

Industry Based Engineering MSc Degrees*



**Discover
Brunel**

**Structural Integrity
(Asset Reliability Management) MSc**

Dr Kevin Hughes

Oil and Gas Engineering MSc

Dr Nenad Djordjevic

Lightweight Structures and Impact Engineering MSc

Dr Kevin Hughes

Structural Integrity (Asset Reliability Management) MSc

Accredited programme covers two key areas:

1. Finding defects
2. Assessing implications of defects

Institution of
**MECHANICAL
ENGINEERS**

Iom³
The Institute of Materials,
Minerals and Mining



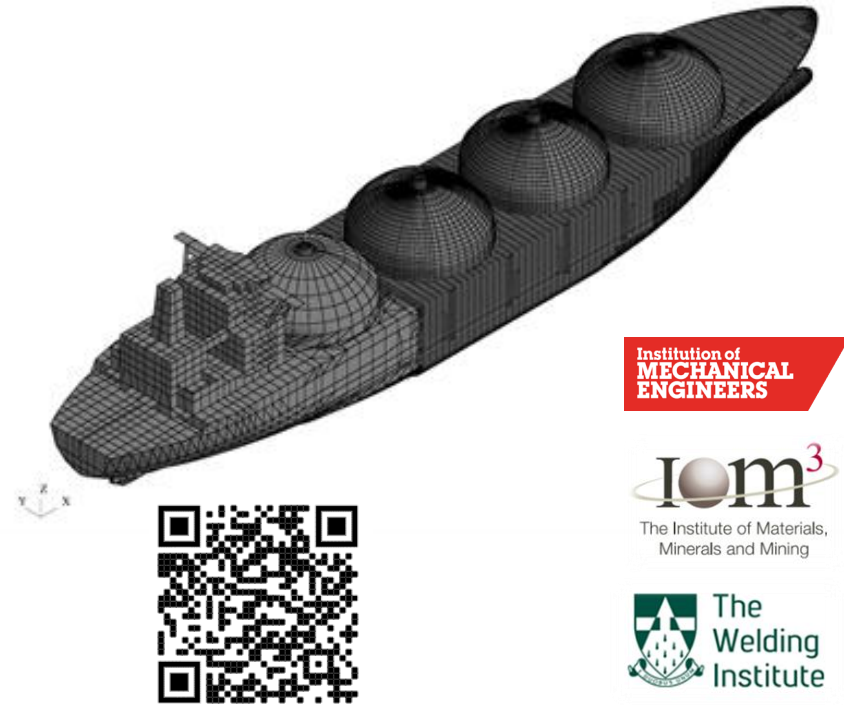
Requiring a good understanding of:

- The nature of materials;
- Loading and its possible consequences;
- Environmental effects;
- Principles of testing and measurement
- Structural Analysis
- and understanding of global codes / standards

Provide industry-relevant training for next generation structural integrity engineers:

- Support safe operation of products and structures;
- Demonstrate solutions for long-term asset management

Oil and Gas Engineering MSc



Course covers:

- Design of oil and gas structures (on/off shore)
- Design and commissioning of oilfield installations, including fabrication and installation
- Systems level thinking to address wide range of complex problems
- Provide industry relevant training, covering numerical, testing and inspection techniques
- Codes of Practice
- Multiphase flow and flow assurance

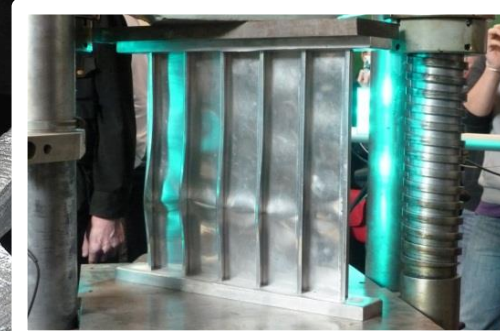
Provide industry-relevant training for next generation oil and gas integrity engineers:

- Design, commissioning and integrity of oil and gas structures;
- Multiphase flow, flow assurance, structural loads from complex internal and external loads.

