

Concrete Cloth™

Geosynthetic Cementitious Composite Mat (GCCM)

CASE STUDY:

Toledo, OH
Slope Protection

Project Overview

In September 2015, the Ohio Department of Transportation (ODOT) found that flood flows were causing erosion of the foundation slope near the columns below a two-lane roadway bridge on Ohio State Route 579 in Toledo, Ohio. This area was also exposed to runoff from bridge drainage. The ODOT considered lining the slope with riprap, but access to the slope was limited and the department did not want to disrupt traffic on the two-lane road. The option to add vegetation to the slope was also considered, but it was deemed impractical because of the excessive shade under the slope that could prevent it from growing and would ultimately require continued maintenance.

The maintenance division had the responsibility of constructing the repair, which had already been designed, incorporating Concrete Cloth GCCM, by EMH&T and Ohio State University (OSU) through a grant from the ODOT Research Division. Dan Mecklenburg, an ecological research engineer in the School of Environmental and Natural Resources at OSU, helped the crew interpret the designs.

"I hadn't worked with [Concrete Cloth GCCM] before this project, so I reviewed installation videos online prior to going onsite," said Mecklenburg. "I was intrigued by the material and liked that it seemed easy to maneuver."

Solution

The surface underneath the overpass was restored prior to the GCCM's installation by smoothing out the repair area and removing any large rocks and clumps of earth that would inhibit the GCCM from being able to lay flat on the slope. The maintenance crew hand-prepared the slope by raking it, and once the surface was ready, the rolls of material were cut in an area near the bridge, carried underneath the overpass and laid in strips down longitudinally on the slope. The only part of the project that required lane closure was when a water tank was brought in to hydrate the material, which closed one lane of the bridge.

According to Mecklenburg, the low clearance of the bridge would've made it difficult for alternative repair methods, such as riprap, to make it into the work area. Similarly, any equipment needed would've been hard to maneuver in such a small working area.

Results

This project was a trial run for the ODOT's use of Concrete Cloth GCCM to see if the material would fit the department's needs, and since its completion, the department has used the material to repair other slopes under bridges throughout the state, specifically on I-77 in Guernsey County, and to line culvert inverts for protection as well. Almost three years after the repair, the Concrete Cloth GCCM underneath this specific bridge is holding up well and protecting the slope from erosion as it was designed to do.

Project Details

Location: Toledo, OH

Application: Slope Protection

Client: Ohio Department of Transportation (ODOT)

Installation: September 2015



Completed Concrete Cloth GCCM installation.

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Initial slope conditions with erosion near columns.



Surface restoration prior to Concrete Cloth GCCM installation.



Completed installation.



Completed installation three years later, view from opposite bank.



Completed installation three years later.