


'New High Temp. Materials' Int. Conference
aimed at industry exchange of experience

Use of 9-12 Cr Martensitic, P23/24, Traditional Low Alloys Steels, Stainless Steels and Ni-based Alloys in USC Power Plants

Design, materials, welding, inspection, quality control, integrity / life assessment issues and plant experience

This international gathering of industry engineers and researchers will be preceded by an optional two-day P92 + P91 Training Course on 2 - 3 August 2011.

**Program &
Registration Form**

Conference Venue & Accommodation: 
The Blackstone Renaissance Hotel, Chicago, IL
** (please follow the link below for room reservation)*

Dates: 4-5 August 2011



Organiser

European Technology Development, UK

Co- Organisers



A Babcock Power Inc. Company



* Accommodation at a reduced rate of \$160/day is available for booking until 5 pm, Friday 15th July 2011 (subject to room availability). To make the room reservation please click (or, control + click) on the link below. You will then be directed to the hotel's home page with the negotiated rate code already entered in the appropriate field. [Renaissance Blackstone Chicago Hotel >>](#) Phone: + 1312 4470955

Why This Conference?

The pace of change in power and process plant sectors has never been faster with a continuing move from the low alloy materials to higher strength higher alloy materials that can withstand higher temperatures and pressures. All of this in an effort to increase output, efficiency and flexibility and reduce pollution and associated penalties. The new high strength materials such as the now ubiquitous higher Cr martensitic steels have another particular benefit in that due to their higher creep strength components can be manufactured in *smaller wall thickness* thus saving time and costs in manufacturing, welding, transportation, erection etc. The smaller wall thickness also means that the adverse thermal fatigue effect due to *power plant cycling*, now becoming a common mode of operation worldwide, will be less. However, the ‘*drawback*’ can be the relative sensitivity of these steels to heat treatment during steel production and component manufacture. This includes *forming/bending or welding*, the criticality of *cooling rate, pre- and post-weld heat treatment* and the resulting *micro-structural details*. However, new modified low alloy steels such as P23 and P24 are now increasingly being considered, and indeed used, in new generation USC power plants as the post-weld/repair heat treatment, which can be difficult to control in an industrial environment, is not critical for these alloys.

Furthermore, new generation of USC power plants are being considered for future construction and operation at temperatures of 700°C/1300°F or above. These include stainless steels, super-stainless steels and Ni-based alloys. A number of organisations in USA, Europe and Japan have been studying the development and improvement of these alloys and studying their short and long term physical and mechanical properties including their fabrication, bending, welding and the development of welding consumables. These include, for example, European Creep Collaborative Committee, NIMS, DOE projects etc. ETD has recently even prepared datasheets for many of these materials for its industry sponsors. Therefore, there is a need at present to bring together the major players from North America, Europe, Japan and elsewhere and discuss the progress so far and new developments under progress or consideration.

The other factors that need special consideration are *component monitoring and integrity/ life assessment at the mid-life stage for the new Cr alloys*. Life assessment of these alloys can be particularly problematic as cavitation in these steels, which has been successfully used in the traditional low alloy steels for creep *life exhaustion studies*, appears late in life and therefore new concepts/ technologies/ techniques are required to enable plant operators to reliably predict damage/ failure and make ‘run, repair or replace’ decisions. Similarly a number of research studies have shown that *steam side oxidation* of these new steels may not be as good as expected of higher Cr steels. This has implications on the use of thin wall boiler tubing for superheaters made from these high strength steels. Indeed many plants

Unlike most other ‘research’ conferences this ‘New Materials Conference’ will be aimed at industry. The aim is to bring together industry engineers and researchers from around the world and discuss successful fabrication, demonstration, use and integrity assessment of these steels.

The Feedback from an earlier seminar on this issue (organised by ETD in London) speaks volumes for the usefulness of these industry and research Seminars - please see separate box).

TYPICAL INTERNATIONAL FEEDBACK
FOR THE PREVIOUS SEMINARS/ CONFERENCES HELD IN LONDON

1) I wanted to thank you for the wonderful conference held in Houston, Texas in July 2010. It was very informative and a great collaborative learning experience for me. Please feel free to keep me informed of any new conferences and developments involving P91.