Lightweight Structures and Impact Engineering MSc

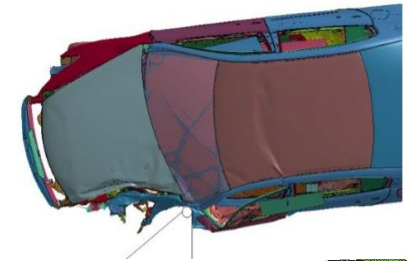
- with Internship
- with Placement

New Programme for
September 2021



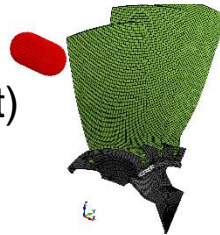
Targeting two key areas:

1. Linear and non-linear material and structural response, including large or rapid deformation, failure and high strain rate loading;
2. Provide industry-relevant training in advanced simulation methods (mesh based and mesh free) to support lightweight structural design



Applications include:

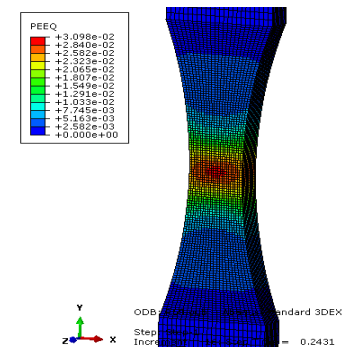
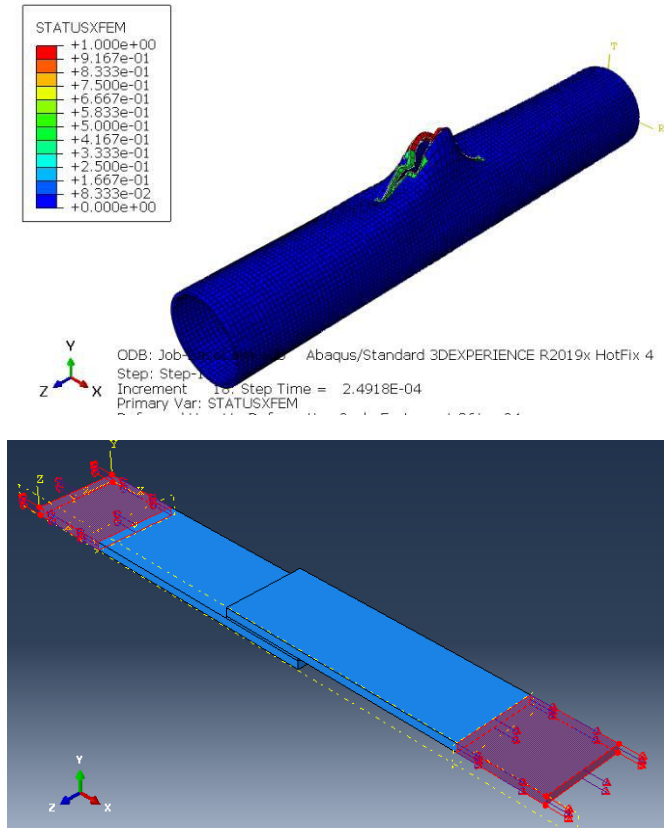
- **Predicting material failure** for metallic and non-metallic materials
- Design optimisation of **automotive crash protection systems** (including motorsport)
- **Aerospace** applications: Crash and ditching, bird strike, debris impact etc.
- Impact protection of electronic devices.



MSc Dissertation Projects

Topics investigated by MSc students for their individual projects during 2020 (completed September 2020) and 2021 (to complete December 2021) include:

- Integrity and fracture of composite pipes and pressure vessels
- Engineering Critical Assessment for plastics
- Fracture and fatigue modelling, stress state equivalency and influence of residual stresses
- Direct measurement techniques for fracture toughness assessment
- Corrosion protection including thermal spray aluminium and cathodic protection at raised temperatures.
- Modelling and testing for ductile failure.

