

Case Study

application | Reinforced Slope
location | St. Francis County, AR
product | Miragrid® 21XT

job owner | Arkansas DOT
engineer | Arkansas DOT
contractor | APAC Memphis
date of installation | October 2012

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 Arkansas DOT had plans for improvements to the Highway 149/Interstate 40 overpass for years due to the increased growth in the surrounding areas. The project consisted of replacing and widening the Highway 149 bridge over Interstate 40. The widening of the new bridge resulted in widening the earthen bridge abutments on either side of the bridge to accommodate a larger roadway. As a result, the Arkansas DOT determined that the most cost effective and sustainable way to construct the embankment enlargement was to utilize a geosynthetic mechanically reinforced earthen slope.

THE DESIGN

The new embankment lies in a highly seismic area associated with the New Madrid Fault line in Southern Missouri. Therefore, the Arkansas DOT had to take into account seismic events in the design and sustainability of the critical structures of the project. Ultimately, a reinforced slope was designed utilizing layers of TenCate Miragrid® 21XT geogrid for support of the new roadways on either side of the overpass.

The design incorporated the use of permanent steel sheet piling between the existing embankment and the new embankment. The new reinforced slope was designed to dissipate seismic waves by absorbing the waves in the sheet piling and distributing any additional loading through the layers of compacted clay backfill and Miragrid® 21XT geogrid.

Miragrid® 21XT geogrid is composed of high molecular weight, high tenacity polyester multifilament yarns which are woven in tension and finished with a PVC coating.



Cutting Miragrid® 21XT geogrid to the appropriate length.



Installation of Miragrid® 21XT geogrid.

THE CONSTRUCTION

The contractor initially installed the sheet piling into the existing embankment. The soil was excavated in the new embankment area to provide a level subgrade for the installation of the first layer of Miragrid® 21XT. The machine direction of the Miragrid® 21XT was placed perpendicular to the centerline of the embankment. The contractor requested customized, 1000 feet long roll lengths of the geogrid to reduce the amount of waste of the product during the installation process. Miragrid® 21XT was placed at 18 inch intervals between layers of compacted clay fill to within 2 feet of the top of the embankment. A crushed rock base course was utilized in the top 2 feet of the embankment for support of the new roadway.

THE PERFORMANCE

Everyone involved in the project hopes that the day will never come that a large seismic event will occur. However, based on the historical seismic activity in the area the chances are pretty high that one will occur at some point. The Arkansas DOT believes that the design and construction of the reinforced slope with TenCate Miragrid® 21XT geogrid can handle any additional surcharge by such an event.



Placement of fill soils on Miragrid® 21XT geogrid.

TenCate® Geosynthetics Americas assumes no liability for the accuracy or completeness of this information or for the ultimate use by the purchaser. TenCate® Geosynthetics Americas disclaims any and all express, implied, or statutory standards, warranties or guarantees, including without limitation any implied warranty as to merchantability or fitness for a particular purpose or arising from a course of dealing or usage of trade as to any equipment, materials, or information furnished herewith. This document should not be construed as engineering advice.

Mirafi® is a registered trademark of Nicolon Corporation..

© 2012 TenCate Geosynthetics North America

1112

365 South Holland Drive Tel 800 685 9990 Fax 706 693 4400
 Pendergrass, GA 30567 Tel 706 693 2226 www.mirafi.com

