

APPLICATION OF PROBABILISTIC STRUCTURAL INTEGRITY METHODS AND BENEFITS FOR NUCLEAR ASSET, DESIGN, OPERATION AND DECOMMISSIONING

Institution of
**MECHANICAL
ENGINEERS**

JOINT SEMINAR WITH:



UK FORUM FOR ENGINEERING STRUCTURAL INTEGRITY

10 October 2018

Institution of Mechanical Engineers
One Birdcage Walk, London

More details available at
www.imeche.org/probabilistic

KEY SPEAKERS INCLUDE:

Andy Holt
Professional Lead for Structural Integrity
ONR

David Langbridge
Head of DNSR
Defence Nuclear Safety Regulator

Keith Wright
Chief Stress Engineer, Submarines
Rolls-Royce

Tom Siddall
Group Head, Structural Analysis Group
EDF-Energy

Mutaz Bashir
Principal Engineering Analyst (Codes & Standards)
UKAEA - Culham Centre for Fusion Energy



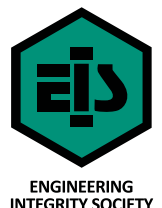
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APPLICATION OF PROBABILISTIC STRUCTURAL INTEGRITY METHODS AND BENEFITS FOR NUCLEAR ASSET, DESIGN, OPERATION AND DECOMMISSIONING

10 October 2018, One Birdcage Walk, London

THE NUCLEAR INDUSTRY HAS TRADITIONALLY FAVOURED DETERMINISTIC DESIGN-CODE USE FOR STRUCTURAL INTEGRITY OVER PROBABILISTIC METHODS. HOWEVER, AS THE DEMAND FOR ENERGY GROWS, SO DOES THE NEED FOR GREATER EFFICIENCY IN DESIGN, OPERATION AND DECOMMISSIONING.

Improved knowledge in the field of structural integrity continues to highlight that the unquantified margins associated with current design-codes do not provide a consistent measure of component risk. Consequently the focus of effort or finance can inadvertently lead to constraints on delivery of optimal designs.

This seminar will discuss current best practice in ensuring structural integrity for nuclear and non-nuclear applications as well as pushing forward the future use of probabilistic methods. This event will also present an opportunity to stimulate debate, improve collaboration and understand regulation in the area of nuclear structural integrity. Join us as we explore how to keep safety a priority while balancing availability of resources and affordability with probabilistic approaches.

KEY TOPICS INCLUDE:

- **Rolls Royce** outline the background, motivation and challenges of using probabilistic methods.
- **University of Bristol** share common issues around the application and implementation of probabilistic methods.
- Hear insights into the design of demo in-vessel components from **UKAEA** and **Wood Group Plc**
- **Horizon Nuclear Power** outline best practice for risk-informed approaches for in-service inspections
- Join the discussion about the proposed direction of travel for probabilistic methods with **Office for Nuclear Regulation, Defence Nuclear Safety Regulator, Wood Group Plc** and **Rolls-Royce**.

ATTEND THIS EVENT TO:

- Hear and discuss the latest industry thinking on development of probabilistic approaches
- Understand how to reduce unnecessary expenditure by using probabilistic approaches to target resources at areas of greatest benefit
- Hear case studies from operators on alternative design approaches to structural integrity challenges in nuclear and non-nuclear settings
- Gain a greater understanding of how to enhance component reliability and minimise power plant outage during in service inspections
- Take away successful strategies to streamline processes for potential nuclear new builds.

ORGANISING COMMITTEE:

Structural Technologies and Materials Group (STMG), Institution of Mechanical Engineers

UK Forum on Engineering Structural Integrity (FESI)

MEMBER CREDITS:

With thanks to:

Keith Wright, Chief Stress Engineer
Rolls-Royce

Stephen Garwood, Professor of Structural Integrity
Imperial College London

John Sharples, Chief Technologist Structural Integrity
Wood Group

Simon Smith, Structural Integrity Consultant
Transforming Stress

Alexander Price, Inspector, Structural Integrity
Office for Nuclear Regulation

Simon Quinn, Professorial Fellow
University of Southampton

Simon Brittle, Assistant Chief Engineer
Rolls-Royce

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PROGRAMME

WEDNESDAY 10TH OCTOBER 2018

08:30	REGISTRATION AND REFRESHMENTS
09:00	CHAIR'S OPENING REMARKS Stephen Garwood, Professor of Structural Integrity, Imperial College London
BACKGROUND AND MOTIVATION	
09:10	BACKGROUND, MOTIVATION & CHALLENGES – THE ROLE FOR PROBABILISTICS Keith Wright, Chief Stress Engineer, Submarines, Rolls-Royce
09:35	TARGET RELIABILITIES IN STRUCTURAL INTEGRITY Simon Williams, Chief Technologist – Nuclear Safety, Rolls-Royce Submarines
10:00	RISK INFORMED PERFORMANCE BASED APPROACH FOR DESIGNING AGAINST EXTREME EVENTS Nawal Prinja, Technology Director, (Nuclear) Wood plc
10:25	QUESTION AND ANSWER SESSION
10:40	NETWORKING REFRESHMENT BREAK
ADVANTAGES AND DISADVANTAGES	
11:10	NON-NUCLEAR PROBABILISTIC APPLICATIONS Mark Joyce, Group Leader, Numerical Modelling, Frazer-Nash Consultancy
11:35	PROBABILISTIC METHODS: APPLICATION AND IMPLEMENTATION ISSUES Julian Booker, Professor of Mechanical Design Engineering, Solid Mechanics Group, University of Bristol
12:00	APPLICATION OF PROBABILISTIC FRACTURE MECHANICS (PFM) IN QUANTIFYING THE ROLE OF WELDING RESIDUAL STRESS IN FRACTURE ASSESSMENT Isabel Hadley, Technology Fellow, Integrity Management Group, TWI Ltd
12:25	QUESTION AND ANSWER SESSION
12:40	NETWORKING LUNCH
EXAMPLES OF APPLICATIONS IN DESIGN, OPERATION AND DECOMMISSION	
13:40	PROBABILISTIC DESIGN OF DEMO IN-VESSEL COMPONENTS Mutaz Bashir, Principal Engineering Analyst (Codes & Standards) UKAEA - Culham Centre for Fusion Energy Paul Smith, Consultant, New Nuclear, Wood plc
14:05	USING PROBABILISTICS TO EXTEND EVAPORATOR OPERATING LIFE Caroline Pyke, Senior Statistician, National Nuclear Laboratory
14:30	PROBABILISTIC ASSESSMENT OF AGR NUCLEAR FUEL PLUG INTEGRITY DURING FUEL HANDLING Tom Siddall, Group Head, Structural Analysis Group, EDF-Energy
14:55	QUESTION AND ANSWER SESSION
15:10	NETWORKING REFRESHMENT BREAK
FUTURE VISION OF PROBABILISTIC STRUCTURAL INTEGRITY FOR NUCLEAR MATERIALS	
15:40	RISK-INFORMED APPROACHES FOR IN-SERVICE INSPECTIONS Tim Jelfs, Acting Head of Nuclear Island, Horizon Nuclear Power
16:05	NUCLEAR STRUCTURAL INTEGRITY PROBABILISTIC WORKING PRINCIPLES Mike Martin, Engineering Associate Fellow – Structural Integrity, Rolls-Royce
16:30	PANEL DISCUSSION: STAKEHOLDER VIEWS ON THE PROPOSED DIRECTION OF TRAVEL FOR PROBABILISTIC METHODS Andy Holt, Professional Lead for Structural Integrity, ONR David Langbridge, Head of DNSR, Defence Nuclear Safety Regulator Nawal Prinja, Technology Director, (Nuclear) Wood plc Keith Wright, Chief Stress Engineer, Submarines, Rolls-Royce
17:00	CHAIR'S CLOSING REMARKS Stephen Garwood, Professor of Structural Integrity, Imperial College London
17:10	END OF SEMINAR

For the most up-to-date and detailed programme for the event, please visit www.imeche.org/probabilistic

- This programme is subject to change.
- The Institution is not responsible for the views or opinions expressed by individual speakers.

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FEES AND CHARGES

Registration fees include entry to the sessions, refreshments, and copies of select presentations.

Fees and charges	Standard Rates
Member, IMechE/FESI/supporting organisation	£180 + VAT = £216
NON-MEMBER	£220 + VAT = £264
Student/Retired	£120 + VAT = £144

THREE WAYS TO BOOK

1 Online:
www.imeche.org/probabilistic

2 Email:
eventenquiries@imeche.org

3 Phone:
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Please read the information listed below as each booking is subject to the Institution's standard terms and conditions.

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Completed application forms should be returned to the address above, along with the correct payment. Attendance at the event will be confirmed on receipt of the full balance. All participants are advised to bring a copy of their confirmation with them on the day, to ensure the fastest possible entry.

SPECIAL REQUIREMENTS

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LIABILITY

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VENUE

Institution of Mechanical Engineers
One Birdcage Walk
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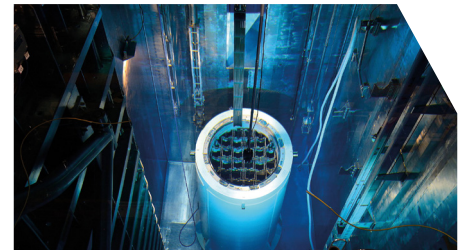
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OTHER EVENTS TO LOOK FOR



NUCLEAR MATERIALS: AVOIDING STRUCTURAL INTEGRITY FAILURES

3 October 2018, Manchester

This one-day seminar sets out to discuss in-operation materials challenges experienced by the current UK generating fleet and how to effectively manage them.

www.imeche.org/nuclearmaterials2018



NUCLEAR LIFTING 2018

29 November 2018, Manchester

Discover engineering solutions to the technical and environmental challenges facing those conducting high risk lifting at the only event of its kind dedicated to lifting projects in the nuclear industry.

www.imeche.org/nuclearlifting2018

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