



## Development and validation of an automated NDE approach for testing welded joints in plastic pipes

- **Project budget: £3.2 m**
- **End Users: British Energy, E.ON Ruhrgas**

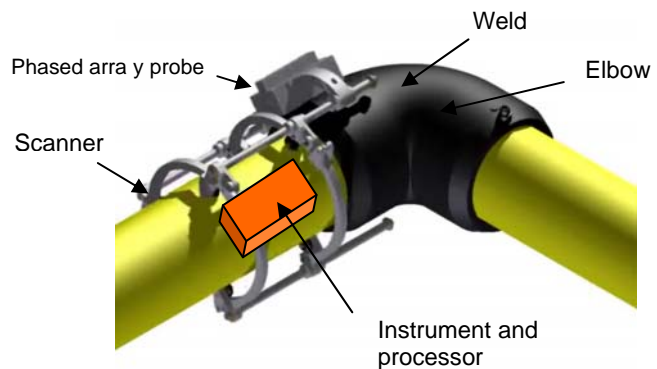
Plastics pipes offer significant advantages over other materials such as cast iron, steel, copper and concrete, for the transportation of fluids such as natural gas, water, effluent and corrosive liquids. They do not corrode; have a longer predicted service life, leading to less frequent replacement; they are less expensive to install due to their light weight and flexibility; and have significantly lower leakage rates due to having an all-welded system. However, their more widespread use is being restricted by the lack of a reliable non-destructive evaluation (NDE) method for the welded joints. Pipeline leakage does not only cause high repair costs but can also result in disastrous environmental consequences and even in loss of life.

The TestPEP project is working to develop phased array ultrasonic NDE procedures, techniques and equipment for the volumetric examination of welded joints in plastics pipes of diameters up to 1m. In addition, the project will develop an

automated inspection system that will be able to inspect pipe-to-pipe and pipe-to-fitting butt and socket joints in various plastic pipe materials and diameters between 90 and 1000mm.

A crucial aim of the project is to develop an inspection system that is site-rugged and simple to operate. The concept in this project is to have a black box instrument with a simple ethernet connection to download the recorded data, and to provide the necessary robustness of the phased array probe. Another objective of the project is to analyse the data semi-automatically so that a red/green (yes/no) answer can be provided for the quality of the welds and the system can be operated by normal pipe laying technicians.

The development will be made by manufacturing welded joints containing known flaws. The NDE data will be analysed to determine the limits of flaw detection for each technique. In parallel, the significance of flaw size and quantity will be established in relation to service requirements. This will be achieved by long-term mechanical testing of joints containing known flaws, and comparison with results for welds containing no flaws.



*Schematic of proposed TestPEP ultrasonic inspection system*

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