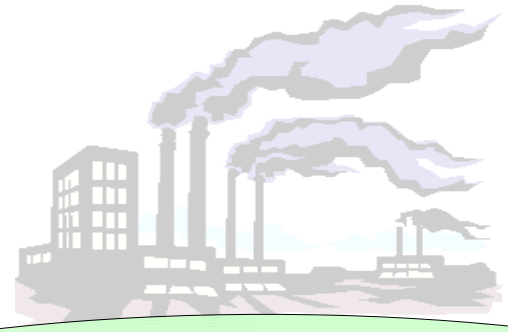
2-Day International Seminar aimed at industry

INDUSTRY & RESEARCH EXPERIENCE IN THE *USE* OF P 91/ T 91 IN HRSG & CONVENTIONAL BOILERS

FABRICATION, OPERATION, WELDING, CODES & INTEGRITY / LIFE ASSESSMENT

*Aimed at exchanging information on **plant experience** and **related research**.*

(Will be preceded by an optional 2-day Training Course being held at the same venue on 5-6 December 05).



Seminar Programme

& Registration Form

Venue: Institute of Materials (IOM3 *), London

Dates: 7- 8 December 2005

The initiative for this Seminar follows a number of failures in thick section P91 components after a service duration of only 20,000 hours and above, and early cracking in T91 superheater tubing and stub welds requiring costly replacement.

***Note:** The Seminar will be preceded by an **optional** two-day **'Training Course'** on 5-6 December at the same venue. While the seminar will discuss new findings, the Training Course will cover in-depth basic understanding of topics such as: The P91 parent, weld metal and HAZ microstructures and the effect of heat treatment (austenitising, tempering, welding including pre- and post-weld heat treatments and best practices etc.), existing codes and industrial practices (and pitfalls to avoid), available and commonly used welding procedures and consumables, weld repairs, cold working, fundamentals of steam side oxidation of T91 tubing and how it differs from low alloy bainitic steels, the current state of life/defect assessment etc. For details of the Course please visit www.etd1.co.uk and look under 'Training Courses'.*

* Venue details at: www.iom3.org.uk

Why This Seminar?

The pace of change in power and petrochemical plant sector has never been higher with a continuing move from the low alloy materials to higher strength higher alloy steels that can withstand higher temperatures and pressures in an effort to increase output, efficiency and flexibility and reduce pollution and associated penalties. The new high strength materials such as the now popular 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 *plant cycling*, becoming a common mode of operation worldwide, will be less thus reducing the incidents of cracking and failures due to this mode of operation. However, the *drawbacks* can be the relative sensitivity of these steels to heat treatment details during steel production and component manufacture. This includes ***forming/bending or welding***, the criticality of ***pre- and post-weld heat treatment***, the resulting ***micro-structural details*** and the effect on material properties and behaviour. The other factors that need special consideration are component monitoring and integrity/ life assessment at the mid-life stage. The last factor can be particularly problematic as cavitation in these steels, which has been successfully used in the 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 predict damage/ failure and make 'run, repair or replace' decisions. Similarly a number of research studies have shown more recently 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 very thin wall boiler tubing for superheaters made from these high strength steels.

A number of conferences based mainly on research experience have now been held on the properties and behaviour of these steels. However, enough *plant experience* has now been accumulated worldwide for the alloy producers, plant operators, manufacturers, service providers and researchers to come together to exchange this information and know-how. *The participants are expected to come from Europe, Japan, North America and elsewhere.*

Who Should Attend?

- *Plant managers, operators and maintenance engineers* of the HRSG/power and petrochemical plant using P/T 91 or intending/planning to use this material.
- *Plant manufacturers and alloy producers* who should be aware of the pitfalls and unsatisfactory practices and who wish to exchange experience and learn from others.
- All those *involved in P/T 91 component damage/ cracking assessment* and wishing to know its behaviour in plant.
- Engineers from *service/consulting companies.*
- *Inspection* personnel seeking an appreciation of the problems and damage/ cracking behaviour of high temperature components using P/T 91 material.
- *Planning personnel* seeking a better understanding of the issues involved with the integrity of P/T91 components and required replacement / repair strategies.
- *Insurance Personnel* wishing to increase their knowledge of practical problems involved with the use of this new material now popular with manufacturers.
- *Researchers* involved in developing P/T91 component integrity, life and crack assessment strategies and methodologies who need to know the industry experience, concerns and needs.