Sean Knowles, Riley Power, Worcester, MA, USA

2) Thank you for an excellent week's schedule of papers on T/P91, 92 and 23. It was a most useful and informative week, not only in the papers presented but in the exchange of views and experience

D Anderson, Technical Authority & Section Manager-Boiler Mech. Design, Doosan Babcock Energy, UK

3) Congratulations for the high quality technical Seminar you organized last week in London. I appreciated the presentations of all the speakers.

Dr Eng Leonardo Cipolla, Centro Sviluppo Materiali (CSM), Italy

4) I want to thank ETD team for the organisation of the Seminar. It was a good occasion to hear and to discuss the potential of new materials ...and the "on-site reality".

Patrick Billard, Electricite de France, France

5) I would like to thank ETD organizers for the wonderful seminar and courses that were presented last week. They were very informative and I learnt a lot.

Mahnaz Missaghi, Sask Power, Canada

6) Thank you once again for a very informative seminar and course.

Rick Bingham, MPR Associates, USA

7) I think both the seminar and course were extremely successful, thank you very much for organising these.

Dr Huijun Li, Australian Nuclear Science and Technology Organisation (ANSTO), Australia

8) Many thanks for the course, seminar and the ability to sit in on the P91 Users Group meeting. The week spent with Dr Shibli, Dr Robertson and colleagues on the course was most enlightening

Mike Pearson, Mechanical Engineer / Equipment Inspector, Genesis Energy, New Zealand

SPONSORSHIP AND EXHIBITION OPPORTUNITIES

Sponsorship and Exhibition opportunities during the conference and the training course are available. For further details please write to:
Mr Sean Hampson at: shampson@etd1.co.uk

CONFERENCE SCOPE & INVITATION FOR PAPERS

The Conference will cover technical issues including fabrication and plant experience, recent research findings, plant demonstration/ trial runs, welding issues, integrity and life assessment and experience of service providers.

PUBLICATION: Proceedings in the form of CDs containing full Papers or Presentations and prints of Abstracts will be provided at the Conference.

Oral presentations will be as follows:

- Keynote Papers = 30 minutes (including discussion).
- Other Papers = 20 minutes (including discussion).

Technical Enquiries to:

Dr Ahmed Shibli, European Technology Development, 6 Axis Centre, Cleeve Road, Leatherhead, Surrey KT22 7RD, UK

Tel: + 44 1372 363 111 Fax: + 44 1372 363 222 ashibli@etd1.co.uk

Registration and Administration Related Enquiries to:

Mrs Kay Mahoney, European Technology Development, 6 Axis Centre, Cleeve Road, Leatherhead, Surrey KT22 7RD, UK

Tel: + 44 1372 363 111 Fax: + 44 1372 363 222 kmahoney@etd1.co.uk

Great Forum for Discussion

This is the 7th ETD organised International Conference largely devoted to the understanding of the issues involved in the industrial use of P/T91, P/T92, P122 and P/T23, P/T24, Stainless & Super Stainless Steels and Ni-based Alloys based on plant experience (where available) and the findings of the leading researchers from the USA, Europe, Japan and elsewhere.

Plant operators, manufacturers (including welding companies and welding consumable manufacturers) and service providers will be encouraged to raise/ discuss problems from their personal / company experience during the Conference.

