

October 17th 2018
Auditorium 1

Welcome

9:00 **S. Weihe**, MPA University of Stuttgart, Germany

Plenary Session

Chairman: **S. Weihe**, MPA University of Stuttgart, Germany

- 1 09:05 **Efficient Parameter Development of New Materials for Additive Manufacturing**
D. Beckers, G. Graf, **S. Donisi**, Rosswag GmbH, Pfinztal, Germany
- 2 09:35 **Development and Quality Assurance of Additive Components at MAN Energy Solutions**
R. Herzog, M. Ernsberger, S. Wiers, C. Wurm, M. Schneck, MAN Energy Solutions SE, Oberhausen, Germany
- 3 10:05 **The Potential of German Power Plant Engineering for Climate Protection**
A. Harrendorf, SET e.V., Wirtschaftsverband Anlagenbau und Industrieservice, Berlin, Germany
- 10:35 Discussion
- 10:45 Coffee Break

Operational Challenges of Conventional Plants

Chairmen: **K. Kimura**, NIMS, Tsukuba, Japan, **S. Weihe**, MPA University of Stuttgart, Germany

- 4 11:05 **The Application of Nickel Alloy Materials to Improve Power Plant Operational Flexibility**
T. Sambor, Electric Power Research Institute (EPRI), Charlotte, USA
- 5 11:35 **Cyclic Operation and Benchmarking of Power Plants – Technical & Cost Issue**
A. Shibli, European Technology Development Ltd., Leatherhead, UK
- 6 12:05 **Investigation on Material Behavior and Condition Assessment to Address Demands in Flexible Power Generation**
A. Klenk, MPA University of Stuttgart, **K. Metzger**, GKM Grosskraftwerk Mannheim AG, Mannheim, Germany
- 12:35 Lunch Break

Verification of Long-term Properties and New HT-Materials

Chairmen: **K. Maruyama**, Dep. of Materials Science, Tohoku University, Sendai, Japan, **A. Klenk**, MPA University of Stuttgart, Germany

- 7 13:35 **Creep Deformation Property of Grade 91 Steel and its Heat-to-Heat Variation**
K. Kimura, K. Sawada, National Institute for Materials Science (NIMS), Tsukuba, Japan
- 8 14:05 **Challenges of Creep Rupture Data Assessments Using the Example of a Large Dataset of Grade P91**
M. Schwienheer, Chair and Institute for Materials Technology, Darmstadt, Germany
- 9 14:35 **Long-term Creep Strength and Rupture Ductility of W-Mo-balanced 9Cr Steel**
F. Abe, T. Ohba, H. Miyazaki, Y. Toda, M. Tabuchi, National Institute for Materials Science (NIMS), Tsukuba, Japan
- 10 15:05 **Qualification of Pressure Part Materials for Advanced Ultra-Supercritical (A-USC) Boilers**
F. Rödiger, **A. Kopp**, **T. Steck**, **R. Hartwig**, **F. Kluger**, **M. Hiller**, GE Boiler Deutschland GmbH, Stuttgart, Germany
- 15:40 Coffee Break

Research Work at MPA Stuttgart

Chairman: J. M. Bareiß, Energie Baden-Württemberg AG, Stuttgart, Germany

- 11 16:00 **Microstructural Changes after Long-Term Creep in Low Alloy Steel**
M. Braun, MPA University of Stuttgart, K. Sawada, K. Kimura, NIMS, Tsukuba, Japan
- 12 16:25 **Damage Mechanics Simulations of the Failure Behavior of Specimens with Multiple Flaws**
P. Gauder, MPA University of Stuttgart and Institute for Materials Testing, Materials Science and Strength of Materials (IMWF), University of Stuttgart, M. Seidenfuß, IMWF, University of Stuttgart, Germany
- 13 16:50 **Theoretical and Experimental Investigation of the Leakage Behavior of Cracks and Slits in Piping**
F. Silber, S. Weihe, MPA University of Stuttgart, Germany
- 14 17:15 **Finite Element Simulation and Parametric Studies of Influences on Residual Stresses and Distortions in Selective Laser Melting**
M. Käß, MPA University of Stuttgart and IMWF, University of Stuttgart, M. Werz, MPA University of Stuttgart, Germany

18:00 Poster Session

Poster

Obikou: A Strengthening Method for High Temperature High Pressure Steam Welded or Seamless Steam Pipes

A. Shibli, European Technology Development Ltd., Leatherhead, U.K.

Interactions Between Mechanical Engineering Components and Structures

K. Kerkhof, MPA University of Stuttgart, Germany

Lifetime Assessment of Power Plant Components with Long Operating Times Under Flexible Operating Conditions

