

RENEWWRAP®

Carbon Fiber Strengthening System



BUILDINGS & PARKING FACILITIES

Case Study Reinforced slab and beam, Southeastern U.S.

More than 100 years after initial construction, a textile plant in the Southeast serving the booming automotive industry discovered it needed to rehabilitate portions of the structure supporting the main manufacturing floor. Years of exposure to the hot, humid manufacturing environment and chlorides used in the manufacturing process had taken a toll on reinforced concrete beams and columns supporting the concrete slab. Significant corrosion-related damaged had weakened the beams and columns.

To shore up the floor, the plant constructed masonry columns adjacent to the most deteriorated columns and beneath the most deteriorated concrete beams. However, as more members continued to deteriorate it became necessary to develop a strategy to repair and strengthen them rather than constructing more support columns. Temporary shoring posts were installed while a repair/strengthening solution was developed that could be implemented in the 4-foot crawl space beneath the floor without disrupting operations at the plant, which was at full capacity.

SOLUTION

Damage to the concrete columns was repaired by removing the loose concrete and, where possible, replacing some of the lateral tie reinforcement. Once the columns were patched using a traditional concrete repair mortar, the columns were wrapped with the RenewWrap carbon fiber reinforced polymer (CFRP) strengthening system to restore any remaining deficient tie steel.

The reinforced concrete beams presented numerous challenges due to the level of deterioration and difficult access within the 4-foot crawl space containing numerous pipes. Early repair/strengthening proposals included removing the existing beams and pouring new, reinforced concrete members and installing supplemental steel beams on either side of the deteriorated members. Both options were difficult to implement without working from the top side and disrupting the manufacturing operations. The “tried-and-true” approach of installing supplement steel beams was impractical to implement.

Working with GeoTree Solutions, Osborne Construction Services (OCS), proposed an alternative approach to eliminate shut-down time. Using a combination of traditional repair materials and the RenewWrap FRP strengthening system, the members were repaired and strengthened in place without disturbing plant operations.

RESULTS

Once OCS completed shoring installation they began making repairs to the beams by removing the loose concrete with small chipping hammers, cleaning and replacing, where possible, the corroded reinforcing steel, and restoring the cross-section of the beam with traditional repair mortar. After the repair mortar cured, RenewWrap carbon fiber was applied to the bottoms of the beams to provide additional flexural strength and U-wraps were bonded to the sides of the beams to provide additional shear strength especially in locations where supplemental masonry columns had been constructed years ago to shorten spans.

PROJECT DETAILS

Application: Reinforced slab and beam supported on columns

Client: Textile Manufacturing Plant

Location: Southeastern United States

Product Used: RenewWrap FRP

Installation: 2015

Installer: Osborn Contract Services



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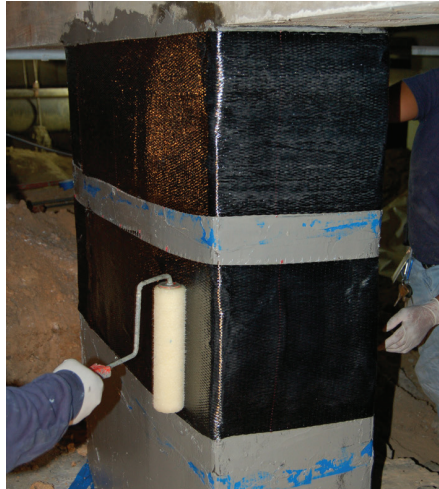
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Deteriorated column prior to repair



Applying RenewWrap FRP to confine column



RenewWrap U-wraps for shear



Deteriorated beam prior to repair



Completed column



Installing U-wraps



Flexure plies and U-wraps

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Before using any GeoTree product, the user must review the most recent version of the product's technical data sheet, safety data sheet and other applicable documents, available at www.geotreesolutions.com or by calling +1.855.655.6750.

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