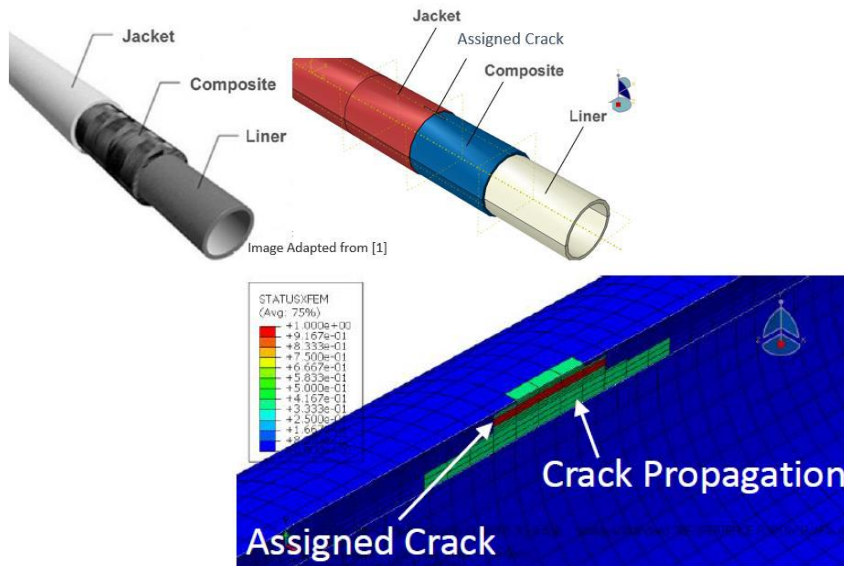


Analysis of Integrity of Composite Structures in Oil and Gas Industry Using Extended Finite Element Method (XFEM)

Cheung Man Chi

Supervisor: Dr Nenad Djordjevic

Assessment of XFEM for prediction of integrity and failure of thermoplastic composite pipes under internal pressure.



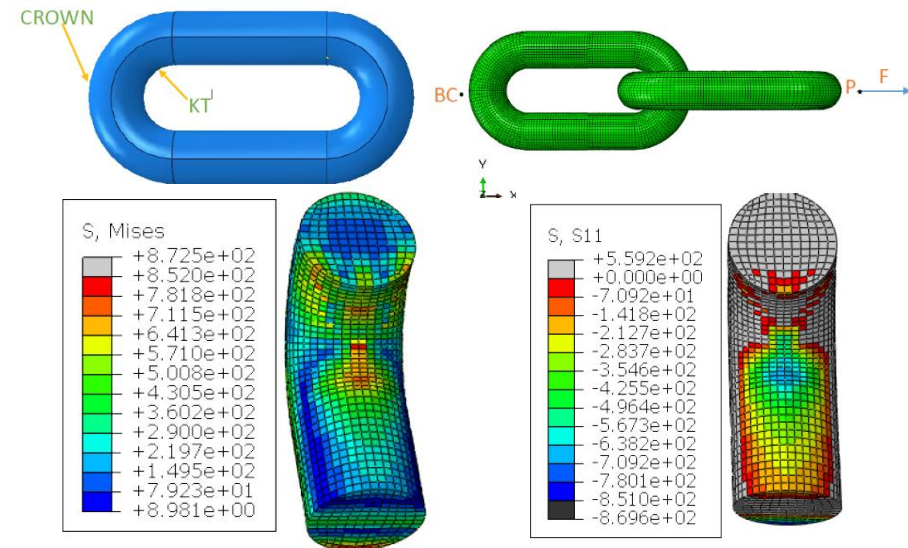
Demonstrated ability of XFEM to represent crack path and burst pressure.

