

# IMPROVING SAFETY WITH ADVANCED FRACTURE MECHANICS

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Institution of  
**MECHANICAL  
ENGINEERS**

15 May 2019  
One Birdcage Walk, London

**Seminar**

More details available at:  
[www.imeche.org/fracturemechanics](http://www.imeche.org/fracturemechanics)

## KEY SPEAKERS INCLUDE:

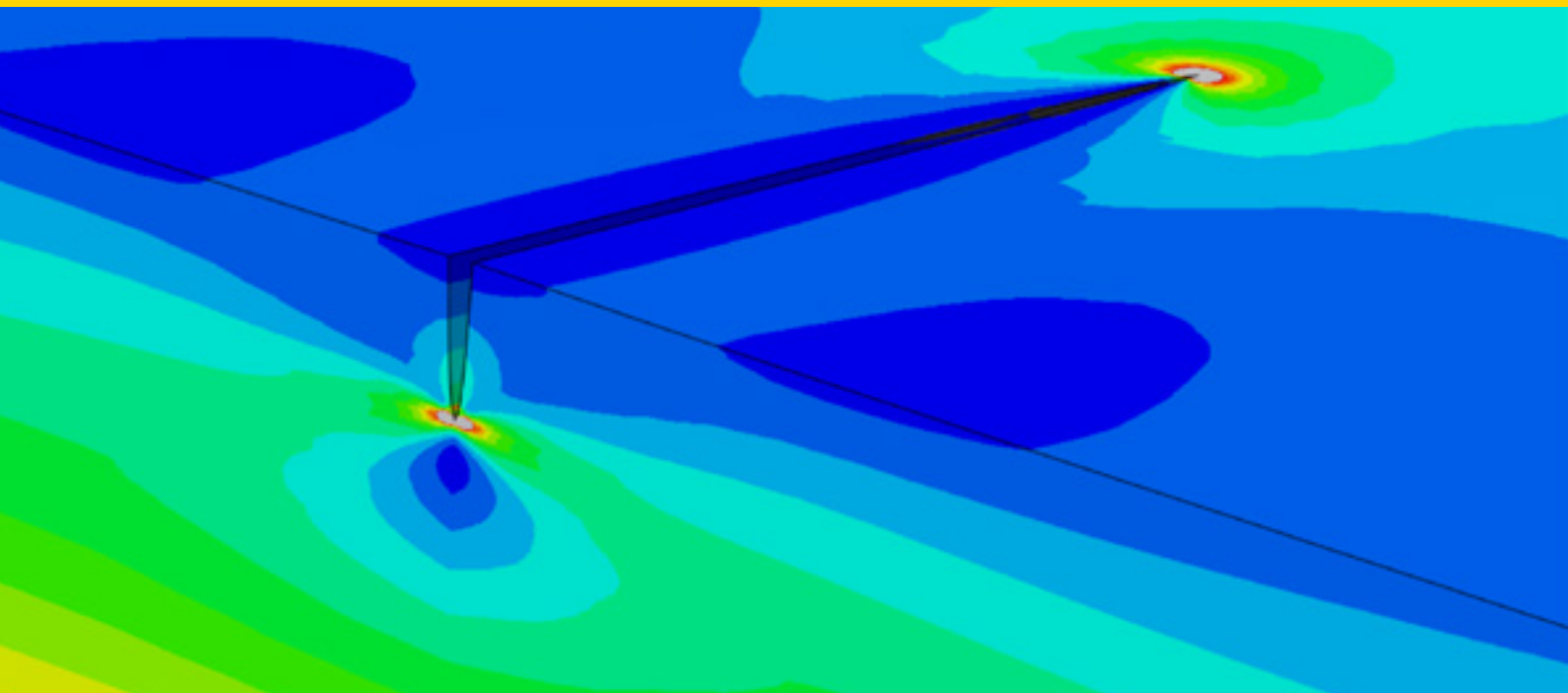
Isabel Hadley, Technology Fellow  
**TWI Ltd**

Chris Aird, Structural Integrity Engineer  
**EDF Energy Nuclear Generation**

John Francis, Reader in Welding Technology  
**The University of Manchester**

Anthony Horn, Structural Integrity Specialist  
**Wood Group PLC**

Martin Booth, Core Stress Engineer  
**Rolls-Royce Submarines**



## SUPPORTING ORGANISATIONS:



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Book your place at: [www.imeche.org/fracturemechanics](http://www.imeche.org/fracturemechanics)

# IMPROVING SAFETY WITH ADVANCED FRACTURE MECHANICS

15 May 2019, One Birdcage Walk, London

## INNOVATION IN FRACTURE MECHANIC TESTING METHODS IS HAPPENING IN RESEARCH, HOWEVER IT IS DIFFICULT FOR INDUSTRY TO ADOPT NEW METHODS QUICKLY.

As codes and standards such as BS7910 and R6 are updated, it is important for industry follow the direction of structural research to encourage the appropriate development of such codes based upon up-to-date knowledge. New testing methods have the potential to reduce costs, as well as reducing safety risks through predictive analytical testing of crack growth and initiation.

