

Inspection of Nuclear Assets with Limited Access

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Traditionally the inspection of nuclear containers and their welds, is highly challenging, time-consuming and expensive due to the complexities and logistics of the environment and process. This problem is further compounded when the asset lifetime is increased beyond their original design intent, and when accessibility to the asset is obstructed. One such problem being faced by Sellafield LTD in the UK is the storage of products arising from the reprocessing of spent nuclear fuel. This material is stored in a multi-package configuration with outer containment provided by 1.4404 stainless steel canisters with a Resistance Seam Weld (RSW) sealing the canister body to the lid. This project seeks to investigate the inspection of the welds located on these canisters at 1) the point of manufacture, 2) periodic inspection intervals and 3) in-situ inspection in their storage environment. When specifically considering in-situ inspection the storage arrangement only allows for partial circumferential access of the complete RSW. This work is concerned with the development of an ultrasonic screening method of the RSW located on these canisters whilst in storage. This work details the successful modelling of Feature Guided Waves (FGW) confined to only the welded region and their interactions with various defects. This enables ultrasonic screening of the weld health from one singular excitation point.