

PhD Studentships

Project Title	Cold cracking in reactor pressure vessel steels
Lead Supervisor	Prof. Mike C Smith
Co-Supervisor(s)	Dr John Francis
Programme	PhD in Mechanical/Nuclear Engineering
Research Theme	
Description	<p>Background</p> <p>Cold cracking is a well-known potential problem in repairs to thick section welds in nuclear reactor pressure vessel steels. It is caused by a combination of high hydrogen concentrations, the formation of brittle phases in the heat affected zone, such as martensite, and achieving a critical stress in the affected region. Weld repair procedures that avoid cold cracking are potentially very valuable to industry. One such process is “cold temper-bead welding”.</p> <p>If the physical mechanisms behind cold cracking are well understood, then it is possible to develop both computational models that both allow the risk of cracking to be assessed and repair procedures that minimise the risk of cold cracking.</p> <p>The project</p> <p>This project builds upon previous research at EDF, which developed an initial modelling framework for cold-cracking. The successful student will work within the Modelling and Simulation Centre at Manchester, and make use of Manchester’s state-of-the art welding research and materials characterisation facilities to extend both our understanding of, and ability to model, cold-cracking in RPV steels, to validate numerical models against experiments, and to optimise temper bead repair procedures. The project is supported by EDF via a Beacon Scholarship and the student will be expected to spend part of the project working at the EDF research laboratories in Paris.</p>
Skills required	<p>Entry requirements can be found by selecting the relevant PhD programme at this link: http://www.mace.manchester.ac.uk/study/postgraduate-research/degree/</p> <p>Specimen preparation and microscopy (optical and SEM); materials characterization testing at room and elevated temperatures; steel metallurgy; finite element modelling</p>
Industrial Links	<p>Beacon Scholarship linked with EDF. Home/EU students only</p> <p>Information on standard fees is available here: http://www.mace.manchester.ac.uk/study/postgraduate-research/degree/ Information on typical stipend is available here: http://www.mace.manchester.ac.uk/study/postgraduate-research/funding/</p>

Closing date for applications	July 31 st 2017
Project specific enquiries	Prof. Mike C Smith (mike.c.smith@manchester.ac.uk)

General enquiries:

General enquiries relating to the postgraduate application process within Mechanical, Aerospace & Civil Engineering should be directed to:

[Martin Lockey](#) - Senior PG Recruitment & Admissions Administrator

Tel: +44(0)161 275 4345

Further information about how to apply can be found at:

<http://www.mace.manchester.ac.uk/study/postgraduate-research/apply/>