



MARKET APPLICATION FOCUS

Water Treatment

Concrete Repair

Surface Erosion

CASE STUDY

Project: Moores Bridge Water Treatment Plant
Norfolk, VA.

Owner: City of Norfolk, VA.

Specifier: Gannett Fleming

Year: 1996-1997

THE PROBLEM



Built in 1950, the Moores Bridges Water Treatment Plant serves as the primary water treatment facility for the City of Norfolk, Virginia. In 1994, a major project was begun to upgrade the existing capacity of the facility from 78 MGD to 108 MGD and to restore the condition of the existing concrete tanks and filters.

Inspection of the existing vertical concrete surfaces within the tanks and filters revealed the loss of cement paste from much of the surface, exposing the coarse aggregate. Freeze/thaw damage and an aggressive water chemistry that included sulfates, chlorides, alum and other water treatment chemicals, resulted in the gradual erosion of the cement matrix that binds the aggregate within the concrete. Additionally, thousands of linear feet of cracks and spalls were permitting direct access of the water to the embedded rebar, which was accelerating the corrosion process and leading to further deterioration of the concrete.

THE SIKA SOLUTION

The first step in the repair process was to seal the cracks. Leaking cracks were repaired by injecting SikaFix HH, an expanding polyurethane foam grout. Non-moving, dry cracks were repaired by first sealing the face of the crack with Sikadur 31 Gel and then injecting Sikadur 52 epoxy resin into the crack. Based on the depth of deterioration, it was determined that the resurfacing effort would require the application of a repair mortar that could be applied at a depth of 1/2 inch in order to fully encapsulate the exposed coarse aggregate and level the tank walls. Due to the large area to be resurfaced (approximately 400,000 square feet), shotcrete methods were employed to increase productivity. Sikacem 103 dry process shotcrete was chosen over other alternatives primarily because it significantly reduces the permeability of the concrete surface making it much more difficult for water to penetrate into the pores of the concrete and cause damage.



The combination of 3,000 pound bulk bags of Sikacem 103 and 6,000 pound capacity volumetric mixing equipment allowed the contractor to achieve production rates of over 28,000 pounds of shotcrete per 8 hour shift.



For Water Treatment Facilities... Sika's System approach to Concrete Repair and Protection

Anti-Corrosion Primer and Bonding Bridge

Sika Armatec 110 Epo-Cem - protects the steel from corrosion in areas of inadequate cover. Improves bond of repair mortar to both the substrate and steel.

High-Performance Repair Mortars

SikaTop PLUS mortars - two-component, polymer-modified materials containing Sika FerroGard 901 corrosion-inhibiting admixture.

Sikacem mortars are machine-applied by dry-process shotcrete techniques for large scale repairs requiring a high level of concrete protection.

Leveling mortars for Coating Damp Concrete

Sikagard 75 Epocem - can be used as temporary moisture barrier to allow application of epoxy coatings (even when the concrete cannot be made dry).

Problem Joints/Cracks Sealing System

Sikadur Combiflex - a unique strip and seal system used to seal problem joints and cracks, even those undergoing extreme movement. Failed joint sealants need not be removed prior to installing Combiflex (a great labor savings).

Joint Sealing

Sikaflex, High Performance Sealants - are premium-grade polyurethane joint sealants that are fully compatible with Sika's concrete repair systems.

Surface Sealing/Waterproofing Mortar

SikaTop Seal 107 - a polymer-modified waterproofing and surface sealing mortar for tanks and reservoirs. Used on the inside of the tank walls it prevents water-loss (seepage) and prevents surface erosion. Used on exterior walls it protects water quality by preventing infiltration.

Protective Epoxy Coating

Sikagard 62 - a 100% solid, high-build protective coating used successfully on water projects for decades. It offers long-term protection to the concrete and easy maintenance.

Epoxy Injection and Bonding

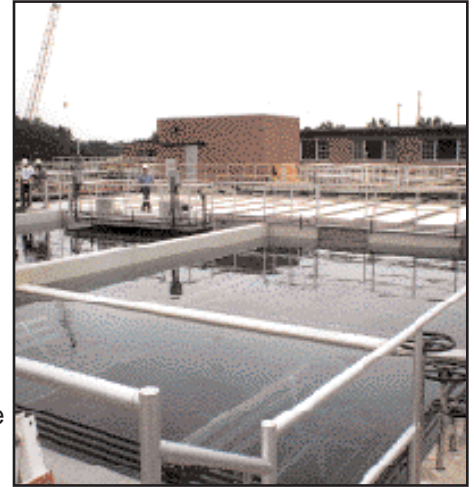
Sikadur - epoxy resins help restore structural integrity by injection into cracks and voids. The most comprehensive range of epoxy products for structural bonding and grouting.

Structural Strengthening Systems CFRP

Sika CarboDur - a proven system of external strengthening using epoxy-bonded Carbon Fiber Reinforced Plastic (CFRP) laminate strips. Stronger than steel, yet lightweight and non-corrosive, this system can solve unique strengthening problems in a variety of concrete structures.

Chemical Grouts for stopping water leaks

Sika Fix - chemical grouts are polyurethane-based and expand into a foam upon contact with water. When injected into leaking cracks, joints or crevices this expansion process forms a seal which stops water infiltration - fast!



1-800-933-SIKA NATIONWIDE

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Sika Corporation (USA)
201 Polito Avenue
Lyndhurst, NJ 07071
Phone: 201-933-8800
Fax: 201-933-6225

Sika Mexicana S.A. de C.V.
Carretera Libre Celaya Km. 8.5
Corregidora, Queretaro
C.P. 76920 A.P. 136
Phone: 52 42 25 0122
Fax: 52 42 25 0537

Sika Canada, Inc.
601 Delmar Avenue
Pointe Claire,
Quebec H9R4A9
Phone: 514-697-2610
Fax: 514-694-2792

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