA; J. B. Hall, Westinghouse, Pittsburgh, PA, USA

### **SESSION 3.2L (SE-12-2)**

*Wednesday, July 19, 10:30 am – 12:15 pm, Kona 3*

**ADVANCED SEISMIC EVALUATION AND CODE II; ADVANCED INELASTIC ANALYSIS METHOD**

Developed by: A. Maekawa, The Kansai Electric Power Co. Inc., Fukui, Japan; I. Nakamura, National Research Institute for Earth Science and Disaster Resilience, Ibaraki, Japan; Y. Li, Japan Atomic Energy Agency, Ibaraki-Ken, Japan

Chair: I. Nakamura, National Research Institute for Earth Science and Disaster Resilience, Ibaraki, Japan

Co-Chair: N. Kojima, Toshiba Corporation, Yokohama, Japan

**PVP2017-65341: INVESTIGATION ON METHOD OF ELASTO-PLASTIC ANALYSIS FOR PIPING SYSTEM MADE OF STAINLESS STEEL (SECONDARY BENCHMARK ANALYSIS)**

N. Kojima, S. Hirouchi, M. Arai, T. Kabaya, M. Bando, MHI Nuclear Systems and Solution Engineering Co., Ltd., Kobe, Japan

**PVP2017-66056: ACCEPTANCE CRITERION OF DUCTILE FAILURE AND PLASTIC COLLAPSE FOR SAFE-SHUTDOWN EARTHQUAKES USING NON-LINEAR DYNAMIC ANALYSIS**

I. Tamura, The Chugoku Electric Power Company, Hiroshima, Japan; S. Matsuura, R. Shimazu, Central Research Institute of Electric Power Industry, Abiko-Shi, Japan; K. Kimura, Tokyo Institute of Technology, Tokyo, Japan

**PVP2017-65673: SEISMIC PERFORMANCE EVALUATION FOR STEEL-FRAME-STRUCTURE CONSIDERING MEMBER FRACTURE**

K. Shiomi, IHI Corporation, Yokohama, Kanagawa, Japan

### **SESSION 3.2M (MF-21-1)**

*Wednesday, July 19, 10:30 am – 12:15 pm, Waikoloa Suite 1*

**ADDITIVE MANUFACTURING ONE MECHANICAL PROPERTIES**

Developed by: P. Korinko, Savannah River National Laboratory, Aiken, SC, USA; A. Duncan, Savannah River National Laboratory, Aiken, SC, USA; C. M. Davies, Imperial College London, London, United Kingdom

Chair: P. Korinko, Savannah River National Laboratory, Aiken, SC, USA

Co-Chair: C. M. Davies, Imperial College London, London, United Kingdom

**PVP2017-65409: DEFORMATION AND FRACTURE BEHAVIOUR OF 316L STAINLESS STEEL MANUFACTURED THROUGH SELECTIVE LASER MELTING**

C. M. Davies, P. Garg, P. A. Hooper, Imperial College London, London, United Kingdom

**PVP2017-65410: FATIGUE CRACK INITIATION AND GROWTH BEHAVIOUR OF 316L STAINLESS STEEL MANUFACTURED THROUGH SELECTIVE LASER MELTING**

C. M. Davies, H. Thomlinson, P. A. Hooper, Imperial College London, London, United Kingdom

**PVP2017-65809: CHARACTERIZATION OF ADDITIVELY MANUFACTURED HEAT EXCHANGER TUBING**

P. Korinko, J. Bobbitt, Savannah River National Laboratory, Aiken, SC, USA; H. McKee, Kansas City National Security Campus, Kansas City, MO, USA; F. List, III, K. Carver, Oak Ridge National Laboratory, Knoxville, TN, USA

**PVP2017-65948: ORIENTATION EFFECTS ON FATIGUE BEHAVIOR OF ADDITIVELY MANUFACTURED STAINLESS STEEL**

T. R. Smith, University of California Davis, Davis, CA, USA; J. D. Sugar, C. San Marchi, Sandia National Laboratories, Livermore, CA, USA; J. M. Schoenung, University of California Irvine, Irvine, CA, USA

### **SESSION 3.2N (DA-4-2)**

*Wednesday, July 19, 10:30 am – 12:15 pm, Waikoloa Suite 2*

**INELASTIC, NONLINEAR AND LIMIT LOAD ANALYSIS—II**

Developed by: D. Vlaicu, Ontario Power Generation, Pickering, ON, Canada; R. Baliga, Advent Engineering Services, San Ramon, CA, USA

Chair: D. Vlaicu, Ontario Power Generation, Pickering, ON, Canada

Co-Chair: R. Baliga, Advent Engineering Services, San Ramon, CA, USA

**PVP2017-65724: NONLINEAR BUCKLING ANALYSIS OF CYLINDRICAL SHELL WITH NORMAL NOZZLE SUBJECTED TO AXIAL LOADS**

Q. Shi, Z. Wang, H. Tang, Harbin Boiler Co., Ltd., Harbin, Heilongjiang, China

**PVP2017-65763: ON THE CRITICAL BOUNDARY CONDITIONS FOR RUP-TURE OF BUCKLED STEEL PIPELINES**

N. M. Rahbari, J. J. R. Cheng, S. Adeeb, University of Alberta, Edmonton, AB, Canada

**PVP2017-66014: NUMERICAL ANALYSIS OF MECHANICAL INTERACTION OF PIPE-IN-PIPE FLOWLINE**

M. Akolawole, Y. Pu, Newcastle University, Newcastle Upon Tyne, Tyne and Wear, United Kingdom

### **SESSION 3.2O (DA-2-5)**

*Wednesday, July 19, 10:30 am – 12:15 pm, Waikoloa Suite 3*

**DESIGN AND ANALYSIS OF PIPING AND COMPONENTS—R**

Developed by: B. Li, AMEC Foster Wheeler, Toronto, ON, Canada

Chair: B. Li, AMEC Foster Wheeler, Toronto, ON, Canada

Co-Chair: S. Iyer, Candu Energy, Mississauga, ON, Canada

**PVP2017-65634: STUDY ON DYNAMIC RESPONSE OF PIPING SYSTEM INDUCED BY WATER HAMMER CONSIDERING SUPPORT CHARACTERISTICS**

A. Okami, S. Kataoka, T. Honda, JGC Corporation, Yokohama, Japan

**PVP2017-65164: EVALUATION OF GAS ACCUMULATION IN THE RCIC SYSTEM DISCHARGE PIPING OF BWR NUCLEAR POWER PLANT**

C. J. Li, Z.-Y. Hung, P.-H. Huang, Industrial Technology Research Institute, Hsinchu, Taiwan

**PVP2017-65744: STRESS OF LARGE DIAMETER PIPING SYSTEM SHOE SUPPORT**

S. Ranjbaran, Sazeh Consultant, Tehran, Tehran, Iran; A. D. Ghalelar, Nargan Engineers & Constructors, Tehran, Tehran, Iran

**PVP2017-65756: LOAD FACTORS FOR CONCRETE WALL PIPE PENETRATIONS WITH A WALL MOUNTED WELDED PLATE**

S. R. Costanzo, C. W. Mak, P. H. Hoang, Sargent and Lundy, LLC, Chicago, IL, USA

### **SESSION 3.2Q (TW-1-8)**

*Wednesday, July 19, 10:30 am – 12:15 pm, Kohala 4*

**ASME SECTION VIII, DIVISION 3 ALTERNATIVE RULES FOR CONSTRUCTION OF HIGH PRESSURE VESSELS (PART 2)**

Developed by: D. L. Stang, Omax Corporation, Kent, WA, USA

Chair: D. L. Stang, Omax Corporation, Kent, WA, USA

Presented by: Daniel T. Peters, Structural Integrity Associates, Edinboro, PA, USA

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**Block 3.3: Wednesday, July 19, 2017 (2:00 pm – 3:45 pm)**

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**SESSION 3.3A (DA-5-1)**

*Wednesday, July 19, 2:00 pm – 3:45 pm, Kohala 1*

**STRESS CLASSIFICATION AND DESIGN BY ANALYSIS METHODOLOGIES**

Developed by: Q. Ma, Walla Walla University, College Place, WA, USA; R. Baliga, Advent Engineering Services, San Ramon, CA, USA

Chair: Q. Ma, Walla Walla University, College Place, WA, USA

Co-Chair: R. Baliga, Advent Engineering Services, San Ramon, CA, USA

**PVP2017-65008: PLASTIC FLOW ANALYSIS OF THICK WALLED PRESSURE VESSELS**

J. A. Jelwan, P. Sader, Holy Spirit University of Kaslik, Jounieh, Mount Lebanon, Lebanon

**PVP2017-65239: DYNAMIC LOAD FACTOR FOR SURGE LOAD ON PIPE USING THE STRESS WAVE PROPAGATION METHODOLOGY**

S. Abu, Samsung C&T Corporation, Gyeonggi-Do, Korea (Republic)

**PVP2017-65846: STATISTICAL EVALUATION OF STRESS INDEPENDENCE OF TWO CONNECTED STRUCTURES**

C. Johnson, J. A. Mann, III, G. Westwater, Emerson, Marshalltown, IA, USA

**PVP2017-66217: VISCOELASTIC AND DAMAGE MODEL OF POLYETHYLENE PIPE MATERIAL FOR SLOW CRACK GROWTH ANALYSIS**

Y. Zhang, X. Luo, J. Shi, Zhejiang University, Hangzhou, Zhejiang, China

**SESSION 3.3B (FSI-2-10)**

*Wednesday, July 19, 2:00 pm – 3:45 pm, Kohala 2*

**FIV & FLUTTER****Symposium of Flow-Induced Vibration—Sponsored by Fluid-Structure Interaction Technical Committee**

Developed by: C. Meskell, Trinity College, Dublin, Ireland; H. Goyder, Cranfield University, Swindon, United Kingdom

Chair: H. Goyder, Cranfield University, Swindon, United Kingdom

Co-Chair: E. Deri, EDF, Chatou, France

**PVP2017-65240: COMBINATIONAL INFLUENCE OF INTERNAL FLOW AND EXTERNAL ANNULAR AXIAL FLOW ON INSTABILITY OF CANTILEVERED DOUBLE WALL PIPES**

K. Fujita, A. Moriasa, Osaka City University, Osaka, Japan

**PVP2017-65325: DESIGN GUIDELINES FOR DYNAMIC STABILITY OF TAIN-TER GATES**

K. Anami, N. Ishii, Osaka Electro-Communication University, Neyagawa, Osaka, Japan; C. Knisely, Bucknell University, Lewisburg, PA, USA; T. Oku, Mayekawa Mfg. Co., Ltd., Moriya, Ibaraki, Japan

**PVP2017-65335: SELF-EXCITED VIBRATION OF A PLATE SUPPORTED BY AIR PRESSURE IN A FLOATING CONVEYING MACHINE**

M. Takeda, M. Watanabe, Aoyama Gakuin University, Sagami-hara-shi, Kanagawa, Japan

**PVP2017-65352: CONFINEMENT EFFECTS ON ADDED MASS OF CYLINDRICAL STRUCTURES IN A POTENTIAL FLOW**

R. Capanna, G. Ricciardi, CEA Cadarache, St Paul les Durance, France; C. Eloy, Irphe, Marseille, France; E. Sarrouy, Laboratoire de Mécanique et d'Acoustique (LMA), Marseille, France

**SESSION 3.3C (CS-11-6)**

*Wednesday, July 19, 2:00 pm – 3:45 pm, Kohala 3*

**FAILURE ANALYSIS OF ENGINEERING STRUCTURE—II****Symposium on Recent Developments in International Codes and Standards—Sponsored by Codes & Standards Technical Committee**

Developed by: G. Jia, The General Administration of Quality Supervision, Inspection and Quarantine, Beijing, China

Chair: G. Jia, The General Administration of Quality Supervision, Inspection and Quarantine, Beijing, China

Co-Chair: G. Deng, China Special Equipment Inspection and Research Institution, Beijing, China

**PVP2017-66042: ACOUSTIC EMISSION ENTROPY FOR EVALUATION OF FRACTURE TOUGHNESS OF HSLA STEEL WELDED JOINT**

M. Chai, W. Wu, Z. Zhang, G. Cheng, Q. Duan, Xi'an Jiaotong University, Xi'an, China

**PVP2017-66123: APPLICATION OF FLEXIBLE ULTRASONIC PHASED ARRAY TECHNIQUE ON DETECTION OF FILLET WELDS IN SMALL-DIAMETER PIPE HOLDER**

W. Guo, C. Miao, X. Du, M. Wang, J. Xia, Zhejiang Provincial Special Equipment Inspection and Research Institute, Hangzhou, China

**PVP2017-66249: STUDY ON SAFETY OF HIGH VOLTAGE GIS BUSBARS SHELL**

S. Yuan, S. Zhou, Y. Fan, Xi'an Shiyou University, Xi'an, China

**PVP2017-65494: STRESS ANALYSIS OF ELLIPSOIDAL HEAD WITH HEATING SPIRAL**

J. Shen, Wison Engineering Co., Ltd., Shanghai, China; H. Peng, Tsinghua University, Beijing, China; Y. Tang, Wison Engineering Co., Ltd., Shanghai, China; X. Liu, Changzheng Engineering Co., Limited., Beijing, China; Y. Liu, Tsinghua University, Beijing, China

**SESSION 3.3D (DA-8-1)**

*Wednesday, July 19, 2:00 pm – 3:45 pm, King's 1*

**FITNESS FOR SERVICE EVALUATIONS****Symposium on Fitness-for-Service—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: G. Van Zyl, SABIC, Jubail, Saudi Arabia; K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

Chair: G. Van Zyl, SABIC, Jubail, Saudi Arabia

Co-Chair: K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

**PVP2017-65183: RESIDUAL STRESS ASSESSMENT FOR PRESSURE VESSEL SUBJECT TO THERMAL SHOCK**

J. Hsiao, H. Qian, C. Brunner, T. Bober, L. D'Amico, GE Gas Power Systems, Windsor, CT, USA

**PVP2017-65512: EFFECTS OF SECONDARY CREEP FORMULATION ON API 579-1 RESIDUAL LIFE EVALUATION**

L. Scano, Studio Scano Associato, Udine, Italy, L. Esposito, University of Naples, Naples, Italy

**PVP2017-65715: SUFFICIENCY OF REFERENCE STRESS SOLUTIONS FOR FFS EVALUATION OF CRACK-LIKE FLAWS**

K. Oyamada, High Pressure Gas Safety Institute of Japan, Tokyo, Japan; N. Miura, Central Research Institute of Electric Power Industry, Yokosuka, Japan

**PVP2017-66271: CONSIDERATION OF REDUCTION IN STIFFNESS DUE TO CRACKING AND THE IMPACT ON STANDARD STRESS INTENSITY FACTOR SOLUTIONS**

D. Blanks, Quest Integrity Group, Varsity Lakes, QLD, Australia

**PVP2017-65882: GUIDELINES FOR BRITTLE FRACTURE ASSESSMENTS ON PIPING SYSTEMS (Presentation Only)**

K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA; J. Penso, Shell Projects and Technology, Houston, TX, USA; G. Garic, Stress Engineering Services Inc., Metairie, LA, USA

**SESSION 3.3E (CS-15-1)**

*Wednesday, July 19, 2:00 pm – 3:45 pm, King's 2*

**PROBABILISTIC AND RISK-INFORMED METHODS FOR STRUCTURAL INTEGRITY ASSESSMENT—I****Symposium on Probabilistic Assessments and Risk Management—Co-Sponsored by Codes & Standards, Materials & Fabrication and Operations, Applications & Components Technical Committees**

Developed by: B. A. Young, Battelle, Columbus, OH, USA; S. Xu, Kinectrics Inc., Toronto, ON, Canada; D. Rudland, U.S. Nuclear Regulatory Commission, Frederick, MD, USA

Chair: J. C. Jin, Canadian Nuclear Safety Commission, Ottawa, ON, Canada

Co-Chair: B. A. Young, Battelle, Columbus, OH, USA

**PVP2017-65262: FAVOR VERSION 16.1—A COMPUTER CODE FOR FRACTURE MECHANICS ANALYSES OF NUCLEAR REACTOR PRESSURE VESSELS**

B. R. Bass, T. Dickson, P. T. Williams, H. Klasky, Oak Ridge National Laboratory, Oak Ridge, TN, USA

**PVP2017-66101: PROBABILISTIC ASSESSMENT OF CANDU REACTOR CORE FOR RISK OF PRESSURE TUBE FAILURE DUE TO PRESENCE OF IN-SERVICE FLAWS**

