



JOINING
INNOVATION
AND EXPERTISE

Fusion & Big Science at TWI

Prepared for NIA Fusion Group Meeting – May '22

TWI Mission

- To provide our Industrial Members with authoritative and impartial expert advice, knowhow and safety assurance through engineering, materials and joining technologies
- Scope of Activities
 - Welding & Joining
 - Structural Integrity
 - Materials & Corrosion
 - Surfacing
 - Non-Destructive Testing
 - Training





No 'N' in the name, but Nuclear at the core...

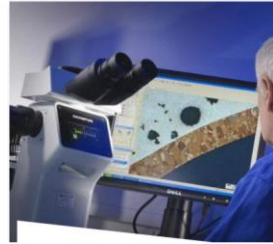
- **Over 70 Member companies** operating in global nuclear industry
- **The complete spectrum**
 - Power utilities/operators
 - Research and development organisations
 - Fuel companies
 - Decommissioning & waste management
 - Regulators
 - Codes and standards
 - Civil and defence contractors
 - Equipment and labour suppliers
- **Over 850 separate 'nuclear' projects** in the last **35 years**

TWI UK Offices

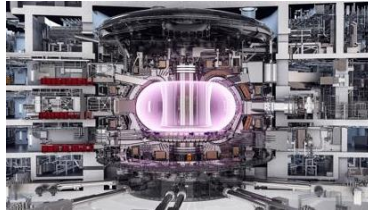
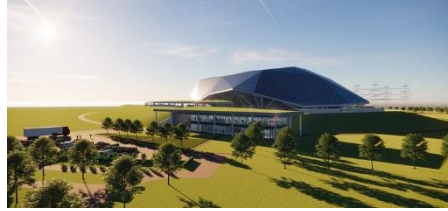


Services provided to Nuclear

- Asset Management
- Welding engineering
- Technology development
- Training
- Expert witness/peer review
- Regulatory submission support
- Failure investigations
- Safety case reviews
- On-site NDE inspection
- Weld management software
-



Dedicated sub-sector support ^{New}



- Specialist advice
- Strategic support
- Frameworks
- Road mapping
- Events
- Insights
- Speakers
- Showcase
- Panel
- Nuclear Forum
- Core Research
- Publications
- Students
- Secondments
- Working groups
- Awards
- **Community**



Nuclear Fusion

Recent
Fusion Energy & 'Big Science'
activities

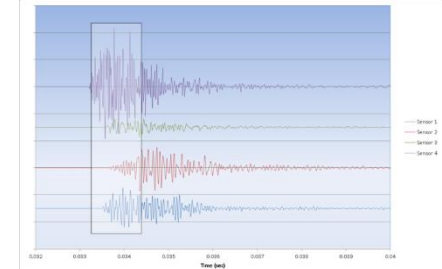
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New challenges : Innovative solutions



Development and supply of Vacuum Vessel Acoustic Emission Monitoring System

2021-2024 £1m (public tender award)
'a globally unique offering'



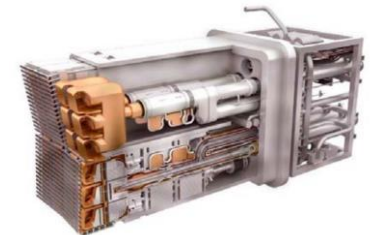
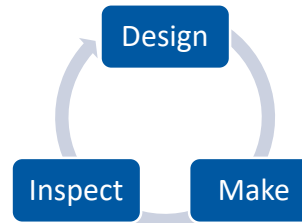
IVC 'feedthrough' development and mock-up demonstrator

- *Alumina to Kovar*
- *Stainless to copper*
- *Kovar to stainless (welded joint)*



DfM/DfNDT of IC Antenna

- Suitable machining and fabrication routes
- Welding technology down-select
- NDE techniques
- Ensuring conformance codes



UK Atomic Energy Authority

Challenging convention



UK Atomic
Energy
Authority

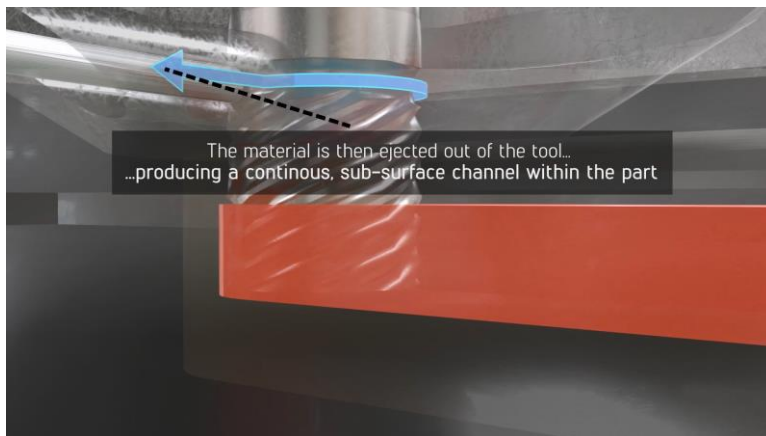
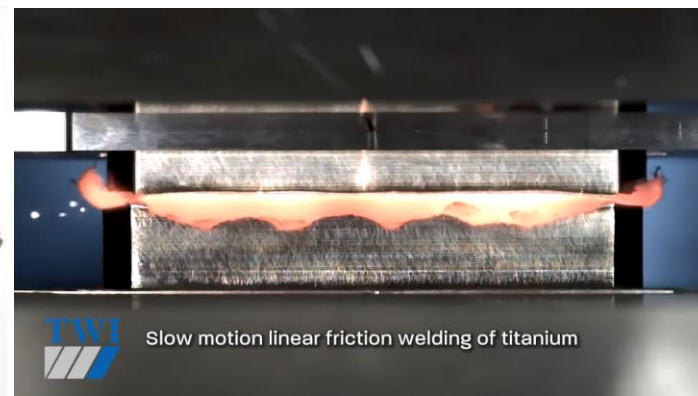


Photo: collaboration of TWI with UK Atomic Energy Authority

Sub-surface
machining of
Cu trials using
COREFLOW

Linear friction
forging of
W to P91



Electron beam welding design optimisation and fabrication of UK-made Nb SCRF cavity



*“the unique nature of TWI provides a great opportunity to assemble
multi-disciplinary teams to deliver quality solutions to industrial
problems.”*

Fusion & Big Science Event

14 June at TWI, Cambridge

‘Manufacturing and Materials Challenges in Fusion & Big Science’

- *Open event (free for Industrial Members)*
- *Buffet lunch*
- *F&BS Core Research Programme topics discussion*
- *Technical tour*



Including presentations from:

- UKAEA
- STFC
- Tokamak Energy
- Frazer Nash Consultancy
- Rolls-Royce
- Atkins Energy
- Commonwealth Fusion Systems
- FreeMelt

Many thanks Questions?

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