Influence of Heat Treatment on Residual Stresses in Mooring Chain Links under Combined Loading

Gulsum Dogan

Supervisors: Dr Nenad Djordjevic, Dr Kevin Hughes, Dr Phillipe Bastid (TWI)

Investigate influence of residual stress within Finite Element Modelling in order to carry out the prediction of fatigue life under proof loading.



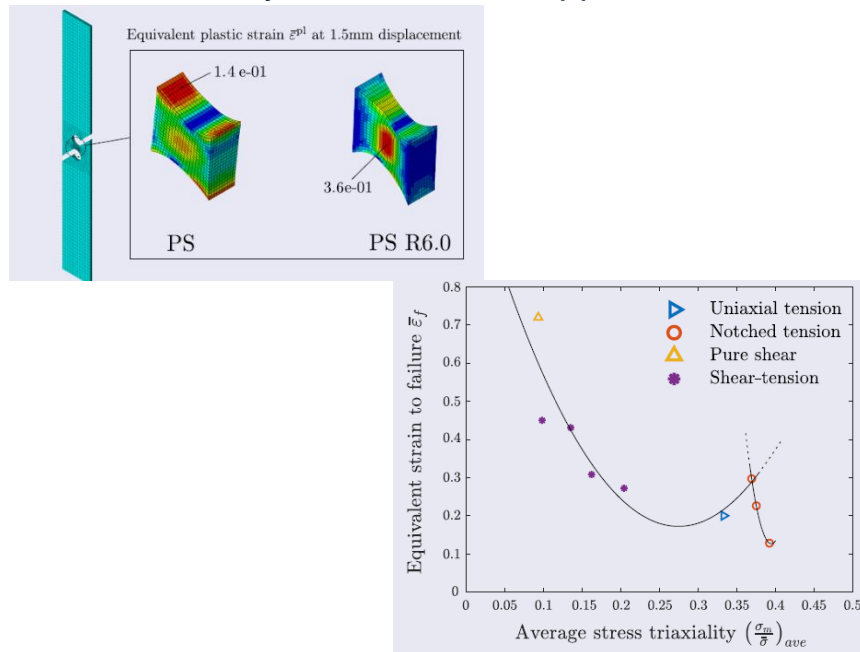
Proof loading produces compressive residual stresses in both Kt and crown regions.

An investigation into stress triaxiality testing of recycled aluminium

Nicholas Karpasitis

Supervisors: Dr Kevin Hughes, Prof. Rade Vignjevic

Assess ductile failure properties of a recycled aluminium alloy for automotive applications.



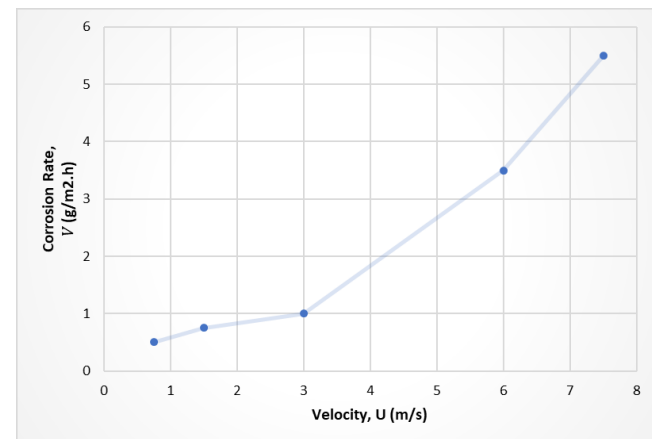
Designed test coupons to permit testing at different stress triaxialities to allow derivation of design curve.

Effect of seawater flow on the performance of thermal Spray aluminium

Nokhaiz Sabir

Supervisors: Dr James Campbell, Dr Shiladitya Paul (TWI)

Development of a mathematical model to predict the corrosion rate for the TSA coated material at varying velocities of sea water.



Model has to account for the influence of hydrodynamics and electrochemistry in the corrosion. Generally the corrosion rate increases with fluid velocity.