D. Cho, Bruce Power, Toronto, ON, Canada; D. Mok, Amec Foster Wheeler, Toronto, ON, Canada; S. Xu, D. Scarth, Kinectrics Inc., Toronto, ON, Canada

**PVP2017-65384: BENCHMARKING PROBABILISTIC CODES FOR LBB ANALYSIS FOR CIRCUMFERENTIAL CRACKS**

R. Kurth, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA; B. A. Young, Battelle, Columbus, OH, USA; C. Sallaberry, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA; P. Scott, Battelle Memorial Institute, Columbus, OH, USA; F. Brust, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA

**PVP2017-66102: IMPACT OF UNDETECTED FABRICATION FLAWS ON LBB RISK**

R. Kurth, C. Sallaberry, E. Kurth, F. Brust, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA

**PVP2017-65225: PROBABILISTIC FRACTURE MECHANICS ANALYSIS OF BOILING WATER REACTOR VESSEL ON RELATIVELY LOW FAILURE PROBABILITY PROBLEM USING PROFAS-RV PFM ANALYSIS CODE**

J. Kim, B. Lee, Korea Atomic Energy Research Institute, Daejeon, Korea (Republic)

**SESSION 3.3F (CS-3-4)**

*Wednesday, July 19, 2:00 pm – 3:45 pm, King's 3*

**ENVIRONMENTAL FATIGUE ISSUES—IV**

**Symposium on Fatigue Issues—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: S. Asada, Mitsubishi Heavy Industries, Ltd., Kobe, Japan; H. Mehta, GE Hitachi Nuclear Engineering, San Jose, CA, USA; C. Faigy, CF Integrity Engineering, Tassin, France; S. Mohanty, Argonne National Laboratory, Lemont, IL, USA

Chair: C. Faigy, CF Integrity Engineering, Tassin, France

Co-Chair: S. Mohanty, Argonne National Laboratory, Lemont, IL, USA

**PVP2017-65514: APPLICABILITY OF HOLLOW CYLINDRICAL SPECIMENS TO ENVIRONMENTAL ASSISTED FATIGUE TESTS**

S. Asada, K. Tsutsumi, Mitsubishi Heavy Industries, Ltd., Kobe, Japan; Y. Fukuta, H. Kanasaki, Mitsubishi Heavy Industries, Ltd., Takasago, Hyogo, Japan

**PVP2017-65975: AN INVESTIGATION INTO THE LIFETIMES OF SOLID AND HOLLOW FATIGUE ENDURANCE SPECIMENS USING CYCLIC HARDENING MATERIAL MODELS IN FINITE ELEMENT ANALYSIS**

P. J. Gill, C. Madew, P. James, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom; C. Currie, Rolls-Royce, Derby, United Kingdom; A. Morley, Rolls-Royce Plc, Derby, Derbyshire, United Kingdom

**PVP2017-65135: MEAN STRESS EFFECT ON FATIGUE PROPERTIES OF TYPE 316 STAINLESS STEEL (PART I: IN HIGH-TEMPERATURE AIR ENVIRONMENT)**

M. Kamaya, Institute of Nuclear Safety System, Inc., Mikata-gun Fukui, Japan

**PVP2017-65136: MEAN STRESS EFFECT ON FATIGUE PROPERTIES OF TYPE 316 STAINLESS STEEL (PART II: IN PWR PRIMARY WATER ENVIRONMENT)**

M. Kamaya, Institute of Nuclear Safety System, Inc., Mikata-gun Fukui, Japan

**SESSION 3.3G (CS-23-1)**

*Wednesday, July 19, 2:00 pm – 3:45 pm, Queen's 4*

**HYDROGEN FLAKES ASSESSMENT IN THE RPV'S**

Developed by: V. Lacroix, Tractebel Engie, Brussels, Belgium

Chair: V. Lacroix, Tractebel Engie, Brussels, Belgium

Co-Chair: P. Dulieu, Tractebel Engie, Brussels, Belgium

**PVP2017-65305: ORNL EVALUATION OF SAFETY CASES FOR TWO BELGIAN REACTOR PRESSURE VESSELS CONTAINING QUASI-LAMINAR DEFECTS**

H. Klasky, B. R. Bass, T. Dickson, S. B. Gorti, R. Nanstad, Oak Ridge National Laboratory, Oak Ridge, TN, USA

**PVP2017-66031: STRUCTURAL INTEGRITY ASSESSMENT OF DOEL 3 AND TIHANGE 2 RPVS: ASME B&PV CODE SECTION III PRIMARY STRESS RE-EVALUATION ACCOUNTING FOR THE PRESENCE OF HYDROGEN FLAKES**

P. Dulieu, V. Lacroix, Tractebel Engie, Brussels, Belgium

**PVP2017-66032: STRUCTURAL INTEGRITY ASSESSMENT OF DOEL 3 AND TIHANGE 2 RPVS: FATIGUE CRACK GROWTH ANALYSIS OF HYDROGEN FLAKES**

V. Lacroix, P. Dulieu, Tractebel Engie, Brussels, Belgium

**PVP2017-66216: ORGANIZATION OF THE INDEPENDENT SAFETY REVIEW DONE BY ELECTRABEL FOR THE SAFETY ASSESSMENT OF DOEL 3 AND TIHANGE 2 RPVS**

A. Meert, J.-P. De Cock, ENGIE Electrabel, Brussels, Belgium

**SESSION 3.3H (OAC-2-1)**

*Wednesday, July 19, 2:00 pm – 3:45 pm, Queen's 5*

**TESTING AND QUALIFICATION ON DIFFERENT MATERIALS**

Developed by: G. Bezdikian, Georges Bezdikian Consulting, Le Vesinet, France; G. Young, Entergy Services Inc., Russellville, AR, USA

Chair: G. Young, Entergy Services Inc., Russellville, AR, USA

Co-Chair: G. Bezdikian, Georges Bezdikian Consulting, Le Vesinet, France

**PVP2017-65252: KEEPING OUR AIR CLEAN: A VALVE MANUFACTURER'S PERSPECTIVE (Presentation Only)**

S. Allen, Bray International, Houston, TX, USA

**PVP2017-65911: QUALIFICATION OF VACUUM BREAKERS (Presentation Only)**

B. Shitole, AMEC, Calgary, AB, Canada

**PVP2017-65916: USING 16-8-2 FILLER METALS IN PETROCHEMICAL APPLICATIONS (Presentation Only)**

J. Penso, Shell Projects and Technology, Houston, TX, USA

**PVP2017-65394: PLUTONIUM DYNAMIC TESTING OPERATIONS AT LANL AND NTS (Presentation Only)**

B. Lopez, S. Talachy, Los Alamos National Laboratory, Los Alamos, NM, USA

**SESSION 3.3I (CT-12-1)**

*Wednesday, July 19, 2:00 pm – 3:45 pm, Queen's 6*

**EXPLICIT AND IMPLICIT FINITE ELEMENT ANALYSIS**

Developed by: W. Reinhardt, Candu Energy Inc., Mississauga, ON, Canada; D. Metzger, SNC, Mississauga, ON, Canada; R. Adibi-Asl, Amec Foster Wheeler, Toronto, ON, Canada

Chair: J. Rudolph, AREVA GmbH, Erlangen, Bavaria, Germany

Co-Chair: D. Metzger, SNC, Mississauga, ON, Canada

**PVP2017-66135: DECAY LENGTH IN PRESSURE VESSELS**

R. Adibi-Asl, Amec Foster Wheeler, Toronto, ON, Canada; R. Seshadri, Memorial University, St. John's, NL, Canada

**PVP2017-66238: COMPARISON OF STRIP YIELD AND NET SECTION PLASTICITY MODELS FOR A BAR IN BENDING WITH A SINGLE EDGE CRACK**

W. Reinhardt, Candu Energy Inc., Mississauga, ON, Canada; D. Metzger, SNC, Mississauga, ON, Canada

**PVP2017-66268: DYNAMIC CYCLIC STRESS ANALYSIS OF ROLLING OF A DIAMETRICALLY LOADED HELICAL TEST SPECIMEN**

D. Metzger, M. Paulseth, A. Gagnon, SNC, Mississauga, ON, Canada

**PVP2017-65817: ERROR NORM VS. UNCERTAINTY METRIC IN ASSESSING ACCURACY OF THE FINITE ELEMENT METHOD**

P. V. Marcal, MPACT, Corp., Oak Park, CA, USA; J. T. Fong, National Institute of Standards and Technology, Gaithersburg, MD, USA; R. Rainsberger, XYZ Scientific Applications Inc., Pleasant Hill, CA, USA; L. Ma, National Institute of Standards and Technology, Gaithersburg, MD, USA

**SESSION 3.3J (DA-20-1)**

*Wednesday, July 19, 2:00 pm – 3:45 pm, Kona 1*

**SPECIAL CONSIDERATIONS IN THE DESIGN AND ANALYSIS OF SUPPORTS, RESTRAINTS, AND WELDED ATTACHMENTS**

Developed by: P. Wiseman, LISEGA Inc., Kodak, TN, USA

Chair: P. Wiseman, LISEGA Inc., Kodak, TN, USA

Co-Chair: Z. Hoch, LISEGA Inc., Kodak, TN, USA

**PVP2017-65970: NOZZLE LOAD CONSIDERATIONS AND MISCONCEPTIONS INTRODUCED BY PIPING SUPPORT FRICTION**

B. S. Antaal, D. Williams, LISEGA Inc., Kodak, TN, USA

**PVP2017-65864: COMPARISONS OF CFD AND TRADITIONAL SOLUTIONS FOR STEAM HAMMER EVENTS**

A. Mayes, K. Gawande, D. K. Williams, LISEGA Inc., Kodak, TN, USA



**PVP2017-66086: A HISTORICAL REVIEW AND ADDITIONS TO SIFS AND STRESS INDICES FOR TRUNNION ELBOWS**

D. Williams, S. Nargund, LISEGA Inc., Kodak, TN, USA

**PVP2017-65377: REVIEW AND COMPARISON OF BUCKLING METHODOLOGIES FOR ASME B&PV CODE LINEAR PIPING AND COMPONENT RESTRAINTS**

P. Wiseman, S. Nargund, Z. Hoch, LISEGA Inc., Kodak, TN, USA

**SESSION 3.3K (MF-7-2)**

*Wednesday, July 19, 2:00 pm – 3:45 pm, Kona 2*

**MATERIALS AND TECHNOLOGIES FOR NUCLEAR POWER PLANTS—II**

Developed by: W. Ren, Oak Ridge National Laboratory, Oak Ridge, TN, USA  
Chair: W. Ren, Oak Ridge National Laboratory, Oak Ridge, TN, USA  
Co-Chair: R. Nanstad, Oak Ridge National Laboratory, Oak Ridge, TN, USA  
**PVP2017-65348: A STUDY OF DUCTILITY DIP CRACKING OF INCONEL 690 WELDING FILLER METAL—DEVELOPMENT OF A REFUSION CRACKING TEST**

A. Rapetti, P. Todeschini, Électricité de France R&D, Moret-sur-Loing, France; S. Hendili, Electricité de France R&D, Chatou, France; F. Christien, Ecole Nationale Supérieure des Mines de St-Etienne, St-Etienne, France; F. Tancret, University of Nantes, Nantes, France

**PVP2017-65694: TECHNICAL BASIS FOR THE EXEMPTIONS TO MANDATORY POST WELD HEAT TREATMENT (PWHT) OF SA-738 GRADE B FOR SEC. III DIV.1 SUBSECTION NE APPLICATION**

T. Hayashi, Toshiba Corporation, Yokohama, Kanagawa, Japan; C. Kim, Westinghouse Electric Co, Murrysville, PA, USA; K. Kumagai, IHI Corporation, Yokohama, Kanagawa, Japan; M. Goto, S. Otake, Toshiba Corporation, Yokohama, Kanagawa, Japan

**PVP2017-66064: TUBE EXPANSION & HYBRID FRICTION DIFFUSION BONDING OF CU-NI AND ASTM A516 G70 TUBE-TO-TUBESHEET JOINTS**

A. Hbbani, F. Al-Badour, A. Bazoune, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia

**PVP2017-66255: DEALLOYING OF AS-WELDED MICROSTRUCTURES IN ALUMINUM BRONZES IN ESSENTIAL COOLING WATER SERVICE**

R. Kirchofer, H. Vaillancourt, Intertek AIM, Santa Clara, CA, USA; M. Garner, South Texas Project, Wadsworth, TX, USA; R. C. Cipolla, Intertek AIM, Santa Clara, CA, USA

**PVP2017-66130: ELEVATED TEMPERATURE CRACKING RESISTANCE OF TA-BEARING HIGH CHROMIUM NI-BASE FILLER METALS**

C. Fink, J. C. Lippold, The Ohio State University, Columbus, OH, USA; A. T. Hope, Thermo-Calc Software Inc., McMurray, PA, USA; S. McCracken, Electric Power Research Institute, Harrisburg, NC, USA

**SESSION 3.3L (SE-4-1)**

*Wednesday, July 19, 2:00pm – 3:45 pm, Kona 3*

**STRUCTURAL DYNAMICS IN SEISMIC ENGINEERING**

Developed by: K. Fujita, Osaka City University, Osaka, Japan  
Chair: K. Fujita, Osaka City University, Osaka, Japan  
Co-Chair: K. Aida, Mitsubishi Hitachi Power Systems, Ltd., Kure-Shi, Japan

**PVP2017-65329: CORE SEISMIC EXPERIMENT AND ANALYSIS OF FULL SCALE SINGLE MODEL FOR FAST REACTOR**

A. Iwasaki, Mitsubishi Heavy Industries, Ltd., Takasago, Japan; S. Matsubara, Mitsubishi Heavy Industries, Ltd., Kobe, Japan; T. Yamamoto, S. Kitamura, Japan Atomic Energy Agency, Fukui pref., Japan; H. Harada, Mitsubishi FBR Systems, Tokyo, Japan

**PVP2017-65354: CORE SEISMIC EXPERIMENT AND ANALYSIS OF HEXAGONAL BUNDLE MODEL FOR FAST REACTOR**

A. Iwasaki, Mitsubishi Heavy Industries, Ltd., Takasago, Japan; S. Matsubara, Mitsubishi Heavy Industries, Ltd., Kobe, Japan; S. Okamura, Mitsubishi FBR Systems, Shibuya-Ku, Tokyo, Japan; S. Kitamura, T. Yamamoto, Japan Atomic Energy Agency, Fukui pref., Japan

**PVP2017-65357: CORE SEISMIC EXPERIMENT AND ANALYSIS OF A LARGE NUMBER OF ELEMENT MODELS FOR FAST REACTOR**

A. Iwasaki, Mitsubishi Heavy Industries, Ltd., Takasago, Japan; S. Matsubara, Mitsubishi Heavy Industries, Ltd., Kobe, Japan; S. Okamura, Mitsubishi FBR Systems, Shibuya-Ku, Tokyo, Japan; S. Kitamura, T. Yamamoto, Japan Atomic Energy Agency, Fukui pref., Japan

**PVP2017-65313: FUNDAMENTAL STUDY ON EVALUATION METHOD OF NONLINEAR SLOSHING WAVE HEIGHT OF CYLINDRICAL TANKS**

H. Morita, Mitsubishi Heavy Industries, Ltd., Hyogo-pref, Japan; T. Takata, H. Madokoro, Mitsubishi Heavy Industries, Ltd., Takasago, Japan; H. Sago, H. Murakami, Mitsubishi Heavy Industries, Ltd., Kobe, Japan; S. Yokoi, Mitsubishi FBR Systems, Inc., Tokyo, Japan

**PVP2017-65677: EARTHQUAKE RESISTANCE ASSESSMENT OF CONTAMINATED WATER STORAGE TANK AND ITS REINFORCEMENT BASIC DESIGN AT FUKUSHIMA**

H. Morishige, Fukushima Nuclear Accident Countermeasures Review Group, Kobe, Hyougo, Japan; K. Fujita, Osaka City University, Osaka, Japan; Y. Yamashiki, Kyoto University, Kyoto, Kyoto, Japan

**SESSION 3.3M (MF-21-2)**

*Wednesday, July 19, 2:00 pm – 3:45 pm, Waikoloa Suite 1*

**ADDITIVE MANUFACTURING TWO**

Developed by: A. Duncan, Savannah River National Laboratory, Aiken, SC, USA; J. Todd, Pennsylvania State University, University Park, PA, USA

Chair: A. Duncan, Savannah River National Laboratory, Aiken, SC, USA  
Co-Chair: J. Todd, Pennsylvania State University, University Park, PA, USA

