



# MARKET APPLICATION FOCUS

Stadium

Strengthening Concrete Columns

Structural Strengthening

**Project:** Ohio Stadium Horseshoe Renovation  
Columbus, Ohio  
**Owner:** Ohio State University  
**Specifier:** Osborn Engineering Company  
Carl Walker, Inc.  
**Contractor:** IC Construction  
**Year:** 2000

## THE PROBLEM



In the midst of renovating the 75-year-old landmark football stadium, it was noticed that the original concrete columns contained no hoop reinforcement. Current code requirements required the use of some form of stirrup in order to confine the vertical bars and provide shear and axial load strength. This necessitated the use of external reinforcement to stabilize the columns.

Since the project was on a very tight timeline, and this problem was unanticipated, a rapid fix was mandatory. The new precast seating was scheduled for delivery 2 weeks after the problem was identified, and the fast-track project could not withstand delays.

There was not enough time to start fabricating steel jackets to install on the columns, nor was there access in many of the areas for this traditional type of repair.



## THE SIKA SOLUTION

SikaWrap Carbon Fiber Fabrics were selected to strengthen the concrete columns and restore their structural integrity. The design was completed in one week using the engineering software provided by Sika and the contractor was able to mobilize almost immediately.

The concrete surface was sandblasted to provide a sound, level surface for the SikaWrap fabric to be applied on to. The material has an extremely high tensile strength (> 100,000 psi), yet is remarkably light and easy to work with. It is also non-corrosive and requires little to no maintenance once installed. A multiple layer system was installed to meet the structural requirements of the project, yet it remained unobtrusive and was able to be installed even in areas where two columns were only inches apart.



The project was completed in a rapid manner, and still accomplished all the requirements of the engineer. "This particular carbon fiber reinforced polymer fabric was the only product that we could have used that would allow us to keep up with the demanding schedule of this historic project," stated David Childress, Division Manager for IC Construction Co.

CASE STUDY



## For Concrete Buildings...

### Sika's System approach to Concrete Repair and Protection

#### Anti-Corrosion Primer and Bonding Bridge

**Sika Armatec® 110 EpoCem®** - protects the steel from corrosion in areas of inadequate cover. Improves bond of repair mortar to both substrate and steel.

#### High Performance Repair Mortars

**SikaTop® Plus mortars** - two component polymer modified materials containing Sika FerroGard 901 corrosion-inhibiting admixture.

#### Corrosion-Inhibiting Impregnation

**Sika FerroGard® 903** - spray-applied to protect areas outside the repair zone against future damage. Proven to penetrate and reduce corrosion effects of carbonation and salt exposure.

#### Surface Leveling/Pore-Filling Mortars

**SikaTop® leveling mortars** - achieve a level surface by filling pores, bugholes, or other irregularities in the surrounding substrate.

#### Anti-Carbonation Coatings

**Sikagard® 550W and 670W** - protect concrete facades from the damaging effects of carbon dioxide (carbonation), water and pollutants. Either crack-bridging (550W) or rigid (670W), both are available in a variety of decorative colors.

#### Joint Sealing/Waterproofing

**Sikaflex® High Performance Sealants** - premium-grade polyurethane joint sealants that are fully compatible with Sika's concrete repair systems.

#### Epoxy Injection and Bonding

**Sikadur®** epoxy resins help restore structural integrity by injection of cracks and voids. The most comprehensive range of epoxy products for structural bonding and grouting.

#### Structural Strengthening Systems (FRP)

**Sika CarboDur® & SikaWrap®** - a proven system of external strengthening using carbon fiber laminate strips, carbon fiber fabric, and glass fiber fabric. Stronger than steel yet lightweight and non-corrosive, these system components can solve unique strengthening problems in a variety of concrete structures.



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