3-Day International 'HIDA - 5' Conference
23-25 June 2010, Guildford, UK   www.hida5.com

PLANT INTEGRITY, DEFECT ASSESSMENT FITNESS-FOR-SERVICE, RISK BASED INSPECTION & MAINTENANCE

Power, Petrochemical, Oil, Gas and other Industrial Applications

2nd Announcement and Call for Papers
Abstracts by 30th October 2009

Keynote Speakers

Speaker and Organisation	Title
1. F Abe, NIMS, Japan	"Martensitic steels for high temperature plant – current issues and future prospects"
2. D Allen, E.ON, UK	"Plant Integrity for dummies: The costs of missing the obvious"
3. F Fujiyama, Meijo University, Japan	"Risk Based Engineering for design, material selection and maintenance of power plants"
4. S R Holdsworth, EMPA, UK	"Creep-Fatigue Interaction"
5. T Igari, MHI, Japan	"Probabilistic in material data assessment"
6. K Maile and A Klenk, MPA Stuttgart, Germany	"Defect assessment by fracture mechanics methods and damage characterisation"
7. F Masuyama, Kyoto Institute Of Technology, Japan	"Advance technology in creep life prediction and damage evaluation for creep strength enhanced ferritic steels"
8. T Ogata, CRIEPI, Japan	"Modelling of creep damage in high temperature component life assessment"
9. A Saxena, Arkansas University, USA	Defect Assessment - Current Issues and Future Prospects
10. A Shibli and P Keatley, ETD and Ulster University, UK	"Power plant cycling and cost analysis"
11. S-T Tu, East China University of Science & Technology, Shanghai, China	"Interaction behaviour of multiple defects in high temperature components"
12. G Webster, Imperial College, London, UK	"Prediction of creep crack growth in the presence of residual stress"
13. Y Yoshioka, Toshiba, Japan	Lifing issues in hot gas path components

Guildford Castle, Surrey

INTRODUCTION

Assessment of the behaviour of high temperature plant components containing defects and operating under steady and/or cyclic load conditions has become an area of urgent need and interest. The series of HIDA conferences, started in April 1998, have now become a regular event aimed at addressing this need. The first HIDA Conference (HIDA-1) was held in Paris in April 1998 and was considered to be a highly focussed event. HIDA-2 Conference was organised in Stuttgart, Germany, at the end of the 4 year of the HIDA project. HIDA (High-temperature Defect Assessment) was a European Commission supported research project aimed at developing a European defect assessment procedure validated on a number of materials of interest to high temperature industry. HIDA-3 was held in Lisbon, Portugal, and was aimed at crack growth and other high temperature behaviour of repair welds. HIDA-4 held at the University of Cambridge, England, was aimed at bringing together experts, academics, researchers and industry personnel interested in assessing the behaviour and life of defect containing components using probabilistic assessment. The development and work/ research on defect and life assessment in high temperature plant components will not be without the interaction of other plant activities or plant experience such as failure analysis, fitness-for-service and preventive maintenance in industrial plant. HIDA-5 will therefore consider a wider scope for which papers are invited on the topics shown below.

CONFERENCE SESSIONS / TOPICS

Papers will be organised under the following *three broad themes* covering both **deterministic** & **probabilistic** methodologies:

1. Integrity and Lifing of Defect-free Components
2. Crack Initiation and Growth
3. Fitness-for-Service, Risk-Based Inspection & Maintenance

Detailed Topics

The above themes are expected to cover following/ related topics:
- Integrity, life assessment/ extension of <u>defect free</u> components
- Integrity, life assessment/ extension of components <u>containing defects/ cracks</u> (manufacturing or service induced)
- Crack growth in new higher strength steels (P91, P92, P23 etc.)
- Sensitivity analysis and cracked component behaviour
- Probability and component life prediction
- Design and material selection based on probabilistic creep, fatigue, and creep-fatigue analysis
- Creep-fatigue interaction in cyclic plant operation
- Probabilistic approach applied to defect assessment
- Numerical techniques and probabilistic assessment
- Risk-Based Inspection and preventive maintenance
- Fitness-for-Service and the new developments
- Applications in various industrial sectors

HIDA-5 Conference
23-25 June 2010

ABSTRACT & PAPER SUBMISSION

Abstracts (200-400 words): **30 October 09**
Full papers: **31 March 10**

Oral presentations will be of <u>20 mins</u> duration including discussion.

Keynote presentations will be of <u>30 mins</u> duration including discussion.