The Improving Safety with Advanced Fracture Mechanics seminar will address the challenges around the industry adoption of new testing methods, bridging the gap between academic innovation and industry application.

Attendees will gain a clear understanding of new testing and modelling methods that will improve the prediction and monitoring of crack initiation and growth as a result of fatigue, stress corrosion and hydrogen exposure.

Ensure that your processes remain safe and are compliant with the latest regulations and codes, together with best practice and insights gained from industry and academic case studies. Take back new strategies for generating and accessing useful material data that will enhance your organisation's assessments and testing processes.

### KEY PROGRAMME HIGHLIGHTS:

- **Isabel Hadley, TWI**, will discuss 2019 improvements to BS 7910 and why it needs updating.
- **EDF energy** share insights into **R6 amendments**, and present fracture assessment of components with residual stresses using **FE fracture analyses**.
- **Wood Group PLC** share best practices for **addressing the gaps in material data** for fracture assessments.
- DNV GL present a **new approach for avoiding stress corrosion cracking** in high H2S pipelines.
- **University of Cambridge** will shed light on the move towards **virtual testing** using physically-based models to **predict cracking as a function of the environment**.

### ATTEND THIS SEMINAR TO:

- **Ensure that your processes remain safe and are compliant** with the latest regulations and codes, with input from BSI and DNV GL
- **Address the challenge** of balancing the accuracy of data gathering with existing budgets
- **Understand the latest techniques and technologies** for monitoring, predicting and modelling fatigue, stress corrosion and hydrogen exposure
- **Take back new strategies for generating and accessing useful material data** to enhance your assessments and testing
- **Bridge the gap between the latest innovations and research** from academia with best practice from engineers in industry
- **Benefit from case study insights** from nuclear operators, including EDF Energy and Wood Plc
- **Network** with engineering thought leaders, researchers, safety and compliance professionals

### ORGANISING / ADVISORY COMMITTEE:

STMG:

Simon Smith

**Transforming Stress Ltd.**

Simon Quinn, Professional Fellow

**University of Southampton**

Joy Tao, Team Lead, Structural Analysis Group,

Structural Integrity Branch,

**EDF Energy**

### MEMBER CREDITS:

Simon Smith

**Transforming Stress Ltd.**

Simon Quinn, Professional Fellow

**University of Southampton**

Joy Tao, Team Lead

**Structural Analysis Group, Structural Integrity Branch, EDF Energy**

BOOK YOUR PLACE TODAY

[WWW.IMECHE.ORG/FRACTUREMECHANICS](http://WWW.IMECHE.ORG/FRACTUREMECHANICS)

TERMS AND  
CONDITIONS  
APPLY

# PROGRAMME

15 MAY 2019	
08:30	REGISTRATION AND REFRESHMENTS
09:00	<b>CHAIR'S OPENING REMARKS</b> Mahmoud Mostafavi, Reader in Structural Integrity, University of Bristol
<b>FRACTURE MECHANICS CODES, STANDARDS &amp; SOFTWARE</b>	
09:10	<b>WORKING TOWARDS BS 7910 2019</b> Isabel Hadley, Technology Fellow, TWI Ltd and RA Eng/University of Bristol/TWI Visiting Professor in Integrity Management
09:35	<b>THE R6 FRACTURE PROCEDURE: OVERVIEW OF THE LATEST AMENDMENT AND HIGHLIGHTS FROM ONGOING DEVELOPMENT WORK - THE R6 FRACTURE PROCEDURE</b> Chris Aird, Structural Integrity Engineer, EDF Energy Nuclear Generation
10:00	<b>MODELLING CRACK PROPAGATION AND ARREST USING FRANC3D</b> Martin Booth, Core Stress Engineer, Rolls-Royce Submarines
10:25	<b>QUESTION AND ANSWER SESSION</b>
10:40	NETWORKING REFRESHMENT BREAK
<b>STRESS CORROSION AND HYDROGEN CRACKING</b>	
11:10	<b>TOWARDS VIRTUAL TESTING IN THE ENERGY SECTOR: RELIABLE MODELLING OF HYDROGEN ASSISTED FRACTURE</b> Emilio Martínez-Pañeda, 1851 Research Fellow, Cambridge Centre for Micromechanics, University of Cambridge
11:35	<b>HYDROGEN EMBRITTLEMENT OF SUBSEA DISSIMILAR METAL WELDS</b> Mike Dodge, Principal Project Leader, Materials Engineer, TWI
12:00	<b>A NEW FRACTURE MECHANICS APPROACH FOR AVOIDING SSC IN HIGH H2S PIPELINES</b> David Baxter, Principal Consultant, DNV GL
12:25	<b>QUESTION AND ANSWER SESSION</b>
12:40	NETWORKING LUNCH
<b>ADDRESSING THE GAPS IN MATERIAL AND INPUT DATA</b>	
13:40	<b>ADDRESSING GAPS IN MATERIAL DATA FOR FRACTURE ASSESSMENTS</b> Anthony Horn, Structural Integrity Specialist, Wood Group PLC
14:05	<b>USE OF RISK-BASED DEFECT ASSESSMENT METHODS TO MANAGE AGEING NUCLEAR ASSETS</b> Paul Shard, Director and Principal Engineer, EASL
14:30	<b>FRACTURE MECHANICS FOR PIPELINES AND STEEL STRUCTURES</b> Ravinder Singh, Senior Engineer, Rosen Group
14:55	<b>QUESTION AND ANSWER SESSION</b>
15:05	NETWORKING REFRESHMENT BREAK
<b>RESIDUAL STRESSES</b>	
15:35	<b>MEASUREMENT, MODELLING AND MITIGATION OF RESIDUAL STRESSES IN STEEL WELDS</b> John Francis, Reader in Welding Technology, The University of Manchester
16:00	<b>FRACTURE ASSESSMENT OF COMPONENTS WITH RESIDUAL STRESSES USING FE FRACTURE ANALYSES</b> Yubao Lei, Structural Integrity Engineer, EDF Energy
16:25	<b>QUESTION AND ANSWER SESSION</b>
16:35	<b>PANEL DISCUSSION: BRIDGING THE GAP BETWEEN INDUSTRY AND ACADEMIA</b>
17:10	<b>CHAIR'S CLOSING REMARKS</b>
17:20	END OF SEMINAR

