

NUCLEAR MATERIALS AVOIDING STRUCTURAL INTEGRITY FAILURES

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Institution of
**MECHANICAL
ENGINEERS**

Power Industries Division
Seminar

3 October 2018

Manchester United Football Club, Old Trafford,
Manchester

KEY SPEAKERS INCLUDE:

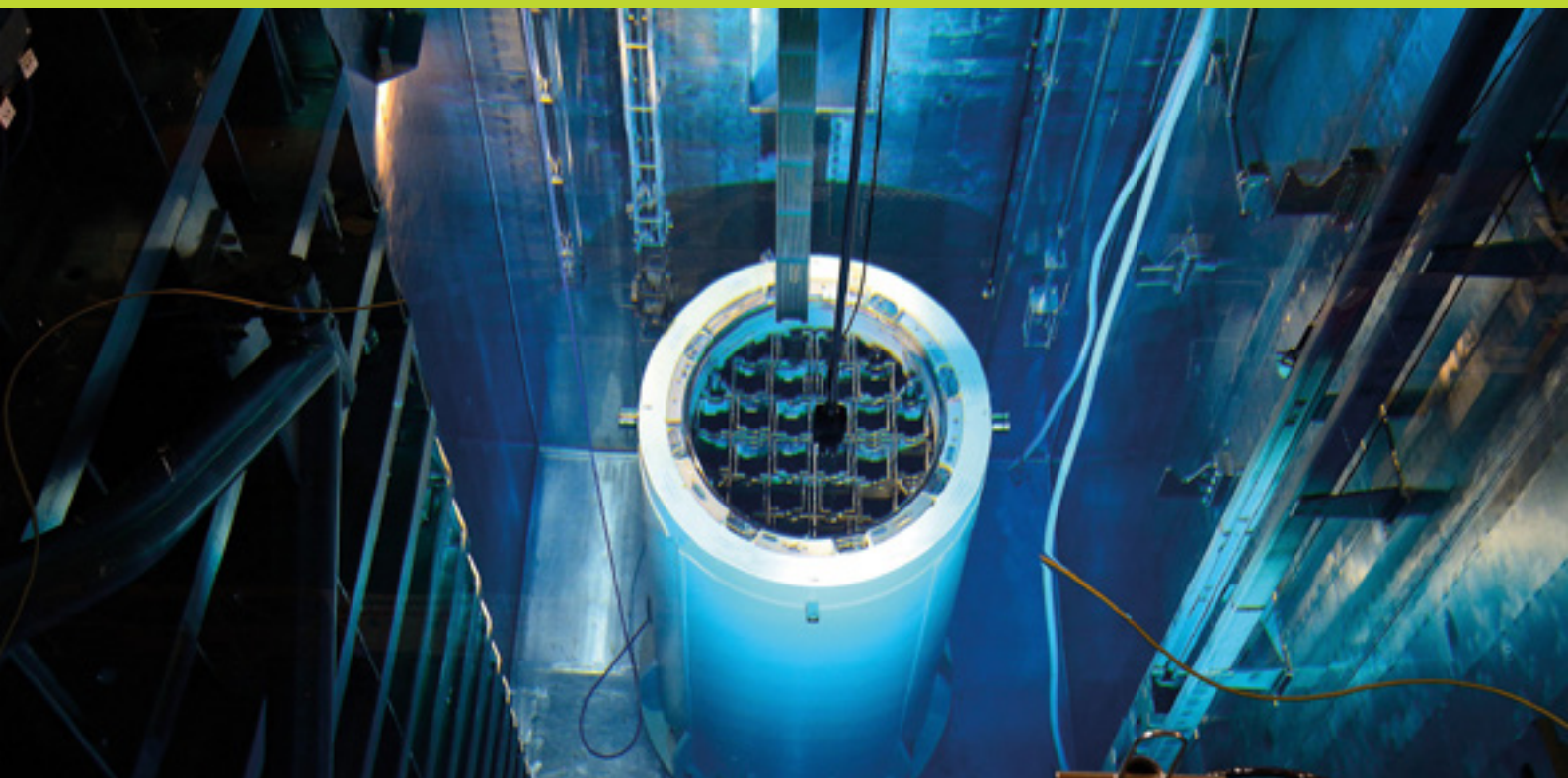
Russell Green, Nuclear Safety Inspector –
Structural Integrity – Operating Facilities
Office for Nuclear Regulation

Tom Siddall, Group Head, Structural Analysis
Group, CTO Structural Integrity Branch
EDF Energy