P. Schmitt, C. Heinemann, F. Müller, C. Kontermann, M. Oechsner, MPA-IfW Darmstadt, A. Udoh, J. Quatier, A. Klenk, MPA University of Stuttgart, Germany

Limit Load Analysis of a Piping System with Post-installed Anchors Subjected to Static and Seismic Loads

F. Dwenger, MPA University of Stuttgart, Germany

Composite Pipes for Plant Applications: Simulation, Component Test and Non-Destructive Testing

M. Friedrich, Institute for Materials Testing, Materials Science and Strength of Materials (IMWF), University of Stuttgart, Germany

Advanced Materials Innovation and Characterization (AMICA) - A Center for Multi-Scale Material Characterization and Visualization at the University of Stuttgart

M.-L. Lemloh, F. Kauffmann, M. Speicher, S. Weihe, MPA University of Stuttgart, Germany

Implementation of a Risk-Based Inspection and Maintenance Programme in a Flexible-Operation Thermal Power Plant

A. Jovanovic, Steinbeis Advanced Risk Technologies GmbH, Stuttgart, K. Maile, MPA University of Stuttgart, K. Metzger, Grosskraftwerk Mannheim AG, A. Klenk, MPA University of Stuttgart, J. Bareiss, Steinbeis Advanced Risk Technologies GmbH, Stuttgart, J. Quatier, S. Husta, MPA University of Stuttgart, Germany

Fatigue Monitoring and Condition Assessment for Boiler Recirculation Pumps

K. Metzger, Grosskraftwerk Mannheim AG, J. Rudolph, S. Bergholz, Framatome GmbH, Erlangen, A. Klenk, J. Quatier, MPA University of Stuttgart, Germany

Influence of Alloying Elements and Process Parameters on Solidification and Microstructure of Aluminium in Laser Beam Welding

C. Böhm, MPA University of Stuttgart, C. Hagenlocher, D. Weller, Institut für Strahlwerkzeuge (IFSW), University of Stuttgart, S. Weihe, MPA University of Stuttgart, T. Graf, IFSW, University of Stuttgart, Germany

Resource-Efficient Dissimilar Friction Stir Welds for High-Performance Lightweight Composites

F. Panzer, MPA University of Stuttgart, Germany

19:00 Evening Reception

The evening reception will be held in the Plenary Hall of the Filderhalle.

Program:

- ❖ Dinner, interrupted by:
- ❖ Best Paper Award for the lectures in the session “Research Work at MPA Stuttgart”
Dr.-Ing. Jörg Bareiß, Chairman of the Friends Organisation of MPA University of Stuttgart
- ❖ Awarding of the Carl-von-Bach-Commemorative-Medal
Prof. Dr.-Ing. Stefan Weihe, MPA University of Stuttgart
- ❖ 1st MPA-Seminar Science Slam

The reception will be accompanied by the Brass Quartett "Metallophon".



October 18th, 2018
Auditorium 1

Additive Manufacturing

Chairmen: S. Donisi, Rosswag GmbH, Pfinztal, Germany, M. Werz, MPA University of Stuttgart, Germany

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| 15 | 08:20 | <p>Qualification of Additive Manufactured Materials for Demanding and Regulated Markets
 M. Boche, G. Schnotz, TÜV SÜD Industrie Service GmbH, Filderstadt, Germany</p> |
| 16 | 08:50 | <p>New Approach for Fast Simulation of Distortion and Stress for Selective Laser melting for Steels with Phase Transformation
 M. Schänzel, A. Ilin, Robert Bosch GmbH, Renningen, V. Ploshikhin, Airbus endowed chair for Integrative Simulation and Engineering of Materials and Processes, University of Bremen, Germany</p> |
| 17 | 09:20 | <p>Additive Manufacturing - First Approaches to Pore Evaluation
 M. Beckert, D. Bietke, A. Schulz, R. Trieglaff, , TÜV NORD Ensys GmbH & Co. KG, Hamburg, Germany</p> |
| 18 | 09:50 | <p>Fracture Mechanical Characterization of Additively Manufactured Lightweight Materials
 G. Kullmer, J.-P. Brüggemann, H. A. Richard, Institute of Applied Mechanics, Direct Manufacturing Research Center, Paderborn University, Germany</p> |
| 19 | 10:20 | <p>From Shape Welding to Friction Stir Additive Manufacturing - A Review of Process Development and its Significance on the Microstructures and Mechanical Properties
 J.-N. Aoh, C.-W. Huang, Dep. of Mechanical Engineering and Advanced Institute of Manufacturing with High-Tech Innovations (AIM-HI), National Chung Cheng University, Minhsiung, Chiayi, Taiwan</p> |
| | 10:50 | Coffee Break |

