



HIDA-7



Conference Programme

3-day International Conference: (HIDA-7) **Life/ Defect Assessment & Failures in High Temperature Industrial Structures**

Dates: 15-17 May 2017

Venue: Portsmouth University, Richmond Building, Portland Street, Portsmouth, PO1 3DE

BACKGROUND & INTRODUCTION

HIDA was originally an EU Commission and industry supported research project which aimed at developing a unified European Defect Assessment procedure. It has been 19 years since the first HIDA conference (Paris, 1998). It was then followed by HIDA-2 in Stuttgart, Germany, HIDA-3 in Lisbon, Portugal, HIDA-4 in Cambridge, UK, HIDA-5 in Surrey, UK, and HIDA-6 in Nagasaki, Japan. These conferences have covered topics: Materials behavior at low and high temperature, failures, defect and life assessments, fitness-for-service and Risk Based Management. The latest HIDA incorporated plant experience with the new steels and creep-fatigue interaction. One of the aims of the HIDA conferences is to make a positive contribution towards the international standards/codes on damage & life assessment of engineering materials and components, such as the R5/R6, ASME, BS and EN codes. HIDA-7 aims to include the technologies, methodologies and applications of the damage/ life assessment to both the low and high temperature industry sectors and diverse engineering sectors such as power and process plant, maritime/ naval, automotive and aerospace sectors.

VENUE: HIDA-7 will be held in the University of Portsmouth, UK. Portsmouth is the UK's only island city in the south coast, near the English Channel where there is a cross ferry to France and Southern Spain/Portugal. Historically, Portsmouth has a very close link to maritime/ naval engineering. This town is now the home of the Tudor King Henry VIII's Mary Rose Shipwreck and the HMS Victory which was the Lord Nelson's flagship at the battle of Trafalgar in 1805. Portsmouth is also the home of the top modern university where approximately 21,000 multi-cultural students come to study (www.port.ac.uk).

Technical Enquiries to:

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(Conference Chairman)
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(Conference Co-Chairman)

Sponsors & Associates



John Brear – Plant Integrity



HIDA-7



Conference Programme

PAPER Submission (Optional): Paper submission will be considered for international journal publication. As this conference is mainly aimed at industry, submission of papers is not obligatory; instead presentations can be included in the Proceedings together with submitted papers.

Conference Proceedings: These will be produced and distributed to the attendees a couple of weeks after the conference.

INTERNATIONAL SCIENTIFIC & ORGANISING COMMITTEE

- Dr Ahmed Shibli, ETD Consulting, UK (Chairman)
- Dr Sarinova Simandjuntak, University of Portsmouth, UK (Co-Chairman)
- Dr D Allen, Chairman ECCC, Impact PowerTech, UK
- Dr Barrie Dunn (Hon. Prof), University of Portsmouth, UK
- Prof K Fujiyama, Meijo University, Nagoya, Japan
- Dr S R Holdsworth, EMPA, Switzerland
- Eur Ing S Huysmans, ENGIE, Belgium
- Dr Andreas Klenk, MPA Stuttgart, Germany
- Dr N Komai, Mitsubishi Heavy Industry, Japan
- Prof S-I Komazaki, Kagoshima University, Japan
- Prof F Masuyama, Kyushu Technology Inst., Japan
- Mr Henryk Mazur, Mazur Energy, Poland
- Prof J Marrow, University of Oxford, UK
- Prof K Nikbin, Imperial College, London, UK
- Prof Z Peng, Wuhan University, China
- Dr David Robertson, ETD Consulting, UK
- Prof R Sandstrom, KTH, Sweden
- Prof A Saxena, Distinguished Professor and Dean, Univ. of Arkansas, USA
- Dr M Tabuchi, NIMS, Japan
- Dr Andreas Thomas, Siempelkamp, Germany
- Prof J Tong, University of Portsmouth, UK
- Dr A Tonti, INAIL, Italy
- Dr Qiang Xu, Huddersfield University, UK
- Dr Y Yaguchi, CRIEPI, Japan
- Dr M Yatomi, IHI, Japan
- Prof A T Yokobori, Tohoku University, Japan
- Prof K B Yoon, Chung Ang University, Korea
- Prof Y Yoshioka, Toshiba & Ehem Uni., Japan