What Do You Get ?

This is the first known industry oriented Seminar largely devoted to the understanding of the issues involved in the practical use of P/T91 based on plant experience and predictions made by the leading researchers. *Plant operators, manufacturers (including welds and welding consumable manufacturers) and service providers will be encouraged to raise and discuss problems from their personal/company experience during the seminar.* The participants will also get the *Seminar notes/ presentations* (and formal papers where these become available) on a CD.

Deadline for Abstracts and Presentations

As the Seminar is aimed more at bringing together industrial audience and related research the speakers are not expected to provide formal papers. Instead, the intention is to provide ***proceedings*** on a CD consisting of presentations in the pdf format. The deadline for the submission of ***presentations*** *is:* ***25th November 05.***
Note: If the presenters wish to offer formal papers these can also be included in the CD and may also be published in a refereed journal.

Technical Enquiries to:
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Who Are We ?

European Technology Development Ltd. (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.etd1.co.uk www.ommi.co.uk

DAY - 1

EXPERIENCE IN THE FABRICATION & OPERATION OF HRSG/BOILERS USING P/T91

Registration and Welcome	0845 – 0930 hrs

Session 1: **Construction of HRSG and Conventional Boilers: P91 Fabrication, Welding and Plant Design** *0930 – 1240 hrs*

1. *Keynote Paper*
   Use of P91 in HRSGs and conventional boilers and developments in the ASME code
   Jeff Henry, Alstom Power, Chattanooga, TN, ***USA***
   (0930-1010)

2. **Vogt Experience with T91/P91 material: effects of rules infraction during manufacturing and operation**
   A Pasha, Vogt Power International, Louisville, KY., ***USA***
   (1010-1040)

3. **Production experience of TenarisDalmine T/P91: microstructure and mechanical properties, creep behaviour and microstructural evolution**
   S Caminada, G Cumino, TenarisDalmine, Dalmine, ***Italy***
   L Cipolla, A Di Gianfrancesco, Centro Sviluppo Materiali S.p.A., Rome, ***Italy***
   (1040-1110)

Coffee Break	1110 – 1140 hrs

4. **Effect of inexpert working of heat resistant steels to the serviceability**
   Russell Fuchs, Bohler Thyssen Welding USA, Stafford, Texas, ***USA***
   Bernard Hahn, Vallourec & Mannesmann Deutchland, Dusseldorf, ***Germany***
   Herbert Houser and Claus Jochum, Bohler Thyssen Deutchland, Hamm, ***Germany***
   (1140-1210)

5. **Welding consumables and processes for P91 – a producer's experience**
   A W Marshall, Metrode Products Ltd., Surrey, ***UK***
   (1210-1240)

Lunch: 1240 – 1340 hrs

Film show: **"The World of Welding Solutions"**
Mark Roberts, Bohler Thyssen Welding UK Limited, ***UK*** *(15 minutes)*

Session 2: Plant Experience in the Use of Thick and Thin Section Components and Cracking / Failure *1340 – 1730 hrs*

1. *Keynote*
   Service Experience with thick section modified 9Cr (Grade 91) Steel
   *S J Brett, RWE npower, **UK***
   (1340-1420)

2. *Keynote*
   Steam side oxidation of superheater tubing
   *Phil Ennis, Juelich Research Centre, **Germany***
   (1420-1500)

Coffee Break 1500 – 1530 hrs

3. **Steam oxidation of T91 and implications for root cause failure analysis**
   *Fred Starr, JRC Petten, **The Netherlands***
   (1530-1550)

4. **Investigation of a leak in a main steamline P91 piping to 1.25Cr1Mo0.25V control valve dissimilar metal joint: causes and implications**
   *J D Fishburn, Alstom Power, Windsor, CT, **USA***
   *J F Henry, Alstom Power, Chattanooga, TN, **USA***
   (1550-1610)

5. **Experience with HRSG T91 Superheater Tube Failures**
   *Mohamad Lutfi bin Samsudin, PPSB Power Plant, **Malaysia***
   (1610-1630)

6. **Learning curve of new users of P91**
   *T Itay, Israel Electricity Corporation, **Israel***
   (1630-1650)