Andrew Barrow, Engineering Specialist –
Materials
Rolls-Royce Submarines

Michael Gorley, Materials Technology
Programme Manager
UKAEA

Paul Whiteside, Senior Materials Engineer,
Inspection & Certification Group
Sellafield



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NUCLEAR MATERIALS: AVOIDING STRUCTURAL INTEGRITY FAILURES

3 October 2018, Manchester United Football Club, Old Trafford, Manchester

WITH AGING NUCLEAR POWER PLANTS AND DEMAND FOR LIFE EXTENSION, IT IS ESSENTIAL TO ADDRESS THE SAFETY, RELIABILITY AND DURABILITY OF MATERIALS USED IN NUCLEAR PLANTS. UNDERSTANDING MATERIALS PROPERTIES AND BEHAVIOUR IS KEY TO REDUCING RISK OF STRUCTURAL FAILURES AND LOWER INSPECTIONS AND MAINTENANCE COSTS.

This seminar will discuss the key materials challenges facing operators, including irradiation, carburisation, testing, regulatory expectations and future issues. Gain insights into the best ways to assess, investigate and manage problems from companies including **EDF Energy, Rolls-Royce Submarines, NNL, ONR and University of Manchester.**

Attendees will gain a better understanding of how materials behave in a nuclear power context and discover how current knowledge can inform future projects, including **small modular reactors, fusion and decommissioning.**

Take advantage of interactive sessions to discuss materials challenges the nuclear engineering community.

KEY PROGRAMME HIGHLIGHTS:

- Find out more about meeting regulatory expectations for highest reliability components on operating reactors from **Office for Nuclear Regulation**
- Hear about the outcome of **Environment Agency** inspection of asset management of nuclear sites in England and Wales
- **Rolls-Royce Submarines** addresses irradiation embrittlement and thermal ageing in low alloy steels
- **EDF Energy** discusses the effect of in-service carburisation on austenitic stainless steels and fracture mechanics assessment of thermally aged AGR fuel plug units
- **University of Manchester** shares insights on irradiation damage in nuclear graphite and the effects on properties and structural integrity of AGR core components

ATTEND THIS SEMINAR TO:

- Explore the causes and effects of material property changes **to reduce the risk of structural integrity failures in your nuclear plant**
- **Hear case studies discussing structural integrity challenges** in power plants and how EDF is overcoming these
- **Understand regulatory expectations** with reference to the ageing and degradation of existing plants
- **Hear the latest developments** from fusion research, decommissioning and new build that can inform better strategies
- Discover effective methods for **inspection, testing and interpreting data** to enhance plant maintenance
- **Meet and network with operators and nuclear materials experts** to share strategies to extend plant life and enhance safety

ORGANISING COMMITTEE:

Power Industries Division
Institution of Mechanical Engineers

MEMBERS CREDITS:

Mark Shannon, Project Management Office
UKAEA

Narmeen Rehman, Mechanical Engineer
EDF Energy

Simon Brittle, Assistant Chief Engineer
Rolls-Royce

Lee Warren, Head of Engineering – Cores
Rolls-Royce

Andy Pyle, Strategic Outage Manager,
Heysham 2 Power Station
EDF Energy

WITH THANKS TO:

Nuclear Power Committee

Structural Technology & Materials Group

EARLY BIRD DISCOUNT ENDS 10 AUGUST 2018

WWW.IMECHE.ORG/NUCLEARMATERIALS2018

TERMS AND
CONDITIONS
APPLY

PROGRAMME

WEDNESDAY 3 OCTOBER 2018	
08:30	REGISTRATION AND REFRESHMENTS
09:00	CHAIR'S OPENING REMARKS Mark Shannon, Project Management Office, UKAEA
PREVENTING ACCIDENTS THROUGH UNDERSTANDING CHALLENGES	
09:10	KEYNOTE: OUTCOME OF ENVIRONMENT AGENCY INSPECTION OF ASSET MANAGEMENT ON NUCLEAR SITES IN ENGLAND AND WALES Karl Littlewood, Nuclear Regulation Group South, Team Leader, Environment Agency
09:35	IRRADIATION DAMAGE: CORRELATING MICROSTRUCTURAL OBSERVATIONS WITH CHANGES IN MATERIAL PROPERTIES IN NUCLEAR POWER PLANTS Jonathan Hyde, Chief Technologist – Reactor Operations Support, National Nuclear Laboratory
10:00	IRRADIATION EMBRITTLEMENT AND THERMAL AGEING IN LOW ALLOY STEELS Andrew Barrow, Engineering Specialist – Materials, Rolls-Royce Submarines
10:25	QUESTION AND ANSWER SESSION
10:40	NETWORKING REFRESHMENT BREAK
IN-OPERATION NUCLEAR CASE STUDIES	
11:10	EFFECT OF IN-SERVICE CARBURISATION ON AUSTENITIC STAINLESS STEELS Jacob Knight, Assessment Technology Engineer, Assessment Technology Group, CTO Structural Integrity Branch, EDF Energy
11:35	FRACTURE MECHANICS ASSESSMENT OF THERMALLY AGED ADVANCED GAS-COOLED REACTOR FUEL PLUG UNITS Tom Siddall, Group Head, Structural Analysis Group, CTO Structural Integrity Branch, EDF Energy
12:00	QUESTION AND ANSWER SESSION
12:10	PANEL DISCUSSION: SUCCESSFULLY EXTENDING MATERIALS OPERATIONAL LIFE Chair: Mark Shannon, Project Management Office, UKAEA Tom Siddall, Group Head, Structural Analysis Group, CTO Structural Integrity Branch, EDF Energy Christopher Bell, Head of Reactor Components – SMR, Civil Nuclear, Rolls-Royce plc David Stoddart, Research Manager, Nuclear AMRC Paul Mummery, Chair in Nuclear Materials, School of Mechanical, Aerospace, and Civil Engineering, University of Manchester <ul style="list-style-type: none">• How to deal with ageing materials in order to ensure durability and safety?• How to reduce costs without compromising results?• Where to focus maintenance efforts for long-term management?
12:45	NETWORKING LUNCH
INTERPRETING DATA AND RISK MITIGATION	
13:45	IRRADIATION DAMAGE IN NUCLEAR GRAPHITE: EFFECTS ON PROPERTIES AND STRUCTURAL INTEGRITY OF ADVANCED GAS-COOLED REACTOR CORE COMPONENTS Paul Mummery, Chair in Nuclear Materials, School of Mechanical, Aerospace, and Civil Engineering, University of Manchester
14:10	GOING OFF THE RAILS - A GOLIATH CHALLENGE: A CASE STUDY OF MATERIAL FAILURE IN A NUCLEAR POLAR CRANE RAIL Jennifer Gilmour, Senior Mechanical Engineer, Dounreay Site Restoration Ltd.
14:35	MEETING REGULATORY EXPECTATIONS FOR MATERIALS INTEGRITY ON OPERATING REACTORS Russell Green, Nuclear Safety Inspector – Structural Integrity – Operating Facilities, Office for Nuclear Regulation
15:00	QUESTION AND ANSWER SESSION
15:15	NETWORKING REFRESHMENT BREAK
MANAGING NUCLEAR MATERIALS CHALLENGES INTO THE FUTURE	
15:45	CONSIDERATIONS FOR LONG TERM DESIGN LIFE FOR DECOMMISSIONING SITES Paul Whiteside, Senior Materials Engineer, Inspection & Certification Group, Sellafield
16:10	UK SMALL MODULAR REACTOR: UNDERSTANDING MATERIALS CHALLENGES Christopher Bell, Head of Reactor Components – SMR, Civil Nuclear, Rolls-Royce plc
16:35	STRUCTURAL INTEGRITY OF FUSION, PREDICTING FUTURE NEEDS Michael Gorley, Materials Technology Programme Manager, UKAEA
17:00	QUESTION AND ANSWER SESSION
17:15	CHAIR'S CLOSING REMARKS Mark Shannon, Project Management Office, UKAEA
17:20	END OF SEMINAR

For the most up-to-date and detailed programme for the event, please visit www.imeche.org/nuclearmaterials2018

- 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.

Seminar	Early Bird Rate Until 10 August 2018	Standard Rate
Member, Institution of Mechanical Engineers / Supporting Organisation	£265 + VAT = £318	£295 + VAT = £354
Non-member	£355 + VAT = £426	£395 + VAT = £474
Student/Retired	£95 + VAT = £114	£100 + VAT = £120

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THREE WAYS TO BOOK

1 Online:
[www.imeche.org/
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2 Email:
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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.

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 this form.

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

Manchester United Football Club
Sir Matt Busby Way
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OTHER EVENTS TO LOOK FOR



ALARP 2018

18 September 2018, Birmingham

Hear directly from regulators about how to ensure that you can prove ALARP has been properly implemented as part of delivering effective risk management.

www.imeche.org/alarp



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.

[http://www.imeche.org/
nuclearlifting2018](http://www.imeche.org/nuclearlifting2018)

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