A **poster session** will also be organised.

Conference proceedings will be provided on a CD at the time of the conference.

INT. SCIENTIFIC & ORGANISING COMMITTEE

Dr S Simandjuntak, ETD, UK	Dr S Marie, Commissariat a L'Energie Atomique , France
Dr A Shibli, ETD, UK	
Dr D Allen, E.ON, UK	Engr M Bezuidenhout, Eskom, S. Africa
Prof M Bache, Swansea University, UK	Prof F Masuyama, Kyushu Institute of Technology, Japan
Dr A Bagaviev, E.ON. Germany	
Dr B Dogan, EPRI, USA	Prof K Nikbin, Imperial College & VAMAS Committee, UK
PEng R Emmott, Transalta, Canada	
Prof K Fujiyama, Meijo Uni, Japan	Dr T Ogata, CRIEPI, Japan
Prof R Hurst, JRC, The Netherlands	M C Petry, EDF, France
Prof F Lin, SPERI, China	Prof A Saxena, Uni. of Arkansas, USA
Dr S R Holdsworth, Empa, Switzerland	Dr M Tabuchi, NIMS, Japan
EurIng S Huysmans, Laborelec, Belgium	Dr Panos Topalis, DNV, UK
Dr T Igari, Mitsubishi Heavy Ind., Japan	Prof S-T Tu, ECUST, Shanghai, China
Dr L Kaley, Equity Engineering, USA	Prof G Webster, Imperial College, UK
Dr T-U Kern, Siemens, Germany	Prof A T Yokobori, Tohoku Uni, Japan
Dr A Klenk, MPA Stuttgart, Germany	Prof K-B Yoon, Chung Ang Uni, Korea
Dr D Knowles, Shell, The Netherlands	Dr Y Yoshioka, Toshiba, Japan

REGISTRATION ---- 0840 – 0900 h

DAY 1 (21 JUNE)   0900 – 1700

Lecture 1: Continuum Damage Mechanics

There are numerous models for determining the development of damage in structures. The main damage models will be critically examined relative to their ability to accurately predicting component behaviour. The underlying micro-mechanisms will also discussed.

Specific Topics: Damage Micro-Mechanisms, How damage develops, Damage models -Kachanov-Rabotnov etc.

Lecture 2: Fracture Mechanics Concepts

Basic elastic fracture concepts will be presented, then expanded to encompass complex loading situations and material property considerations. This will be developed to elastic/plastic, fully plastic and creep concepts.

Specific Topics: Fracture theory, Material influences, Elastic/plastic fracture mechanics models, Fully plastic and creep fracture mechanics concepts.

Lecture 3: Defect Assessment Procedures

This part of the course aims to bring the foregoing theory into practice. After briefly reviewing and comparing various codes, a general approach to defect assessment will be presented step-by-step and applied to specific case studies.

Specific Topics: Defect Assessment procedures, UK BS7910 (R6 and R5), French RCCMR-A16, API 579, HIDA, Crackfit.

DAY 2 (22 JUNE)   0900 - 1700

Lecture 4: Creep, Fatigue, Creep/Fatigue Crack Growth

High temperature crack growth is a complex phenomenon. Determination of the behaviour of a component containing a crack / defect at a given time is dependent on the interpretation of numerous material and loading parameters and their interaction. In this module both the underlying principles and the influencing parameters will be examined. Like any component assessment, defect assessment requires reliable input data such as operation, inspection and material data. In practice such data are rarely available for a particular defect location, material cast etc. Hence the use of sensitivity analysis and probabilistic approach to defect assessment are essential to reliably predicting plant integrity by taking into account uncertainty in the input data and variability in material properties.

Specific Topics: Creep crack growth models, Determination of materials parameters, Creep/Fatigue interaction models, Introduction to sensitivity analysis / Probabilistic approach, Problem examples/discussion.

Lecture 5: Defect Assessment Procedures, Their Application and 'CRACKFIT' Software Demo. for Sensitivity Analysis and Probabilistic Assessment (continued on next page)

LMF3 TRAINING COURSE

(21-22 June 2010)

Damage & defect assessment
under creep and/or fatigue conditions

The three-day HIDA-5 conference will be preceded by a Training Course (LMF3) in damage and defect assessment under creep and/or fatigue conditions. This LMF3 course is one of a series of ETD Life Management Foundation (LMF) courses (LMF1, LMF2 and LMF3). The other two courses are: *Plant operation, damage and life assessment* (LMF1) and *Failure Avoidance and Advanced Assessment of Complex / Welded Components* (LMF2).

