RHINO™
CARBON FIBER REINFORCEMENT PRODUCTS

CFRP CASE STUDY

HISTORICAL WATER TOWER STRENGTHENING WITH CFRP

LOCATION
Clay City, Kansas

PRODUCTS USED

- Rhino Carbon Fiber™ CFRP (Bidirectional): 560 GSM in 24-Inch Widths
- RCF™ Saturant-Adhesive Epoxy

ICC ES®

CASE BACKGROUND

The Kansas City Public Works Department hired an engineering company to assess needed repairs on a deteriorating historical water tower in Clay City, Kansas that was crumbling due to its old age. There had been 2 previous attempts to strengthen the tower, both of which failed. The first attempt involved patching the concrete cracks with an additional concrete layer. This repair did not last as the concrete continued to shift and deteriorate due to thermal differentiation and thermal cycling; changes in temperature caused the concrete cracks to expand. The second attempt involved using steel reinforcement, but the steel eventually corroded. In addition, it caused further complications as the corrosion from the steel accelerated the corrosion of the structural rebar, compromising its structural integrity.

After seeing two repair attempts fail, the engineering company worked to develop a plan for the repair. The site engineer concluded that CFRP would be the ideal repair solution as it met or exceeded the technical requirements of the repair, in addition to being a cost-effective, non-corrosive solution.

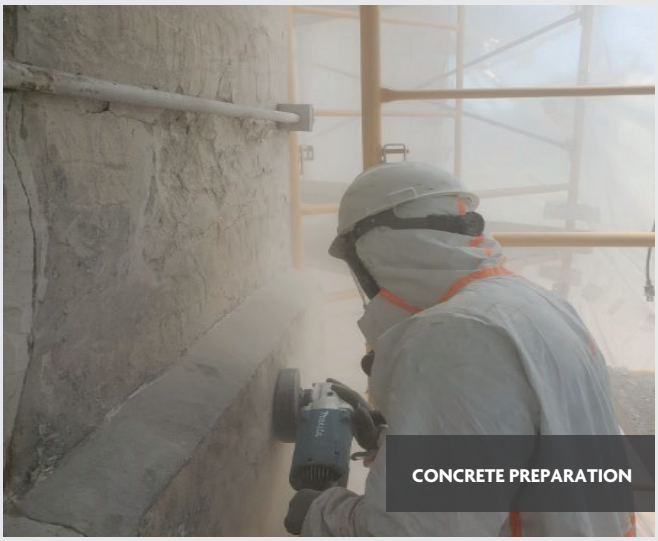
The engineer contacted **Rhino Carbon Fiber™** to ascertain the best possible repair, determining that 560 GSM **Rhino Carbon Fiber™ CFRP (Bidirectional)** in 24-inch widths would be the best option for the repair due to the 560 GSM's strength in all directions.

THE SOLUTION

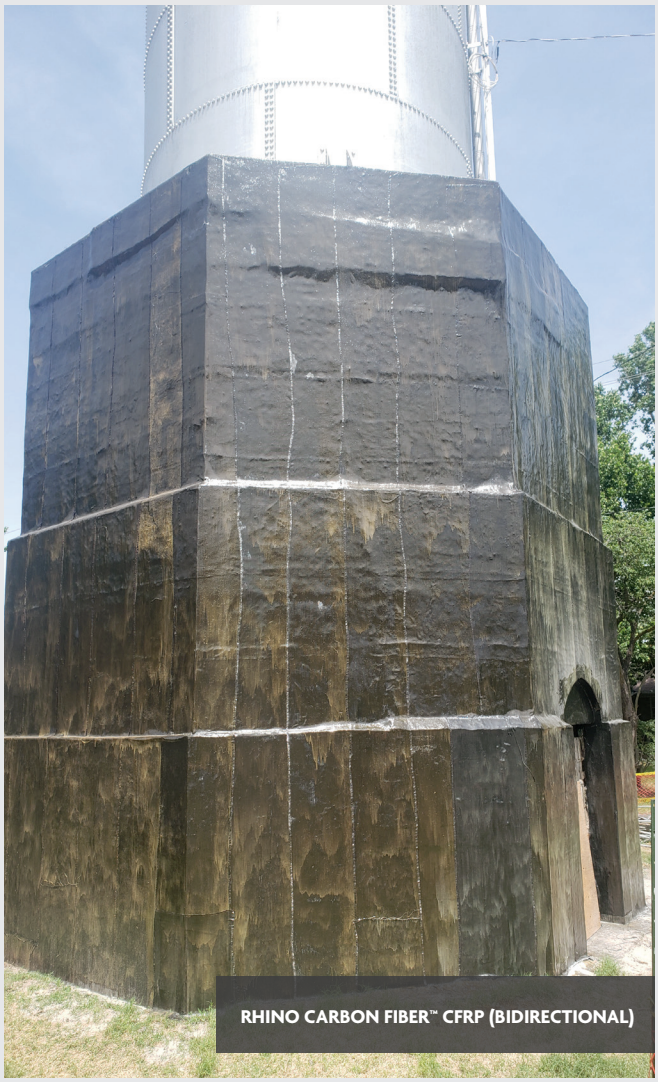
Before the CFRP could be installed, the concrete required surface preparation, as preparation is key to ensure a strong bond. The entire surface area of the tower was mechanically abraded, all loose concrete and debris were removed, and large gaps were filled with concrete.

Three crews completed the project applying CFRP to the structure. The base pillar of the tower was entirely encapsulated in CFRP. A cementitious coating, or paint that bonds to CFRP, will be applied after the CFRP cured to restore the exterior appearance and to protect the CFRP from UV light. The end result was that the water tower was successfully restored to operational condition, and the repair was virtually invisible, thanks to the superior properties of CFRP.

SCAFFOLDINGS FOR PREP/INSTALL



CONCRETE PREPARATION



RHINO CARBON FIBER™ CFRP (BIDIRECTIONAL)

1-888-684-3889 www.rhinocarbonfiber.com info@rhinocarbonfiber.com

RHINO™ CARBON FIBER REINFORCEMENT PRODUCTS