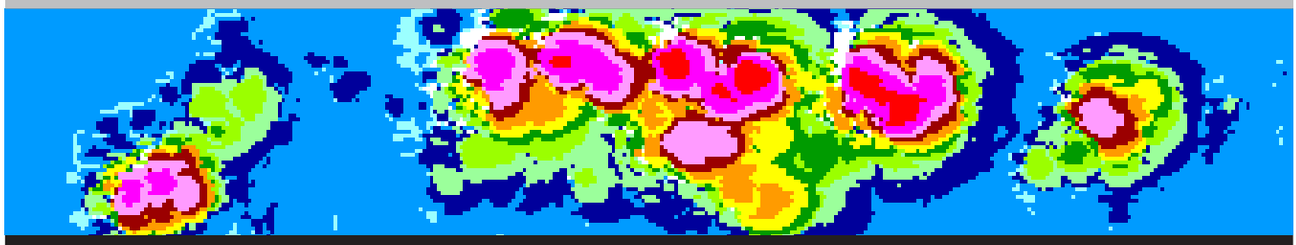
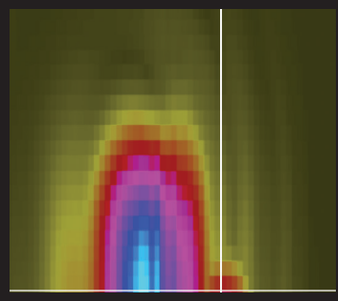
sonomatic®

innovative inspection technologies



Ultrasonic Inspection Modelling using CIVA NDE Software



Ultrasonic inspection is widely used to obtain information on the condition of pressure equipment before entering service and while in-service. The objective is to identify and, if possible, to size any degradation or defects that have the potential to threaten the integrity of the equipment. There is an increasing emphasis on quantifying the performance of inspections carried out – for instance, can the inspection actually find the defects of concern and with what level of reliability? This has typically been addressed in the past by validation trials on test pieces with built-in defects. However, the costs of such an approach are normally high and lengthy timescales can be involved. Ultrasonic modelling is an attractive alternative that allows rapid and accurate assessment of the performance of an inspection. It also facilitates optimisation of the approach to inspection through the evaluation of different options with respect to probe placement, travel paths, frequencies, angles etc.

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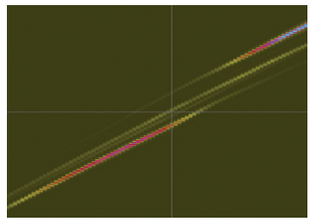
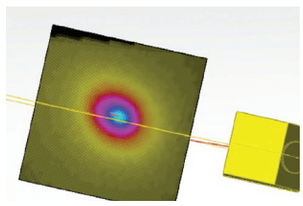
Sonomatic has offices in strategic global locations so we can respond quickly to customers' requirements wherever they may be situated. Our high quality products are matched only by our customer service. In addition to our field services, we offer training and consultancy at our sites in the UK or at clients' premises anywhere in the world. Sonomatic is committed to improving asset performance through applied and innovative technology; to delivering these benefits to our customers in the products and services that we provide; and to working with our customers, as value-added partners, to realise the maximum benefits of inspection technology.

Ultrasonic Inspection Modelling using CIVA NDE Software



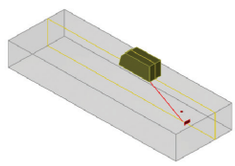
Sonomatic use CIVA NDE ultrasonic modelling software. This was originally developed in the French nuclear industry and is now used extensively in a range of major industries including power generation, aerospace, automotive and oil and gas. CIVA is widely viewed as setting the standard for ultrasonic modelling and has been extensively validated. The software allows evaluation of ultrasonic beam properties and interaction with a range of defect types such as planar and volumetric flaws. Inspection situations can be simulated by specification of the component's geometry and material properties, the probe characteristics, the inspection approach and the defect type and location. The output from CIVA is available in a variety of forms including the typical a, b, c and d-scans that would be obtained from an ultrasonic inspection.

Sonomatic's application of the CIVA NDE software covers the following areas

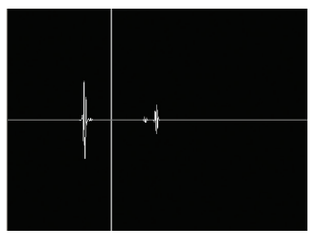


• Development and evaluation of inspection approaches for specific applications. This typically covers complex geometries where beam paths/profiles would be difficult to assess accurately without detailed analysis.

• Demonstration of the capability of an inspection with respect to detection of specified defect sizes and locations. Modelling can be used to provide the assurance that the inspection has a sufficiently high probability of detection for defects of concern (e.g. at allowable sizes as defined by an Engineering Criticality Assessment).



• Assessment of the sensitivity of inspection performance to system variables. Modelling provides an understanding of those variables, e.g. probe skewing, misalignment, probe position, to which detection capability is particularly sensitive. This knowledge is then used in ensuring the required level of control when carrying out the inspection, and in defining the potential limitations of the inspection.



• Assessment of areas covered by the inspection. Beam modelling is used to identify the extent of internal coverage for a given probe location.

• Development of delay laws for Phased Array Inspection. Modelling is used to optimise Phased Array Inspection of specific geometries and defect types.

Analysis can be carried out on a wide range of geometries, from simple parametrically defined plate and pipe models, through to complex nozzles and 3-D CAD defined components. Existing 2-D and 3-D CAD models can be imported for subsequent analysis.

The software caters for a range of defect types including planar flaws (rectangular, circular or CAD defined), side-drilled holes, flat-bottom holes, hemispherical-bottom holes, spheres and 3D CAD defined shapes.

A range of ultrasonic inspection approaches can be modelled including single-probe compression and shear-wave pulse-echo, twin-probe "pitch-catch" arrangements, twin-probe Time of Flight Diffraction and Phased Array Inspection.

QA and HS&E

It is Sonomatic's ongoing commitment to supply services and products, through the application of technical and engineering excellence, which complement both the customer's and our own QA and HS&E requirements.

Sonomatic's commitment to quality is maintained through continuous assessment and review of our Quality Management Systems to BS EN ISO 9001:2008. Sonomatic actively promotes the development, implementation and improvement of our QMS as a part of our ongoing drive to enhance customer satisfaction by meeting or exceeding customer requirements. In 2009 Sonomatic achieved UKAS accreditation as an Inspection Body to BS EN ISO/IEC 17020 (UKAS IB4276).