**PVP2017-65827: QUALITY ASSURANCE AND TECHNOLOGY QUALIFICATION FOR ADDITIVE MANUFACTURING OF METALLIC PRESSURE COMPONENTS**

M. K. Mandeville, Jr., DNV GL, Katy, TX, USA; M. Brongers, DNV GL, Dublin, OH, USA; F. Tang, DNV GL, Katy, TX, USA

**PVP2017-65857: HYDROGEN ISOTOPE PERMEATION AND TRAPPING IN ADDITIVELY MANUFACTURED STEELS**

R. A. Karnesky, P. Chao, D. Buchenauer, Sandia National Laboratories, Livermore, CA, USA

**PVP2017-65992: THERMAL-MECHANICAL FINITE ELEMENT SIMULATION OF ADDITIVE MANUFACTURING; PROCESS MODELING OF THE LENS PROCESS**

M. Stender, L. Beghini, M. Veilleux, S. Subia, J. D. Sugar, Sandia National Laboratories, Livermore, CA, USA

**PVP2017-66134: THERMAL STABILITY OF 3-D AM PRINTED 316L STAINLESS STEEL PROTOTYPES AND ITS IMPACT ON MECHANICAL PROPERTIES (Presentation Only)**

N. Yang, R. A. Karnesky, J. Yee, Sandia National Laboratories, Livermore, CA, USA

**SESSION 3.3N (DA-11-1)**

*Wednesday, July 19, 2:00 pm – 3:45 pm, Waikoloa Suite 2*

**CFD IN DESIGN AND ANALYSIS**

Developed by: S. McGuffie, Porter McGuffie, Inc., Lawrence, KS, USA  
Chair: S. McGuffie, Porter McGuffie, Inc., Lawrence, KS, USA  
Co-Chair: S. Xu, Hefei General Machinery Research Institute, Hefei, China

**PVP2017-65310: ANALYSIS ON THE TRANSIENT-STATE OF THE GAS-CONDENSATE PIPELINE**

G. Shi, X. Li, China University of Petroleum-Beijing, Beijing, China; Z. Wang, Changqing Technology Engineering Co., Ltd., Xi'an, China; D. Wang, J. Gong, China University of Petroleum-Beijing, Beijing, China

**PVP2017-65669: CFD SIMULATION OF SUPERCRITICAL LNG HEAT TRANSFER IN A HORIZONTAL TUBE OF AN INTERMEDIATE FLUID VAPORIZER**

S. Xu, X. Chen, Z. Fan, Hefei General Machinery Research Institute, Hefei, China  
**PVP2017-66001: TEMPERATURE MEASUREMENT OF A 7×7 ARRAY OF HEATED RODS SUBJECTED TO VACUUM DRYING CONDITIONS**

D. Maharjan, M. Hadj-Nacer, M. Greiner, University of Nevada, Reno, Reno, NV, USA

**PVP2017-66002: EXPERIMENTALLY BENCHMARKED COMPUTATIONAL FLUID DYNAMICS SIMULATIONS OF A 7×7 ARRAY OF HEATED RODS WITHIN A SQUARE-CROSS-SECTION ENCLOSURE FILLED WITH RAREFIED HELIUM**

D. Maharjan, M. Hadj-Nacer, M. Greiner, University of Nevada, Reno, Reno, NV, USA

### SESSION 3.30 (DA-2-6)

Wednesday, July 19, 2:00 pm – 3:45 pm, Waikoloa Suite 3

#### DESIGN AND ANALYSIS OF PIPING AND COMPONENTS—VI

Developed by: S. Iyer, Candu Energy, Mississauga, ON, Canada; K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

Chair: S. Iyer, Candu Energy, Mississauga, ON, Canada

Co-Chair: K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA

#### PVP2017-66019: NUMERICAL MODELLING OF THE COOLING SYSTEM AT ALBA SYNCHROTRON RADIATION FACILITY TO UNDERSTAND ITS PERFORMANCE

X. Escaler, Universtitat Politècnica De Catalunya, Barcelona, Spain; M. Prieto, M. Quispe, ALBA Synchrotron Light Source, Cerdanyola del Valles, Spain; M. Kjeldsen, Flow Design Bureau AS, Stavanger, Norway; O. de la Torre, National University of Ireland Galway, Galway, Connacht, Ireland

#### PVP2017-65981: ATTENTION POINTS FOR HIGH TEMPERATURE STRUCTURE DESIGN USING NI-BASED ALLOY (Presentation Only)

J. Tan, F.-Z. Xuan, East China University of Science and Technology, Shanghai, China

#### PVP2017-65094: FINITE ELEMENT ANALYSIS BASED SIF CALCULATION AND COMPARISON WITH VARIOUS APPROACHES FOR SIF CALCULATION

M. Kulkarni, V. Dewangan, Technip India Ltd., Mumbai, India

#### PVP2017-65996: DISTRICT HEATING NETWORK OPTIMIZATION USING A COUPLED PUMP AND PIPE SYSTEM ANALYSIS

M. Jonsson, L. Magnusdottir, University of Iceland, Reykjavik, Iceland

#### PVP2017-66245: BASIC DESIGN RULES FOR LINES IN PULSATING FLOW SERVICE

M. Eijgenhuijsen, G. Masand, Chevron Australia Pty Ltd., Perth, Australia

### SESSION 3.3Q (MF-14-1)

Wednesday, July 19, 2:00 pm – 3:45 pm, Kohala 4

#### LEAK BEFORE BREAK

Developed by: P. J. Gill, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom

Chair: P. J. Gill, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom

Co-Chair: A. Horn, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom

#### PVP2017-66037: MODELING OF PIPE SYSTEM BEHAVIOR WITH CIRCUMFERENTIAL SURFACE CRACK FOR SECONDARY STRESS MARGIN ASSESSMENT

M. Uddin, F. Brust, G. Wilkowski, S. Kalyanam, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA; J. Martin, BMPC, Schenectady, NY, USA

#### PVP2017-65438: “APPARENT NET-SECTION-COLLAPSE” METHODOLOGY FOR CIRCUMFERENTIAL SURFACE FLAWS IN PIPING

S. Kalyanam, G. Wilkowski, S. Pothana, Y. Hioe, C. Sallaberry, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA

#### PVP2017-65985: LEAK DETECTION ASSESSMENT OF A THROUGH WALL CRACK IN A CIRCUMFERENTIAL WELD

P. J. Gill, C. Madew, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom; S. Booth, EDF Energy, Gloucester, United Kingdom

#### PVP2017-65193: STUDY ON DIFFUSION AREA OF FLUID LEAKAGE WITH PIPE FAILURE

S. Watanabe, K. Yoneda, Central Research Institute of Electric Power Industry, Yokosuka, Kanagawa, Japan

## THURSDAY, JULY 20

### Block 4.1: Thursday, July 20, 2017 (8:30 am – 10:15 am)

### SESSION 4.1A (DA-1-1)

Thursday, July 20, 8:30 am – 10:15 am, Kohala 1

#### DESIGN AND ANALYSIS OF PRESSURE VESSELS PER THE ASME CODE

Developed by: N. Barkley, Contract Fabricators, Inc., Holly Springs, MS, USA

Chair: J. Taagepera, Chevron ETC, Richmond, CA, USA

Co-Chair: R. Frith, University of Queensland, St Lucia, Queensland, Australia

#### PVP2017-65023: A NEW PRESSURE VESSEL CLASS—CHALLENGING WELD EFFICIENCIES

R. Frith, University of Queensland, St Lucia, Queensland, Australia, S. Laird, FE Consultants Pty Ltd., Newstead, Qld, Australia

#### PVP2017-65858: ELLIPSOIDAL HEAD RULES: A COMPARISON BETWEEN ASME SECTION VIII, DIVISIONS 1 AND 2

T. Seipp, Becht Engineering Co., Inc., Okotoks, AB, Canada; N. Barkley, Contract Fabricators, Inc., Holly Springs, MS, USA; C. Wright, Christopher Wright Registered Engineer, Minnetonka, MN, USA

#### PVP2017-65766: DESIGN AND ANALYSIS OF VERTICAL VESSELS FOR LIFTING IN FULLY DRESSED CONDITION

C. Doctor, Fluor Canada Ltd., Calgary, AB, Canada; R. Stefanovic, Fluor Canada, Calgary, AB, Canada

#### PVP2017-65188: FINITE ELEMENT ANALYSIS OF A QUICK-ACTUATING CLOSURE

G. Ricco, BSS Ltd., Beijing, China

### SESSION 4.1B (FSI-2-11)

Thursday, July 20, 8:30 am – 10:15 am, Kohala 2

#### FIV IN TUBE ARRAYS III (TUBE-SUPPORT INTERACTION)

#### Symposium of Flow-Induced Vibration—Sponsored by Fluid-Structure Interaction Technical Committee

Developed by: D. S. Weaver, McMaster University, Hamilton, ON, Canada; N. Mureithi, Polytechnique Montreal, Montreal, QC, Canada; T. Nakamura, Osaka Sangyo University, Daito, Osaka, Japan

Chair: T. Nakamura, Osaka Sangyo University, Daito, Osaka, Japan

Co-Chair: L. Kaiktsis, National Technical University of Athens, Zografou, Greece

#### PVP2017-65708: GAP EFFECT ON THE RANDOM AND FLUID-ELASTIC FORCES ACTING IN THE VIBRATION OF A LOOSELY SUPPORTED TUBE UNDER CROSS-FLOW

L. Borsoi, P. Piteau, X. Delaune, CEA, Gif-sur-Yvette, France; J. Antunes, Instituto Superior Técnico, Universidade de Lisboa, Bobadela LRS, Portugal

#### PVP2017-65725: FLUID STRUCTURE INTERACTION FOR TUBES BUNDLES: PRESENTATION OF A LINEAR EQUIVALENT MODEL

D. Broc, G. Artini, CEA Saclay, Gif-sur-Yvette, France

#### PVP2017-65727: FLUID STRUCTURE INTERACTION FOR TUBES BUNDLES: DIFFERENT HOMOGENIZATION METHODS

D. Broc, G. Artini, CEA Saclay, Gif-sur-Yvette, France

#### PVP2017-65898: AN EXPERIMENTAL INVESTIGATION OF THE DYNAMICS OF A LOOSELY SUPPORTED TUBE ARRAY

A. Elhelaly, M. Hassan, University of Guelph, Guelph, ON, Canada; A. Mohany, University of Ontario Institute of Technology, Oshawa, ON, Canada; Soha Eid Moussa, University of Guelph, Guelph, ON, Canada

### SESSION 4.1C (CS-38-1)

Thursday, July 20, 8:30 am – 10:15 am, Kohala 3

#### IMPROVEMENT OF FLAW CHARACTERIZATION RULES IN FITNESS-FOR-SERVICE CODES

Developed by: V. Lacroix, Tractebel Engie, Brussels, Belgium

Chair: V. Lacroix, Tractebel Engie, Brussels, Belgium

Co-Chair: K. Hasegawa, Japan Atomic Energy Agency, Ibaraki-ken, Japan

#### PVP2017-65199: STUDY ON THE RELATIONSHIP BETWEEN INTERACTION FACTORS AND STRESS INTENSITY FACTOR FOR ELLIPTICAL FLAWS

K. Azuma, Y. Li, K. Hasegawa, Japan Atomic Energy Agency, Ibaraki-ken, Japan

#### PVP2017-65303: RSE-M NUCLEAR IN-SERVICE INSPECTION CODE—NEW FLAW INTERACTION RULES

C. Faigy, CF Integrity Engineering, Tassin, France

#### PVP2017-65667: INTRODUCTION OF SUBSURFACE PROXIMITY CRITERIA IN THE WORLD AND ITS REMAINING FATIGUE LIVES

K. Hasegawa, Y. Li, Japan Atomic Energy Agency, Ibaraki-Ken, Japan; G. Katsumata, Mizuho Information and Research Institute, Tokyo, Japan; P. Dulieu, V. Lacroix, Tractebel Engie, Brussels, Belgium

**PVP2017-65670: STRESS INTENSITY FACTOR INTERACTION OF SUBSURFACE FLAWS UNDER NOTCHES**

K. Hasegawa, Japan Atomic Energy Agency, Ibaraki-ken, Japan; P. Dulieu, V. Lacroix, Tractebel Engie, Brussels, Belgium

**PVP2017-66049: PROPOSAL OF A NEW SUBSURFACE-TO-SURFACE FLAW TRANSFORMATION RULE FOR FATIGUE CRACK GROWTH ANALYSES**

V. Lacroix, Tractebel Engie, Brussels, Belgium; A. Bouydo, Tractebel Engie, Woluwé Saint Lambert, Belgium; G. Katsumata, Mizuho Information and Research Institute, Tokyo, Japan; Y. Li, K. Hasegawa, Japan Atomic Energy Agency, Ibaraki-ken, Japan

**SESSION 4.1D (CS-6-1)**

*Thursday, July 20, 8:30 am – 10:15 am, King's 1*

**API 579/ASME CODE FITNESS-FOR-SERVICE ACTIVITIES**

**Symposium on Fitness-for-Service—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: P. E. Prueter, The Equity Engineering Group, Inc., Shaker Heights, OH, USA

Chair: P. E. Prueter, The Equity Engineering Group, Inc., Shaker Heights, OH, USA

Co-Chair: M. Uddin, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA

**PVP2017-65960: ANALYSIS OF MULTIPLE CRACKS IN A PRESSURE VESSEL SEAM WELD USING THE API 579-1/ASME FFS-1 LEVEL 3**

J. E. Maneschy, JEM Consultoria, Rio de Janeiro, Brazil; J. Freire, J. de J. L. Carvajalino, V. E. L. Paiva, J. G. Diaz, PUC Rio de Janeiro, Rio de Janeiro, Brazil

**PVP2017-66201: FITNESS-FOR-SERVICE ASSESSMENT OF STEAM GENERATOR TUBING SUBJECT TO DEALLOYING DEGRADATION**

R. Mousavi, Ontario Power Generation, Richmond Hill, ON, Canada; X. Duan, Candu Energy, Mississauga, ON, Canada; M. Kozluk, CANTECH Associates Ltd., Burlington, ON, Canada; M. Wang, SNC Lavalin, Mississauga, ON, Canada; Y. Shi, Candu Energy, Mississauga, ON, Canada

**PVP2017-65475: NUMERICAL STUDY OF STEAM FILM COOLING ON A THICK-WALL CYLINDER WITH R5 CODE BASED STRENGTH ANALYSIS**

Z. Cai, W. Wang, H. Hong, Y. Liu, Shanghai Jiao Tong University, Shanghai, China

**SESSION 4.1E (CS-31-1)**

*Thursday, July 20, 8:30 am – 10:15 am, King's 2*

**ASSESSMENT OF FATIGUE AND FRACTURE—A PROBABILISTIC PERSPECTIVE (MAINTAINING INTEGRITY OF COMPONENTS)**

**Symposium on Probabilistic Assessments and Risk Management—Co-Sponsored by Codes & Standards, Materials & Fabrication and Operations, Applications & Components Technical Committees**

Developed by: Y. Garud, SIMRAND, LLC, San Jose, CA, USA

Chair: Y. Garud, SIMRAND, LLC, San Jose, CA, USA

Co-Chair: D. Steining, Electric Power Research Institute, Palo Alto, CA, USA

**PVP2017-65416: CONFIDENCE BOUNDS FOR FATIGUE DISTRIBUTION FUNCTIONS**

D. G. Harlow, Lehigh University, Bethlehem, PA, USA

**PVP2017-65850: ASSESSMENT OF UNCERTAINTY SOURCES IN FATIGUE USAGE IN RELATION TO DETERMINISTIC MARGINS, AND SENSITIVITY ANALYSIS**

Y. Garud, SIMRAND, LLC, San Jose, CA, USA; D. Steining, Electric Power Research Institute, Palo Alto, CA, USA

**PVP2017-66133: RELIABILITY BASED DESIGN OPTIMIZATION OF PRIMARY SHIELD STRUCTURE CONSISTING OF STEEL-PLATE COMPOSITE (SC) WALLS UNDER SEISMIC LOAD**

A. Chakraborty, S. K. Radha, Virtual Integrated Analytics Solutions, Houston, TX, USA; K. C. Sener, A. H. Varma, Purdue University, West Lafayette, IN, USA

**PVP2017-65496: DEVELOPMENT OF A NOVEL TEST PROCEDURE TO INVESTIGATE THE IMPACT OF STRAIN GRADIENTS ON THE FATIGUE ENDURANCE OF STAINLESS STEEL**

M.-R. Riley, C. M. Davies, S. Garwood, Imperial College London, London, United Kingdom

