NCFI GEOTECHNICAL

Neshoba Spillway Rehabilitation
24-003 Void Fill and Stabilization

Problem

When waters rise and dams begin to reach their capacity, spillways serve as a vital structure for ensuring water does not overflow and damage or destroy the dam or levee. Spillways ensure that high water events can be eased through controlled release of flows from a dam or levee into a downstream area. Rehabilitating spillways prevent failure and helps ensure the safety of adjacent communities and keeping expensive water control structures from being replaced.

In Neshoba County, MS, the Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) was noticing some severe undermining in the Neshoba County Lake Spillway. The Lake manager noticed two swirling patterns on the lake-side of the dam and two additional swirling patterns on the spillway side in a detention area which was used to equalize flow rates. The dam was also showing signs of cracking and settlement on the top slabs. The Lake Manager was concerned that water was getting below the cap and causing soil subsidence and could compromise the dam and spillway.

Solution

To repair the seepage, MDWFP contracted with Bulldog Construction (through a solicited-bid contract) to inject the TerraThane 24-003 high-density polyurethane into the weak soil zones to fill the voids, stabilize the soils, and stop the water seepage through the dam and the spillway.

To repair the dam and spillway, Bulldog Construction had to address the dam-side first. Bulldog approached this by 175′ x 160′ area-wide area using Deep Soil Injection to stabilize the soils and re-establish contact with the dam. Bulldog Construction used a 1′, 4′ and 8′ deep injection pattern on 4′ x 4′ gridded area. The goal was to saturate the zone with the 24-003, densifying the soils, sealing the dam, and displacing any present water.

Results

When geotechnical polyurethane is injected into a treatment zone, the polyurethane saturates the soil layer and begins to expand through the soil layer creating a highly dense matrix of polyurethane and soil. The 24-003 polyurethane is a hydrophobic formulation, meaning it displaces and moves water away from the treatment zone, making it ideal for applications where high water saturation is involved.

Prior to the injection phase, Bulldog pre-drilled injection/chase holes down the spillway. As the injections were made, the initial focus was near the knee wall on the dam-side. As injections progressed toward the spillway, Bulldog followed the water as it seeped through the chase holes and continued the injections down the spillway until the water extrusion stopped.

The project took 3 days with about 40 cubic yards of material (approximately 4,000 lbs of 24-003.) Bulldog Construction sealed the diverters, undersealed the slabs, and stabilized the soils at depth. The cap was treated and the water seepage was stopped.

24-003 CASE STUDY

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