

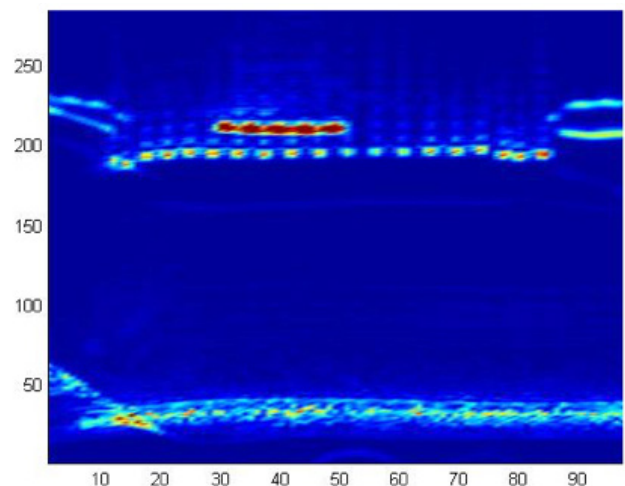
Development and Validation of an Automated Non-Destructive Evaluation (NDE) Approach for Testing Welded Joints in Plastic Pipes/ TESTPEP

the objective of the project

development and validation of automated non-destructive system for testing of welded joints in plastic pipes. The TestPEP project had develop phased array ultrasonic NDE procedures, techniques and equipment for the volumetric examination of welded joints in polyethylene (PE) and other plastics pipes of diameters up to 1m. In addition, the project developed an automated inspection system that enables to inspect pipe-to-pipe and pipe-to-fitting butt and socket joints in various plastic pipe materials and diameters between 90 and 1000mm. In parallel, the significance of flaw size and quantity is established by application of developed automatic algorithms of data analysis, defect recognition and their assessment in relation to service requirements. The requirements have been determined by long-term mechanical testing of joints containing known flaws, and comparison with results for welds containing no flaws.



Example of ultrasonic testing of the welded plastic pipe



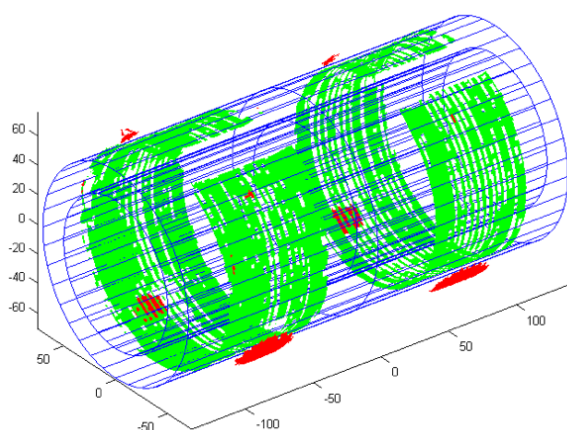
The B-scan image of the weld with a defect

the technical problem

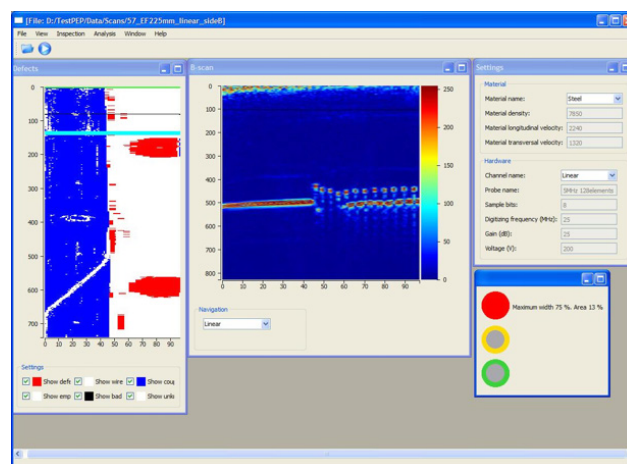
being relatively new structural materials non-destructive evaluation of plastics is challenging, due to a high attenuation and a low velocity of ultrasonic waves in the material.

ultrasound institute

The inspection techniques for inspection of electrofusion welds based on application of ultrasonic phased arrays have been developed and their parameters determined using modelling and data analysis of many experiments. The algorithms for automatic analysis of inspection data, defect recognition and assessment have been developed. The algorithms have been implemented in the pilot version of the software and tested on the inspection data plastic pipes with wide range of diameters.



Reconstructed positions of the heating wires and artificial defects



Screen shot of the developed software for automatic inspection, data analysis and assessment of welds

project partners

Asociación española de ensayos no destructivos (Spain), British Energy (UK), Consorzio Catania Ricerche (Italy), E.ON - Ruhrgas AG (Germany), European Federation for Welding, Joining and Cutting (Portugal), Hessel Ingenieurtechnik GmbH (Germany), I.SO.TEST Engineering srl (Italy), Ultrasound Institute Kaunas University of Technology (Lithuania), M2M (France), Plasflow Ltd (UK), SMART Group (UK), TWI Ltd (UK), Vermon (France), Associazione Italiana Prove Non Distruttive (Italy), Pipeline Industries Guild (UK).

project homepage

<http://www.testpep.eu/>