



Case Study

application Temporary Fabrics Wrapped Grade Separation Structures
location Minneapolis, MN
product Mirafi® HP570

job owner
engineer
contractor

State of Minnesota
Gale-Tec Engineering, Inc.
Flatiron Constructors, Inc./Carl Bolander & Sons, Inc.

TenCate™ develops and produces materials that function to increase performance, reduce costs and deliver measurable results by working with our customers to provide advanced solutions.

THE CHALLENGE

The I-35W Mississippi River Bridge (known simply as “Bridge 9340”) was an 8-lane, steel truss arch bridge that carried 140,000 vehicles per day across the Mississippi River in Minneapolis, MN. The bridge catastrophically collapsed during the evening rush hour on August 1, 2007. Thirteen people were killed and approximately 100 more were injured. MNDOT announced on September 19, 2007, Flatiron Constructors, Inc. and Manson Construction Company would build the replacement bridge for USD \$234 million, to be completed no later than December 24, 2008. MNDOT selected a design build process in order to expedite construction.

Subsequent to the collapse, a new Transportation Commissioner was appointed. New Commissioner, Tom Sorel said he has two main goals for MNDOT: to regain the public trust and confidence lost with the bridge collapse and to regenerate a spirit of innovation and creativity.

THE DESIGN

In order to expedite the design build process, the designers chose to innovate using TenCate™ high strength geotextiles in the new bridge project. The new St. Anthony Falls Bridge has 3 piers within the Mississippi River with abutments on both sides of the river. The abutment approach walls range from 0-20 ft high over a distance of 240 ft. The approach ramp face is a geogrid reinforced gabion wall with a limestone block face. In order to allow construction of both the retaining wall and the bridge at the same time, a temporary fabric wrapped wall was required on the back side of

the reinforcement for the gabion retaining wall and adjacent to the bridge abutment.

Gale-Tec Engineering, Inc. was retained by Flatiron Constructors, Inc. to create an inexpensive 10-12 ft high fabric wrapped retaining wall at four locations adjacent to the bridge abutment. Mirafi® HP570 was chosen to provide the necessary reinforcement for the temporary retained structure and to provide a durable face. This material is composed of high-tenacity polypropylene yarns, which are woven into a staple network with the product being inert to biological degradation and resistant to naturally encountered chemicals, alkalis and acids. The design was based on AASHTO considerations, which included internal and external stability analyses for the 10 ft plus high vertical retaining structures.



I-35 bridge over river.

THE CONSTRUCTION

The fabric wrapped walls were constructed to a height of 10-12 ft high, with a 1-2 ft embedment on both sides of both the north and south abutments. Both design and construction occurred over a 3 week period in order to allow bridge construction to proceed concurrent with gabion wall construction. The Contractor is to be rewarded with a bonus of \$100,000 for each day they finish early, to a maximum of \$3M.

THE PERFORMANCE

This project demonstrates sound engineering principles making use of new technologies in order to provide economical solutions for customers.



Gabion Wall at bridge abutment. Fabric wrapped wall in background.



Temporary fabric wrapped wall at bridge abutment will allow Gabion retaining wall and bridge to be built concurrently.

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02.08