CONFERENCE COMMITTEE

Mr A Pasha, Technical Director, Vogt Power Int.,
Louisville, USA

Co-Chairman

Mr R Emmott, Vice President, TransAlta, Calgary,
Canada

Co-Chairman

Dr A Shibli, European Technology Development, UK

Co-ordinator

Prof F Masuyama, Kyushu Institute of Technology
(formerly Mitsubishi Heavy Industry), Japan

Dr D Robertson, European Technology Development
UK

Dr F Abe, NIMS, Japan

Prof P Ennis, University of Leicester, UK

Dr T Igari, MHI, Japan

Mr R Fuchs, Bohler Welding, Houston, TX, USA

Dr M Pitrun, Alstom Power, Switzerland

Prof S Tu, East China University of Science &
Technology, Shanghai, China

Prof R (Vis) Viswanathan, Consultant, Palo
Alta, Ca., USA

Mr P Billard, Electricite de France

Dr T Ogata, Crieipi, Japan

Dr T Gibbons, Consultant, Wilmington,
North Carolina, USA

Dr Y Yoshioka, Toshiba, Japan

Mr D Lapointe, CEATI, Canada

EurIng S Huysmans, Laborelec, GDF Suez,
Belgium

Dr A Bagaviev, E.On., Germany

Dr A Tonti, INAIL area ex ISPESL,
Italy

Dr A Klenk, MPA Stuttgart, Germany

Who Should Attend?

- *Plant managers, operators and maintenance engineers* of the HRSG/power plant using P/T 91, P92, P23, P24 or intending/planning to use these materials.
- *Plant designers, manufacturers, utilities and service providers who need to be aware of the potential new materials (new **Cr Alloys, Stainless Steels and Super Stainless Steels and Ni-based Alloys** being developed and tested or tried in plant.*
- *Plant manufacturers and alloy producers* who should be aware of the pitfalls and unsatisfactory practices and who wish to exchange experience.
- All those *involved in P/T 91, P92, P23, P24 component damage/ cracking assessment* and wishing to know their behaviour in plant.
- Engineers from *service providing / consulting companies.*
- *Inspection* personnel seeking an appreciation of the problems and damage/ cracking behaviour of high temperature components using the new high temperature alloys.
- *Planning personnel* seeking a better understanding of the issues involved with the integrity of P/T 91, P92, P23, P24 components and required replacement / repair strategies.
- *Researchers* involved in developing P/T 91, P92, P23, P24 component integrity, life and crack assessment strategies and methodologies who need to know the industry experience, concerns and needs.
- *Researchers* involved in the development or property determination of new high temperature alloys.

About the Organisers

European Technology Development Ltd. (ETD)

ETD is a UK based engineering advisory, consulting and R&D company specialising in high temperature plant life assessment/extension, maintenance, materials and engineering issues in all type of power generating and petrochemical/ process plant. ETD has, in the recent past, organised various international workshops/ courses/ conferences in Europe and Asia mainly on the issues such as: industrial plant life assessment/extension, high temperature plant materials, plant component safety and durability, performance of in-service welds, power plant cycling, risk based maintenance (RBM), probabilistic assessment, weld repairs etc. The company is leading and co-ordinating a number of large leading edge international industry initiatives (supported by the industry from North America, Japan, Europe and elsewhere or by government organisations such as the European Commission) on issues related to the assessment and improvement of high temperature plant performance, materials and design, and maintenance and inspection strategies. The company has carried out/ participated in leading edge projects on P91 weld repairs, crack assessment, integrity issues and has carried out studies of P/T91 performance in plant worldwide. Further information about ETD, its projects, life assessment courses offered and other activities can be seen at: www.etc1.co.uk

Vogt Power (*Co-organiser*)

Vogt Power International Inc. is the premier HRSG manufacturer with unequalled experience in Combined Cycle and Cogeneration plants. VPI's extensive experience includes supplementary and auxiliary fired units, the supply of SCR and CO systems, and additional design features such as stack dampers, silencers, shrouds, and exhaust bypass systems. Our Aftermarket department specializes in inspections, studies, turnkey engineered retrofits, and field TA services for all OEM's HRSGs. www.vogtpower.com

Babcock Power (*Co-organiser*)

Babcock Power Inc. (www.babcockpower.com) is one of the world's leading suppliers of technology, equipment and services to the power generation industry. Babcock Power designs, manufactures and services heat recovery steam generators and simple cycle exhaust systems through its Vogt Power International Inc. subsidiary located in Louisville, KY; provides heat exchangers and after market services, including moisture separator reheaters, steam surface condensers and feedwater heaters for fossil-fired, nuclear and concentrated solar plants through its Thermal Engineering International (USA) Inc. subsidiary located in Santa Fe Springs, CA; and provides new steam generators, environmental solutions (including SCRs, flue gas scrubbers and mercury removal systems), and a complete portfolio of after market solutions to the electric utility and waste-to-energy industries for any OEM's boiler through its subsidiaries located in Worcester, MA.