**For the most up-to-date and detailed programme for the event, please visit:**  
[www.imeche.org/fracturemechanics](http://www.imeche.org/fracturemechanics)

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

## HOW TO BOOK YOUR PLACE

### FEEs AND CHARGES

Registration fees include entry to the sessions, refreshments and a copy of the conference proceedings.

Delegate Type	EARLY BIRD RATE Until 29 March 2019	STANDARD RATE
Member, Institution of Mechanical Engineers / Supporting Organisation	£270 + VAT = £324	£300 + VAT = £360
Non-member	£360 + VAT = £432	£400 + VAT = £480
Full-time Student/Retired	£90 + VAT = £108	£90 + VAT = £108

### THREE WAYS TO BOOK

- 1 online:  
[www.imeche.org/fracturemechanics](http://www.imeche.org/fracturemechanics)
- 2 email:  
[eventenquiries@imeche.org](mailto:eventenquiries@imeche.org)
- 3 phone:  
**+44 (0)20 7973 1251**

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

#### CONDITIONS OF BOOKING

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

Please inform us of any special requirements, ie dietary or access, on the relevant section of the booking form or email [eventenquiries@imeche.org](mailto:eventenquiries@imeche.org)

#### Cancellation

For a refund (minus £25+VAT admin charge), cancellations must be received at least 30 days prior to the event. Replacement delegates are welcome at any time. The Institution reserves the right to cancel any event. In this case, the full fee will be refunded unless a mutually convenient transfer can be arranged. In the event that the Institution postpones an event for any reason and the delegate is unable or unwilling to attend on the rescheduled date, they will receive a full refund of

the fee paid. The Institution is not responsible for any loss or damage as a result of a substitution, alteration or cancellation/postponement of an event. The Institution shall assume no liability whatsoever if this event is cancelled, rescheduled or postponed due to a fortuitous event, Act of God, unforeseen occurrence or any other event that renders performance of this conference impracticable, illegal or impossible. For the purposes of this clause, a fortuitous event shall include, but not be limited to: war, fire, labour strike, extreme weather or other emergency.

Please note that while speakers and topics were confirmed at the time of publishing, circumstances beyond the control of the organisers may necessitate substitutions, alterations or cancellations of the speakers and/or topics. The Institution reserves the right to alter or modify the advertised speakers and/or topics if necessary without any liability to you whatsoever. Any substitutions or alterations will be updated on the event's webpage as soon as possible.

#### LIABILITY

The organisers do not accept liability for any injuries or losses of any nature incurred by delegates and/or accompanying persons, nor for loss or damage to their luggage and/or personal belongings.

#### CONFERENCE VENUE

Institution of Mechanical Engineers  
One Birdcage Walk  
Westminster  
London  
SW1H 9JJ

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### OTHER EVENTS TO LOOK FOR



### FIT FOR PURPOSE SAFETY CASES IN THE NUCLEAR INDUSTRY

4 June 2019, Birmingham

Learn all the fundamentals and gain an appreciation of the essential elements of achieving safety cases that are suitable and sufficient for their purpose of enabling safe facility management.

[www.imeche.org/fitforpurpose](http://www.imeche.org/fitforpurpose)



### ROBOTICS AND AUTONOMOUS SYSTEMS (RAS) IN OFFSHORE WIND OPERATION AND MAINTENANCE (O&M) SERVICES

23 May 2019, One Birdcage Walk, London

RAS are currently being used by offshore wind operators to reduce costs and de-risk O&M activities. This event will reveal the specific industry challenges related to O&M and requirements for RAS (both commercial and technical).

[www.imeche.org/offshorewind](http://www.imeche.org/offshorewind)

The Institution of Mechanical Engineers organises over 120 events a year, including free-to-attend lectures as well as conferences, seminars, annual luncheons and dinners. Please visit [www.imeche.org/events](http://www.imeche.org/events) for the complete list of events.

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