

I-35W ST. ANTHONY FALLS BRIDGE MINNEAPOLIS, MINNESOTA, USA

Product: Maccaferri MSE Terramesh® System & Terrawall™

Background

The I-35W Mississippi, officially known simply as 'Bridge 9340', was an eight-lane steel truss arch bridge that carried Interstate 35W across the Mississippi River in Minneapolis. Completed in 1967 and maintained by the Minnesota Department of Transportation (Mn/DOT), the bridge carried a daily average of 140,000 total vehicles north and south, which made it one of the busiest bridges in the country over the Mississippi River, and one of three principal arteries into downtown Minneapolis, a city with one of the highest population densities in the Midwest.

Just after 6 p.m. on the evening of August 1, 2007, the 40-year old bridge collapsed into the river and its banks without warning, killing 13 and injuring 145 others. At the time, there were approximately 120 vehicles, carrying 160 people, on the bridge. The impact of the fall broke the span into multiple planes of broken steel and crushed concrete. Cars, buses, and trucks all resting precariously along guardrails or suddenly unprotected edges, crashed into other vehicles, partially embedded in the muddy river bank, or dropped precipitously into the river.

The New St. Anthony Falls Bridge Design

On October 8, 2007, the Mn/DOT awarded the design-build contract for this important bridge to a joint venture of Flatiron Constructors Inc. and Manson Construction Company. FIGG Engineering Group led the design phase of the project and is the engineer of record for the new bridge, with TKDA of St. Paul, Minnesota, responsible for general civil, storm water/drainage, 2nd Street overpass, and other engineering support services. Oslund and Associates from Minneapolis was responsible for the landscape design.

Client:

Mn/DOT

Main contractor:

Flatiron-Manson Joint Venture

Designer:

FIGG Engineering Group

Products used:

Terramesh® System, Terrawall™, geogrid, filter fabric, geomembrane

Date of construction:

START: 11/2007; END: 9/2008



Initial Site



During Construction

As the design was underway, the community received an opportunity to select their preferences on various aesthetic aspects during a full day FIGG Bridge Design Charette™ held on October 24, 2007. A cross section of the community including residents, business people, government officials, representatives of the cultural arts, University of Minneapolis, and others, voted on a curved pier shape, open railing for new vistas, bridge color of white, native stone gabion walls, and feature lighting.

Maccaferri was first contacted by FIGG Engineering Group and Flatiron Construction in November 2007 to see if we could provide a product to meet the structural and aesthetic requirements of their project, along with a design life for corrosion protection of all components of the wall of 100 years.

Another critical requirement that Mn/DOT specified in the contract documents was that the MSE wall system had to be evaluated by the Highway Innovative Technology Evaluation Center (HITEC) for compliance with AASHTO requirements for the system and its components.

After considerable review of the project documents and scope of work, Maccaferri utilized all resources within its organization to come up with a solution that would satisfy the requirements of this prestigious design-build MSE wall project. With over 125 years experience in soil stabilization, we were confident this was a challenge we could meet.

Maccaferri Solution

Maccaferri's solution for the MSE walls was the Terramesh® System and for the bridge abutments the Terrawall™, which have both been evaluated by HITEC.

Because of the design-build nature of this project, Maccaferri had to provide Flatiron Construction with a complete set of stamped shop drawings. Maccaferri worked with The Collin Group, Ltd. of Bethesda, MD to provide the entire design and construction drawings for both the Terramesh® System and Terrawall™ structures. The design, drawing preparation, and submittal review process took approximately 3 months.

Both patented systems had to be modified in order to meet structural and aesthetic requirements. The Terramesh® System had to be produced with a welded panel at the front face. A special, factory-made connection joins the welded fascia panel to the Terramesh® double-twisted mesh, in order to eliminate any additional work for Flatiron at the jobsite, saving installation time. Both systems were produced with a much heavier gauge wire than the typical units due to the 100 year life-span requirement.

