

## **Nuclear applications of neutron stress measurement:**

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The determination of accurate, reliable stresses is critical to many fields of engineering and, in particular, the structural integrity and hence, safety, of many systems. This is particularly so for the Nuclear industry where safety is understandably paramount. Neutron stress measurement is a non-destructive technique that uniquely provides insights into stress fields deep within components and structures. As such, it has become an increasingly important tool within the engineering community where the definition and application of more precise structural integrity lifing procedures is a major driver in the 21<sup>st</sup> century. Accurate structural integrity assessments require a good description of the through-wall residual stress field in any component. However, reliable characterisation of residual stresses at the non-stress-relieved welds used in large power utility fabrications has been notoriously difficult. Since many of the welds in nuclear power plant are difficult to repair or replace it is not surprising that the Nuclear Industry has been one of the forerunners in using neutron stress measurements to inform structural integrity assessment not least through the validation of finite element simulations. This talk will provide examples of how recent advances in the current state of the art provided by the 2nd generation dedicated engineering stress diffractometers currently being designed and commissioned world-wide have enabled solutions to industrially relevant Nuclear Engineering problems.