NPL performs its first off-site X-ray residual stress measurement service

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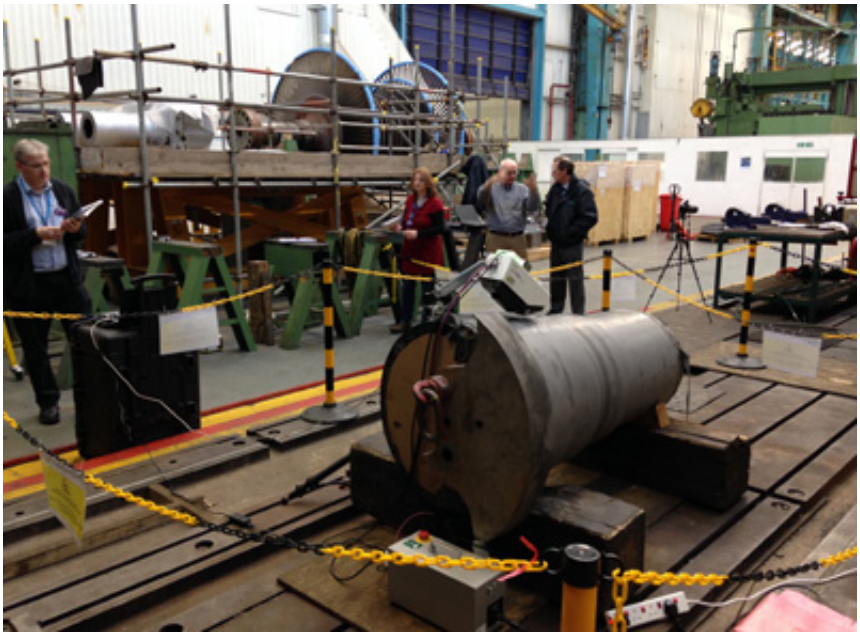

The NPL team at the workshop of Siemens Service Power & Gas, based in Newcastle

The National Physical Laboratory (NPL) has performed its first off-site X-ray residual stress measurement service for engineering company, Siemens.

Siemens required a series of residual stress measurements to be carried out on a 2 m long steam turbine rotor shaft, designed for use in power plants. NPL's new portable X-ray system, the Pulstec μ-x360, meant the

Advanced Materials team was ideally placed to accept the measurement challenge.

The lifetime of a structural component is usually determined by interactions between defects within the component and the stresses it is exposed to. These stresses are a combination of those applied in service and those introduced during manufacture and processing, known as the residual stresses.

While applied stresses can be accounted for in the design of a component, residual stresses pose more of a problem as they are difficult to predict and measure reliably. X-ray diffraction is a commonly-used technique which probes the near surface layers of a component with X-rays to determine the levels of residual stress.

The NPL team travelled to the workshop of Siemens Service Power & Gas in Newcastle, and conducted more than 50 X-ray residual stress measurements on the rotor shaft over the course of a day. This provided Siemens with the valuable data required to complete its assessment.

As well as being the first time that NPL has conducted off-site X-ray residual stress measurements, it's also the first time that NPL has taken its own X-ray generating equipment to customer premises to conduct measurements. Ian McCorry, a Senior Engineer on the project at Siemens, remarked that they were highly impressed with the NPL team, equipment and measurements provided:

"NPL reacted to our needs in a quick and timely fashion. The team were very helpful and worked with great attention to detail, and the equipment was incredibly flexible and able to make measurements in positions no other system could have accessed."

Provided by National Physical Laboratory