Safety and Integrity of Nuclear Components

Chairmen: X. Schuler, EnBW Kernkraft GmbH, Neckarwestheim, U. Mayer, MPA University of Stuttgart, Germany

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| 20 | 11:10 | <p>Investigations on Various Leak Types from Operational Experience and Consequences for Leak-before-break Assessment of the Pressure Boundary
 K. Heckmann, M. Elmas, J. Sievers, Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) gGmbH, Cologne, Germany</p> |
| 21 | 11:40 | <p>Improvement of Local Cleavage Fracture Assessment Methods Under Dynamic Loading Conditions
 J. Tlatlik, D. Siegele, Fraunhofer Institute for Mechanics of Materials (IWM), Freiburg, Germany</p> |
| 22 | 12:10 | <p>Modelling Ultra-low Cycle Fatigue by Macroscopic Damage Mechanics Approaches
 S. Münstermann, B. Hoppe, Y. Di, D. Novoksharov, Integrity of Materials and Structures, Steel Institute, RWTH Aachen University, Germany</p> |
| 23 | 12:40 | <p>Fracture Mechanics Assessment of Piping Taking Into Account Thermal Transient Loads Using the Example of the Pressurizer Auxiliary Spray Line
 D. Saborido, FABIAN Engineering GmbH, Frankfurt, A. Manke, X. Schuler, EnBW Kernkraft GmbH, Neckarwestheim, G. Wackenhut, MPA University of Stuttgart, Germany</p> |
| | 13:10 | Lunch Break |
| 24 | 14:15 | <p>Determination of the POD to Assess the Reliability of Ultrasonic Testing of Safety Relevant Components
 H. Rieder, M. Spies, Fraunhofer Institute for Nondestructive Testing, Saarbrücken, A. Jüngert, MPA University of Stuttgart, Germany, S. Dugan, Swiss Federal Nuclear Safety Inspectorate ENSI, Brugg, Switzerland</p> |

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- 25 14:45 **Mechanistic Study of the Rate of Oxide Formation on AISI316L Steel in the PWR Primary Water Environment**
R. Matthews, Eskom, Cape Town, Centre for Materials Engineering, University of Cape Town, **R. Knutsen**, Centre for Materials Engineering, University of Cape Town, J. Westraadt, Nelson Mandela University, Port Elizabeth, South Africa
- 15:15 Coffee Break

Media Influence and Corrosion

Chairman: S. Zickler, MPA University of Stuttgart, Germany

- 26 15:30 **Qualification Strategies for Components Exposed to High Pressure Gaseous Hydrogen**
S. Zickler, MPA University of Stuttgart, Germany
- 27 16:00 **FPF MathYP – Materials Under Hydrogen Pressure**
A. Schubert, P. Fayek, K. Bauer-Trossmann, Robert-Bosch-GmbH, Corporate Sector Research and Advanced Engineering, Renningen, S. Zickler, S. Weihe, MPA University of Stuttgart, R. Westerheide, Robert-Bosch-GmbH, Corporate Sector Research and Advanced Engineering, Renningen, Germany
- 28 16:30 **Tension-Compression and Reverse-Bending Tests - A Bridge from Testing in Compressed Gaseous Hydrogen to Testing in Air for Strength Assessment of Additively Manufactured and Hydrogen-Exposed Solid Joints**
T. Möller, J. Mayer, Carl Zeiss SMT GmbH, Oberkochen, A. Nitschke, S. Zickler, MPA University of Stuttgart, C. Hauck, S. Auernhammer, MBFZ toolcraft GmbH, Georgensgmünd, Germany

Auditorium 2

Long-Term Behavior of Steels

Chairmen: C. Kontermann, MPA-IfW University of Darmstadt, Germany, F. Abe, NIMS, Tsukuba, Japan

