

Market Application Focus

Transportation

Grouting

Post Tensioning Strands Protection

Project: I 35 West, Minneapolis, MN
Owner: Minnesota Department of Transportation
Contractor: Flatiron-Manson Joint Venture
Year: 2007-2008

The Problem

The 2007 collapse of the Interstate 35 Bridge, Minneapolis, MN, was a tragedy felt by all segments of American society and people around the world. At 6:06 PM on Wednesday August 1 2007 cars sat in evening rush hour atop the I 35 W bridge, the central span of the bridge plunged into the Mississippi River resulting in thirteen casualties and dozens injured.



Built in 1964, this bridge had served as a transportation lifeline for the growing Twin Cities population, carrying across its 14 spans many of the SUVs, cars, and trucks that accounted for the 42 percent rise in Minnesota’s vehicle traffic from 1990 to 2003.

The bridge, officially designated ‘Bridge 9340’, was designed in accordance with American Association of State Highway Officials (AASHO, the precursor to AASHTO) standard specifications. Construction began in 1964 and the bridge was opened to traffic in 1967. The bridge’s fourteen spans extended 1,907 feet (580 m) long. The three main spans were of deck truss construction while all but two of the eleven approach spans were steel multi-girder construction, the two exceptions being concrete slab construction. The bridge ranked as Minnesota’s fifth busiest and carried more than 140,000 vehicles a day. It was estimated that the loss of the bridge resulted in \$400,000 per day in lost revenue, increased commuter expenses and stress on surrounding roads.



Featured Project



The Sika Solution

The replacement bridge was designed as a Segmental Bridge Type Construction and was to be built on a fast track schedule within 437 days. The contract was awarded to Flatiron-Manson Joint Venture and work on the project commenced in October 2007.

Sikadur 300PT- Post Tensioning Grout

In Segmental Bridge Construction, Sika Corporation is considered one of the premier suppliers for cement-based grouts that are used to grout around the PT strands. Representatives of Sika Corporation were invited to meet with key decision makers from Flatiron to discuss their needs on this high profile fast tracked project. SikaGrout 300 PT was selected by Flatiron-Manson based on, quality, value and a compelling reference list of bridge projects completed with the same material. The challenge and uniqueness of this project was the compressed nature of the grouting schedule. In initial conversations with Flatiron, Sika was told that the requirements of the project would be about 3-4 truckloads per week, for a total of 40,000 bags over a period of 3 to 4 months.



Sika's Marion, OH manufacturing plant was the chosen facility to produce the material for this project. Not an easy endeavor to embark on, the project became even more challenging when the grouting schedule was accelerated for completion in only 2 months instead of the original 3-4 months. From purchasing to production to shipping, the logistics of processing 2,000,000 pounds of material on 54 truckloads in such a short amount of time required daily monitoring of the Sika's committed personnel involved with the project.

A steady in-flow of raw materials had to be maintained and the quality of every lot of SikaGrout 300 PT had to be tested and approved by a third-party laboratory prior to being shipped. When interruptions in raw material supply became an issue, Sika's production team had to work even harder to overcome the roadblocks and maintain a steady supply of product to the customer. When good weather allowed the project to get ahead of the aggressive schedule, additional truckloads had to be scheduled with little notice, up to 12 truckloads in a single week, in order to keep the project



going. Flatiron went from two to six grout pumps in operation 24 hours a day, 7 days a week. Because of Sika's ability to supply the project with a continuous inventory of product, Flatiron was able to gain valuable time on the expected bridge and help the contractor gain valuable time on the project.



Sikadur 42, Grout Pak - Pour Back Grout

Sikadur 42, Grout-Pak is a 3-component, 100% solids, moisture-tolerant, epoxy base plate grouting system. Sikadur 42 Grout-Pak was selected to protect the anchorages of the post-tensioning tendons because of its impermeable nature and low exotherm for larger pours. The project utilized approximately 3000 units of the special epoxy grout

Repair Products

For repair applications of minor defects, Sika products including SikaTop 111 Plus a polymer modified with an integral corrosion inhibitor was used. Additionally other single component repair products like SikaRepair 222 and SikaRepair 223 were used on this project.

Only 14 months after the collapse, on September 16th at 5:00am, this vital transportation link was reopened three months ahead of schedule. The \$234 million bridge was built using round-the-clock construction, in less than half the usual time it takes to build a project of this size. With the help of its committed employees, Sika Corporation in its own capacity was able to contribute as a key material supplier in a project that is regarded as remarkable engineering success story of recent times.

Sika Products Used

Sikagrout® 300 PT A state of the art, sand free, zero bleed cement based grout. This grout is used for horizontal and vertical grouting of ducts within bonded post-tensioned systems.

Sikadur® 42, Grout-Pak is a 3-component, 100% solids, moisture-tolerant, epoxy base plate grouting system.

SikaTop® 111 PLUS is a two-component, polymer-modified, portland-cement, fast-setting, screed mortar. It is a performance repair mortar for horizontal, vertical and overhead applications or form and pour application. It offers the additional benefit of FerroGard 901, a penetrating corrosion inhibitor.

SikaRepair® 222 is a one-component, early strength gaining, cementitious, patching material for horizontal repair of concrete.

SikaRepair® 223 is a one-component, early strength gaining, cementitious, patching material for vertical and overhead repair of concrete.



I 35 West Bridge reopened at 5:00 am on September 16, 2008.

References:

Picture on pg. 4 courtesy of MN DOT: <http://www.dot.state.mn.us/>

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