HIDA-7



Conference Programme

Day 1: Monday 15th May 2017

08:30 – 09:30h Registration & Reception		
Welcome Address		
09:30 – 09:35	Welcome by the Conference Chairman, Dr A Shibli	
09:35 – 09:40	Dean of the Faculty of Technology, University of Portsmouth	
09:40 - 09:45	Vice Chancellor, University of Portsmouth	
Note: Keynote (35 minutes); Others (25 minutes); time includes ~3 mins. Q&A		
Preliminary Session <i>Session Chairman: Dr. David Robertson, ETD Consulting, UK</i>		
09:45 – 10:20	(S0-1): Keynote: Lessons from Eddystone's high temp. failure experiences & material selection for USC steam temperature beyond the limit for CSEF steels	Fujimitsu Masuyama, Kyushu Institute of Technology, Japan
10:20 – 10:55	(S0-2): Keynote: Life assessment – myth and reality	David Allen, Impact PowerTech, UK
10:55 - 11:10 Short Break		
Session 1: Structural Integrity and Plant Experience <i>Session Chairman: Dr. David Allen, Impact PowerTech, UK</i>		
11:10 – 11:45	(S1-1): Keynote: Damage informatics concept for plant life-cycle management	Kazunari Fujiyama, Meijo University, Japan
11:45 – 12:10	(S1-2): Integrity assessment of a plug valve by material investigation fracture mechanics and stress analysis	Andreas Thomas, Siempelkamp, Germany
12:10 – 12:20	The process for chartered engineering application	Jake Godfrey, Inst. of Eng. & Tech. (IET), UK
12:20– 13:20 Lunch Break		
Session 2: P91 and P92 Heat Treatment, Lifting and Repair Issues <i>Session Chairman: Dr. Stuart Holdsworth, EMPA, Switzerland</i>		
13:20 – 13:55	(S2-1): Keynote: Aberrant P91 and P92: inspection, monitoring and life assessment issues	Ahmed Shibli, ETD, UK
13:55 – 14:20	(S2-2): A possible new remnant life assessment method of ASME Gr.91 and its evaluation of high temperature hydrogen attack resistance	Yasushi Hasegawa, Nippon Steel, Sumitomo Metals, Japan
14:20 – 14:45	(S2-3): Failures in P91 components in power plants – Heat treatment issues & aberrant microstructures	David Robertson, ETD, UK
14:45 – 15:10	(S2-4): Innovative method of reinforcing damaged high temperature P91 steam piping	Hidetaka Nishida, Chugoku Electric Power Co., Japan
15:10 – 15:40 Afternoon Break (Parallel Sessions Start)		



HIDA-7



Conference Programme

Session 3a: Life Assessment / Extension and Weld Performance <i>Session Chairman: Prof. Shin-ichi Komazaki, Kagoshima University, Japan</i>		
15:40 – 16:15	(S3a-1): <i>Keynote</i> : Effect of prior heat treatment on creep strength of P91 steel welded joint	Masatsugu Yaguchi, CRIEPI, Japan
16:15 – 16:40	(S3a-2): Developments in high temperature weld life optimisation	David Allen, Impact PowerTech, UK
16:40 – 17:05	(S3a-3): An approach to prediction of 570°C/100kh creep rupture strength and safety of P91 components with low hardness after service exposures at 530~560°C.	Liu Sheng, Wuhan University, China
17:05 – 17:30	(S3a-4): The inclusion of multiaxial stresses and material ageing effects in weld failure prediction maps.	John M Brear, Plant Integrity Cyfyngedig, UK
Session 3b: Microstructure, Hardness & Life Extension <i>Session Chairman: Prof. Zhifang Peng, Wuhan University, China</i>		
15:40 – 16:15	(S3b-1): <i>Keynote</i> : The effect of microstructural evolution on the impact and tensile properties of certain 300 series stainless steels	John M Brear, Plant Integrity Cyfyngedig, UK
16:15 – 16:40	(S3b-2): Microstructural changes in weld joint of COST F and FB2 steels after long term creep tests	Josef Kasl & Dagmar Jandová, VZU, Czech Republic
16:40 – 17:05	(S3b-3): Extending the creep life of a high temperature refinery reactor	Gerald Wilks, CITGO Refinery, USA
17:05 – 17:30	(S3b-4): Developing probabilistic methodologies in the creep regime	Nader Zentuti, University of Bristol, UK
Group Photo Session		
17:30h END OF DAY 1		



HIDA-7



Conference Programme

Day 2: Tuesday 16th May 2017

Session 4: Defect Assessment

Session Chairman: **Dr. Andreas Thomas, Siempelkamp, Germany**

09:00 – 09:35	(S4-1): <u>Keynote</u> : Developments in defect assessment for high temperature components	Andreas Klenk, MPA Stuttgart, Germany
09:35 – 10:00	(S4-2): Portable Scanning Force Microscopy for early stage damage detection - latest developments	Ahmed Shibli, ETD, UK
10:00 – 10:25	(S4-3): Defect assessment in high temperature plant using 'Crackfit' tool	Feroza Akther, ETD, UK Suraya Md. Nadzeer, TNB, Malaysia