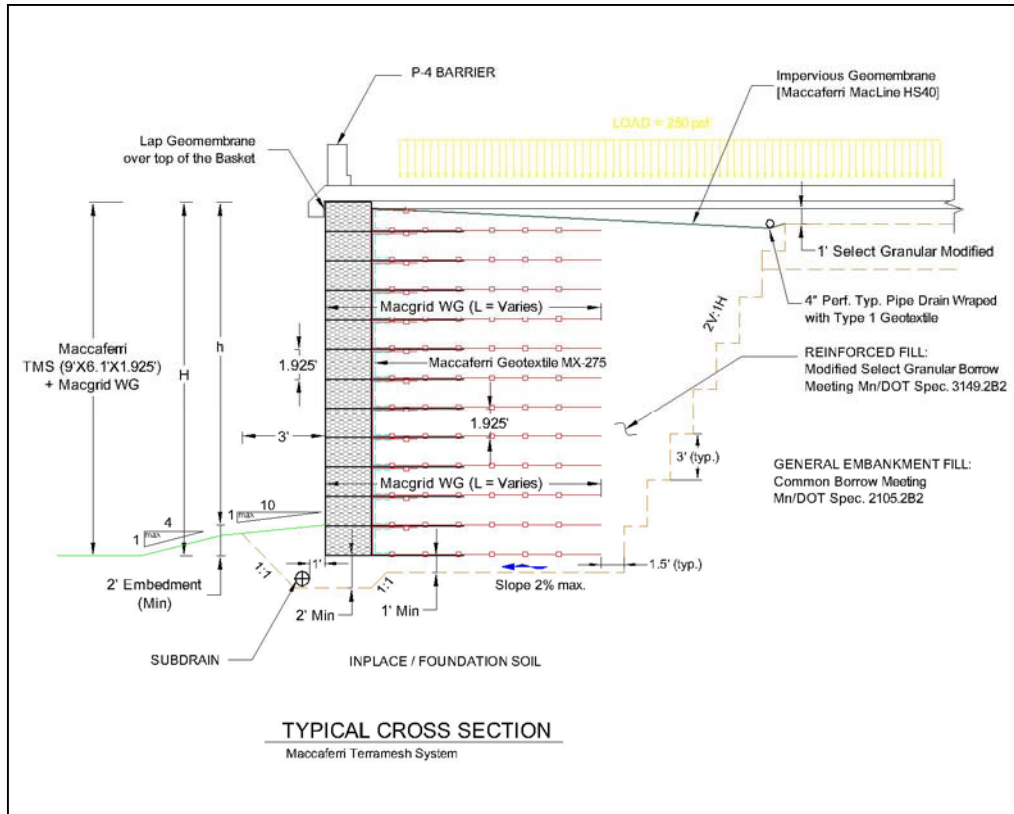
Maccaferri worked very closely with Vetterstone, the local quarry in Mankato, MN who supplied all the custom cut limestone for the fascia panels and with Carl Bolander & Sons, who was the sub-contractor installing the Terramesh® System and the Terrawall™ units. The stone supplied was shipped in 3 different shades and cut in to 3 different sizes in order to be placed in a staggered pattern. The landscape architect, Oslund and Associates, had the installers select from specific pallets of stone in a specific order to maintain the aesthetic look they were trying to achieve.



During Construction



After Construction



Typical Cross Section

Construction

Carl Bolander & Sons started construction of the Terramesh® System and the Terrawall™ in March 2008. The walls varied in height, with the highest point at approximately 27 ft. The MSE walls were completed at the end of August 2008. Maccaferri supplied the following items: 19,048 s.f. of Terramesh® System, 11,600 s.f. of Terrawall™, 40,000 s.y. of geogrid, 25,000 s.y. of filter fabric, and 53,000 s.f. of geomembrane.

The new bridge, which is actually two side-by-side spans, is made of concrete box girders tied together with high tension steel cables. Many "smart" technologies have been built into it, including many pavement sensors which will transmit real time road conditions to Mn/DOT.

The new I-35W St. Anthony Falls Bridge was opened to traffic September 18, 2008, **ninety six days ahead of schedule!!**



Recent View of the Structure

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