Prest®

GEOSYSTEMS

GLOBAL LEADER • GLOBAL PARTNER

creating

sustainable environments™

THE VEGETATED SLOPE PROTECTION SYSTEM

Preserving the natural environment with vegetation is a high priority in slope protection solutions.

The Geoweb® slope protection system provides a structurally stable environment for topsoil and sustainable vegetation through a structured network of interconnected cells. The system confines and reinforces the vegetated upper soil layer, increasing its resistance to erosive and sliding forces.

Examples where the Geoweb® system solved unique slope protection problems are illustrated in this case study summary.

GEOWEB®

slope protection system

VEGETATED CASE STUDY SUMMARY 1

GEOWEB®

providing sustainable slope protection solutions

case study 1

HIGHWAY EMBANKMENT

HALTON HILLS, ONTARIO, CANADA • FALL 1996

THE CHALLENGE

Building a new bridge to link a newly developed residential area to Hwys 7 and 401 posed soil stability problems of the new embankment slopes. Crossing over a deep valley and cold-water trout stream also posed environmental concerns for several governing agencies. Stabilizing and vegetating the 1.5h:1v slopes to a natural state was imperative. Project Engineers, Ecoplans and McCormick Rankin's design plan was to stabilize the embankments while minimizing the footprint on the valley.

Project Photos courtesy of Armtec Limited

THE INSTALLATION

The Geoweb® system with tendons was installed over the embankment surface. As each embankment lift was constructed, the Geoweb sections were extended down the slope and connected with the sections in each benched area. Three tendons per section provided the structural mechansim to secure the system against sliding forces.

THE RESULTS

The slope was seeded and mass plantings were placed within the cells for immediate stabilization. Years after installation, the slopes remain vegetated, stable and performing as designed.

case study 2

HIGHWAY EMBANKMENT

OHIO DOT, CLEVELAND, OHIO • SUMMER 1990

THE CHALLENGE

To repair heavily-eroded areas and improve the appearance, Ohio DOT's restoration plan included landscaping 5.6 km (3.5 miles) of both cut and fill slopes. Rainfall runoff had saturated the silty-clay and shale subsoil causing various soil slides on the 2h:1v to 1.5h:1v highway slopes. Plans called for re-grading, draining, and planting trees, shrubs and plants. Before landscaping could begin, nearly 10,400m^2 (112,000 ft^2) of slope would need to be stabilized.

Project Photos courtesy of Meredith Brothers

THE INSTALLATION

The Geoweb® system was employed to stabilize the slopes on the north side of I-480. Landscape crews prepared the slopes by removing 100 mm (4 in) of soil, and finish graded the site so the Geoweb sections were flush with the adjacent terrain. After all sections were secured on the embankment, a bucket excavator filled the cells with topsoil. The following spring, small areas of the Geoweb cell walls were cut and opened in order to plant trees and shrubs. Where natural springs existed within the hillside, a clear stone infill was used to allow water drainage.

THE RESULTS

Following the installation, Northern Ohio received heavy rains through the fall, winter and spring. The Geoweb slope protection system's performance was reported as exceptional.

case study 3

Project Photos courtesy of Sunshine Supplies, Inc.

INDUSTRIAL SITE EMBANKMENT • JEFFERSON COUNTY SOLID WASTE TRANSFER SITE
BESSEMER, ALABAMA • APRIL 1997

THE CHALLENGE

Providing stable vegetative cover to a large slope tested the ingenuity of the project engineer and contractor during construction of a new solid waste transfer facility. The entire site was cut out of a large shale hill. The excavation left a 1h:1v slope length ranging from 21-91 m (70-300 ft) and a base length of 760 m (2500 ft) long. Budget constraints did not allow the slope angle to be reduced, leaving the unprotected shale subject to erosion problems. The comprehensive solution specified as the reinforced slope cover included the Geoweb® system.

THE INSTALLATION

A 4-oz non-woven geotextile followed by Geoweb sections were secured on the slope. High-strength tendons, anchored to a 3-in PVC pipe at the crest, were integrated to counteract the significant sliding forces. A high-speed conveyor truck sprayed the infill 15-18 m (50-60 ft) onto the slope as crews, suspended by harnesses, raked the infill into the Geoweb cells. Varying lengths of corrugated polyethylene pipe was attached to the conveyor discharge to direct and transport fill farther down the slope. After infilling, a rainstorm provided a natural hydro-tamping prior to hydro-seeding. An erosion control blanket was finally placed as a cover to prevent any surface washout before vegetation could be established.

