

Enhancing structural efficiency through novel dissimilar material joining techniques / SAFEJOINT

the objective of the project

Development of novel techniques for metal to metal and metal to composite joining as well as developing novel techniques for the non-destructive inspection and evaluation of such joints in order to enhance confidence to designers and end-users of hybrid structures of their through life safe performance.

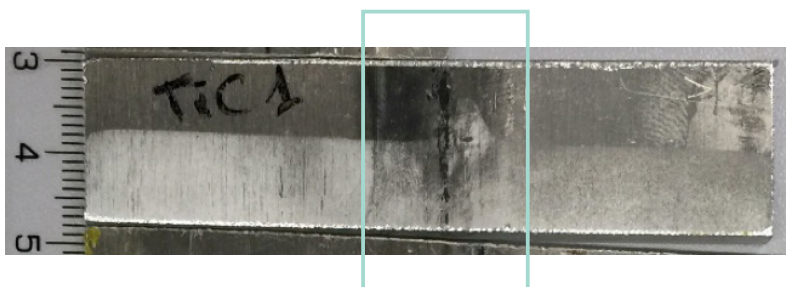
motivation

There is a high demand for the design of lightweight energy efficient structures for transport applications. To achieve this, designers have introduced the concept of “hybrid” structures where two or more lightweight materials are used each possessing unique properties that when joined together result in high performance lightweight structures that would not have been possible if a single material was used. This approach requires the development of joining techniques for materials with fundamentally different physical properties.

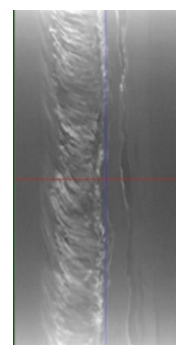
ultrasound institute

Have undertaken the development of the NDE methodologies for the novel joints that were developed in this project. That included:

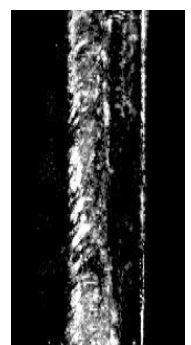
- Development of NDE technique for dissimilar metal joints;
- Development of NDE techniques for quality control of metal composite joints;
- NDE inspections of the demonstrator structures at build and also during and after testing.



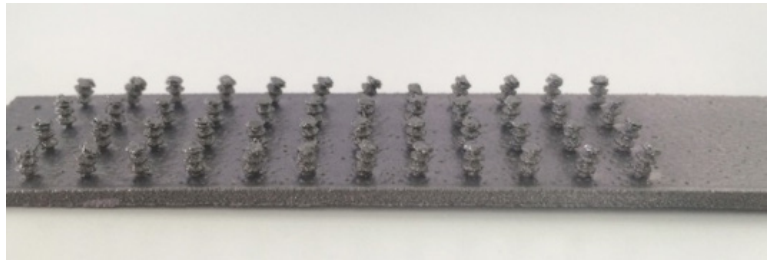
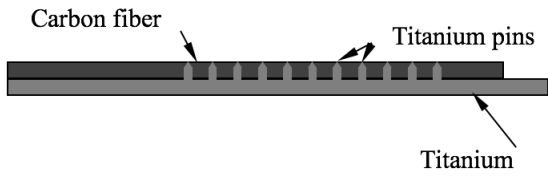
Inspection of dissimilar metal welds with nanoparticles using acoustic microscopy and X-ray CT



X-ray CT

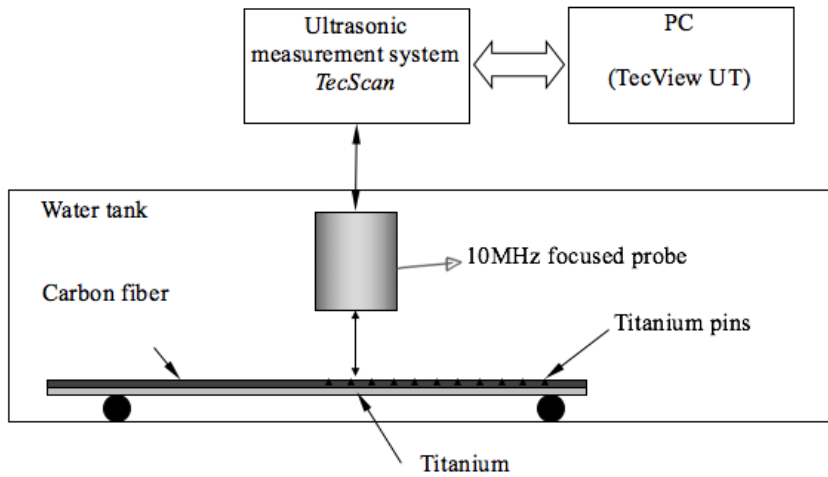


Ultrasound C-scan

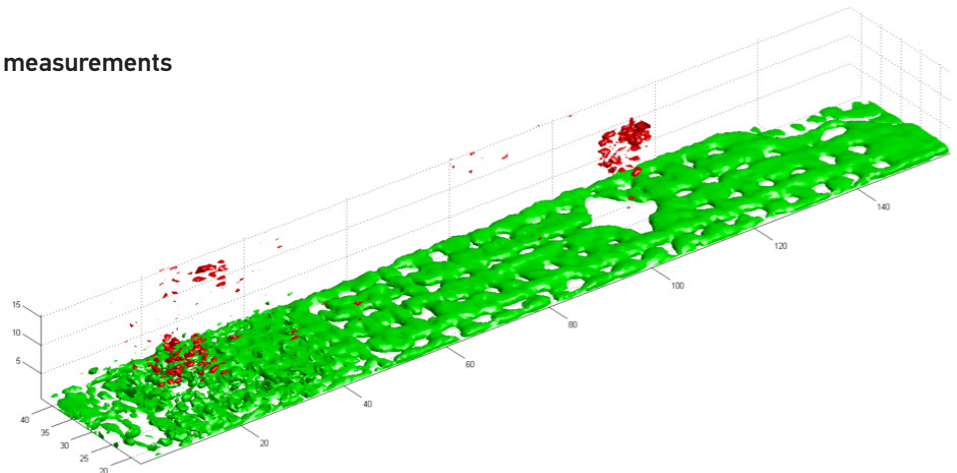


Schematic of a hybrid CFRP-Titanium joint

A pin array from titanium



Experimental set-up for pulse-echo measurements



The reconstructed interface between the CFRP and titanium in 3D (green) and the defect positions (red)

project homepage

<http://www.safejoint.net/>