



Case Study

application | Roadway Construction Over Peat
location | Wyandot County, OH
product | Mirafi® RS580i

job owner
engineer
contractor
date of installation

Ohio Department of Transportation
Ohio Department of Transportation
Helms & Sons Excavating
May, 2013

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 Ohio Department of Transportation (ODOT) needed to rebuild a section of SR53 that was performing poorly. The 425 linear feet section of roadway was underlain by a peat deposit that extended up to 12 feet below existing grades. The soft peat deposits were underlain by soft to medium stiff clay to a depth of approximately 20 feet. The existing pavement had experienced uneven settlement, both laterally and longitudinally, resulting in surface undulation in all directions which required continual pavement maintenance work. ODOT estimated settlement up to one (1) inch per year in some locations as well as the roadway experiencing freeze/thaw issues in winter and spring. The initial plan was to remove the peat. Expanded Polystyrene (EPS) geofoam was also considered as a potential solution. However, there was concern regarding the effect of the high ground water level on the EPS, as well as the very high costs to remove the peat layer.

THE DESIGN

ODOT contacted TenCate Gesoynthetics Americas and asked for their assistance in the development of a geosynthetic reinforced system as an option for roadway reconstruction. ODOT was aware of and willing to accept potential total settlement, and was more concerned with controlling differential settlement of the roadway to maintain rideability. Subsequently, a value engineering alternative utilizing a geosynthetic reinforced, mechanically stabilized section was developed. The final design consisted of two (2) layers of TenCate Mirafi® RS580i reinforcing geosynthetic placed at 12-inch vertical spacing within 24 inches of 3-inch minus, open-graded crushed limestone aggregate.



Mirafi® RS580i installation.



Placement of the 3-inch minus aggregate on Mirafi® RS580i.

The design included settlement calculations for both the unreinforced and geosynthetic reinforced roadway sections. The settlement analysis indicated a reduction of overall settlement for the geosynthetic reinforced cross section. The Mirafi® RS580i roadway section would provide a platform for uniform settlement, thus reducing the potential for differential settlement. In addition, analyses were performed to determine the factor of safety against lateral squeeze in accordance with the method presented in the National Highway Institute Course No. 132042 – Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines.

THE PERFORMANCE

The costs savings from avoiding removal and replacement of the peat, including dewatering, is estimated to be over \$250,000. In addition, the project schedule was expedited by several weeks, reducing the amount of time the road needed to be closed and traffic detoured. ODOT continues to visit the roadway construction project to periodically observe its performance and is pleased with their findings.



Above and below: The completed roadway 18 months after construction (December 2014).



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