DAY 1

Thursday, 4th August 2011

REGISTRATION & BREAKFAST

0730 - 0820 hrs

Welcome & Introduction

0820 – 0830

Ahmed Shibli, ETD, UK
Bob Emmott, TransALta, Canada
Akber Pasha, Vogt Power Int., USA

SESSION 1: Microstructural Issues

0830-1000

Keynote Paper

1. Microstructure control for prevention of type IV failure in high Cr heat resistant steel HAZ

S Tsukamoto, T Shirane, Y Liu, M Tabuchi, F Abe, National Institute for Materials Science, Tsukuba, Japan

0830 - 0900

2. Microstructure evolution of Ac3 HAZ simulated 9%Cr heat resistant steels during creep

Y Liu, S Tsukamoto, K Sawada, M Tabuchi & F Abe, National Institute for Materials Science, Tsukuba, Japan

0900 - 0920

3. Effect of long term thermal exposure on the fracture properties of high strength steels and 12% Cr steels

Sudhir Rajagopalan, Oliver Luesebrink, Jonathan Shipper, Siemens Energy Inc., Orlando FL, USA

0920 – 0940

4. Decisive factor of the Type IV damage at HAZ of welded joints in W containing 9%Cr ferritic creep resistant steels

Hirohito Fujita, Tohoku University, Japan
Yasushi Hasegawa, Nippon Steel, Japan

0940 – 1000

Break

1000 – 1030 h

Keynote Paper

1. A design and quality control guide to prevent weld failures in creep enhanced ferritic steels

Akber Pasha, Robert Lescinski, Vogt Power International, Louisville, Ky, USA

1030-1100

2. Data and design approaches for reliable elevated temperature design

Martin Prager, Materials Properties Council; David Osage, Equity Engineering Group Inc., USA

1100-1120

3. Manufacturing of advanced rotor forgings for highly efficient fossil power plants

B Donth, N Blaes, A Diwo, D Bokelmann, Saarschmiede GmbH, Freiformschmiede, Völklingen, Germany

1120-1140

4. Heat-to-heat variation of creep strength property of Grade 91 steel

K Kimura, K. Sawada, H. Kushima and Y. Toda, National Institute for Materials Science, Japan

1140-1200

5. Materials challenges encountered and solutions for a daily cycling solar boiler

Kevin Toupin, Andrew Plotkin, Robert Rancatore, Riley Power Inc., Worcester, Massachusetts, USA

1200-1220

6. Development of the acceptance criteria for the USC power plant components made of high alloy ferritic steel

A Bagaviev, A Karpunow, E.ON Anlagenservice GmbH, Gelsenkirchen, Germany

1220-1240

Lunch

1240 – 1340 h

SESSION 3A:

Room 1

New Materials for Nuclear Energy PlantSESSION 3B:

Room 2

Low & High Alloy Traditional Steels*Keynote Paper*

- 1. Enhancing synergy to learn and benefit from the experience and knowledge-base of advanced nuclear and coal fired power plant materials and technologies**

Baldev Raj, Director, Indira Gandhi Centre for Atomic Research, Kalpakkam

K Bhanu Sankara Rao, University of Hyderabad, India

1340 - 1410

- 1. Failures of high alloy expansion bellows in refinery catalytic cracking units**

Gerald W Wilks, CITGO Petroleum Corporation, Lemont Refinery, USA

1340 - 1410

- 2. Time dependent deformation in advanced nuclear plants**

Wolfgang Hoffelner, Paul Scherrer Institut, Switzerland

1410 - 1430

- 2. Developments in high temperature plant life assessment methodologies and tools including e-Atlas - an interactive lifing tool based on microstructural assessment of plant replicas**