10:25 – 10:50 Morning Break
(Parallel Sessions Start)

Session 5a: Creep - Fatigue Failures

Session Chairman: **Dr. Peter Skelton, Materials at High Temperature, UK**

10:50 – 11:25	(S5a-1): <u>Keynote</u> : Creep and oxidation interactions with fatigue crack growth thresholds	Stuart Holdsworth, EMPA, Switzerland
11:25 – 11:50	(S5a-2): Cyclic relaxation behavior of thick-wall P91	Rami Pohja, VTT, Finland
11:50 – 12:15	(S5a-3): Creep-fatigue crack propagation assessment of a nozzle-to-header weld with a lack of fusion defect	Frits Petit, Engie, Belgium

Session 5b: Ni-based Alloys and Gas Turbine Life Management

Session Chairman: **Prof. Uwe Gampe, Dresden University of Technology, Germany**

10:50 – 11:25	(S5b-1): <u>Keynote</u> : The prediction method of remnant life of creep fracture coupled with QL* Parameter and Micro Erosion Method for notched specimens of Ni-base superalloys	Toshimitsu Yokobori Jr, Teikyo University, Japan
11:25 – 11:50	(S5b-2): Effect of γ' squareness difference in typical dendritic regions on 760/982°C creep rupture life of a Ni-base single crystal alloy	SHI Zhenbin, Wuhan University, China
11:50 – 12:15	(S5b-3) Estimation of fatigue crack growth under complex loading using an accumulative approach	Karl Michael Kräemer, TU Darmstadt, Germany

12:15– 13:15 Lunch Break

Conference Programme

Session 6a: Inspection, Monitoring and Testing <i>Session Chairman: Dr. Falk Mueller, IfW-Darmstadt, Germany</i>		
13:15 – 13:50	(S6a-1): <i>Keynote</i> : Study of fracture in polygranular nuclear graphite by synchrotron computed tomography, image correlation and X-ray diffraction	James Marrow, University of Oxford, UK
13:50 – 14:15	(S6a-2): An evaluation of the capability of data conversion of Impression Creep Tests	Bianca Cacciapuoti et. al., University of Nottingham, UK
14:15 – 14:40	(S6a-3): Development of a Small Bulge Fatigue (SBF) testing technique	Shin-ichi Komazaki, Kagoshima Uni, Japan
Session 6b (continuation of Session 5b): Ni-based Alloys and Gas Turbine Life Management <i>Session Chairman: Prof. Yomei Yoshioka, Ehime University, Japan</i>		
13:15 – 13:50	(S6b-1): <i>Keynote</i> : Prediction of creep-fatigue interaction of superalloys	Jie Tong, University of Portsmouth, UK
13:50 – 14:15	(S6b-2): Damage characterisation and life analysis of an industrial gas turbine rotor used in a flexible power plant	Yaroslav Rae, University of Nottingham, UK
14:15 – 14:40	(S6b-3): Fouling and maintenance of GT compressor vanes and blades	James Pullen, ETD, UK
14:40 – 15:10 Afternoon Break		
Session 7a (continuation of Session 6a): Inspection, Monitoring and Testing <i>Session Chairman: Dr. Yasushi Hasegawa, Nippon Steel & Sumitomo Metals, Japan</i>		
15:10 – 15:45	(S7a-1): <i>Keynote</i> : Full-field imaging systems used in structural integrity assessment	Janice Barton, University of Southampton, UK
15:45 – 16:10	(S7a-2): Detection of creep degradation during pressure vessel testing using electromagnetic sensor technology	John Wilson, University of Manchester, David Allen, Impact PowerTech, UK
16:10 – 16:35	(S7a-3): Use of Potential Drop technique for creep damage monitoring and end of life warning for high temperature components	Adam Wojcik, Matelect Ltd, UK



HIDA-7



Conference Programme

Session 7b: Cracking and Life Assessment of Welded Components

Session Chairman: *Dr. Josef Kasl, VZU Plzen, Czech Republic*

15:10 – 15:45	(S7b-1): <i>Keynote</i> : Long-term creep strength and fracture of Gr.91 steel welds	Masaaki Tabuchi, NIMS, Japan
15:45 – 16:10	(S7b-2): Assessment of the effects of residual stresses in elastic-plastic fracture of dissimilar welded components	Kiranmayi Abburi Venkata, University of Bristol, UK
16:10 – 16:35	(S7b-3): An experimental study on the creep behavior of P91 type steel weld and base material with miniature specimen testing	Deniz Taygun Erten, Chung-Ang University, Korea

