

## Automated non-destructive evaluation of welded joints in plastics pipes



*PE pipe being installed for gas distribution*

The Pipeline Industries Guild has recently joined the TestPEP project, which is co-ordinated by TWI and gathers 17 partners from seven countries with the aim of developing an automated non-destructive evaluation (NDE) approach for testing welded joints in plastic pipes. It started in February 2010 and will last for three years.

Plastics have many advantages over metals or concrete, such as good chemical resistance, low weight, low cost and longer predicted service life. Plastic pipes are already used for the transport of gas, water and chemicals; however their use in more safety critical applications is limited by the fact that there is no inspection system available to evaluate plastic joints.

Although a number of non-destructive inspection systems are available commercially to inspect welds in plastic pipes, they have not been adequately validated and the data generated by these systems are not lin-

ked to any acceptance criteria. In addition, these systems require trained operators to allow interpretation of the results.

Following responses received from the plastic pipe industry, the system that would be developed within the TestPEP project will be designed to accommodate pipe diameters from 90 mm to 1 m for both butt fusion and electrofusion joints.

Another part of the project will be to develop acceptance criteria for various types of flaws in welded joints based on both short-term and long-term testing. The NDE and mechanical test data will be brought together to develop a system capable of delivering an automatic pass/fail result, thus eliminating the need for a trained NDE operator.

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## TWI experts keep flying legend airborne

Nineteen forties engineering and 2011 welding expertise joined forces at TWI recently, in a combined effort to keep the world's oldest flying jet aircraft in the skies.

A thin sheet stainless steel shroud surrounding the jet pipe of a North American Aviation F-86A Sabre jet fighter was in need of some specialist attention when it was delivered to TWI. The purpose of the shroud is to deflect any leaking exhaust gases away from the internal structure during the brief period, between start-up, and the engine reaching running temperature, when previously weeping seals around the jet expand and become leakproof. Although within limits, several small cracks and tears were in need of attention during the Sabre's annual maintenance if the aircraft was to achieve its Permit to Fly. Because there is no direct civilian equivalent, such historic ex-military aircraft fly under this rigorous permit system rather than the Civil Aviation Authority's certificate of airworthiness.

"It's very tricky to weld materials like this but we're lucky here at Duxford," said Roger King of the Aircraft Restoration Company. "TWI's experts are almost on our doorstep. Its arc welding department had exactly the skills we required and offered to help us out."

Using TIG welding and an appropriate consumable for the aged material, TWI was able to arrest and repair cracks in the wafer thin material. "It's not a structural part," clarifies King. "It is a heat deflector. Had it made a structural contribution a more rigorous and detailed procedure would have been deman-



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