F Akther, Seam Hampson, European Technology Development, Surrey, UK

1410 - 1430

- 3. Analysis of margins in the creep damage evaluation of Grade 91 steel using the ASME B&PV Code Section III Subsection NH**

Tai Asayama, Japan Atomic Energy Agency, Japan

1430 - 1450

- 3. Assessment methods and residual life testing**

Peter Carter, SES, Mason, OH, USA

1430 - 1450

- 4. RCC-MR - Application of negligible creep clauses to EN10028 and EN13445**

Andrea Tonti, Fabrizio Ciuffa, Daniela Lega, INAIL area ex Ispesl, Rome, Italy

Guy Baylac, Consultant Pressure Equipment, France, Odile G lineau, Areva, France

Sabrina Pagano, Italian Institute of Welding (IIS), Genova, Italy

1450 - 1510

Break

1510 – 1540 h

SESSION 4: Plant Experience, Remaining Life Assessment and Inspection of 9-12Cr Alloy Steels 1540 1800

Keynote Paper

- 1. Studies on creep damage development in 9 Cr steels**
Karl Maile, Andreas Klenk, Klaus Metzger, MPA Stuttgart, Germany 1540-1610

Keynote Paper

- 2. Creep life prediction of Gr.91 based on creep strain analysis**
F Abe, National Institute for Materials Science, Tsukuba, Japan 1610-1640
- 3. Recent progress in creep damage/ life assessment for 9Cr steels**
F Masuyama, Kyushu Institute of Technology, Kyushu, Japan 1640-1700
- 4. Development of new NDE techniques for the lifing of 9-12Cr martensitic steels**
A Shibli, European Technology Development, Surrey, UK 1700-1720
- 5. Evaluation of precipitates in 12%Cr ferritic heat-resistant steels by electrochemical method**
Shin-ichi Komazaki^{}, Yohsuke Abe^{*} and Toshiki Mitsueda^{**}, ^{*}Kagoshima University, Korimoto, Kagoshima; ^{**}Hokkaido Electric Power Co., Inc., Tuishikari, Ebetsu, Japan* 1720-1740
- 6. Steam oxidation and creep failure of 9Cr steel tubes**
S Kihara, K Yagi, H Matsuda, M Takehara, D Horikoshi, I Kajigaya, K Yoneyama, H Umemura and F Masuyama, 9Cr Steel Boiler Tube User's Group, Japan 1740-1800

Conference Dinner
1930 - 2200 hrs

DAY 2

Friday, 5th August 2011

SESSION 5: **Stainless Steels and Ni-Based Alloys**

0830 - 1000

Keynote Paper

- 1. Superior creep properties and strengthening mechanism of advanced austenitic heat resistant steels strengthened by intermetallics**

Masao Takeyama, Tokyo Institute of Technology, Tokyo, Japan 0830 - 0900

- 2. Process development of heavy-wall large diameter nickel-base alloy pipe for A-USC power plants**

Leon G Klingensmith, Wyman-Gordon Pipe & Fittings, Houston, Texas, USA
0900-0920

- 3. Corrosion behavior of Ni alloy wrought, coextruded, and weld overlay coatings**

John N DuPont, Lehigh University; William Van Geertruyden, EMV Technologies, Bethlehem, PA; A Caizza, A Esposito, Plymouth Engineered Shapes, Hopkinsville, KY, USA
0920-0940

- 4. Residual stress measurements on a P92/In625 dissimilar weldment**

*Alexandros Skouras, Martyn J Pavier, Matthew Peel, Peter Flewitt
Department of Mechanical Engineering, University of Bristol, UK* 0940 - 1000

- 5. Microstructural studies of Alloys 617, 230 and 740 after ageing at 650-750°C**

P J Ennis, A Strang, H V Atkinson, G M McColvin, University of Leicester, UK
1000 - 1020

Break

1020 – 1050 h

SESSION 6:

Low Alloy Modified 2.25Cr Steels P23 and P24

1050-1230

Keynote Paper

1. Grade 23 development story and experience

F Masuyama, Kyushu Ins. of Technology, Kyushu, Japan

1050 – 1120

Keynote Paper

2. Assessment of weldability related to the use of advanced 2 ¼ Cr modified T24 creep resisting steels in modern Ultra SuperCritical Power Plants

S Huysmans¹, J Vekeman², F Vanderlinden¹

¹ Laborelec GDF Suez; ² Belgian Welding Institute, **Belgium**

1120 – 1150

3. Experience with the welding of Grade 23 and Grade 24, including a new approach to dissimilar chromium-molybdenum welds

Russel Fuchs, Bohler Welding Group, Houston, Texas, USA

Herbert Heuser, Bohler Schweissttechnik – Hamm, Germany

1150 - 1210

Lunch

1230 – 1330 h

Keynote Paper

1. Service experience and weld repair of creep strength enhanced ferritic steels

Jonathan Parker, Jeff Henry, Kim Bezzant, Structural Integrity Associates, Inc.

Canada

1330 – 1400

Keynote Paper

2. Experience with the welding of Grade 91 and Grade 92 with matching filler metals

Russel Fuchs, Bohler Welding Group, Houston, Texas, USA

Herbert Heuser, Bohler Schweisstechnik – Hamm, Germany

1400 – 1430

3. Assessment of weldment behaviour and weld reduction in 9-10 Cr steels

Andreas Klenk, Karl Maile, Kay Schmidt, MPA Stuttgart, Germany

1430 - 1450

4. Micro-macro creep damage simulation for Type-IV failure in high Cr steel welds

T Fukahori, F Kawashima, T Tokiyoshi, T Igari, Y Chuman, N Komai, M Fujita

Mitsubishi Heavy Industries, Nagasaki, Japan

1450 - 1510

5. ‘P91 Users Group’ experience with the P91 similar and dissimilar weld issues involving P91

David Robertson, European Technology Development, Surrey, UK

1510 - 1530

6. Welding of P91 steel with Russian 12X1MF steel at a superheater pipeline

Alexandros Antonatos, Test Research and Standards Center of Public Power Corporation of Greece, Greece

1530 - 1550

CONCLUDING REMARKS

1550 - 1615 HRS

Remarks by the Conference Organisers

REGISTRATION FORM (Please copy and e-mail / fax / post)

P92/P91 Course + New Materials Conference
Chicago, USA, 2 – 5 August 2011

REGISTRATION FEE:

Please circle in the table below the amount relevant to you and show it in the total box.
Fee will be charged in the equivalent pound sterling. For guidance the conversion rate on 6 April 2011 was: £1 = \$1.62. *Please feel free to register for any one or both events.*

		Reduced Fee <small>(until 29th June 11)</small>	Full Fee <small>(from 30 June 11)</small>
<i>P92/ P91 Training Course (2-3 Aug)</i>		900 (dollars)	1000 (dollars)
Conference <small>(4-5 Aug)</small>	Delegates	400 (dollars)	500 (dollars)
	Authors	350 (dollars)	450 (dollars)
Total to pay:		\$.....	\$.....

10% reduction will be offered for two or more attendees from the same organisation.

Payment Options

1) By bankers draft or bank to bank transfer to: European Technology Development
 (For payment by bank to bank transfer, account details will be supplied on request).

2) By UK bank cheque made payable to 'ETD Ltd.'

Please quote reference 'Course + Conf., Chicago 11' with the payment and state here how you paid or intend to pay:

.....

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By Credit Card: Major cards such as Visa/ Master Card/ JCB/ American Express/ Switch are accepted with the exception of Dinners Club. For security please *fax or post* this information.

Name of Account Holder		Amount to pay	\$
Card Type and No.		Expiry date	
Authorisation signature		Security code	

Venue + Accommodation: [Renaissance Blackstone Chicago Hotel >>](#)

Delegate Details: (Required for your badge)

Your **title and name:**

Company:

Position:

Address:

Phone:

Fax:

E-mail:

REGISTRATION ADDRESS: Please copy and post/ fax/ e-mail to address below:

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