**SESSION 4.1F (CS-3-5)**

*Thursday, July 20, 8:30 am – 10:15 am, King's 3*

**ENVIRONMENTAL FATIGUE ISSUES—V**

**Symposium on Fatigue Issues—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: S. Asada, Mitsubishi Heavy Industries, Ltd., Kobe, Japan; H. Mehta, GE Hitachi Nuclear Engineering, San Jose, CA, USA; C. Faigy, CF Integrity Engineering, Tassin, France; S. Mohanty, Argonne National Laboratory, Lemont, IL, USA

Chair: S. Mohanty, Argonne National Laboratory, Lemont, IL, USA

Co-Chair: T. Metais, EDF, Villeurbanne, France

**PVP2017-65374: STRAIN WAVEFORM EFFECTS FOR LOW CYCLE FATIGUE IN SIMULATED PWR WATER**

T. Seppänen, J. Alhainen, E. Arelahti, J. Solin, VTT Technical Research Centre of Finland Ltd., Espoo, Finland

**PVP2017-66197: DISCUSSIONS ON EFFECTS OF TEMPERATURE IN FATIGUE AND ASSESSMENT OF STAINLESS NPP PRIMARY PIPING**

J. Solin, VTT Technical Research Centre of Finland Ltd., Espoo, Finland; F. Curtit, G. Blatman, EDF, Moret-sur-Loing, France; T. Metais, EDF, Villeurbanne, France; H. E. Karabaki, PreussenElektra GmbH, Hannover, Germany

**PVP2017-66097: FATIGUE WITH HOLD TIMES SIMULATING NPP NORMAL OPERATION RESULTS FOR STAINLESS STEEL GRADES 304L AND 347**

H. E. Karabaki, PreussenElektra GmbH, Hannover, Germany; J. Solin, VTT Technical Research Centre of Finland Ltd., Espoo, Finland; M. Twite, Rolls-Royce Plc, Derby, United Kingdom; M. Herbst, Areva NP, Erlangen, Germany; J. Mann, University of Manchester, Manchester, United Kingdom

**PVP2017-66103: EXPERIMENTAL RESEARCH ON CYCLIC RESPONSE, HOLD EFFECTS AND FATIGUE OF STAINLESS STEEL**

J. Solin, J. Alhainen, T. Seppänen, VTT Technical Research Centre of Finland Ltd., Espoo, Finland; H. E. Karabaki, PreussenElektra GmbH, Hannover, Germany; W. Mayinger, E. ON Kernkraft GmbH, Hanover, Germany

**SESSION 4.1G (MF-30-1)**

*Thursday, July 20, 8:30 am – 10:15 am, Queen's 4*

**BRITTLE FRACTURE OF CARBON STEEL FITTINGS, FLANGES, AND PIPING—I**

Developed by: J. Penso, Shell Projects and Technology, Houston, TX, USA; M. Brongers, DNV GL, Dublin, OH, USA

Chair: J. Penso, Shell Projects and Technology, Houston, TX, USA

Co-Chair: M. Brongers, DNV GL, Dublin, OH, USA

**PVP2017-65801: IMPACT TOUGHNESS DEFICIENCIES IN ASME SA350 LF2 FLANGES**

R. Thompson, K. Baker, Chevron ETC, Houston, TX, USA

**PVP2017-65803: MECHANICAL PROPERTIES OF VANADIUM MICROALLOYED HIGH-STRENGTH ASTM A694 FORGINGS**

K. Baker, R. Thompson, Chevron ETC, Houston, TX, USA; T. Gorrell, Allied Group, Houston, TX, USA

**PVP2017-65825: INCREASED SUSCEPTIBILITY OF CARBON STEEL PIPE FITTING AND FLANGES TO BRITTLE FRACTURE**

B. Messer, S. Soltaninia, Fluor Corp, Calgary, AB, Canada; T. Hamre, Acuren Group Inc., Edmonton, AB, Canada

**SESSION 4.1H (DA-10-4)**

*Thursday, July 20, 8:30 am – 10:15 am, Queen's 5*

**INTERNATIONAL LIAISON AND PCC-1 APPENDIX A SESSION—I**

Developed by: C. Rodery, BP p.l.c., League City, TX, USA; W. Brown, Integrity Engineering Solutions, Dunsborough, WA, Australia

Chair: C. Rodery, BP p.l.c., League City, TX, USA

Co-Chair: W. Brown, Integrity Engineering Solutions, Dunsborough, WA, Australia

*Panelists:*

T. Sawa, Hiroshima University, Tokyo, Japan

J. Veiga, Teadit Industria e Comercio Ltda, Rio De Janeiro, Brazil

H. Lejeune, Cetim, Nantes 44000, France

M. Schaaf, AMTEC GmbH, Lauffen, Germany



## SESSION 4.1I (CS-19-1)

Thursday, July 20, 8:30 am – 10:15 am, Queen's 6

### INTEGRITY OF CAST STAINLESS STEEL PIPE—

Developed by: D. J. Shim, Structural Integrity Associates, San Jose, CA, USA  
Chair: D. J. Shim, Structural Integrity Associates, San Jose, CA, USA  
Co-Chair: K. Hojo, Mitsubishi Heavy Industries Ltd., Kobe, Japan

#### PVP2017-65768: FRACTURE TOUGHNESS AND DEFORMATION BEHAVIOR OF CAST AUSTENITIC STAINLESS STEELS AFTER THERMAL AGING

Y. Chen, W.-Y. Chen, Argonne National Laboratory, Lemont, IL, USA; C. Xu, University of Florida, Gainesville, FL, USA; X. Zhang, Argonne National Laboratory, Argonne, IL, USA; Z. Li, Y. Yang, University of Florida, Gainesville, FL, USA

#### PVP2017-65633: ALLOWABLE FLAW SIZE OF JAPANESE CAST STAINLESS STEEL PIPE USING PROBABILISTIC FRACTURE MECHANICS METHOD

S. Hayashi, Mitsubishi Heavy Industries, Ltd., Takasago-Shi, Japan; K. Hojo, Mitsubishi Heavy Industries Ltd., Kobe, Japan; M. Ochi, Mitsubishi Heavy Industries Ltd., Takasago, Japan; T. Yamane, W. Nishi, Mitsubishi Heavy Industries Ltd., Kobe, Japan

#### PVP2017-65959: THERMAL AGING BEHAVIOR OF GRADE CF3M CAST AUSTENITIC STAINLESS STEELS

Y. Miura, T. Sawabe, K. Betsuyaku, T. Arai, Central Research Institute of Electric Power Industry, Yokosuka, Japan

## SESSION 4.1J (MF-11-1)

Thursday, July 20, 8:30 am – 10:15 am, Kona 1

### INTEGRITY ISSUES IN SCC AND CORROSION FATIGUE

Developed by: K. Nikbin, Imperial College London, London, United Kingdom; Z. Wei, Tenneco, Ann Arbor, MI, USA

Chair: K. Nikbin, Imperial College London, London, United Kingdom

Co-Chair: Z. Wei, Tenneco, Ann Arbor, MI, USA

#### PVP2017-65216: A METHOD FOR FIELD EVALUATION OF HEAT TREATMENT TO IDENTIFY VESSELS THAT ARE SUSCEPTIBLE TO SULFIDE STRESS CRACKING

G. Ramirez, ABS Group, Houston, TX, USA; K. Kenady, ABS Consulting, San Antonio, TX, USA; J. Jackson, G2MT Laboratories, LLC, Houston, TX, USA

#### PVP2017-65830: MATERIAL-ENVIRONMENT INTERACTIONS AND RANKING OF MATERIALS IN CORROSION-FATIGUE AND STRESS CORROSION CRACKING RESISTANCE

Z. Wei, Tenneco, Ann Arbor, MI, USA; L. Luo, K. Smith, Tenneco Inc., Grass Lake, MI, USA; A. Basutka, H. Kang, University of Michigan, Dearborn, MI, USA

#### PVP2017-65886: CRACK GROWTH RATES FOR EVALUATING PWSCC OF THICK-WALL ALLOY 690 MATERIAL AND ALLOY 52, 152, AND VARIANT WELDS

A. Jenks, G. White, Dominion Engineering, Inc., Reston, VA, USA; P. Crooker, Electric Power Research Institute, Palo Alto, CA, USA

#### PVP2017-65915: ASSESSMENT OF 2205 WELDMENTS IN HYDROPROCESSING REACTOR AIR COOLERS (Presentation Only)

J. Penso, Shell Projects and Technology, Houston, TX, USA

#### PVP2017-66151: BWR SHROUD WELD OFF-AXIS CRACK GROWTH INVESTIGATION

J. Broussard, Dominion Engineering, Inc., Reston, VA, USA; W. Lunceford, Electric Power Research Institute, Morgan Hill, CA, USA

## SESSION 4.1K (MF-7-3)

Thursday, July 20, 8:30 am – 10:15 am, Kona 2

### MATERIALS AND TECHNOLOGIES FOR NUCLEAR POWER PLANTS—III

Developed by: W. Ren, Oak Ridge National Laboratory, Oak Ridge, TN, USA

Chair: W. Ren, Oak Ridge National Laboratory, Oak Ridge, TN, USA

Co-Chair: R. Nanstad, Oak Ridge National Laboratory, Oak Ridge, TN, USA

#### PVP2017-65159: EVALUATION ON MICROSTRUCTURE AND MECHANICAL PROPERTIES OF WELDED JOINTS BY GMAW IN UNS N10003 ALLOY

K. Yu, Chinese Academy of Sciences, Shanghai, China; Z. Jiang, Harbin Institute of Technology, Harbin, China; X. Shi, C. Li, S. Chen, Chinese Academy of Sciences, Shanghai, China

#### PVP2017-66107: ALLOYING OF STEEL AND GRAPHITE BY HYDROGEN IN NUCLEAR REACTOR

E. A. Krasikov, National Research Centre "Kurchatov Institute", Moscow, Russia

#### PVP2017-65436: SURFACE ENGINEERING OF NUCLEAR MATERIALS BY ULTRASONIC NANOCRYSTALLINE SURFACE MODIFICATION TECHNIQUE (Presentation Only)

Y.-S. Pyun, A. Amanov, Sun Moon University, Asan-Si, Korea (Republic)

#### PVP2017-66254: MECHANICAL PROPERTIES OF DEALLOYED ALUMINUM BRONZE LARGE-BORE CASTINGS IN ESSENTIAL COOLING WATER SERVICE

R. C. Cipolla, Intertek AIM, Santa Clara, CA, USA; M. Garner, A. J. Aldridge, South Texas Project, Wadsworth, TX, USA

## SESSION 4.1L (SE-5-1)

Thursday, July 20, 8:30 am – 10:15 am, Kona 3

### SEISMIC DAMAGE ASSESSMENT AND HEALTH MONITORING

Developed by: F. Paolacci, University Roma Tre, Rome, Italy

Chair: F. Paolacci, University Roma Tre, Rome, Italy

Co-Chair: P. Franchin, Sapienza University of Rome, Rome, Italy

#### PVP2017-65138: UNIVARIATE FRAGILITY MODELS FOR SEISMIC VULNERABILITY ASSESSMENT OF REFINERY PIPING SYSTEMS

S. Caprinuzzi, A. M. Mohiuddin, F. Paolacci, University Roma Tre, Rome, Italy, O. S. Bursi, V. La Salandra, University of Trento, Trento, Italy

#### PVP2017-65170: STATE OF THE ART OF SEISMIC FRAGILITY OF GAS PIPELINES

L. Di Sarno, University of Sannio, Benevento, Italy, F. Paolacci, University Roma Tre, Rome, Italy

#### PVP2017-65273: LOW-DAMAGE DESIGN PHILOSOPHY FOR FUTURE EARTHQUAKE-RESISTANT STRUCTURES

N. Chow, The University of Auckland, Auckland, New Zealand

#### PVP2017-65447: STRUCTURAL HEALTH MONITORING FOR LOCAL DAMAGES OF RC WALLS USING PIEZOCERAMIC-BASED SENSORS UNDER SEISMIC LOADING

W.-I. Liao, National Taipei University of Technology, Taipei, Taiwan; W.-J. Jean, National Center for Research on Earthquake Engineering, Taipei, Taiwan

#### PVP2017-65665: ELASTO-PLASTIC FINITE ELEMENT ANALYSIS OF LONG-LIVED SEISMIC TIES FOR THERMAL POWER BOILER STRUCTURE

K. Aida, S. Morikawa, Mitsubishi Hitachi Power Systems, Ltd., Kure-shi, Japan; M. Shimono, Mitsubishi Heavy Industries, Ltd., Hiroshima-shi, Japan; M. Kato, Mitsubishi Heavy Industries, Ltd., Takasago City, Japan; K. Morishita, Mitsubishi Heavy Industries, Ltd., Nagoya City, Japan

#### PVP2017-65927: AN ALGORITHM FOR PARAMETER IDENTIFICATIONS OF ACTIVE MASS DAMPER AND PRIMARY SYSTEMS BASED ON ACCELERATION MEASUREMENTS

C.-C. Chang, National Center for Research on Earthquake Engineering, Taipei, Taiwan; J.-F. Wang, National United University, Miaoli, Taiwan; C.-C. Lin, National Chung-hsing University, Taichang, Taiwan

## SESSION 4.1M (MF-21-3)

Thursday, July 20, 8:30 am – 10:15 am, Waikoloa Suite 1

### WELDING AND JOINING TECHNIQUES

Developed by: C. Hamelin, ANSTO, Kirrawee, DC, NSW, Australia; A. Horn, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom

Chair: C. Hamelin, ANSTO, Kirrawee, DC, NSW, Australia

Co-Chair: A. Horn, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom

#### PVP2017-65376: NEW APPROACH ON SOLID-STATE JOINING OF STAINLESS STEEL TUBE TO TUBE SHEET JOINTS

A. Roos, M. Winkler, Helmholtz-Zentrum Geesthacht, Geesthacht, Germany; G. Wimmer, Linde AG, Tacherting, Germany; J. Dos Santos, S. Hanke, Helmholtz-Zentrum Geesthacht, Geesthacht, Germany

#### PVP2017-65543: CONTROL OF RETAINED DELTA FERRITE IN TYPE 410 STAINLESS STEEL WELDS

D. Stone, B. Alexandrov, The Ohio State University, Columbus, OH, USA; J. Penso, Shell Projects and Technology, Houston, TX, USA

#### PVP2017-65599: DEVELOPMENT OF MANUFACTURING TECHNOLOGIES FOR THE ITER TOROIDAL FIELD COIL -EFFORT FOR PRECISE MANUFACTURING

Y. Nishijima, D. Hara, Mitsubishi Heavy Industries, Kobe, Japan; M. Toyoda, K. Kamitani, S. Tsubota, Mitsubishi Heavy Industries, Takasago, Japan; T. Baba, Mit-

subishi Heavy Industries, Kobe, Japan

**PVP2017-65793: HYBRID WELDING VS. CONVENTIONAL WELDING—A SOLUTION TO RESIDUAL STRESS AND DISTORTION MITIGATION?**

S. Gallee, R. Lacroix, Esi-France, Lyon, France; V. Robin, Electricité de France, Chatou, France; F. Gommez, E. Jourden, AREVA NP, LYON, France

**SESSION 4.1N (DA-7-1)**

*Thursday, July 20, 8:30 am – 10:15 am, Waikoloa Suite 2*

**THERMAL STRESSES AND ELEVATED TEMPERATURE DESIGN—I**

Developed by: A. Segall, Penn State University, University Park, PA, USA; S. Iyer, Candu Energy, Mississauga, ON, Canada

Chair: A. Segall, Penn State University, University Park, PA, USA

Co-Chair: S. Iyer, Candu Energy, Mississauga, ON, Canada

**PVP2017-65211: USING ISOCHRONOUS METHOD TO CALCULATE CREEP DAMAGE—PART 1**

C. Nadarajah, Becht Engineering Co. Inc., Fairfax, VA, USA; B. Hantz IV, Valero Energy Corp., San Antonio, TX, USA; S. Krishnamurthy, Honeywell UOP, Des Plaines, IL, USA

**PVP2017-65212: USING ISOCHRONOUS METHOD TO CALCULATE CREEP DAMAGE IN PRESSURE VESSEL COMPONENT—PART 2**

C. Nadarajah, Becht Engineering Co. Inc., Fairfax, VA, USA; B. Hantz IV, Valero Energy Corp., San Antonio, TX, USA; S. Krishnamurthy, Honeywell UOP, Des Plaines, IL, USA