THE RESULTS

The fully vegetated slope has remained stable and is performing to specification.

case study 4

HIGHWAY EMBANKMENT
VIRGINIA DOT, COLLINSVILLE, VIRGINIA • APRIL 1988

THE CHALLENGE

The sandy clay embankments along Route 220 were subject to severe surface sliding and loss of vegetative cover, particularly after heavy rainfalls. The problems were most severe on embankments with steep slopes. As past attempts to stabilize the soil and control surface erosion with conventional methods had failed, the Geoweb® system was chosen to repair the 1h:1v slopes.

THE INSTALLATION

VDOT crews first prepared the severely eroded slopes. The upper row of Geoweb cells was placed over existing guardrail posts, plus staked at 0.9 m (3 ft) centers and the sections expanded down the slope. A sandy clay soil/topsoil mix was placed in the sections with a telescoping boom excavator. Crews raked the infill level with the top of the cells, and hydro-seeded.

THE RESULTS

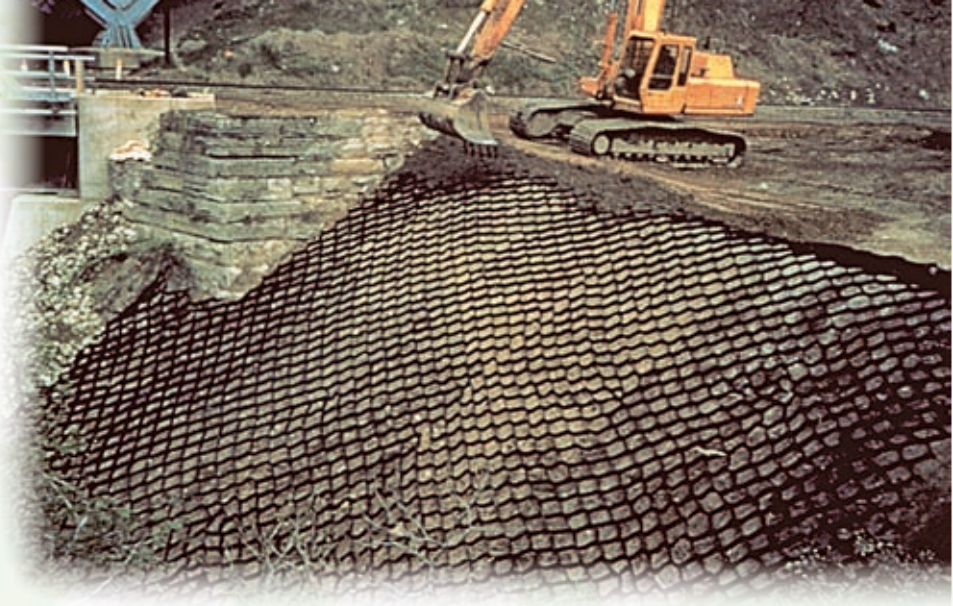
The protected slopes support vegetation and have withstood years of exposure without problems. VDOT has approved the Geoweb system for use in similar slope applications throughout the state.

Project Photos courtesy of ACF Environmental

case study 5

RAILROAD EMBANKMENT

COOTES PARADISE, HAMILTON, ONTARIO, CANADA • SPRING 1995



THE CHALLENGE

An expansion of Ontario's transit authority commuter rail lines necessitated track improvements between Toronto and Hamilton through a conservation area. As part of the upgrade, track owner CP Rail constructed a new track and railway bridge over Des Jardins Canal. Construction of the new bridge involved cutting a road into the side of an existing slope for construction access. Project engineers and landscape architects faced these challenges: 1) reinstating the slope to its original condition, 2) working with difficult site access, and 3) preventing the topsoil from siding into the canal. The team opted for the Geoweb® system to stabilize and re-establish vegetation on the 1.5h:1v slope.

Project Photos courtesy of InterSol Engineering

THE INSTALLATION

The silty clay material was placed and compacted to restore the slope's original profile. The 100 mm (4 in) depth Geoweb material with three tendons per section was installed on the slope cover and anchored with stakes. The use of tendons in the design provided cost-savings by allowing the stake diameter and density to be reduced. A track backhoe with an extended bucket infilled the system with topsoil.

THE RESULTS

That fall prior to hydro-seeding, the area was exposed to 35 to 100-year rainfall – the remnants from Hurricane Opal. McCormick Rankin, the consulting engineer, reported that when exposed to those conditions, the steep slope section protected with the Geoweb system performed far better than unprotected areas.

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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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