- 29 08:20 **Development of a New High-Performance Martensitic Heat-Resistant Super VM12 Steel for Power Plant Applications**
M. Subanovic, J. Pirón, Vallourec Research Center Germany, Vallourec Deutschland, Düsseldorf, M. Jarrar, A. Gauss, Vallourec Deutschland, Düsseldorf, A. Schneider, Vallourec Research Center Germany, Vallourec Deutschland, Düsseldorf, Germany
- 30 08:50 **Extending the Applicability Range of CSEF Steels for Steam Oxidation Prone Service Conditions - THOR115 the TENARIS Solution**
S. Ceuca, A. Ferrara, S. Baietta, G. Murai, Tenaris, Dalmine, Italy
- 31 09:20 **Cyclic Loading Performance of Several 9-12% Cr Steels**
J. Olbricht, L. Agudo Jácome, M. Jürgens, F. Roohbakhshan, B. Fedelich, B. Skrotzki, Department Materials Engineering, Federal Institute for Materials Research and Testing (BAM), Berlin, Germany
- 32 09:50 **Creep Life Assessment Method for Welded Joint of Grade 91 Steel Considering Heat-to-Heat Variations**
M. Yaguchi, Central Research Institute of Electric Power Industry (CRIEPI), Yokosuka, Japan
- 33 10:20 **Investigation of Metallurgical Influence Factors of Fusion Boundary Damage of Ex-Service Dissimilar Metal Welds**
T. Tokairin, Mitsubishi Hitachi Power Systems, Ltd, T. Honda, T. Tokiyoshi, M. Honda, Mitsubishi Heavy Industries, Ltd., Tokyo, Japan
- 10:50 Coffee Break

New Materials for High Efficiency

Chairmen: T. Sambor, Electric Power Research Institute EPRI, Charlotte, USA,
M. Speicher, MPA University of Stuttgart, Germany

- 34 11:10 **Research and Manufacture of Key Valve Forging for 700°C A-USC Steam Turbine**
L. Sun, L. Mei, Y. Dong, Shanghai Electric Power Generation Equipment Co., Ltd. Turbine Plant, Shanghai, China
- 35 11.40 **High Temperature Properties of INCONEL Alloy 740H for High Pressure Applications**
S. A. McCoy, PCC Metals Group, Hereford, UK, R. Gollihue, B. A. Baker, J. de Barbadillo, Special Metals Corporation, Huntington, USA
- 36 12:10 **Elevated Temperature and Fatigue Behavior of Structural Materials for Advanced Ultra Supercritical Application**
A. Nagesha, A. Sarkar, R. Sandhya, G. Sasikala, Materials Development and Technology Division, Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam, India
- 37 12:40 **Fracture Mechanics Based Evaluation of High Temperature Materials for Advanced Ultra-supercritical Power Plant Applications**
G. Sasikala, A. Moitra, M. Nani Babu, Materials Development and Technology Division, Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam, India
- 13:10 Lunch Break

Life Assessment and Inspection

Chairmen: A. Shibli, European Technology Development Ltd., Leatherhead, UK, A. Klenk, MPA University of Stuttgart, Germany

- 38 14:15 **Monkman-Grant Relation in Long-Term Creep of Modified 9 Cr-1Mo Steel**
K. Maruyama, N. Sekido, K. Yoshimi, Department of Materials Science, Tohoku University, Sendai, Japan
- 39 14:45 **Validity of Creep Property Assessment Using Small Sample Taken from Outer Portion of Pipes in Service**
M. Tomobe, M. Yaguchi, Central Research Institute of Electric Power Industry (CRIEPI), Yokosuka, S. Komazaki, Kagoshima University, Kagoshima, A. Kumada, Kobe Material Testing Laboratory Co., Harima, Japan
- 40 15:15 **Determination of Inspection Intervals Based on Realistic Load Monitoring and Fracture Mechanics**
J. Rudolph, S. Bergholz, Framatome GmbH, Erlangen, D. Jerinic, TÜV Nord Systems GmbH & Co. KG, Hamburg, D. Rieck, ENCOS GmbH & CO. KG, Greifswald, Germany
- 15:45 Coffee Break

Risk Based Inspection

Chairmen: A. Jovanovic, Steinbeis Risk Technologies, Stuttgart, J. Quatier, MPA University of Stuttgart, Germany

- 41 16:00 **Comparison between the New European Risk-Based Inspection (RBI) Standard EN16991:2018 and the US Standards API580/581: When and how to use which of the two?**
A. Jovanovic, Steinbeis Risk Technologies, Stuttgart, Germany
- 42 16:30 **The Revised Standard VGB-S-506 for Condition Monitoring and Inspection of Pressurized Components**
J. Bareiß, EnBW Energie Baden-Württemberg AG, Stuttgart, Germany
- 43 17:00 **Competency and Training Requirements for Sustainable Implementation of a Risk Based Inspection Programme**
J. Wannenburg, University of Pretoria, Hatfield, Eskom Power Plant Engineering Institute, Midrand, South Africa