**PVP2017-65851: CREEP-FATIGUE DAMAGE EVALUATION OF MODIFIED GRADE 91 HEADERS USING DAMAGE COUPLED UNIFIED VISCOPLASTIC MODEL**

N. Islam, North Carolina State University, Raleigh, NC, USA; D. Dewees, M. Cooch, Babcock and Wilcox, Barberton, OH, USA; T. Hassan, North Carolina State University, Raleigh, NC, USA

**PVP2017-65437: NUMERICAL SIMULATION OF THE CREEP FAILURE OF A STEAM REFORMER OUTLET MANIFOLD**

G. Van Zyl, SABIC, Jubail, Saudi Arabia; J. Keltjens, SABIC, Geleen, Netherlands, A. Al-Shawaf, SABIC, Jubail, Saudi Arabia

**SESSION 4.1O (DA-15-1)**

*Thursday, July 20, 8:30 am – 10:15 am, Waikoloa Suite 3*

**EVALUATION AND COUNTERMEASURE FOR DBDE—I**

Developed by: B. Li, AMEC Foster Wheeler, Toronto, ON, Canada; N. Kasahara, University of Tokyo, Tokyo, Japan

Chair: B. Li, AMEC Foster Wheeler, Toronto, ON, Canada

Co-Chair: N. Kasahara, University of Tokyo, Tokyo, Japan

**PVP2017-65227: FAILURE MODE OF ED AND AD TYPE HEAD PLATES SUBJECT TO CONVEX SIDE PRESSURE**

H. Yada, M. Ando, K. Tsukimori, Japan Atomic Energy Agency, Fukui-Ken, Japan; M. Ichimiya, Y. Anoda, Fukui University, Fukui, Japan

**PVP2017-65289: STATISTICAL ANALYSES OF INCIDENTS ON OIL AND GAS PIPELINES BASED ON COMPARING DIFFERENT PIPELINE INCIDENT DATA-BASES**

K. Shan, J. Shuai, China University of Petroleum-Beijing, Beijing, China

**PVP2017-65344: SAFETY ANALYSES FOR PREVENTING PCV DAMAGE BY FCI IN KASHIWAZAKI-KARIWA 6,7**

A. Hayakawa, S. Suehiro, S. Mizuno, Y. Oyama, S. Kawamura, Tokyo Electric Power Company Holdings, Inc., Chiyoda-ku, Tokyo, Japan

**PVP2017-65676: FRACTURE BEHAVIOR OF AGED CF8A CAST AUSTENITE STAINLESS STEEL UNDER DYNAMIC AND CYCLIC LOADING CONDITIONS**

J. W. Kim, M. R. Choi, Chosun University, Gwangju, Korea (Republic); Y.-J. Kim, Korea University, Seoul, Korea (Republic)

**PVP2017-65478: DIFFERENCE OF STRENGTH EVALUATION APPROACH BETWEEN FOR DBE AND FOR DBDE**

N. Kasahara, T. Sato, The University of Tokyo, Tokyo, Japan

**SESSION 4.1Q (EPRI-1-1)**

*Thursday, July 20, 8:30 am – 10:15 am, Kohala 4*

**SESSION 1—KEYNOTE PRESENTATIONS**

Developed by: J. Parker, Electric Power Research Institute, Charlotte, NC, USA; E. Benton, Electric Power Research Institute, Charlotte, NC, USA

Chair: J. Parker, Electric Power Research Institute, Charlotte, NC, USA

Co-Chair: S. Zamrik, Penn State, State College, PA, USA

*Panelists:*

P. Mayr, Chemnitz University of Technology, Chemnitz, Germany

J. Henry, Kiefner, Columbus, OH, USA

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**Block 4.2: Thursday, July 20, 2017 (10:30 am – 12:15 pm)**

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**SESSION 4.2A (DA-1-2)**

*Thursday, July 20, 10:30 am – 12:15 pm, Kohala 1*

**ADDITIONAL CONSIDERATIONS FOR THE DESIGN AND ANALYSIS OF PRESSURE VESSELS**

Developed by: N. Barkley, Contract Fabricators, Inc., Holly Springs, MS, USA

Chair: N. Barkley, Contract Fabricators, Inc., Holly Springs, MS, USA

Co-Chair: J. Taagepera, Chevron ETC, Richmond, CA, USA

**PVP2017-65176: A SIMPLE ANALYTICAL METHOD TO PREDICT AXIAL BUCKLING CRITICAL LOAD OF WELDED CYLINDRICAL SHELLS**

C. Yu, Z. Ren, Xi'an Jiaotong University, Xi'an, China

**PVP2017-65220: A METHOD FOR STRESS ANALYSIS OF CYLINDERS WITH LOADINGS FROM ATTACHED RECTANGULAR SECTIONS WITH AN ASPECT RATIO GREATER THAN FOUR**

B. Millet, K. Kirkpatrick, G. Miller, B. Mosher, Fluor Enterprises, Inc., Sugar Land, TX, USA

**PVP2017-65786: A COMPARISON STUDY OF PIPING LOADS EFFECT ON SUPPORT/FOUNDATION FOR ELASTIC AND RIGID VERTICAL VESSELS**

M. Diaz-Barrie, E. Szeto, R. Stefanovic, R. Chahal, Fluor Canada, Calgary, AB, Canada

**PVP2017-65246: DYNAMIC MATERIAL TEST AND ANALYSIS FOR RUPTURE STUDY FOR PRESSURE VESSEL EXPOSED TO FIRE IN PLANT**

T. Kawai, Y. Mitarai, Y. Waki, Chiyoda Corporation, Yokohama, Japan; K. Kimura, Y. Yamabe-Mitarai, National Institute for Materials Science, Tsukuba, Ibaraki, Japan

**SESSION 4.2B (FSI-2-12)**

*Thursday, July 20, 10:30 am – 12:15 pm, Kohala 2*

**PIPING & ACOUSTICS—III**

**Symposium of Flow-Induced Vibration—Sponsored by Fluid-Structure Interaction Technical Committee**

Developed by: H. Goyder, Cranfield University, Swindon, United Kingdom; P. Moussou, IMSIA, Palaiseau, France

Chair: K. Fujita, Osaka City University, Osaka, Japan

Co-Chair: R. Morita, Central Research Institute of Electric Power Industry, Kanagawa, Japan

**PVP2017-65545: TURBULENT STRUCTURE STUDY ON FLOW INDUCED VIBRATION IN TEE JUNCTION PIPE**

T. Ishigami, M. Nishiguchi, M. Maekawa, H. Izuchi, Chiyoda Corporation, Yokohama-shi, Kanagawa-ken, Japan

**PVP2017-65767: CHARACTERIZATION OF FLOW-SOUND-STRUCTURE COUPLING IN SPRING-LOADED VALVES**

S. El Bouzidi, McMaster University, Hamilton, ON, Canada; M. Hassan, University of Guelph, Guelph, ON, Canada; S. Ziada, McMaster University, Hamilton, ON, Canada

**PVP2017-65929: STUDY ON THE MECHANISM OF FATIGUE FAILURE AT BRANCH CONNECTIONS CAUSED BY SHELL-MODE VIBRATION**

S. Kataoka, JGC Corporation, Yokohama, Japan

**PVP2017-66265: DEVELOPMENT OF PIPING DYNAMIC ANALYSIS TO ADDRESS PULSATION VIBRATION AND ACCEPTANCE CRITERIA**

M. A. El Ella, A. Papadopoulos, Power Generation Engineering and Services Company, Cairo, Egypt

**SESSION 4.2C (CS-14-1)**

*Thursday, July 20, 10:30 am – 12:15 pm, Kohala 3*

**REPAIR, REPLACEMENT AND MITIGATION FOR FITNESS-FOR-SERVICE RULES—I**

Developed by: S. McCracken, Electric Power Research Institute, Harrisburg, NC, USA

Chair: S. McCracken, Electric Power Research Institute, Harrisburg, NC, USA

Co-Chair: J. O'Sullivan, Procon 1, LLC, Fort Myers Beach, FL, USA; H. Kobayashi, The Japan Atomic Company, Tokyo, Japan

**PVP2017-65942: ADVANCES IN NUCLEAR NON-METALLIC REPAIR/REPLACEMENT ACTIVITIES**

J. O'Sullivan, Procon 1, LLC, Fort Myers Beach, FL, USA

**PVP2017-66017: UNDERWATER LASER PEENING APPLICATION FOR U.S. NUCLEAR PLANT**

A. Ito, Toshiba, Yokohama, Japan; S. Marlette, Westinghouse Electric Company, Cranberry Township, PA, USA; M. Yoda, K. Imasaki, I. Chida, Toshiba, Yokohama, Japan

**PVP2017-66164: WJP APPLICABILITY STUDY FOR PWR COMPONENTS AS A PWSCC MITIGATION TECHNIQUE**

R. Kimura, Hitachi-GE Nuclear Energy, Ltd., Hitachi, Japan; N. Saito, H. Hato, Hitachi, Ltd., Hitachi-shi, Ibaraki-ken, Japan; A. Kanno, M. Ando, Hitachi-GE Nuclear Energy, Ltd., Hitachi-shi, Ibaraki-ken, Japan

**PVP2017-65659: REPAIR WELDING OF IRRADIATED REACTOR PRESSURE VESSELS STEEL AND CURRENT DIRECTION OF REVISING JSME RULES ON FITNESS-FOR-SERVICE CODE**

Y. Kono, Mitsubishi Heavy Industries, Ltd., Kobe, Japan; H. Adachi, Toshiba, Yokohama, Japan; R. Kimura, Hitachi-GE Nuclear Energy, Ltd., Hitachi, Japan

**SESSION 4.2D (MF-6-1)**

*Thursday, July 20, 10:30 am – 12:15 pm, King's 1*

**FITNESS FOR SERVICE AND FAILURE ASSESSMENT—I**

**Symposium on Fitness-for-Service—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: M. Cohn, Intertek, Santa Clara, CA, USA; C. Jaske, HSI Group, Inc., Torrance, CA, USA; B. Wiersma, Savannah River National Laboratory, Aiken, SC, USA

Chair: M. Cohn, Intertek, Santa Clara, CA, USA

Co-Chair: C. Jaske, HSI Group, Inc., Torrance, CA, USA

**PVP2017-65977: ESSENTIAL ELEMENTS OF AN ASSET INTEGRITY MANAGEMENT PROGRAM FOR AMMONIA AND METHANOL PLANTS**

C. Jaske, HSI Group, Inc., Torrance, CA, USA; S. Weichel, M. Brongers, DNV GL, Dublin, OH, USA

**PVP2017-65820: REGULATORY PERSPECTIVES ON FITNESS FOR SERVICE ASSESSMENTS OF CANDU PRESSURE BOUNDARY COMPONENTS**

J. C. Jin, B. Carroll, Canadian Nuclear Safety Commission, Ottawa, ON, Canada

**PVP2017-65361: CORRELATION OF FRACTURE TOUGHNESS WITH CHARPY IMPACT ENERGY FOR LOW ALLOW, STRUCTURAL STEEL WELDS**

K. E. Bianchi, Federal University of Rio Grande, Rio Grande, Brazil; V. S. Barbosa, R. G. Savioli, University of Sao Paulo, Sao Paulo, SP, Brazil; P. E. A. Fernandes, National Service for Industrial Training, Osasco, Brazil; C. Ruggieri, University of Sao Paulo, Sao Paulo, Sao Paulo, Brazil

**SESSION 4.2E (OAC-1-4)**

*Thursday, July 20, 10:30 am – 12:15 pm, King's 2*

**REGULATORY VIEWS ON THE USE OF PROBABILISTIC FRACTURE MECHANICS ASSESSMENTS IN THE NUCLEAR INDUSTRY**

**Symposium on Probabilistic Assessments and Risk Management—Co-Sponsored by Codes & Standards, Materials & Fabrication and Operations, Applications & Components Technical Committees**

Developed by: B. Carroll, Canadian Nuclear Safety Commission, Ottawa, ON, Canada; A. Reich, Streamline Automation LLC, Huntsville, AL, USA

Chair: B. Carroll, Canadian Nuclear Safety Commission, Ottawa, ON, Canada

Co-Chair: A. Reich, Streamline Automation LLC, Huntsville, AL, USA

**Panelists:**

D. Rudland, U.S. Nuclear Regulatory Commission, Frederick, MD, USA

J. Jin, Canadian Nuclear Safety Commission, Ottawa, ON, Canada

S. M. Lee, Korea Institute of Nuclear Safety, Daejeon, Korea (Republic)

**SESSION 4.2F (CS-3-6)**

*Thursday, July 20, 10:30 am – 12:15 pm, King's 3*

**ENVIRONMENTAL FATIGUE ISSUES—VI**

**Symposium on Fatigue Issues—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: S. Asada, Mitsubishi Heavy Industries, Ltd., Kobe, Japan; C. Faidy, CF Integrity Engineering, Tassin, France; S. Mohanty, Argonne National Laboratory, Lemont, IL, USA; H. Mehta, GE Hitachi Nuclear Engineering, San Jose, CA, USA

Chair: H. Mehta, GE Hitachi Nuclear Engineering, San Jose, CA, USA

Co-Chair: S. Asada, Mitsubishi Heavy Industries, Ltd., Kobe, Japan

**PVP2017-65787: EFFECT OF HOLD PERIODS ON THE CORROSION FATIGUE CRACK GROWTH RATES OF AUSTENITIC STAINLESS STEELS IN LWR COOLANT ENVIRONMENTS**

N. Platts, D. R. Tice, A. Panteli, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom; S. Cruchley, Rolls-Royce, Derby, United Kingdom

**PVP2017-65645: FURTHER VALIDATION OF THE WEIGHTED STRESS INTENSITY FACTOR RATE (WKR) METHOD FOR STAINLESS STEEL PRESURISED WATER REACTOR FATIGUE CRACK GROWTH CALCULATIONS**

J. Emslie, S. Cruchley, C. Currie, K. Wright, Rolls-Royce, Derby, United Kingdom

**PVP2017-66029: EFFECT OF VARIABLE TEMPERATURE ON THE FATIGUE LIFE AND CRACK GROWTH RATES OF AUSTENITIC STAINLESS STEELS IN PWR COOLANT ENVIRONMENTS**

N. Platts, P. J. Gill, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom; S. Cruchley, E. Grieveson, M. Twite, Rolls-Royce, Derby, United Kingdom

**PVP2017-66233: STUDY ON EFFECTS OF NON-ISOTHERMAL CONDITION ON ENVIRONMENTALLY ASSISTED FATIGUE IN PWR PRIMARY WATER ENVIRONMENT (STEP II)**

S. Asada, Mitsubishi Heavy Industries, Ltd., Kobe, Japan; D. Takagoshi, Y. Fukuta, Mitsubishi Heavy Industries, Ltd., Takasago, Japan; K. Tsutsumi, Mitsubishi Heavy Industries, Ltd., Kobe, Japan; K. Ahluwalia, Electric Power Research Institute, Livingston, NJ, USA

**SESSION 4.2G (MF-30-2)**

*Thursday, July 20, 10:30 am – 12:15 pm, Queen's 4*

**BRITTLE FRACTURE OF CARBON STEEL FITTINGS, FLANGES, AND PIPING—II**

Developed by: M. Brongers, DNV GL, Dublin, OH, USA; J. Penso, Shell Projects and Technology, Houston, TX, USA

Chair: M. Brongers, DNV GL, Dublin, OH, USA

Co-Chair: J. Penso, Shell Projects and Technology, Houston, TX, USA

**PVP2017-66179: FLANGE QUALITY INVESTIGATION TO PREVENT BRITTLE FRACTURE**

S. Zhu, J. Bouman, D. Raghu, Shell Global Solutions US Inc., Houston, TX, USA

**PVP2017-65848: IMPACT TOUGHNESS AND BRITTLE FAILURE OF CARBON STEELS**

K. Xu, Praxair, Tonawanda, NY, USA; M. Rana, Consultant, Niantic, CT, USA

**PVP2017-65893: THE EFFECT OF RECLASSIFICATION OF CARBON STEEL FITTINGS DURING FITNESS-FOR-SERVICE ASSESSMENTS (Presentation Only)**

K. Subramanian, Stress Engineering Services Inc., Metairie, LA, USA; J. Penso, Shell Projects and Technology, Houston, TX, USA

**SESSION 4.2H (DA-10-5)**

*Thursday, July 20, 10:30 am – 12:15 pm, Queen's 5*

**INTERNATIONAL LIAISON AND PCC-1 APPENDIX A SESSION—II**

Developed by: C. Rodery, BP p.l.c., League City, TX, USA; W. Brown, Integrity Engineering Solutions, Dunsborough, WA, Australia

