

POLYTANK - Development and validation of an automated ultrasonic system for the non-destructive examination of welded joints in thermo-plastic storage tanks

Plastic tanks are normally designed for a finite life, usually between 15-25 years. However, due to economic pressure, many of these tanks are still in operation beyond their design life, often with little or no engineering justification, and it is not uncommon for plastic tanks to be used for storing chemicals that they were not designed to contain. For these reasons it is very important that operators of plastics tanks and vessels inspect them throughout their life. An issue at hand is that there are currently no standards for the in-service inspection of plastics tanks. There is also very limited expertise available on the visual examination of plastics tanks and virtually no use of non-destructive examination (NDE).



The majority of visual inspections are external and can therefore only identify cracks that break the outside surface of the tank. Since many of the cracks initiate from the inside of the tank there is already a leak path through the tank wall if and when the crack is detected. Internal inspections are carried out less frequently, if at all, because they are expensive, potentially dangerous to the inspector and result in a shut-down because the tank has to be emptied.

Project objective

The PolyTank project will determine the potential failure mechanisms in plastics tanks and storage vessels and develop ultrasonic non-destructive evaluation procedures, techniques and systems to be able to identify these. Importantly, the project will develop an inspection system that is site-rugged and simple to operate. As part of the project, welded joints representative of those used to fabricate plastic tanks and vessels will be manufactured

containing known flaws. These will be inspected and the NDE data analysed to determine the limits of flaw detection.



This will be achieved by long-term mechanical testing of joints containing known flaws, and comparison with results for welds containing no flaws. The PolyTank project will establish the following:

- Ultrasonic non-destructive examination techniques and procedures for the examination of plastics tanks and vessels.
- A database of critical defect sizes and contamination levels that cause a reduction in the long-term integrity of each type of welded joint.
- A non-destructive examination system for the reliable volumetric examination of plastics tanks and storage vessels.

For further information, please visit the project website at www.polytank.eu.

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