



Case Study

application | GRS-IBS
location | Sunfield, MI - Keefer Road over Sebewa Creek
product | Mirafi® HP570

job owner

FHWA / MDOT/ Ionia County

Road Comm

engineer

Milbocker & Sons, Inc.

date of installation

September 2014

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

In Sunfield, MI, Ionia County needed to disassemble the existing deteriorated bridge over Sebewa Creek and replace it with as little highway down time as possible. In addition, due to budget constraints, the bridge reconstruction had to be very cost effective.

THE DESIGN

To meet the limited budget for building the abutments, the Federal Highway Administration (FHWA) Geosynthetic Reinforced Soil Integrated Bridge System (GRS-IBS) was chosen. This system is the core of FHWA's initiative for innovative bridge construction for this type of abutment. It is derived from examples of ancient structures that utilize closely spaced reinforcement members, usually some type of organic material, to reinforce soil. The principles are the same for this modern design adaptation by using angular, crushed gravel with a high strength geotextile or geogrid in frequent layers. The interactions of these components stabilize the structure internally. TenCate Mirafi® HP570 geotextiles were chosen for this project. Although there are now over 100 GRS-IBS bridges in service throughout the country, the Ionia County GRS-IBS bridge is the first in the state of Michigan. The construction technique did not require deep foundation design and thus could be completed in much less time, usually just weeks. It also utilizes basic earthwork methods and practice with minimal environmental impact.



The cut Mirafi® HP570 placed behind the block.



Block facade is placed as geotextile reinforcement and stone lifts are brought up.

Protective & Outdoor Fabrics

Geosynthetics

Aerospace Composites

Industrial Fabrics

Armour Composites

Synthetic Grass

THE CONSTRUCTION

TenCate Mirafi® geosynthetics fit perfectly into the design for two of the components of this bridge system. The Reinforced Soil Foundation was constructed using Mirafi® HP570 to achieve the needed confinement and reinforcement for the base support of this structure. It consists of select gravel compacted and encapsulated in the Mirafi® HP570 geotextile fabric to function as an integral base for the abutment. Next, the abutment was built by placing alternating layers of select gravel and geosynthetic reinforcement in 12" lifts. The final course of block was capped with ready-mix concrete.

The ease of construction using the flexible TenCate materials along with the simple installation techniques increased worker safety and decreased the time to complete the project.

THE PERFORMANCE

The bridge is now in service and the performance is outstanding. Monitoring has been in place since the beginning of construction with no issues. In addition to saving the county significant construction costs, there has been no maintenance cost.



Stone is placed behind the block, on top of Mirafi® HP570. Care must be taken with loading until compaction is adequate.



Completed Keefer Highway Bridge abutment ready for traffic.

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