Chair: C. Rodery, BP p.l.c., League City, TX, USA

Co-Chair: W. Brown, Integrity Engineering Solutions, Dunsborough, WA, Australia

**Panelists:**

R. Noble, Asset55 Ltd., Hebburn, Tyne and Wear, United Kingdom

W. Brown, Integrity Engineering Solutions, Dunsborough, WA, Australia

J. Barnard, Hydratight, Darlaston, United Kingdom



## SESSION 4.2I (CS-19-2)

Thursday, July 20, 10:30 am – 12:15 pm, Queen's 6

### INTEGRITY OF CAST STAINLESS STEEL PIPE—II

Developed by: K. Hojo, Mitsubishi Heavy Industries Ltd., Kobe, Japan  
Chair: K. Hojo, Mitsubishi Heavy Industries Ltd., Kobe, Japan  
Co-Chair: D. J. Shim, Structural Integrity Associates, San Jose, CA, USA

#### PVP2017-65612: COMPARISON OF PREDICTION MODELS FOR MECHANICAL PROPERTIES OF THERMALLY AGED CAST AUSTENITIC STAINLESS STEELS

T. Hirota, M. Ochi, Mitsubishi Heavy Industries Ltd., Takasago, Japan; K. Hojo, W. Nishi, Mitsubishi Heavy Industries Ltd., Kobe, Japan; S. Hayashi, Mitsubishi Heavy Industries, Ltd., Takasago-Shi, Japan

#### PVP2017-66100: TECHNICAL BASIS FOR FLAW ACCEPTANCE CRITERIA FOR CAST AUSTENITIC STAINLESS STEEL PIPING

D. J. Shim, N. Cofie, D. Dedhia, D. Harris, T. Griesbach, Structural Integrity Associates, Inc., San Jose, CA, USA

#### PVP2017-66111: FLAW EVALUATION PROCEDURE FOR CAST AUSTENITIC STAINLESS STEEL MATERIALS USING THERMAL AGING MODELS

M. Uddin, G. Wilkowski, S. Pothana, F. Brust, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA

## SESSION 4.2J (MF-33-1)

Thursday, July 20, 10:30 am – 12:15 pm, Kona 1

### 3D CRACK GROWTH SIMULATIONS USING FEA

Developed by: D. J. Shim, Structural Integrity Associates, San Jose, CA, USA;  
Y. Li, Japan Atomic Energy Agency, Ibaraki-Ken, Japan  
Chair: D. J. Shim, Structural Integrity Associates, San Jose, CA, USA  
Co-Chair: Y. Li, Japan Atomic Energy Agency, Ibaraki-Ken, Japan

#### PVP2017-65347: EVALUATION OF FATIGUE CRACK PROPAGATION BEHAVIOR CROSSING INTERFACE IN CLADDED PLATES USING XFEM

M. Nagai, Central Research Institute of Electric Power Industry, Yokosuka-Shi, Japan; K. Murai, T. Nagashima, Sophia University, Tokyo, Japan; N. Miura, Central Research Institute of Electric Power Industry, Yokosuka, Japan

#### PVP2017-66140: FRACTURE MECHANICS ASSESSMENT OF A DISSIMILAR METAL BUTT WELD CONTAINING RESIDUAL STRESS (Presentation Only)

M. N. Tran, M. R. Hill, University of California, Davis, Davis, CA, USA

#### PVP2017-65548: BENCHMARK ANALYSIS OF DUCTILE FRACTURE SIMULATION FOR CIRCUMFERENTIALLY CRACKED PIPES SUBJECTED TO BENDING

N. Miura, T. Kumagai, Central Research Institute of Electric Power Industry, Yokosuka-shi, Kanagawa-ken, Japan; M. Kikuchi, A. Takahashi, Tokyo University of Science, Noda-shi, Chiba-ken, Japan; Y.-J. Kim, Korea University, Seoul, Korea (Republic)

#### PVP2017-65691: MODE I DUCTILE CRACK GROWTH OF CT SPECIMEN UNDER LARGE CYCLIC LOADING

K. Hojo, Mitsubishi Heavy Industries Ltd., Kobe, Japan; S. Kawabata, Ryoyu System Gijutsu, Kobe, Japan

## SESSION 4.2K (MF-7-4)

Thursday, July 20, 10:30 am – 12:15 pm, Kona 2

### MATERIALS AND TECHNOLOGIES FOR NUCLEAR POWER PLANTS—IV

Developed by: W. Ren, Oak Ridge National Laboratory, Oak Ridge, TN, USA  
Chair: W. Ren, Oak Ridge National Laboratory, Oak Ridge, TN, USA  
Co-Chair: R. Nanstad, Oak Ridge National Laboratory, Oak Ridge, TN, USA

#### PVP2017-65522: EVALUATION AND EXTENSION OF ALLOWABLE STRESS VALUES FOR GR.91

K. Kimura, National Institute for Materials Science, Tsukuba, Ibaraki, Japan

#### PVP2017-65579: FRACTURE TOUGHNESS EVALUATION OF CARBON STEELS IN PIPING AND VALVE FOR REACTOR PRIMARY SYSTEM

Y. Uemoto, D. Hirasawa, A. Hirano, Hitachi-GE Nuclear Energy, Ltd., Hitachi-shi, Ibaraki-ken, Japan

#### PVP2017-65842: FATIGUE BEHAVIOR OF SPENT NUCLEAR FUEL RODS IN SIMULATED TRANSPORTATION ENVIRONMENT

H. Wang, J. Wang, H. Jiang, Oak Ridge National Laboratory, Oak Ridge, TN, USA

#### PVP2017-66033: DEVELOPMENT OF SECONDARY STRESS WEIGHTING FACTOR AND PLASTIC REDUCTION FACTOR FROM MOMENT-ROTATION

## CURVES OF SC PIPE TESTS

S. Pothana, G. Wilkowski, S. Kalyanam, Y. Hioe, G. Hattery, Engineering Mechanics Corporation of Columbus, Columbus, OH, USA

## SESSION 4.2L (SE-6-1)

Thursday, July 20, 10:30 am – 12:15 pm, Kona 3

### SEISMIC ANALYSIS AND DESIGN OF PIPING SYSTEMS—I

Developed by: G. Slagis, G C Slagis Associates, Roseville, CA, USA; T. Hassan, North Carolina State University, Raleigh, NC, USA

Chair: G. Slagis, G C Slagis Associates, Roseville, CA, USA

Co-Chair: T. Hassan, North Carolina State University, Raleigh, NC, USA

#### PVP2017-65516: THE OECD-NEA PROGRAMME ON METALLIC COMPONENT MARGINS UNDER HIGH SEISMIC LOADS (MECOS): TOWARDS NEW CRITERIA

P. Sollogoub, PSConsultant, Clamart, France

#### PVP2017-65300: ON CATEGORIZATION OF SEISMIC LOAD AS PRIMARY OR SECONDARY

P. Labbé, EDF, Paris, France

#### PVP2017-65099: LOAD CLASSIFICATION FOR DYNAMIC RESPONSES ON SINGLE MASS CANTILEVER STRUCTURE WITH BI-LINEAR MATERIAL PROPERTY

S. Kai, A. Otani, IHI Corporation, Yokohama, Japan

## SESSION 4.2M (MF-21-4)

Thursday, July 20, 10:30 am – 12:15 pm, Waikoloa Suite 1

### STAINLESS STEELS AND NI-BASE ALLOYS

Developed by: C. San Marchi, Sandia National Laboratories, Livermore, CA, USA; A. Duncan, Savannah River National Laboratory, Aiken, SC, USA

Chair: C. San Marchi, Sandia National Laboratories, Livermore, CA, USA

Co-Chair: A. Duncan, Savannah River National Laboratory, Aiken, SC, USA

#### PVP2017-65106: EFFECTS OF CHATTERING ON SURFACE INTEGRITY IN ROBOTIC MILLING OF ALLOY 690

A. Maurotto, L. T. Tunc, The University of Sheffield, Catcliffe, United Kingdom

#### PVP2017-65536: DEVELOPMENT OF FIT-FOR-PURPOSE AUSTENITIC STAINLESS STEELS (347AP AND 317AP) WITH HIGH POLYTHIONIC ACID STRESS CORROSION RESISTANCE

T. Osuki, M. Seto, H. Okada, M. Sagara, S. Matsumoto, Nippon Steel & Sumitomo Metal Corporation, Amagasaki, Japan

#### PVP2017-65806: DEVELOPMENT OF PROCESS INDUCED RESIDUAL STRESS DURING FLOW FORMING OF TUBULAR 15-5 MARTENSITIC STAINLESS STEEL

S. Khayatzaheh, S. Rahimi, S. R. Moturu, Advanced Forming Research Centre, Glasgow, United Kingdom; J. Kelleher, ISIS Pulsed Neutron & Muon Source, Didcot, United Kingdom

#### PVP2017-65971: MODIFIED GTAW ORBITAL TUBE-TO-TUBESHEET WELDING TECHNIQUE, AND THE EFFECT OF A COPPER WELD RETAINER DURING WELDING OF ALLOY 825

A. Krustev, Kelvion Thermal Solutions, Germiston, South Africa; B. Alexandrov, J. Kovacich, The Ohio State University, Columbus, OH, USA

## SESSION 4.2N (DA-7-2)

Thursday, July 20, 10:30 am – 12:15 pm, Waikoloa Suite 2

### THERMAL STRESSES AND ELEVATED TEMPERATURE DESIGN—II

Developed by: S. Iyer, Candu Energy, Mississauga, ON, Canada; A. Segall, Penn State University, University Park, PA, USA

Chair: S. Iyer, Candu Energy, Mississauga, ON, Canada

Co-Chair: A. Segall, Penn State University, University Park, PA, USA

#### PVP2017-65923: CREEP LIFE PREDICTION OF HR3C STEEL USING CREEP DAMAGE MODELS

H. Lee, S.-J. Kang, J. B. Choi, M. Kim, Sungkyunkwan University, Kyungi-do, Korea (Republic)

#### PVP2017-66267: THERMAL-PRESSURE COUPLING ANALYSIS FOR CHROMIUM COATED GUN BARREL DURING AUTOMATIC FIRING PROCESS

G. Xuehao, Z. Kedong, H. Lei, Nanjing University of Science and Technology, Nanjing, China

## SESSION 4.20 (DA-15-2)

Thursday, July 20, 10:30 am – 12:15 pm, Waikoloa Suite 3

### EVALUATION AND COUNTERMEASURE FOR BDBE—II

Developed by: N. Kasahara, University of Tokyo, Tokyo, Japan; B. Li, AMEC Foster Wheeler, Toronto, ON, Canada

Chair: N. Kasahara, University of Tokyo, Tokyo, Japan

Co-Chair: T. Yamazaki, Japan Nuclear Safety Institute, Tokyo, Japan

#### PVP2017-65666: THE FORMULATION OF MATERIAL CHARACTERISTICS OF AUSTENITIC STAINLESS STEELS AT EXTREMELY HIGH TEMPERATURE

K. Shimomura, T. Onizawa, S. Kato, M. Ando, T. Wakai, Japan Atomic Energy Agency, Ibaraki, Japan

#### PVP2017-66214: INVESTIGATION ON EFFECT OF ANALYSIS VARIABLES ON STRUCTURAL INTEGRITY OF THE NUCLEAR PIPING UNDER BEYOND DESIGN BASIS EARTHQUAKE

J. Kim, S.-H. Lee, Sejong University, Seoul, Korea (Republic); H. D. Kweon, Korea Hydro & Nuclear Power Co., Ltd., Daejeon, Korea (Republic)

#### PVP2017-65226: EXPERIMENTAL DEMONSTRATION OF FAILURE MODES ON BELLOWS STRUCTURES SUBJECT TO INTERNAL PRESSURE

M. Ando, H. Yada, K. Tsukimori, Japan Atomic Energy Agency, Fukui-Ken, Japan; M. Ichimiya, Y. Anoda, Fukui University, Fukui, Japan

#### PVP2017-66283: CANDU NUCLEAR POWER PLANT MITIGATING STRATEGIES ON BEYOND DESIGN BASIS EVENTS (BDBE) (Presentation Only)

B. Li, AMEC Foster Wheeler, Toronto, ON, Canada

## SESSION 4.2Q (EPRI-1-2)

Thursday, July 20, 10:30 am – 12:15 pm, Kohala 4

### SESSION 2—DESIGN AND FABRICATION

Developed by: J. Parker, Electric Power Research Institute, Charlotte, NC, USA; E. Benton, Electric Power Research Institute, Charlotte, NC, USA

Chair: I. Perrin, Structural Integrity Associates, Huntersville, NC, USA

Co-Chair: V. Vodářík, VSB - Technical University of Ostrava, Ostrava - Poruba, Czech Republic

#### Panelists:

I. Perrin, Structural Integrity Associates, Inc., Huntersville, NC, USA

T. Fukahori

A. Pfeffer, GE

D. Bruno, GE

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### Block 4.3: Thursday, July 20, 2017 (2:00 pm – 3:45 pm)

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## SESSION 4.3A (DA-1-3)

Thursday, July 20, 2:00 pm – 3:45 pm, Kohala 1

### OPTIMIZATION AND BENCH-MARKING IN THE DESIGN AND ANALYSIS OF PRESSURE VESSELS AND HEAT EXCHANGERS

Developed by: N. Barkley, Contract Fabricators, Inc., Holly Springs, MS, USA

Chair: S. Metwalli, Cairo University, Cairo, Egypt

Co-Chair: B. Gao, Hebei University of Technology, Tianjin, China

#### PVP2017-65120: STATISTICAL APPROACH TO ESTABLISHING TUNED SIMULATION PARAMETERS

G. Westwater, J. A. Mann, III, J. R. Speichinger, Emerson, Marshalltown, IA, USA

#### PVP2017-65287: APPLICATION OF SUB-MODELING IN THE FINITE ELEMENT ANALYSIS OF A LARGE FIXED TUBE-SHEET HEAT EXCHANGER

B. Gao, B. Liu, J. Dong, Hebei University of Technology, Tianjin, China; J. Shi, Amec Foster Wheeler, Gloucester, United Kingdom

#### PVP2017-65469: AN OPTIMIZATION FRAMEWORK FOR CURVILINEARLY STIFFENED COMPOSITE PRESSURE VESSELS AND PIPES

K. Singh, W. Zhao, R. Kapania, Virginia Tech, Blacksburg, VA, USA

#### PVP2017-65538: OPTIMUM DESIGN OF PRESSURE VESSELS USING HYBRID HGP AND GENETIC ALGORITHM

K. Abdelaziz, S. Metwalli, Cairo University, Cairo, Egypt

## SESSION 4.3C (CS-14-2)

Thursday, July 20, 2:00 pm – 3:45 pm, Kohala 3

### REPAIR, REPLACEMENT AND MITIGATION FOR FITNESS-FOR-SERVICE

## RULES—II

Developed by: S. McCracken, Electric Power Research Institute, Harrisburg, NC, USA

Chair: S. McCracken, Electric Power Research Institute, Harrisburg, NC, USA

Co-Chair: J. O'Sullivan, Procon 1, LLC, Fort Myers Beach, FL, USA; H. Kobayashi, The Japan Atomic Company, Tokyo, Japan

#### PVP2017-65139: DEVELOPMENT OF LASER PEENING TECHNOLOGY FOR MITIGATION OF TENSILE RESIDUAL STRESS IN NUCLEAR REACTOR DMWS (Presentation Only)

W. G. Yi, K. S. Park, S. Cho, G. B. Ko, Doosan Heavy Industries & Construction, C. Won, Korea (Republic)

#### PVP2017-65427: REPAIR EFFECTIVENESS OF EPOXY STEEL SLEEVE ON PIPELINES GIRTH WELD CRACKS BY EXPERIMENTAL INVESTIGATION (Presentation Only)

Z. Cheng, B. Liu, SWJTU, Chengdu, China; Y. Zhang, Deyuan, Chengdu, China; M. Li, SWJTU, Chengdu, China

#### PVP2017-66065: TECHNICAL BASIS FOR CODE CASE N-865—PAD REINFORCEMENT REPAIR OF ASME CLASS 2 AND 3 ATMOSPHERIC STORAGE TANKS (Presentation Only)

E. Gerlach, Gerlach Engineering, LLC, Berwick, PA, USA; S. McCracken, Electric Power Research Institute, Harrisburg, NC, USA

