



**GEOSYSTEMS**<sup>®</sup>

GLOBAL LEADER • GLOBAL PARTNER



## THE GEOWEB<sup>®</sup> SOIL STABILIZATION SYSTEM

The GEOWEB<sup>®</sup> system is a proven technology for solving challenging soil stabilization problems common in the railroad industry. Railway engineers worldwide have successfully applied the GEOWEB<sup>®</sup> cellular confinement technology to 1) provide a high-stiffness roadbed foundation at grade under track, crossings and turnouts, particularly in areas of weak soils, 2) eliminate deterioration from sloughing and spreading of embankment slopes and 3) stabilize drainage channels.

### THE COST BENEFITS OF THE SOLUTION

The GEOWEB<sup>®</sup> system stabilizes the subballast layer, reducing vertical and lateral stresses and significantly reducing subsoil movement. Stabilization within the system provides a longer lasting trackbed profile that extends rail and track-work component service life, while significantly reducing maintenance cycles and cost. The cost-benefit ratio is high because of its overall flexibility and low-cost installation rate. Long-term test results and successful applications worldwide confirm the benefits of the GEOWEB<sup>®</sup> system.



# GEOWEB<sup>®</sup>

*stabilization of railroad track & right-of-ways*

APPLICATION OVERVIEW



**GEOWEB**<sup>®</sup>

*providing sustainable solutions to the railroad industry*

## TRACK BALLAST REINFORCEMENT CLASS I RAILROAD

### THE CHALLENGE

A section of a Class I Railroad track had a history of track misalignment and weekly maintenance due to settlement caused by weak clay subbase material. The track, a main artery into Dallas, handled up to three trains per day. Previous methods of stabilization, including pole slide pilings, lime-fly ash injections, and concrete caps had all failed to provide long-term track stabilization.

### THE INSTALLATION

The GEOWEB® material was placed under 300 feet of single-track on a 25-foot high, elevated bridge approach embankment comprised of clay and shale fill. Extensive tamping was required to establish and maintain the track cross elevation. Rail and ties along with a two-foot deep layer of ballast and sub-ballast were removed over a 300-foot length of track. After grading and leveling, a 20-ounce nonwoven geotextile was installed as a separation layer. Next, a four-inch layer of sand was placed over the geotextile. GEOWEB® sections were then positioned providing a 20-foot wide bed under the ties. After infilling the sections with limestone screenings, the 6,000 sq. ft. area was



compacted. A three-inch surcharge was added, leveled and new track and ties panels were placed. Finally, ballast was dumped and tamped, and the track was leveled and returned to service.

### THE RESULTS

This section of track was repaired with the GEOWEB® system in less than one day, allowing the track to be fully operational the same day. Consistency of the track modulus was maintained after installation, allowing the work order to be lifted and speed returned to its normal 40 mph just 24 hours later. After six weeks, no maintenance was required on this track section that normally required weekly maintenance.



## The GEOWEB® System : AAR-TTCI Tested



In load support applications, the GEOWEB® system generates powerful confinement forces and soil-to-cell wall friction creating a load dispersion structure with high flexural strength. The results, significant

improvement in the long-term performance of the load support system. The proof, a reduction in the rate of track geometry degradation and measurable lower maintenance costs.

### TESTING PROOF

A 2.5-year under track test at the AAR FAST High Tonnage Loop (TTCI) in Pueblo, Colorado yielded the following results, proving the system significantly reduces traffic-induced stresses that negatively effect the track subgrade.

### UNREINFORCED VS REINFORCED SUBBALLAST LAYERS

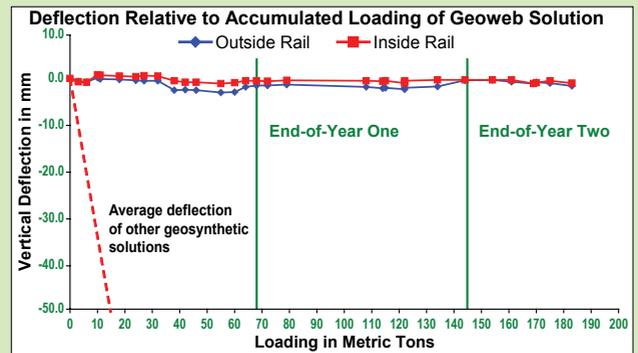
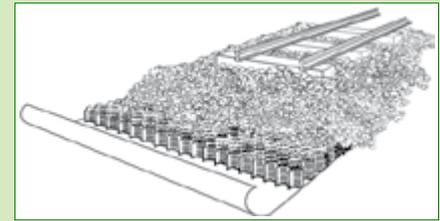
#### UNREINFORCED LAYER