16:35 – 17:30 Faculty Tour, Networking Session and Poster Session

17:30h END OF DAY 2

19:30h CONFERENCE DINNER



HIDA-7



Conference Programme

Day 3: Wednesday 17th May 2017

Session 8a: Steam and Gas Turbine Life Management

Session Chairman: **Dr. Sarinova Simandjuntak, Portsmouth University, UK**

09:00 – 09:35	(S8a-1): <u>Keynote</u> : Current status of Japanese thermal power plants and life assessment of high temperature steam and gas turbine components	Yomei Yoshioka, Ehime University, Japan
09:35 – 10:00	(S8a-2): Crack detection in steam turbine blades	Pavel Mares, Research Centre Rez, Czech Rep
10:00 – 10:25	(S8a-3): Life assessment of steam turbine blades	Shengqi Zhou, NPL, UK

Session 8b: Creep Damage Modelling and Life Prediction

Session Chairman: **Dr. Masaaki Tabuchi, National Institute for Materials Science, Japan**

09:00 – 09:35	(S8b-1): <u>Keynote</u> : On the development of creep damage constitutive equations	Qiang Xu, Huddersfield University, UK
09:35 – 10:00	(S8b-2): The clarification of the occurrence mechanism of creep micro cracking at weld joint based on vacancy diffusion analysis	Go Ozeki, Teikyo University, Japan
10:00 – 10:25	(S8b-3): Threshold crack sizes depending on ductility and stress gradients in high temperature components	Alexander Hobt, MPA Stuttgart, Germany

10:25 – 10:55 **Morning Break**

Session 9a: Multi-Materials Design, Testing and Modelling

Session Chairman: **Dr. Qiang Xu, Huddersfield University, UK**

10:55 – 11:30	(S9a-1): <u>Keynote</u> : Predicting arbitrary damage proration in engineering materials using a novel extended cohesive damage element	Jiye Chen, University of Portsmouth, UK
11:30 – 11:55	(S9a-2): Vibration analysis and control of delaminated/ or damage composite plate structures using finite element analysis	P K Mahato, Indian Institute of Technology, India
11:55 – 12:20	(S9a-3): Statistical modelling for damage tolerance in multi material: Feasibility Study	Samuel Chan, University of Portsmouth, UK



HIDA-7



Conference Programme

Session 9b: Damage and Life Prediction <i>Session Chairman: Mr. Gerald Wilks, CITGO Refinery, USA</i>		
10:55 – 11:30	(S9b-1): <i>Keynote</i> : Accelerated material data generation for visco-plastic material models based on complex LCF and incremental creep tests	Marcus Thiele & Uwe Gampe, Dresden Uni. of Technology, Germany
11:30 – 11:55	(S9b-3): Assessment of system stresses and creep-fatigue damage in power plant pipelines using a Pipeline Modelling Tool	Priyesh Kapadia, Imperial College, UK
11:55 – 12:20	(S9b-4): Failure mechanisms in steam turbine condenser tubes	Bill Moore, ETD Consultant, UK
12:20– 13:20 Lunch Break		
Session 10: Materials and Component / Plant Integrity <i>Session Chairman: Dr. Ahmed Shibli, ETD Consulting, UK</i>		
13:20 – 13:55	(S10-1): <i>Keynote</i> : Predicting environmental damage and multiple cracking under creep conditions	Kamran Nikbin, Imperial College, London
13:55 – 14:20	(S10-2): Refinery equipment analysis to improve unit start-ups and shut-downs	Gerald Wilks, CITGO Refinery, USA
14:20 – 14:45	(S10-3): Integrity of Co-Cr-C coated P92 steel for power plant applications	Thomas Hoey, University of Nottingham, UK
14:45 – 15:10	(S10-4): Near-tip Strain Fields in Welded Steels Mapped Using DIC and EDXD	Tim Wigger, University of Portsmouth, UK
15:10 – 15:15	Closing Remarks	
15:15h Conference Ends		



HIDA-7



Conference Programme

<i>Poster Papers</i>	
EDSE 'boat sampling' for the machining of miniature specimens for non-destructive life assessment of old industrial structures.	James Pullen, ETD Consulting, UK
Experimental and analytical investigation of notched components of a Nickel base superalloy under high temperature cyclic loading	Adam Butz, Federal Institute for Materials Research and Testing, Germany
Crack tip strain analysis in HAZ using DIC	Elie Anthony Ghanem/ Prof J Tong & Dr S Simandjuntak, University of Portsmouth, UK
The use of digital image correlation to study the near-tip strain in a welded specimen	Luke Gaiger & Prof. J Tong, University of Portsmouth, UK
Digital image correlation for strain analysis near a crack tip	Zheyuan Feng & Prof. J Tong, University of Portsmouth, UK