#### PVP2017-66144: DEVELOPMENT OF SWPS FOR NUCLEAR POWER PLANTS (Presentation Only)

J. Jang, Korea Electric Association, Seoul, NA, Korea (Republic)

## SESSION 4.3D (MF-6-2)

Thursday, July 20, 2:00 pm – 3:45 pm, King's 1

### FITNESS FOR SERVICE AND FAILURE ASSESSMENT—II

#### Symposium on Fitness-for-Service—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees

Developed by: C. Jaske, HSI Group, Inc., Torrance, CA, USA; M. Cohn, Intertek, Santa Clara, CA, USA; B. Wiersma, Savannah River National Laboratory, Aiken, SC, USA

Chair: C. Jaske, HSI Group, Inc., Torrance, CA, USA

Co-Chair: M. Cohn, Intertek, Santa Clara, CA, USA

#### PVP2017-65113: DEFICIENT MATERIALS IN HOT REHEAT HIGH ENERGY PIPING

K. Coleman, S. Rosinski, Electric Power Research Institute, Charlotte, NC, USA; J. Foulds, Clarus Consulting, Llc, Charlotte, NC, USA

#### PVP2017-66022: RISK BASED INSPECTION METHODOLOGY FOR COMPONENTS SUBJECT TO HIGH-TEMPERATURE CREEP

C. Jaske, HSI Group, Inc., Torrance, CA, USA; P. Topalis, DNV GL, London, United Kingdom; S. L. Wong, DNV GL, Kuala Lumpur, Malaysia; A. S. M. Sidek, DNV GL, Singapore, Singapore

#### PVP2017-65815: AN ENHANCED CREEP LIFE EVALUATION METHODOLOGY FOR GRADE P91 CIRCUMFERENTIAL WELDMENTS

M. Cohn, Intertek, Santa Clara, CA, USA

#### PVP2017-65834: FITNESS-FOR-SERVICE CREEP LIFE EVALUATION OF A HOT REHEAT PIPING SYSTEM AT 400,000 OPERATING HOURS

M. Cohn, Intertek, Santa Clara, CA, USA

## SESSION 4.3E (CS-41-1)

Thursday, July 20, 2:00 pm – 3:45 pm, King's 2

### UPDATES TO THE 2017 EDITION OF THE ASME BOILER AND PRESSURE VESSEL CODE—PART I

#### Symposium on Recent Developments in International Codes and Standards—Sponsored by Codes & Standards Technical Committee

Developed by: R. Barnes, Anric Enterprises Inc., Etobicoke, ON, Canada

Chair: Richard Barnes, Anric Enterprises Inc., Etobicoke, ON, Canada

Co-Chair: T.-L. Sham, Argonne National Laboratory, Lemont, IL, USA

#### Panelists:

R. Hill, Hill Engineering Solutions LLC, Las Vegas, NV, USA

R. Barnes, Anric Enterprises Inc., Etobicoke, ON, Canada

J. Hall, Tannersville, PA, USA

W. Hembree, TVA, Signal Mountain, TN, USA

C. Rodery, BP p.l.c, Webster, TX, USA

### SESSION 4.3F (DA-3-1)

Thursday, July 20, 2:00 pm – 3:45 pm, King's 3

#### FATIGUE I—MEMORIAL SESSION FOR FERNAND ELLYIN

Symposium on Fatigue Issues—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees

Developed by: L. de Baglioni, AREVA, Paris La Défense, Ile-de-France, France  
Chair: L. de Baglioni, AREVA, Paris La Défense, Ile-de-France, France  
Co-Chair: D. Steining, Electric Power Research Institute, Palo Alto, CA, USA

#### PVP2017-65386: THERMAL FATIGUE CRACK PROPAGATION IN LARGE SCALE YIELDING (LSY) CONDITIONS: PACIFIC EXPERIMENT ON A 316L QUASI-STRUCTURE

G. Leopold, EDF, Moret-sur-Loing, France; F. Curtit, EDF, Ecuelles, France; S. Courtin, AREVA, La Defense, Ile-de-France, France

#### PVP2017-65711: CONTINUITY OF ENVIRONMENTALLY ASSISTED FATIGUE AND STRESS CORROSION CRACKING BASED ON SHORT CRACK GROWTH BEHAVIOR OF 316 STAINLESS STEEL IN SIMULATED PWR PRIMARY WATER

C. Shim, Y. Takeda, T. Shoji, Tohoku University, Sendai, Miyagi-Ken, Japan  
PVP2017-65995: COMPONENT TESTING PROPOSAL TO QUANTIFY THE SAFETY MARGINS IN EXISTING EAF RULES

D. Steining, Electric Power Research Institute, Palo Alto, CA, USA; T. Metais, EDF, Villeurbanne, France; K. Wright, M. Twite, A. Morley, Rolls-Royce Plc, Derby, United Kingdom; G. Leopold, EDF, Moret-sur-Loing, France

#### PVP2017-65336: VALIDATION OF THE NEW POST-RCCM OPTION FROM CODE ASTER THROUGH BENCHMARK COMPARISONS WITH OTHER INDUSTRIAL CODES

T. Metais, EDF, Villeurbanne, France; S. Plessis, EDF Lab Paris-Saclay, Palaiseau, Ile-de-France, France; J. Miralles, ATR Engineering, Villeurbanne, Rhône-Alpes, France

### SESSION 4.3G (CS-9-2)

Thursday, July 20, 2:00 pm – 3:45 pm, Queen's 4

#### ASME SECTION XI CODE ACTIVITIES

Developed by: R. C. Cipolla, Intertek AIM, Santa Clara, CA, USA; F. Iwamatsu, Hitachi, Ltd., Ibaraki, Japan

Chair: R. C. Cipolla, Intertek AIM, Santa Clara, CA, USA

Co-Chair: F. Iwamatsu, Hitachi, Ltd., Ibaraki, Japan

#### PVP2017-65058: TECHNICAL BASIS FOR ASME CODE SECTION XI NON-MANDATORY APPENDIX C UPDATE

C. Guzman-Leong, LPI, Inc., Richland, WA, USA; A. Udyawar, Westinghouse Electric Company, Cranberry Township, PA, USA

#### PVP2017-66150: SOLUTION OF A SAMPLE PROBLEM RELATED TO REVISION 1 OF CODE CASE N-830

M. Kirk, Nuclear Regulatory Commission, Rockville, MD, USA; S. Xu, Kinectrics Inc., Toronto, ON, Canada; C. Liu, Kinectrics Inc., Toronto, ON, Canada; M. A. Erickson, Phoenix Engineering Associates, Inc., Claremont, NH, USA; Y. Kim, GE Hitachi Nuclear Energy, Wilmington, NC, USA

#### PVP2017-66205: TECHNICAL BASIS OF FATIGUE CRACK GROWTH THRESHOLD FOR STAINLESS STEEL IN AIR ENVIRONMENT FOR ASME CODE SECTION XI

K. Hasegawa, Japan Atomic Energy Agency, Ibaraki-ken, Japan; S. Usami, Hitachi Ltd., Hitachi-shi, Japan

#### PVP2017-66169: FRACTURE TESTS OF FLAT PLATE AND PIPE WITH NON-ALIGNED MULTIPLE FLAWS

F. Iwamatsu, K. Miyazaki, Hitachi, Ltd., Ibaraki, Japan; K. Saito, Hitachi-GE Nuclear Energy, Hitachi, Ibaraki, Japan

### SESSION 4.3H (CS-25-1)

Thursday, July 20, 2:00 pm – 3:45 pm, Queen's 5

#### INTEGRITY OF REACTOR PRESSURE VESSELS AND INTERNALS FOR CODES

Developed by: K. Hojo, Mitsubishi Heavy Industries Ltd., Kobe, Japan; R. C. Cipolla, Intertek AIM, Santa Clara, CA, USA

Chair: K. Hojo, Mitsubishi Heavy Industries Ltd., Kobe, Japan

Co-Chair: R. C. Cipolla, Intertek AIM, Santa Clara, CA, USA

#### PVP2017-66054: STUDY ON QUANTITATIVE MODELS OF WPS EFFECT WITH THE USE OF EXPERIMENTS OF JAPANESE RPV STEELS (Presentation Only)

H. Takamizawa, T. Tobita, K. Iwata, Y. Yamaguchi, J. Katsuyama, Japan Atomic Energy Agency, Ibaraki, Japan

#### PVP2017-66248: SWELLING CHARACTERISTICS OF A TYPE 304SS BAFFLE PLATE IRRADIATED UP TO 50DPA IN PWR AND VALIDATION OF A SWELLING EQUATION

Y. Mogami, T. Matsubara, S. Yaguchi, Mitsubishi Heavy Industries, Ltd., Kobe, Japan; T. Tsuda, K. Fujimoto, Nuclear Development Corporation (NDC), Ibaraki, Japan

#### PVP2017-66116: EXPLORATORY ANALYSIS OF ESTIMATING AXIAL FRACTURE TOUGHNESS FOR ZR-2.5NB PRESSURE TUBES USING TEST DATA FROM SMALL CURVED COMPACT SPECIMENS

S. Xu, Kinectrics Inc., Toronto, ON, Canada; K. Wallin, VTT Technical Research Centre of Finland Ltd., Espoo, Finland

### SESSION 4.3I (CS-12-1)

Thursday, July 20, 2:00 pm – 3:45 pm, Queen's 6

#### RECENT DEVELOPMENTS IN EUROPEAN CODES AND STANDARDS

Developed by: J. Sharples, Amec Foster Wheeler, Warrington, United Kingdom; J. Shi, Amec Foster Wheeler, Gloucester, United Kingdom; C. Faidy, CF Integrity Engineering, Tassin, France

Chair: P. J. Gill, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom

Co-Chair: A. Horn, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom

#### PVP2017-65067: PRESENTATION OF NEW EDITION OF AFCEN RCC M CODE IN 2017

P. Malouines, M. Fabre, AFCEN, Maurepas, France

#### PVP2017-66073: QUALIFICATION OF THE NOTCH STRESS APPROACH FOR THE FATIGUE ASSESSMENT OF WELDED PRESSURE EQUIPMENT AND POWER PLANT COMPONENTS

J. Rudolph, AREVA GmbH, Erlangen, Bavaria, Germany; R. Trieglaff, TÜV NORD EnSys GmbH & Co.KG, Hamburg, Germany; R. Stöblein, FHWS Schweinfurt, Haßfurt, Germany; F. Hauser, Technische Hochschule Nürnberg Georg Simon Ohm, Nürnberg, Germany

#### PVP2017-66199: METHOD FOR UNIFIED SAFETY ASSESSMENT WITH RESPECT TO PLASTIC COLLAPSE IN DESIGN AND IN-SERVICE DEFECT ANALYSES

P. von Unge, Inspecta, Stockholm, Sweden; B. Brickstad, Swedish Radiation Safety Authority, Stockholm, Sweden

### SESSION 4.3K (MF-9-1)

Thursday, July 20, 2:00 pm – 3:45 pm, Kona 2

#### STRESS INTENSITY FACTOR SOLUTIONS

Developed by: D. J. Shim, Structural Integrity Associates, San Jose, CA, USA; Y. Li, Japan Atomic Energy Agency, Ibaraki-ken, Japan

Chair: D. J. Shim, Structural Integrity Associates, San Jose, CA, USA

Co-Chair: Y. Li, Japan Atomic Energy Agency, Ibaraki-ken, Japan

#### PVP2017-65198: CLOSED-FORM STRESS INTENSITY FACTOR SOLUTIONS FOR DEEP SURFACE CRACKS IN CYLINDERS SUBJECTED TO GLOBAL BENDING

K. Azuma, Y. Li, K. Hasegawa, Japan Atomic Energy Agency, Ibaraki-ken, Japan; D. J. Shim, Structural Integrity Associates, San Jose, CA, USA

#### PVP2017-65381: STRESS INTENSITY FACTOR SOLUTIONS FOR CRACK-LIKE ANOMALIES IN ERW SEAM WELDED PIPE

J. O'Brian, R. Olson, B. A. Young, Battelle Memorial Institute, Columbus, OH, USA  
PVP2017-65646: STRESS INTENSITY FACTORS OF PIPE-IN-PIPES WITH CIRCUMFERENTIAL THROUGH-WALL CRACKS BASED ON ELASTIC FINITE ELEMENT ANALYSES

S.-C. Kim, Sungkyunkwan University, Suwon, Korea (Republic); N.-S. Huh, Seoul National University of Science and Technology, Seoul, Korea (Republic); J. B. Choi, Sungkyunkwan University, Kyunggi-do, Korea (Republic)



## SESSION 4.3L (SE-6-2)

Thursday, July 20, 2:00 pm – 3:45 pm, Kona 3

### SEISMIC ANALYSIS AND DESIGN OF PIPING SYSTEMS—II

Developed by: G. Slagis, G C Slagis Associates, Roseville, CA, USA; I. Nakamura, National Research Institute for Earth Science and Disaster Resilience, Ibaraki, Japan

Chair: G. Slagis, G C Slagis Associates, Roseville, CA, USA

Co-Chair: I. Nakamura, National Research Institute for Earth Science and Disaster Resilience, Ibaraki, Japan

#### PVP2017-66161: BUCKLING STRENGTH EVALUATION OF LOCALLY WALL THINNING ELBOW

M. Sakai, S. Matsuura, Central Research Institute of Electric Power Industry, Chiba, Japan; R. Morita, F. Inada, Central Research Institute of Electric Power Industry, Kanagawa, Japan; S. Onishi, Chubu E.P., Nagoya, Aichi, Japan

#### PVP2017-65454: BUCKLING BEHAVIOR OF BURIED STEEL PIPELINE UNDER COMPRESSION STRIKE-SLIP FAULT MOVEMENT

X. Liu, H. Zhang, M. Xia, M. Li, China University of Petroleum-Beijing, Beijing City, China

#### PVP2017-65596: EVALUATION METHOD FOR SEISMIC FATIGUE DAMAGE OF PLANT PIPELINE

F. Inada, Central Research Institute of Electric Power Industry, Kanagawa, Japan; M. Sakai, Central Research Institute of Electric Power Industry, Abiko-shi, Chiba-ken, Japan; R. Morita, Central Research Institute of Electric Power Industry, Kanagawa, Japan; I. Tamura, The Chugoku Electric Power Company, Hiroshima, Japan; S. Matsuura, Central Research Institute of Electric Power Industry, Chiba, Japan

#### PVP2017-65847: INFLUENCE OF INITIAL AND WELDING RESIDUAL STRESSES ON LOW CYCLE FATIGUE AND RATCHETING RESPONSE SIMULATIONS OF ELBOWS

N. Islam, T. Hassan, North Carolina State University, Raleigh, NC, USA

## SESSION 4.3M (MF-21-5)

Thursday, July 20, 2:00 pm – 3:45 pm, Waikoloa Suite 1

### THERMOMECHANICAL TREATMENT AND HOT ISOSTATIC PRESSING

Developed by: M. Brongers, DNV GL, Dublin, OH, USA; A. Duncan, Savannah River National Laboratory, Aiken, SC, USA

Chair: M. Brongers, DNV GL, Dublin, OH, USA

Co-Chair: A. Duncan, Savannah River National Laboratory, Aiken, SC, USA

#### PVP2017-65320: EFFECT OF POSTWELD HEAT TREATMENT CONDITIONS ON MECHANICAL PROPERTIES OF 9CR-1MO-V STEEL WELDS FOR PRESSURE VESSEL

T. Tanaka, M. Abe, Hitachi Zosen Corporation, Kumamoto, Japan; M. Nakatani, Hitachi Zosen Corporation, Osaka, Japan; H. Terasaki, Kumamoto University, Kumamoto, Japan

#### PVP2017-65331: EFFECT OF POSTWELD HEAT TREATMENT CONDITIONS ON MICROSTRUCTURE OF 9CR-1MO-V STEEL WELDS FOR PRESSURE VESSEL

H. Terasaki, Kumamoto University, Kumamoto, Japan; T. Tanaka, M. Abe, Hitachi Zosen Corporation, Kumamoto, Japan; M. Nakatani, Hitachi Zosen Corporation, Osaka, Japan

#### PVP2017-65751: DEVELOPMENT OF NB-BEARING HIGH STRENGTH STEEL PLATES FOR 150000 M3 OIL STORAGE TANK BY TMCP AND TEMPERED PROCESS

Z. Gao, Q. Ding, H. Yang, J. Li, Jiangyin Xingcheng Special Steel Works Co., Ltd., Jiangyin, China; G. Zhu, National Local Joint Engineering Laboratory of Oil and Gas Storage and Transportation Technology, Zhoushan, China