- The soft clay subgrade under an 18 inch thick unreinforced ballast /subballast layer deforms at a relatively rapid rate.
- The unreinforced track structure reaches the maximum vertical profile limit and requires tamping every 15 million gross tons (mgt) on average to maintain Federal Railroad Administration (FRA) class-4 track geometry.

#### REINFORCED LAYER

• The high stiffness of the subballast layer reinforced with the GEOWEB® system caused a stress reduction that directly effected the time between required tampings, allowing the tamping cycle to extend beyond 200 mgt of heavy, 39-ton axle load.

• In the 2.5-year test period, the vertical track profile never exceeded 30% of the allowable FRA class-4 track geometry standard. Clear indications were that the vertical track profile limit would never be reached. See Graph Results.



## TRACK BRIDGE APPROACHES & CROSSING DIAMONDS

The GEOWEB® system's deep 3D soil confinement technology creates a high-stiffness foundation under bridge approaches, diamonds and turnouts. Unlike 2D solutions, the GEOWEB® system confines soil and creates a stiffened slab by increasing apparent cohesion of otherwise cohesionless soils. The system is quick to deploy and easy to handle with a railroad's own crew.

### BRIDGE APPROACH OVER SOFT SUBGRADES

The GEOWEB® system was utilized by Florida East Coast Railway (FEC) to stabilize a section of track on a bridge approach through a heavily travelled grade crossing. The GEOWEB system was subjected to 25 MGT in the first year of use with zero deflection. The other end of the bridge without the GEOWEB system settled over 2 inches and had been resurfaced twice in that same timeframe.

The GEOWEB system is a more durable subgrade stabilization solution than Hot Mix Asphalt and increases railway life by preventing long term settlement and consolidation.



# RIGHT-OF-WAY STABILIZATION

## EMBANKMENT STABILIZATION | EROSION CONTROL

Challenges common to the railroads' right-of-way land includes:

- stabilizing cut slopes adjacent to track when new track is constructed.
- stabilizing bridge abutments and slopes that are cut for access roads to construct new bridges.
- protecting new or repairing existing embankments from severe erosion problems.
- protecting embankments from washouts and slides that can block track, causing costly closures.



## THE GEOWEB® SYSTEM'S BENEFICIAL VALUE

A proven 30-year soil stabilization solution, the GEOWEB® system, efficiently handles the most difficult site challenges. The system is easy to transport and quick to deploy. Most new slope construction and repairs do not require large construction equipment, and can be installed by the railroad's own crew.

A variety of infill options including topsoil/vegetation, aggregate and concrete allow customization of the final surface to meet site requirements. Local infill may be utilized in many instances. For a low-maintenance, permeable surface, rock confined in the GEOWEB® structure replaces expensive rip-rap, reducing aggregate size up to 10 times.



## RETAINING WALLS | EARTHEN BERMS

The multi-layered GEOWEB® system is also a versatile solution for load-bearing retaining walls and earthen berms that support right-of-way maintenance access roads along tracks or tracks themselves. The wall structure is beneficial for bridging change in grade from raised track grades and can be built with a near vertical face in areas with limited space constraints. GEOWEB® retaining walls can be vegetated by using topsoil as fill for the front cells or can be filled with aggregate.



**PRESTO GEOSYSTEMS® COMMITMENT** – To provide the highest quality products and solutions.

At Presto, we're committed to helping you apply the most cost-efficient solution to your soil stabilization problems. Contact Presto GEOSYSTEMS® or our worldwide network of knowledgeable distributors/representatives for assistance with your project needs.



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