Full understanding of the intricacies of evaluating the effect of defects in complex structures can only come from a good understanding of the principles underlying materials behaviour. The modules in this course present the theory behind the main damage and crack growth models. The course also critically reviews the main Defect Assessment procedures currently in use.

Experts on defect/life assessment from research organisations and from industry will give interactive lectures. They will demonstrate the new **commercial 'Crackfit'** Defect Assessment Procedure and Software *[developed jointly by ETD (UK) and Laborelec (Belgium)],* and will demonstrate its use for sensitivity analysis and probabilistic assessment in creep and fatigue crack growth. This Training Course, though optional, will be a good preparation for the Conference which will consist of research and industry specific papers.

Who Should Attend

All those who have responsibility for assessing the condition of plant, making run/repair decisions or ensuring safe and uninterrupted operation, or are intimately involved with any of the following functions in Power Generation or Petrochemical industries.

O   Engineering Planning
O   Maintenance Service Providers
O   Inspection - assessing defect significance
O   Insurance
O   Research and Development
O   All those involved in High Temperature Defect Assessment

Course Certificates

These will be awarded to attendees on the completion of the course.

This Lecture will review, compare and discuss various available defect assessment codes and procedures. A general approach to defect assessment will be presented step-by-step and then applied to specific case studies.

The benefits offer

• The opportunity to understand the procedure of defect (hence life) assessment of various components which contain defects like lack of fusion/penetration in welds (defect at weld toes), internal and external surface emerging or embedded defects in straight pipes, defects at stress concentrations such as sharp corners (T-piece, nozzle) and standard laboratory specimens. This includes failure analysis (fast fracture, plastic collapse and ligament rupture) and evaluation of damage mechanisms such as creep, fatigue, and creep-fatigue interaction.

• Hands-on application of Crackfit© for industry engineers who would like to carry out defect assessment without having to go through different established codes or national/ in-house defect assessment practices.

Crackfit© introduces

• The *Material* module allows the user to select different materials commonly used in high temperature plant, such as: martensitic steel ASME P91 including the weld metal and HAZ properties; traditional low alloy steels such as 2.25Cr1Mo (P22) steel, rotor steels such as 1CrMoV, and the austenitic steels such as 304 and 316. The material properties included are tensile strength, stress rupture, rupture ductility, fatigue and creep crack growth data from established sources like HIDA and ECCC datasheets.

• The *Cyclic Loading* module provides algorithm for the user to apply up to four scenarios of cyclic loading of different maximum and minimum load, temperature and dwell time values for the case of creep-fatigue interaction.

• *Sensitivity and Probabilistic analysis:* In reality, input data required for the defect assessment can be varied and may be obtained from well scattered data tending to produce large deviation of the input values, hence reducing the confidence in the quality of the results. CRACKFIT© accommodates the two types of analyses by allowing the user to simply choose the confidence level for different type of input data. The outcome of the evaluation (such as 'time to failure', 'cycles to failure', 'number of cycles required for a specific crack growth' etc.) is represented in CRACKFIT© in a simple tornado or bar diagram for the sensitivity analysis case, and the 'probability of failure versus time' curve can be derived from the probabilistic analysis using Monte-Carlo Simulation.