#### PVP2017-65776: ASSESSMENT OF POWDER METALLURGY-HOT ISOSTATIC PRESSED NOZZLE-TO-SAFE END TRANSITION JOINTS

B. Sutton, D. Gandy, Electric Power Research Institute, Charlotte, NC, USA

## SESSION 4.3N (DA-9-1)

Thursday, July 20, 2:00 pm – 3:45 pm, Waikoloa Suite 2

### PIPING AND EQUIPMENT DYNAMICS—I

Developed by: P. Van Beek, TNO, Delft, Netherlands; M. Porter, Porter McGuffie, Inc., Lawrence, KS, USA

Chair: P. Van Beek, TNO, Delft, Netherlands

Co-Chair: M. Porter, Porter McGuffie, Inc., Lawrence, KS, USA

#### PVP2017-65079: STUDY OF CONTROL ROD DEVICE MECHANISM MISSILE IMPACT ON PROTECTION PLATE

X. Ye, F.-R. Xiong, B. Zheng, N. Jiang, Nuclear Power Institute of China, Chengdu, China

#### PVP2017-65230: SHOCK WAVES, VIBRATIONS, AND RESONANCE IN ELASTIC BEAMS

R. Leishear, Leishear Engineering, LLC., Aiken, SC, USA

#### PVP2017-65728: TRANSIENT IMPACT OF VALVE CLOSURE TIMES—DISAGREEMENTS BETWEEN DESIGN AND APPLICATION

I. Telci, S. Koirala, Bechtel Oil, Gas & Chemicals Inc., Houston, TX, USA

#### PVP2017-65804: WATER HAMMER CAUSED BY FAST CLOSING VALVES

S. Koirala, I. Telci, Bechtel Oil, Gas & Chemicals Inc., Houston, TX, USA

#### PVP2017-65973: ADVANTAGES OF AIR BLOW CLEANING OF STEAM PIPES FOR COST AND SCHEDULE SAVINGS

J. Jarvis, M. Brenner, Bechtel Corporation, Reston, VA, USA; M. Hall, Bechtel Corporation, Richland, WA, USA; P. Babel, Bechtel Corporation, Reston, VA, USA

## SESSION 4.3O (DA-17-1)

Thursday, July 20, 2:00 pm – 3:45 pm, Waikoloa Suite 3

### COMPANY STANDARDS AND DESIGN PHILOSOPHY

Developed by: J. Taagepera, Chevron ETC, Richmond, CA, USA

Chair: J. Taagepera, Chevron ETC, Richmond, CA, USA

Co-Chair: L. Antalffy, Fluor, Sugar Land, TX, USA

Panelists:

L. Antalffy, Fluor Enterprises, Inc., Houston, TX, USA

S. Kataoka, JGC Corporation, Yokohama, Japan

C. Rodery, BP p.l.c, Webster, TX, USA

J. Taagepera, Chevron ETC, Richmond, CA, USA

## SESSION 4.3Q (EPRI-1-3)

Thursday, July 20, 2:00 pm – 3:45 pm, Kohala 4

### SESSION 3—DISSIMILAR WELDS IN FERRITIC STEELS

Developed by: J. Parker, Electric Power Research Institute, Charlotte, NC, USA; E. Benton, Electric Power Research Institute, Charlotte, NC, USA

Co-Chair: J. Henry, ApplusRTD Canada, Chattanooga, TN, USA

Chair: P. Mayr, TU Chemnitz, Chemnitz, Germany

Panelists:

J. Parker, EPRI, Charlotte, NC, USA

V. Vodarek, VŠB-Technical University of Ostrava, Ostrava, Czech Republic

R. Krein, Voestalpine, Linz, Austria

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## Block 4.4: Thursday, July 20, 2017 (4:00 pm – 5:45 pm)

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## SESSION 4.4A (DA-1-4)

Thursday, July 20, 4:00 pm – 5:45 pm, Kohala 1

### THERMO-MECHANICAL DESIGN AND ANALYSIS OF PRESSURE VESSELS AND HEAT EXCHANGERS

Developed by: N. Barkley, Contract Fabricators, Inc., Holly Springs, MS, USA

Chair: J. Taagepera, Chevron ETC, Richmond, CA, USA

Co-Chair: Rakesh Kapania, Virginia Tech, Blacksburg, VA, USA

#### PVP2017-65091: NUMERICAL INVESTIGATION ON HEAT TRANSFER PERFORMANCE OF A NEW ANTI-VIBRATION SUPPORTING STRUCTURE OF A TUBE-SHELL HEAT EXCHANGER WITH LONGITUDINAL FLOW OF SHELL-SIDE

C. Yu, Z. Ren, M. Zeng, Xi'an Jiaotong University, Xi'an, China

#### PVP2017-65607: EXPERIMENTAL INVESTIGATION ON CONDENSATION IN CORRUGATED LOW FINNED TUBES IN PRESENCE OF NONCONDENSABLE GAS

B. Ren, X. Tang, H. Lu, D. Fu, P. Song, Shanghai Institute of Special Equipment Inspection and Technical Research, Shanghai, China

#### PVP2017-65423: ENGINEERING AND SIMULATIONS TO INVESTIGATE AND PREDICT THE FAILURE OF THE FOUR COMMONLY USED FLAT HEAD DESIGNS IN HEAT RECOVERY STEAM GENERATORS

M. Asadi, ApplusRTD Canada, Surrey, BC, Canada; J. Henry, ApplusRTD Canada,

Chattanooga, TN, USA; S. Torkildson, Retired, Greer, SC, USA; M. T. Kashani, M. Smith, ApplusRTD Canada, Surrey, BC, Canada

**PVP2017-66093: THE EFFECT OF MATERIALS AND DESIGN GEOMETRY ON TUBE PLUGS AT HIGH PRESSURE STEAM SUPER HEATER**

M. Alsaud, G. Van Zyl, A. D. Al-Dakhil, SABIC, Industrial Jubail, Saudi Arabia

**PVP2017-66138: WEIGHT-REDUCED OPTIMIZATION DESIGN OF LARGE NUCLEAR POWER LOW PRESSURE CYLINDER**

Y. Hu, X. Ye, G. Chen, Shanghai Electric Power Generation Equipment Co., Ltd., Shanghai, China

**SESSION 4.4D (MF-6-3)**

*Thursday, July 20, 4:00 pm – 5:45 pm, King's 1*

**FITNESS FOR SERVICE AND FAILURE ASSESSMENT—III**

**Symposium on Fitness-for-Service—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: A. Horn, P. James, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom

Chair: M. Cohn, Intertek, Santa Clara, CA, USA

Co-Chair: A. Horn, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom

**PVP2017-65004: APPLICATION OF THE STRAIN ENERGY DENSITY CRITERION TO THE ESTIMATION OF FRACTURE LOADS IN STRUCTURAL STEEL S355J2 AT LOWER SHELF TEMPERATURES**

S. Cicero, F. Ibañez, I. Procopio, University of Cantabria, Santander, Spain; V. Madrazo, Centro Tecnológico de Componentes, Santander, Cantabria, Spain

**PVP2017-66095: VALIDATION OF THE PROPOSED R6 METHOD FOR ASSESSING NON-SHARP DEFECTS**

A. Horn, Amec Foster Wheeler, Warrington, Cheshire, United Kingdom; S. Cicero, University of Cantabria, Santander, Spain; A. Bannister, Tata Steel, Rotherham, United Kingdom; P. Budden, EDF Energy, Barnwood, United Kingdom

**PVP2017-65378: VALIDATION OF FATIGUE MODELS FOR ERW SEAM WELD CRACKING**

B. A. Young, R. Olson, J. O'Brian, Battelle Memorial Institute, Columbus, OH, USA

**SESSION 4.4E (CS-41-2)**

*Thursday, July 20, 4:00 pm – 5:45 pm, King's 2*

**UPDATES TO THE 2017 EDITION OF THE ASME BOILER AND PRESSURE VESSEL CODE—PART II**

**Symposium on Recent Developments in International Codes and Standards—Sponsored by Codes & Standards Technical Committee**

Developed by: R. Barnes, Anric Enterprises Inc., Etobicoke, ON, Canada

Chair: R. Barnes, Anric Enterprises Inc., Etobicoke, ON, Canada

Co-Chair: S. Xu, Kinectrics Inc., Toronto, ON, Canada

**Panelists:**

R. McLaughlin, The National Board, Chattanooga, TN, USA

J. Henry, ATC, Inc., Chattanooga, TN, USA

D. Scarth, Kinectrics Inc., Toronto, ON, Canada

T. Adams, Jensen Hughes, Independence, OH, USA

R. Barnes, Anric Enterprises Inc., Etobicoke, ON, Canada

**SESSION 4.4F (DA-3-3)**

*Thursday, July 20, 4:00 pm – 5:45 pm, King's 3*

**FATIGUE—II**

**Symposium on Fatigue Issues—Co-Sponsored by Design & Analysis, Codes & Standards and Materials & Fabrication Technical Committees**

Developed by: T. Metais, EDF, Villeurbanne, France

Chair: T. Metais, EDF, Villeurbanne, France

Co-Chair: J. Rudolph, AREVA GmbH, Erlangen, Bavaria, Germany

**PVP2017-65397: AN ASSESSMENT OF THE SAFETY FACTORS AND UNCERTAINTIES IN THE FATIGUE RULES OF THE RCC-M CODE THROUGH THE BENCHMARK WITH THE EN-13445 STANDARD**

T. Metais, EDF, Villeurbanne, France; S. Courtin, AREVA, La Defense, Ile-de-France, France; F. Billon, ONET Technologies, Marseille, France; F. Bridier, DCNS, Bouguenais, France; R. Briot, Bureau Veritas, Brignais, France

**PVP2017-65530: A COMPARATIVE FATIGUE ANALYSIS STUDY BASED ON RCC-M CODE AND EN-13445 STANDARD THROUGH ACTUAL TEST CASES**

F. Billon, J. Halleguen, ONET Technologies, Marseille, France

**PVP2017-66006: AN ANALYTICAL-BASED STRUCTURAL STRAIN METHOD FOR LOW CYCLE FATIGUE EVALUATION GIRTH-WELDED PIPES**

X. Pei, University of Michigan, Ann Arbor, MI, USA; W. Wang, Harbin Engineering University, Harbin, Heilongjiang, China; P. Dong, University of Michigan, Ann Arbor, MI, USA

**PVP2017-66071: COMPONENT LOW CYCLE FATIGUE BEHAVIOR BASED ON STANDARD CALCULATION PROCEDURE AND NON-LINEAR FEA**

J. Rudolph, A. Willuweit, S. Bergholz, AREVA GmbH, Erlangen, Bavaria, Germany; C. Philippek, J. Kobzarev, Siemens AG, Erlangen, Germany

**SESSION 4.4L (SE-8-1)**

*Thursday, July 20, 4:00 pm – 5:45 pm, Kona 3*

**SEISMIC EVALUATION OF SYSTEMS, STRUCTURES AND COMPONENTS**

Developed by: F. Paolacci, University Roma Tre, Rome, Italy

Chair: T. Fukasawa, Mitsubishi FBR Systems, Tokyo, Tokyo, Japan

Co-Chair: O. Furuya, Tokyo Denki University, Saitama, Japan

**PVP2017-65293: A SPECTRUM-TO-SPECTRUM METHOD FOR CALCULATING UNIFORM HAZARD FLOOR RESPONSE SPECTRA**

A. Lucchini, P. Franchin, F. Mollaioli, Sapienza University of Rome, Rome, Italy

**PVP2017-65315: NONLINEAR DYNAMIC ANALYSIS OF RC SHEAR WALLS (Presentation Only)**

D. Y. Kim, Y. H. Nam, Y. S. Lee, KEPCO E&C, Gimcheon-si, Gyeongsangbuk-do, Korea (Republic)

**PVP2017-65740: SEISMIC DESIGN OF FREE STANDING RACKS IN JAPANESE NUCLEAR POWER PLANTS**

Y. Takaki, K. Taniguchi, J. Kishimoto, Mitsubishi Heavy Industries, Ltd., Kobe, Japan; A. Iwasaki, Y. Nekomoto, Mitsubishi Heavy Industries, Ltd., Takasago, Japan

**PVP2017-65814: NONLINEAR FINITE ELEMENT ANALYSIS OF UNANCHORED STEEL LIQUID STORAGE TANKS SUBJECTED TO SEISMIC LOADINGS**

H. N. Phan, F. Paolacci, University Roma Tre, Rome, Italy, P. Mongabure, CEA Saclay, Paris, France

**PVP2017-66198: SMART TECHNOLOGIES FOR INTEGRATED NATURAL RISK MANAGEMENT: INNOVATIVE METHODOLOGIES AND REMOTE SENSING**

A. Marino, M. Ciucci, INAIL/DIT, Roma, Italy, F. Paolacci, University Roma Tre, Rome, Italy

**SESSION 4.4N (DA-9-2)**

*Thursday, July 20, 4:00 pm – 5:45 pm, Waikoloa Suite 2*

**PIPING AND EQUIPMENT DYNAMICS—II**

Developed by: M. Porter, Porter McGuffie, Inc., Lawrence, KS, USA; P. Van Beek, TNO, Delft, Netherlands

Chair: M. Porter, Porter McGuffie, Inc., Lawrence, KS, USA

Co-Chair: P. Van Beek, TNO, Delft, Netherlands

**PVP2017-65448: VIBRATION CONTROL OF PIPING SYSTEMS AND STRUCTURES USING TUNED MASS DAMPERS**

S. Rechenberger, D. Mair, Advisian, Melbourne, VIC, Australia

**PVP2017-66066: SUPPORT COMPLIANCE OF PIPE MOUNTED THERMOWELLS**

D. S. Bartran, Becht Engineering, Saint Louis, MO, USA

**PVP2017-66222: THE MAIN DRIVING SYSTEM VIBRATION ANALYSIS UNDER DIFFERENT ROTATING SPEED OF TBM CUTTERHEAD**

J. Huo, H. Wu, Dalian University of Technology, Dalian/Liaoning, China

**PVP2017-66246: DESIGN AND MATERIAL SELECTION FOR ACOUSTIC ISOLATED PIPE SUPPORTS**

M. Eijgenhuijsen, G. Masand, Chevron Australia Pty Ltd., Perth, Australia

**SESSION 4.4Q (EPRI-1-4)**

*Thursday, July 20, 4:00 pm – 5:45 pm, Kohala 4*

**SESSION 4—DISSIMILAR WELDS BETWEEN FERRITIC AND AUSTENITIC STEELS**

Developed by: J. Parker, Electric Power Research Institute, Charlotte, NC, USA; E. Benton, Electric Power Research Institute, Charlotte, NC, USA

Chair: A. Pfeffer, GE, Windsor, CT, USA

Co-Chair: F. Masuyama, Kyushu Institute of Technology, Kitakyushu, Japan

Panelists:

F. Masuyama, Kyushu Institute of Technology, Kitakyushu, Japan  
J. DuPont , Lehigh University, Bethlehem, PA, USA  
J. Siefert, EPRI, Charlotte, NC, USA  
B. Alexandrov, The Ohio State University, Columbus, OH, USA

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**FRIDAY, JULY 21**

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**Block 5.1: Friday, July 21, 2017 (8:30 am – 10:15 am)**

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**SESSION 5.1Q (EPRI-1-5)**

*Friday, July 21, 8:30 am – 10:15 am, Kohala 4*

**SESSION 5—CASE STUDIES 1; IN-SERVICE EXPERIENCE**

Developed by: J. Parker, E. Benton, Electric Power Research Institute, Charlotte, NC, USA

Chair: K. Coleman, Electric Power Research Institute, Charlotte, NC, USA

Co-Chair: S. Huysmans, SH MatWeld Consulting, Belgium, Belgium

*Panelists:*

B. Cane, Independent Consultant,, Thailand

B. Shelton, Dominion Energy, USA

F. Timmons, Dominion Energy, USA

T. Totemeier, Structural Integrity Associates, Inc., Boulder, CO, USA

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**Block 5.2: Friday, July 21, 2017 (10:30 am – 12:15 pm)**

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**SESSION 5.2Q (EPRI-1-6)**

*Friday, July 21, 10:30 am – 12:15 pm, Kohala 4*

**SESSION 6—CASE STUDIES 2; IN-SERVICE EXPERIENCE**

Developed by: J. Parker, E. Benton, Electric Power Research Institute, Charlotte, NC, USA

Chair: J. Siefert, Electric Power Research Institute, Charlotte, NC, USA

Co-Chair: B. Cane, Dr Brian Cane Ceng, FIMMM, Prachuap Khiri Khan, Thailand

*Panelists:*

K. Coleman, EPRI, Charlotte, NC, USA

S. Huysmans, Engie Lab-Laborelec, SH MatWeld Consult, Belgium