

RenewWrap®

Carbon Fiber Strengthening System

Overview

The SCDOT found corrosion-related deterioration of the pier caps and columns supporting the Butler Road bridge over I-385 in Greenville, SC, during a routine inspection. The corrosion was caught early enough and was limited to only one column and a couple of locations on the pier cap to be repaired by the SCDOT maintenance crews. To prevent further deterioration, the SCDOT determined it was necessary to repair the damage, restore any loss of strength and protect the pier from further deterioration. A repair that could be made quickly and with as little disruption to the traveling public was important.

Challenge

ClockSpring|NRI engineers visited the job site with the SCDOT to assess the scope of the problem and understand the objectives of the SCDOT. After the site visit, ClockSpring|NRI recommended using GeoStrong™ geopolymer repair mortar to make the vertical and overhead spall repairs on the pier cap, followed by the application of a single layer of RenewWrap FRP strengthening system to restore any loss strength and to protect the pier cap from further deterioration.

The work was completed by the SCDOT maintenance crews in the evenings to minimize lane closures on I-385. Standard concrete repair methods were used by the SCDOT to make the repairs. Once the loose concrete was removed and the corroded rebar was cleaned, the GeoStrong geopolymer repair mortar was placed by hand to fill the spalled sections. Unfortunately, heavy rains in South Carolina forced the crew to shut down before the patching could be completed. When they returned two weeks later, they could patch directly over the cured GeoStrong material with confidence knowing that cold joints are not a concern with ClockSpring|NRI innovative geopolymer material.

When the GeoStrong mortar was applied and cured, engineers instructed the maintenance crew on how to apply RenewWrap FRP system to the pier cap and column. The carbon fibers were aligned in the same direction as the corroded reinforcing steel to provide additional strength and protection to the damaged areas. The following night, the SCDOT coated the RenewWrap with a Sherwin-Williams epoxy paint to match the rest of the pier. To the traveling public, the pier looks like a brand-new structure.

Results

The SCDOT Assistant District Maintenance Engineer and maintenance crew commented on the ease of installing the FRP strengthening system, and hope to use this material on future maintenance applications.

Project Details

Application: Column and Cap Repair

Client: South Carolina Department of Transportation (SCDOT)

Location: Greenville, SC

Product Used: RenewWrap® FRP System

Installation: June 2018

Installer: SCDOT



Column and pier cap prior to repair.

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Application of GeoStrong repair mortar.



SCDOT maintenance crew wrapping pier cap with RenewWrap FRP system.



Application of RenewWrap FRP around column for confinement.



Completed repairs prior to coating.



Painting RenewWrap FRP system with epoxy coating.



Completed column and pier cap.