7. **Worldwide experience in the use of P/T91 steel and component integrity issues**
   *Ahmed Shibli, European Technology Development, Surrey, **UK***
   (1650-1710)

Presentations and Discussion of ASME and European Codes, in particular modifications proposed to ASME Codes *1710 – 1730 hrs*

Seminar Dinner 1930 – 2200 hrs

DAY - 2

INTEGRITY / LIFE ASSESSMENT & REPAIR ISSUES

***Session 3*: P/T91 Component Integrity and Life Assessment** *0900 – 1230 hrs*

1. *Keynote*
   Integrity and life assessment of P91 components
   Fujimitsu Masuyama, Ex-Mitsubishi Heavy Industry, now with Kyushu Institute of Technology, ***Japan***
   (0900-0940)

2. **VTT experience with the life assessment of P91 components**
   P Auerkari, J Henrik Rantala, VTT, ***Finland***
   (0940-1010)

3. **Microstructural changes and life assessment issues in P91 steel**
   Markus Rauch, Karl Maile, MPA Stuttgart, ***Germany***
   (1010-1040)

Coffee Break	1040 – 1110 hrs

4. **Assessment of new ECCC creep rupture database of Grade 91**
   Leonardo Cipolla,Centro Sviluppo Materiali S.p.A., Rome, ***Italy***
   J Gabrel, Vallourec Research Center, ***France***
   (1110-1140)

5. **Predicting the onset of Type IV cracking in P91 - Parametric and model approaches**
   J Brear, SES (Europe), ***UK***
   (1140-1210)

6. **Creep rupture strength values for cast steel 91**
   S R Holdsworth, ALSTOM Power, Rugby, ***UK***
   S Sheng, Siemens Power Generation, Mulheim Ruhr, ***Germany***
   (1210-1240)

7. **Low cycle fatigue and creep-fatigue interaction in mod. 9Cr1Mo steel**
   K Bhanu Sankara Rao, Baldev Raj, Indira Gandhi Centre for Atomic Research Kalpakkam 603 102, ***India***
   (1240-1310)

Lunch: 1310 – 1400 hrs

Session 4: **Weld Repair of P91 Components** *1400 – 1530 hrs*

1. **Can *cold weld repair* be applied to P91 or T91 steel components?**
   D Allen, T R Morgan, Power Technology, E.ON UK plc, ***UK***

   (1400-1430)

2. **Full scale pressure vessel tests on *weld repaired* ex-service and new P91 steel and observations on the resulting cracking**
   J Henrik Rantala, VTT, ***Finland***
   Ahmed Shibli, European Technology Development, ***UK***

   (1430-1500)

3. **Feature tests and simulation of P91 repair welds**
   Ahmed Shibli, Nacera Le Mat Hamata European Technology Development, ***UK***
   Andreas Klenk, Mathias Bauer MPA Stuttgart, ***Germany***

   (1500-1530)

Panel Discussion (HRSG/Boiler integrity assessment and repair
1530 – 1545 hrs

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

P / T 91 Seminar, 7- 8 December 2005

REGISTRATION FEE: Amount payable is that shown in the 'Fee + VAT' column.
* Overseas delegates also pay VAT (Value Added Tax) for events held in the UK.

	Reduced Fee (until 11th November)			**Full Fee** (from 12th November)		
	Fee *	**Fee +VAT @ 17.5% * (To Pay) –** Pounds		Fee *	**Fee +VAT @ 17.5% * (To Pay) –** Pounds	
Delegates	£400	**470**		450	**528.75**	
Presenters	£350	**411.25**		400	**470**	
'Seminar'* + *'Course'* *	£900	**1057.50**		£900	**1057.50**	

** The P91 Course is being held on 5-6 Dec. 2005 at the same Venue. For details visit www.etd1.co.uk and look under 'Training Courses'.

PAYMENT

By UK bank cheque, bankers draft, or bank to bank transfer to:
European Technology Development Ltd.
Nat West Bank, A/C No: 26096625, Sort Code: 60-12-36, UK
*Please quote reference **'P / T 91 Seminar'** with the payment and state here how you paid / 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			
Card Type and No.		Expiry date	
Authorisation signature			

Venue: Institute of Materials, Minerals and Mining (IOM3) www.iom3.org

Accommodation: Information on local hotels will be supplied by ETD on request.

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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