

Materials Testing & Analysis Unit



2709

The Materials Testing and Analysis Unit is a commercial group within the Residual Stress & Damage Characterisation Unit in the School of Materials. It has a dedicated team of Project Officers, acting as a quick-response unit, which is able to take on both commercial and research projects at short notice.

Our main work is measuring residual stresses in engineering components, using x-ray diffraction. We are the only testing laboratory in the UK that is accredited to ISO 17025¹ for this work. We help engineers:

- validate new or existing manufacturing processes
 - extend lifetimes of critical engineering components
 - investigate causes of stress-related component failures
- by providing them with stress data that can be used to modify their component designs to combat service stresses



¹ ISO 17025 accreditation only applicable to xrd stress measurements performed in our laboratory

Facilities

Portable x-ray Stress Measurement

We have a 'state-of-the-art' Proto iXRD system, which:

- is fully portable for use in the field ¹
- has an automated stress mapping facility
- can perform measurements in awkward locations, by using a four degrees-of-freedom sample stage with movement in three planes and rotation about a vertical axis
- can be used to measure metal samples of varied shape and weight, by positioning the Proto in its floor-standing mode
- collects many x-ray events simultaneously, resulting in very fast data collection
- has high throughput, allowing us to make multiple measurements in a relatively short time

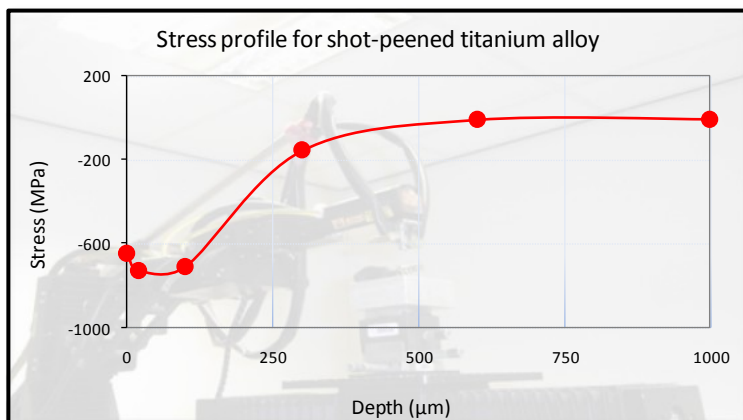
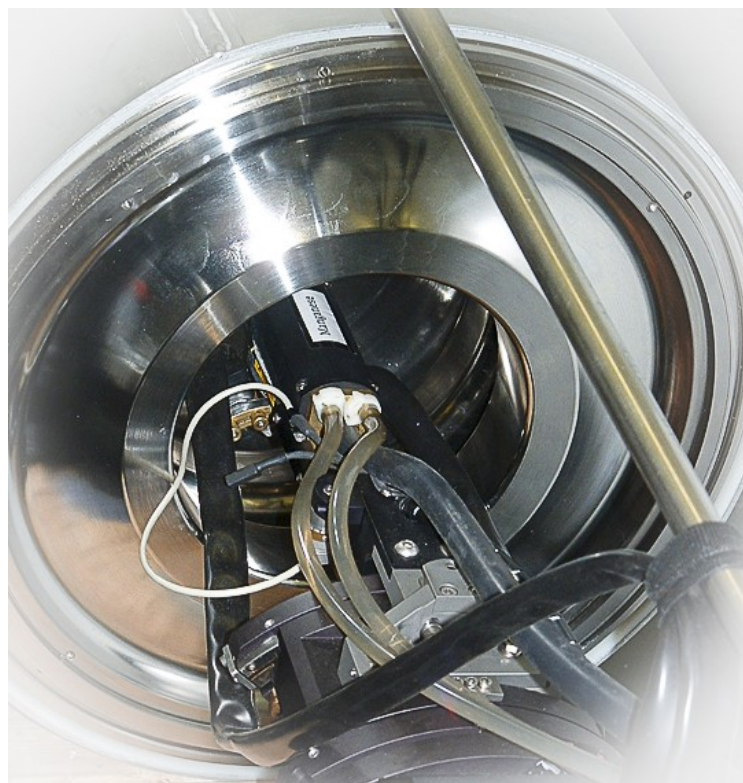
Some of the varied components in which we have measured residual stresses are:

- fuel tubes
- shot-peened gears
- laser-peened fan blades
- food cans
- sintered tungsten plates

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We can also facilitate access to a wide range of materials-related analysis techniques¹ for our customers, including:

- atomic force microscopy
- C-scan analysis
- 3D coordinate measuring
- Electronic speckle pattern interferometry
- image correlation



- x-ray diffraction
- nanoindentation
- neutron strain measurement
- Raman spectroscopy
- scanning acoustic and electron microscopy

- stress measurements using slitting, contour and magnetic methods
- x-ray tomography.

¹ ISO accreditation not applicable

Staff

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