

Imperial College London

STRUCTURAL INTEGRITY CENTRE

Post-Experience Course

8-10 July 2020

Predictive Methods in Assessing the Integrity of Cracked Structures PMAS-2020

Covering : continuum and discrete and fracture mechanics based failure modes under creep, fatigue impact, fracture and environmental degradation



TOPICS :

- Mechanisms of fatigue, creep
- NDE and NDT application
- Damage mechanics concepts
- Metallurgical aspects of lifing
- Fracture mechanics K, J, C*
- Corrosion/oxidation mechanics
- Treatment of residual stress
- Testing and analysis
- Models of crack initiation/growth
- Industrial lifing- parent/weld
- Thermo-mechanical fatigue
- Creep-Fatigue interaction
- Component Lifing predictions
- Probabilistic methods
- Codes – BS7910, R5/R6, API, A16

Department of Mechanical Engineering, South
Kensington London, SW7 2AZ United Kingdom

<http://www.imperial.ac.uk/si>

► **Course Resume :**

- This well established course incorporates the most recent advances in the subject of fracture and damage based structural integrity for high temperature component lifetime assessment under static and cyclic loading conditions. It aims to provide a comprehensive understanding of the latest procedures for assessing safety of cracked and un-cracked components so that criteria for their safe use can be specified using damage and fracture mechanics concepts. The methodologies described are established in EU and Internationally Reference will be made to International codes dealing with crack growth test methods
- The lectures will include advice and examples on the use of A16, R5 / R6, BS7910, API/ASME, FITNET, ASTM procedures for component defect assessment and testing methodologies. The course is relevant to the chemical, aerospace, nuclear and conventional power industries .

► **Lecturers :**

- **Bob Ainsworth** is a Professor of Structural Integrity at the University of Manchester, a visiting Professor at Imperial College London and a consultant to EDF Energy. He is involved with the development of criteria for determining the significance of defects in nuclear power plant and engineering equipment.
- **Frank Abdi** Visiting Professor at Imperial and UCLA in the USA. He is also head of Alphastar Corp, Long beach, California working with DoD and NASA. He has extensive expertise in progressive failure analysis, in NDE assessment in addition to testing, modelling processes in 3D additive manufacturing
- **Esteban Busso** is since 2013 one of the Scientific Directors of ONERA, France. He received his PhD from MIT, was an academic member at Imperial College and head of R&D Ecole des Mines de Paris since 2005 and lead researcher at Onera with extensive experience modelling and damage kinetics phenomena.
- **Catrin Davies** is a Lecturer at Imperial College London since 2010 following her PhD at Imperial. In particular she has developed analytical, numerical skills and testing techniques for predicting damage under creep and fatigue of welds with residual stress in collaborating with BSI and TAGSI committees.
- **David Dean** is a visiting Professor at Imperial College London and a high temperature specialist in the Assessment Technology Group within the Nuclear Division of EDF Energy managing their high temperature R&D. As chair to the R5 Industrial panel he oversees the development of the R5 procedure.
- **Michael Lowe** is the Head of Mechanical Engineering and elected as a Fellow of the Royal Academy of Engineering in 2014. He is a director of Guided Ultrasonics Ltd. His research interests are in Non Destructive Testing (NDT), and covers mechanics, stress analysis, vibration, and FE modelling.
- **Noel O'Dowd** is Professor of Mechanical Engineering at the University of Limerick, Ireland. He received his PhD from Brown University in the USA and then worked at the California Institute of Technology before joining Imperial College London . His R&D interests are computational methods in fracture mechanics.
- **Jonathan Parker** is Executive at the Electric Power Research Institute (EPRI). He was Head of Materials Dept. at Swansea University, and has worked with CEGB(UK), Ontario Hydro and Structural Integrity Associates, Inc. (USA) and responsible for research and training in the power industry worldwide.
- **Yun-Jae Kim** is Professor of Mechanical Engineering at Korea University and a visiting Professor at Imperial College London. His current research covers computational structural analysis methods and developing micromechanical models of damage and fracture for structural integrity applications.
- **Kamran Nikbin** Holds a Royal Academy of Engineering/EDF Energy Professor's Chair in 'Structural Integrity' at Imperial College London. His research findings are used to establish procedures for determining the safety of structural components. He is involved in the ASTM, VAMAS and ISO committees.

▶ **Who should attend ?**

The course is suitable for engineers, managers, materials scientists and technical personnel, with a degree or equivalent, involved in the aerospace, chemical, electrical, nuclear and the power industry .

A certificate of attendance will be awarded to each participant at the end of the course .

▶ **Course Booking and Payments**

Registration should usually be made online starting 1st Jan. 2020

▶ **Course Fees** (VAT Exempt) to cover tuition, course notes, refreshments, lunches and dinners

****Please note fees must be received BEFORE the course start date ****

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| ● Registration before 10th June 2020 | £1100 |
| ● Registration of two or more persons (same Organisation) | £950 pp |
| ● Late registration after 10th June 2020 | £1250 |
| ● Registered Students | £850 |
| ● Attendees from outside of the European Union | £850 |

You can complete and submit the registration form at :

<http://www3.imperial.ac.uk/mestructuralintegrity/PMAS-20 form>

This will proceed to the payments page (Note in the 'Event Fees' page the Organiser option should be 'Mechanics of Materials') .

▶ **ON-LINE REGISTRATION : OPEN ON THE WEBSITE FROM 1ST Jan. 2020**

If you are unable to complete the on-line registration form, for any reason, please contact: Miss Valerie Crawford by email (preferable), or post to the address shown below quoting .

"Ref: PMAS-20, c/o K. Nikbin or Ms Valerie Crawford (PMAS-20 Course)
Mechanics of Materials Division Department of Mechanical Engineering Imperial College London
South Kensington Campus , London, SW7 2AZ

Email: v.crawford@imperial.ac.uk or k.nikbin@imperial.ac.uk

Detailed joining instructions, including the final timetable, a map of the venue and details of lecture rooms, will be emailed to all participants 10 -14 days prior to the commencement of the course. While every attempt will be made to ensure the material arrives in time, it is the participants' responsibility to contact the course organisers if no information has been received.

▶ **Places on the course are limited therefore EARLY REGISTRATION IS ADVISABLE .**

Accommodation

you can book rooms at Imperial College Campus which will make it very convenient and economical for the attendees, at :

<http://www.imperial-accommodationlink.com>

Early booking is recommended by contacting the Imperial

Summer accommodation and Hotel Booking Service :

Tel : +(44)20 7594 9506/11

Fax : +(44)20 7594 9504/5

Email: reservations@imperial.ac.uk

<http://www.imperial-accommodationlink.com>

following the link to the South Kensington Campus .

The centre will also help with list and reservations at local hotels if College rooms are unavailable for that period .

