CASE STUDY
LEAK SEAL

Tunnel Crack Repair with Expanding Grout

A tunnel structure in the Mobile, Alabama area had persistent water infiltration at the interface between concrete and metal components. The leak was traced to a tight crack at the joint, allowing water to migrate into the tunnel and cause visible staining, as well as potential long-term deterioration. The client sought a solution that would seal the leak without requiring major demolition or extended tunnel closure.

Initial Assessment

Visual inspection and on-site review identified the leak path at the interface between the concrete and metal. The crack width was measured between 0.2 and 0.3 mm, indicating that traditional cementitious grouts or surface sealants would not be effective. The challenge was to deliver a material that could penetrate deep into the joint and expand to form a watertight seal, even in confined spaces and around embedded metal.

Proposed Solution

Alchatek recommended Spetec PUR F400, a low-viscosity, hydrophobic polyurethane grout. Its ability to penetrate narrow cracks and react with water creates a durable, flexible seal. The product's flow characteristics made it ideal for tight joints, and its expansive properties ensured comprehensive coverage within the voids and cracks. The injection plan called for drilling at the locations marked on the provided site photos, angling back toward the metal at approximately 18 inches deep to intersect the leak path.

Procedures

1. Identified injection points along the crack, using red-dot markings on the structure as a guide.
2. Drilled holes at 45° angle 12-inches apart, reaching approximately 18 inches deep to intersect the metal interface.
3. Injected Spetec PUR F400 polyurethane grout through the drilled ports, using a pump setup suitable for low-viscosity materials.
4. Monitored for material refusal and evidence of grout migration to ensure the joint was fully saturated and sealed.
5. Continued injection until the crack would not accept additional material, confirming a complete watertight barrier.

Results

The injection process successfully sealed the tunnel leak at the concrete-to-metal interface. The approach allowed for precise targeting of the leak path, with minimal disturbance to the tunnel structure and no need for extended closure or demolition. The client was able to resolve the water infiltration efficiently, reducing the risk of future deterioration and avoiding the significantly higher costs and downtime associated with traditional excavation or membrane replacement. This project demonstrates the effectiveness of modern polyurethane injection in addressing challenging below-grade leak scenarios, particularly where access is limited and the leak path is confined.

Alchatek

About Alchatek

Alchatek is an international leader in the manufacture and supply of chemical grouts and construction products for Geotechnical, Leak Seal, and Seawall Repair applications. Providing solutions from its headquarters in Tucker, Georgia and its manufacturing facility in Reno, Nevada, Alchatek specializes in advanced construction technologies for sealing leaks, stabilizing soils, lifting concrete, and protecting infrastructure and seawall structures. To best serve its customers, Alchatek is organized onto three divisions:

The Leak Seal Division combines a full system offering of polymer chemical grouts and equipment with perhaps the most experienced technical team in the industry. It specializes in preventing water ingress through concrete infrastructure including parking garages, culverts, basements and foundations, and sewer manholes.

The Geotechnical Division offers a complete line of single component products for soil stabilization as well as two component polyurethane foams for concrete lifting, void filling, and stabilization of infrastructure. This includes lifting sunken structures such as warehouse floors, back into place.

Seawall Repair Network® is the only national network of certified contractors in the repair, preservation, and protection of Seawalls waterfront barriers. Its proprietary methods and materials are environmentally friendly and safe for use in all marine environments and provide a non-destructive solution for seawall repair at 80% less than the cost of replacement.

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