



Title: Effects of loss of constraint on fracture of stainless steel type 316

(supported by EDF Energy)

Type of award **PhD Research Studentship**

Department **Mechanical Engineering**

Details **£16,000 per annum (subject to confirmation) and eligibility status**

Duration **4 years**

Eligibility **Home/EU and overseas applicants**

Start Date **1 October 2018**

PhD Topic Background/Description

An EPSRC Industrial CASE award PhD studentship is available at the University of Bristol in collaboration with EDF Energy.

Failure characteristics of thick-walled austenitic steel structures containing crack-like defects has been well established, particularly in the nuclear industry where safety critical components must demonstrate clear margins to fast fracture even after long term exposure to demanding environments such as irradiation or high temperature. It is well known that thin-walled structures exhibit higher toughness, hence are more defect tolerant, but this is not exploited in assessing the integrity of non - safety critical components. Many of these items are still central to reliable operation of plant nonetheless and a substantial reduction in the conservatism associated with assessment of their defect tolerance is sought to avoid undue inspection, maintenance, or replacement. The aim of this research is to characterise fracture of such thin section components.

The research will use particularly advanced and novel experimental techniques such as integrated digital image correlation – finite element modelling to unravel the characteristic strain fields ahead of defects which can then be incorporated into defect assessment procedures. The work will be complemented by experiments carried out at large national and international facilities such as Diamond Light Source, Didcot, and European Synchrotron Radiation Facility, Grenoble, France, to validate laboratory measurements.

Further Particulars

You will be working as a member of a solid mechanics group at the University of Bristol, a world-renowned research team in the field of Structural Integrity. During your studies you will be performing experiments at University of Bristol's state of the art mechanical testing laboratory and simulating the experiments using finite element analysis. You are expected to be highly computer literate and able to learn using software such as finite element to simulate your experiments.

This is an Industrial Case studentship with EDF Energy. The successful candidate, therefore, is expected to work closely with industrial supervisors at EDF Energy and the EDF Fellow at the University of Bristol as well as liaising with other EDF students.

Doing research at the University of Bristol

The quality of research at the University of Bristol places it within the top five Universities in the UK based on the Research Excellence Framework and Times higher Education rankings 2014-15. The PhD candidate will be a part of a friendly and diverse community, with the Bristol Doctoral College (BDC) as the focal central coordinating facility. Alongside the specialist training the candidate will receive in PhD-specific topics, the BDC offers approximately 200 courses, interactive workshops and seminars as a part of the University's Personal and Professional Development Programme for PGR students. The BDC organises University-wide events and provides a hub of information, guidance and resources to help researchers to get the most of their time at Bristol.

Candidate Requirements

We are looking for an enthusiastic student with a 1st class honours degree in, or expected to achieve in Maths, Physics or Engineering.

- Enthusiasm and willingness to develop and adapt computer models. a grasp of computer coding is desirable.
- Ability and willingness to travel nationally and internationally
- Willingness to spend a significant amount of time at EDF Energy, Barnwood.

Scholarship Details

This scholarship (subject to confirmation) covering home/EU tuition fees and a generous stipend of at least £16k pa is open to UK applicants and any EU applicants who have been resident in the UK for at least three years prior to registration. EU nationals who do not meet the UK residence requirement may also apply but will be eligible only for payment of tuition fees. Eligible overseas nationals may be required to pay the difference between home and overseas tuition fee rates.

Informal enquiries

For informal enquiries please email Professor David Knowles david.knowles@bristol.ac.uk or Dr Mahmoud Mostafavi M.Mostafavi@bristol.ac.uk

For general enquiries, please email came-pgr@bristol.ac.uk

Application Details

To apply for this studentship, submit a PhD application to the Department of Mechanical Engineering using our [online application system](http://www.bristol.ac.uk/pg-howtoapply) [www.bristol.ac.uk/pg-howtoapply]

Please ensure that in the Funding section you tick "I would like to be considered for a funding award" and specify the title of the scholarship in the "other" box below with the name of the supervisor Dr Mahmoud Mostafavi.

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