

SYNTHO-GLASS[®] XT

PIPELINE INSTALLATION: HEAT EXCHANGER REINFORCEMENT AND REPAIR



Problem

Previous competitors patches on this heat exchanger had failed in several locations, were leaking and in need of immediate repair. A long term shutdown was not an option, therefore the repair had to be completed while the system was operational.

Conditions

The composite calculations were based on a design pressure of 76 psi (5.2 bar) for the API 5L GrB exchanger pipe with an original wall thickness of 0.375" (9.5mm) which was inspected to have a minimum remaining wall thickness of 0" (0mm) leaking.

Solution

NRI recommended that a leak check be performed to identify each leak's point of origin prior to starting the repair. After each leak was identified and labeled on the pipe, the repair area was hand sanded and a rounded file was used to create an X-profile pattern on the surface of the pipe around the edge of each leak point since sandblasters could not be used to create the recommended Sa 2.5 or NACE 2 SSPC 0.5mm-1mm anchor pattern. Once surface prep was completed Syntho-Steel[™], a 2-part epoxy putty stick, was used to seal each leak by forcing it into the source of each leak using a pressure sealing straps to overcome the 76 psi of pressure. Once all leaks were sealed, the pressure straps were removed and a leak test "hold point" was performed. After passing the leak test, additional surface preparation was completed over the entire pipe. All pits, patch seams and other anomalies were filled, profiled and covered using Syntho-Poxy HC to match the contour of the outside diameter of the pipe providing a secondary pressure sealing barrier over the primary leak patches. Once the Syntho-Poxy fully cured, a second leak test "hold point" was performed to reconfirm that each leak was sealed prior to applying the Syntho-SubSea[™]LV, a water displacement load transferring 2-part Kevlar[®] reinforced epoxy. The SubSea LV epoxy was applied at 30mils (0.76cm-1.5cm) around the entire circumference of the heat exchanger, extending the coverage over the entire composite repair length of 197" (5004mm) providing a third pressure sealing barrier over the primary leak patches. Eight layers of Syntho-Glass[®]XT, a 54,000 tensile/hoop strength E-glass composite sleeve were applied over 197" (5004mm) to add hoop strength over the leak patches and rehabilitate the structural integrity of the defective areas of stressed pipe on the heat exchanger pipe.

Result

The composite repair system was engineered to arrest the leaks while providing the structural strength to meet the design pressure of 76 psi (5.2 bar) for a minimum of 2 months, thus preventing the refinery from experiencing an unexpected shutdown of the heat exchanger.

"The guys at the refinery were so thrilled with the results of the job, that the top man who oversees operations within that section of the refinery came down to personally thank us for preventing a shutdown"

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