'CRACKFIT' Procedure and Software Demonstration

The day-2 afternoon of the Training Course will be devoted to the understanding of the commercially available Defect Assessment Procedures. As a part of Lecture 5 the recently developed commercial Software 'Crackfit' will also be demonstrated including its functions as a sensitivity analysis and probabilistic assessment tool. This Software has been jointly developed by ETD and Laborelec/Electrabel (Belgium) and is based on the original HIDA Procedure. It covers a number of power and petrochemical plant component geometries and provides option of the use of other available procedures to analyse defect initiation, growth and probability of failure in high temperature plant. In this module the Crackfit software will be used to solve problem examples related to defect containing components in high temperature plant.
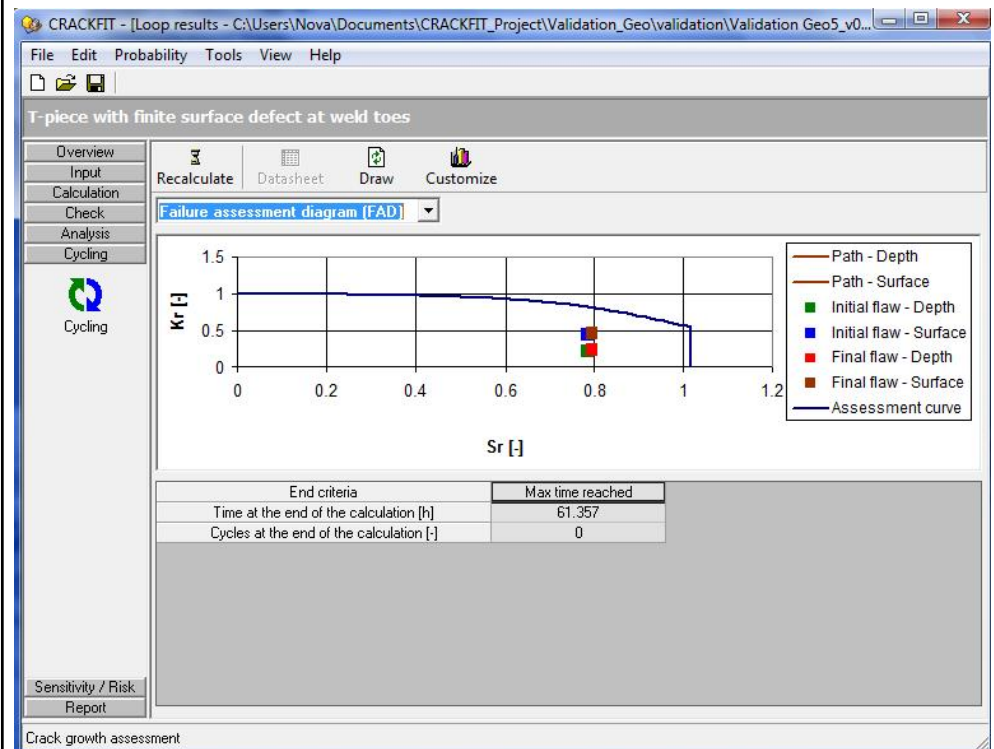
Course enquiries
Dr Sarinova (Nova) Simandjuntak
Tel: + 44 1372 363 111   ssimandjuntak@etd1.co.uk

Registration Form *(vertical text in left margin)*

Registration Fee - *For events held in the UK, overseas delegates also need to pay UK applicable VAT 'value added tax' at 15%. All figures are in* **UK pounds***. (Registration Fee covers Conf. Proceedings, Refreshments, Lunches, and Conf. Dinner).*

* Concessionary fee applies only to the author presenting the paper.		Until 21 May 2010			After 21 May 2010		
** Please 'tick (√)' in appropriate box.		Fee	Amount Payable (Fee + VAT)	**	Fee	Amount Payable (Fee + VAT)	**
Training Course	Any attendee	600	690.00		650	747.50	
Conference	Delegate	550	632.50		600	690.00	
	Author	500	575.00		550	632.50	
Course + Conf.	All	1000	1150.00		1100	1265	
University Accommodation (only during the conference) – limited number of en-suite 'single' rooms (with shower) have been reserved		£55 + £8.25 (VAT) per night = £63.25 (including Breakfast & Dinner)					
Please show check-in and check-out dates for University accommodation		Check-in date: Check-out date:		Total payable for accommodation: £			
Total amount payable to ETD		Registration + Accommodation = £					

Accommodation: Only single room University accommodation (with en-suite shower) is available. *Those wishing to use other type of accommodation need to look for 'hotel' links on the Conf. Website www.hida5.com and book directly with the hotel.*

Payment: Registration and Accommodation Fees are to be paid into the UK pound sterling bank account: A/c Name: European Technology Development Ltd., Bank: Nat West Bank, A/C No: 26096625, Sort Code: 60-12-36. **Please quote reference 'HIDA- 5'.** *(Please state below how and when the fee was paid or will be paid)* …… …… …… …… …… …… …… …… …… …… …… …… …… ……

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 By Paypal: For payment by Paypal using credit card please go to the Conference website: www.hida5.com
Direct to ETD: Payment can also be made by sending the following credit card details (Visa, Mastercard, Switch, JCB, etc., except Diners Club) to ETD **by fax or post** (for security reasons you are advised not send these by email).
Name of account holder: Security code:
Credit card number: Expiry date:
Amount payable: Signatures of the cardholder:

Your title and name:
Company: Position (optional):
Address:
Phone: Fax: E-mail:
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Please state special dietary/access requirements (if any): ..…………………………………………….

Please copy and post / fax / e-mail to the Registration Address below: