

GEOWEB®

RETAINING WALL ELIMINATES TRACK INSTABILITY; REDUCES MAINTENANCE
McKenzie, TN



GEOWEB® STABILIZATION SOLUTION EMPLOYED AT LONG-TERM RAILROAD EMBANKMENT PROBLEM AREA

Project Overview

The Bruceton Subdivision consists of a north-south trending, medium to light-tonnage route from Nashville, TN to McKenzie, TN. Traffic typically consists of about 14 freight trains per day at 50 miles per hour.

A problematic area of the track approximately 170 feet long and consisting of single, curved mainline runs parallel to State Route 100 (SR 100). Overhead electric wires also run parallel between SR 100 and the track making overhead construction difficult. The primary problem was cross-level with the high rail dropping. The track within the problem area is located at the transition from a side-hill fill to a cross-valley embankment fill (south to north). The track is about 20 feet above SR 100 to the east and varies between 10 to 15 feet above the west ditch. The east slope is fairly steep at about a 1.5H:1V and had been showing signs of bulging in several locations along the toe.

Wet Soils Worsen Site Problems, Embankment Stability

This site had been an on-going maintenance nuisance for several years. AMEC Environmental & Infrastructure, Nashville Office, visited the site before in February 2010. At that time the track was experiencing cross-level settlement (east rail dropping) and some minor profile problems, reportedly coinciding with wet weather periods. During May 2010 flood events, a portion of the west slope was washed out. Local forces temporarily repaired the area with riprap and also dumped rock on the east slope. The problems subsided for a period of time, but eventually the same issues resurfaced.

AMEC determined that a creep-type sloughing failure was occurring along the east slope and cinders were present along the slope which may have also been present below shoulder.



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PHOTOS:

Top: Placing backfill in the Geoweb sections above the wall.

Bottom: Grading the slope above the wall.

Wet Soils Worsen Site Problems, Embankment Stability *(Continued)*

The cause of the instability appeared to be the steep inclination of the fill embankment and periods of wet weather contributing to the base of the fill becoming saturated and losing strength. Cross-level settlement of the rail resulted as the shoulder dropped and ballast was lost from head of tie down the slope. Prior attempts by local forces to address the historic instability at this site included driving rail pile, which did not solve the problem.

GEOWEB® Earth Retention Solution

Work from track level to drive additional piling would be disruptive and would require significant site preparation work for equipment access. After considering several treatment methods, AMEC determined that a passive crib wall system along the toe utilizing the GEOWEB Earth Retention System was the preferred option. AMEC's decision was based on the GEOWEB system's ability to be constructed less expensively, and quicker than alternatives, with the added benefit of not disturbing train operations.

The GEOWEB system was selected as the MSE wall facing due to the system's light weight, flexibility during installation, tolerance to settlement, and ability to minimize downtime.

PROJECT TEAM

PROJECT ENGINEER:

AMEC Environmental & Infrastructure, Inc.
Nashville, TN

CONTRACTOR:

Thorne's Excavating Co., LLC, Lebanon, TN

RAILROAD CONSULTANT:

Erie Works, Frisco, CO

MATERIAL SUPPLIER:

Jen-Hill Construction Materials, Inc.
Hendersonville, TN



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Completed GEOWEB retaining wall system with aggregate infill.

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