

TEAM WrapAssure – Reinforcing Integrity

TEAM's WrapAssure inspection technique brings together pioneering aviation inspection methodology with our in-house, industry leading carbon fibre reinforced composite repair programme. Using advanced ultrasonic technology, WrapAssure is able to provide information on the bondline and body of the repair laminate which can be used to confirm quality and conformity, giving you a new level of confidence in your composite repairs.

WRAPASSURE - INCREASING CONFIDENCE IN COMPOSITE REPAIRS

Evidence of Composite Repair Integrity

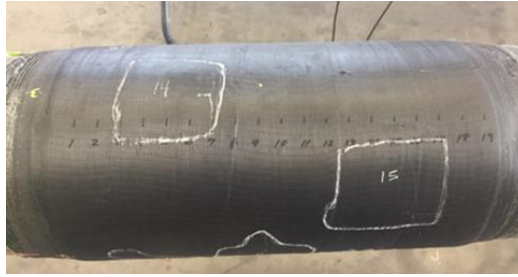
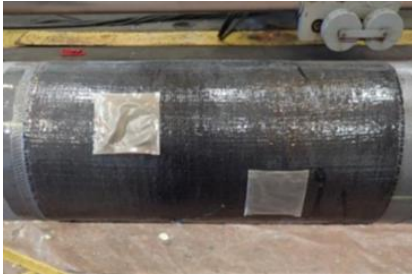
TEAM has been at the forefront of the development of engineered composite repair technology for over 20 years, promoting standardisation in qualification, design and installation. Our integrated service has always focused on attention to detail and quality, to ensure the repairs installed can be relied upon to keep pressurised systems operating safely. WrapAssure has been developed to provide additional verification that repairs have been installed as designed and then continue to perform as intended. The technique, based on low-frequency ultrasonics, enables the detection and quantification of debonding between repairs and the substrate and delaminations within the repair material. The significance of features found is assessed by comparing them with experimentally-derived limits to provide evidence to support verification of the integrity of the repaired system. Acceptable features identified can be confirmed as static and unchanging by repeating the inspection after agreed intervals in service, providing evidence that can be used to help demonstrate the on-going integrity of a system and its suitability to remain in service.



TEAM INSPECTION UK

TEAM Inspection is committed to delivering independent, high integrity conventional and advanced NDT services throughout the UK in support of the oil, gas, energy, renewable and manufacturing sectors. Fostering the high standards and proactive approach set out by TEAM Inspection throughout the Europe and USA, we are committed to providing industry leading performance, in support of our clients and contract partners.

TEAM's WrapAssure inspection technique uses a hand-held ultrasonic probe to locate and size delaminations and debonds within our composite repairs. The technique is easily deployed, intuitive and gives immediate results. Data can be gathered on the condition of the repair as installed and also provides a baseline against which future, repeat inspections can be compared. Correlation of the historical data set provides confidence in the integrity of the repaired asset.



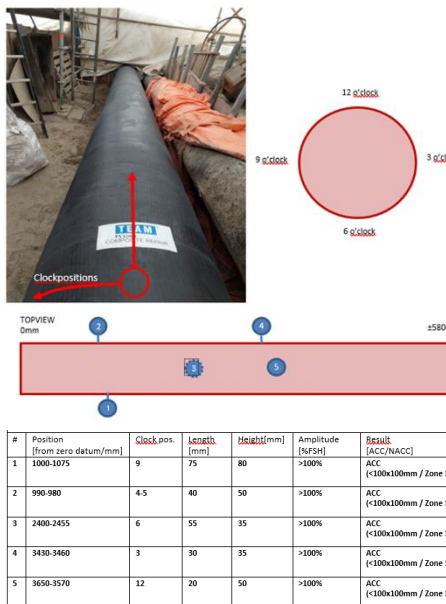
The validation of the tool focused on two, key issues:

1. What size defects can be tolerated within the repair without degrading performance?
2. Can defects of this size be found reliably?

The first question was answered by inserting defects of different sizes, at differing locations and depths within the repair during manufacture. These included locations coincident and remote from the pipe defects and within the overlap areas. The samples were subject to 100,000 full pressure cycles. The results demonstrated that extreme defects (25% of the repair area) could be tolerated provided they were remote from the defect in the pipe. Otherwise defects 100mm x 100mm in size had no measurable effect on performance.

Test samples were then manufactured containing debonds and delaminations of various sizes and at a range of locations and depths within the repair to optimise the tool settings and demonstrate they could be found repeatably.

Inspection Strategy



The objective of the inspection is to verify that no defects greater than the allowable size verified by testing are present within the repairs and to map and record all defects observed. The inspection focuses on the area around the original defect in the substrate, adopting a reduced allowable defect size in the composite and bond in this location. Based on the verification testing, a larger acceptable defect size is allowed remote from the defect within the substrate. This approach means the inspection can typically be completed in a few hours, even on larger diameter pipes and longer repairs, avoiding delays when returning components to service.

The inspection gathers evidence that no significant defects are present in the repair but also provides a finger-print against which future inspections can be compared, enabling repairs to be monitored for signs of change and so giving confidence in their on-going fitness for service.

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