Three Dimensional Slope Stabilization Case Studies

Smart Earth Solutions

Mike Everhart
Eastern Erosion & Geo-product Specialist
ME, NH, VT, Eastern MA & RI
603-767-1263
mike.everhart@ejprescott.com
Smart Earth Solutions

Stabilization / Structural Benefits:

- Allows for **steeper, stabilized slopes** resistant to erosion than other methods. As steep as 1H:1V or greater.
Overview:

- What is a GeoCell?
- How does it work?
- Review of Local Projects.
In the late 1970s, the U.S. Army Corps of Engineers contacted Presto Products Co., a plastics manufacturer, for assistance in developing a stronger grid confinement system that would maintain strength under heavy vehicle loads.

Working with Steve Webster at the Waterways Experiment Station (WES), Presto’s Gary Bach devised a method to weld polyethylene strips to form a cellular structure that became known as “Sandgrid” and was used by the military primarily for road applications.
Smart Earth Solutions
The Container
3 Sizes
5 Depths
5 Section Lengths

The Content
Topsoil
Aggregate
Concrete
Engineered Fill
Smart Earth Solutions

Unexpanded Section
2’ x 4’ X 8’’
ATRA Key Improvements over Stapled Connections

- Plastic or Galvanized Steel
- 3x the connection strength
- Long Lasting
- Faster Installation—one less laborer,
  - up to 2x as fast
- No Special Tools or Generator
- Easier to Use
Smart Earth Solutions

How does it work?
200’ Long, 1.5:1 Slope
Fully Vegetated

Steeper Slopes no Undermining
Topsoil / Vegetation

Concrete Infill

Aggregate Infill

Supports a Variety of Infills
- Stability to upper soil layer
- Allows slopes to be as steep as 1H:1V or greater.
Roadside Embankments:

- Areas prone to sheet flow and storm water runoff.
Aggregate Infill Hard Armor, Permeable Protection
SUMMARY

- Allows for steeper, stabilized slopes, more resistant to erosion than other methods.
- Limits undermining by confining upper layer.
- Allows for various surfaces
  - Topsoil/Vegetation
  - Aggregate
  - Concrete
Smart Earth Solutions

Review of Local Projects
Existing 2:1 Slope. The project is to cut the slope back and widen the road.
Notes:
1. This evaluation is copyrighted and is based on the use of products manufactured by Presto Products Co. All rights reserved. Any use of this evaluation for any product other than that manufactured by Presto Products Co. this evaluation invalid.
2. The evaluation assumes that the slope is globally stable.
3. Limit the drop of infill to less than 3 feet to prevent distortion of the cell walls.
4. The Geoweb panels shall be connected with Atra keys at each interleaf and end to end connection.
5. Provide a TRM sized for site conditions to prevent cell wash-out prior to establishment of vegetation.

GEOWEB GW30V6 PANELS FILLED WITH TOPSOIL

SURFACE PROTECTION SEE NOTE 5.

8 IN SOLID WALL PVC DEADMAN

30 FT

8, TP-93 TENDONS PER GEOWEB PANEL

ATRA TENDON CLIP TIED TO TENDON EVERY 6TH CELL
They cut the slope back at the base. It left them with a 1:1 slope that was approximately 48’ High.
The Town crew put the panels together up top.
GW30V629 = 6” web 29 cells long
8 cells wide

Alton Bay, NH
The Town crew then pulled the panels over the edge.

Alton Bay, NH
They had one of the guys repel down the slope to put in the Atra Keys.
Smart Earth Solutions
Alton Bay, NH
Alton Bay, NH

8-9 weeks after Hydro Seeding
Alton Bay, NH

Wild Flowers
Wolfeboro, NH
Wolfeboro, NH
Notes:
1. This evaluation is copyrighted and is based on the use of products manufactured by Presto Products. Any use of this evaluation for any product other than that manufactured by Presto makes this evaluation invalid.
2. The evaluation assumes that the slope is globally stable.
3. Limit the drop of fill to prevent distortion of the cell walls.
4. Consider using an ECB or TRM over the Geoweb if the slope is expected to experience water flow prior to full vegetation.

![Diagram of Geoweb Slope Protection]

- 6" Geoweb GW30V6
- Topsoil Infill
- 12" Dia. Solid Wall PVC Pipe Deadman
- Prepared Slope
- ATRA Tendon Clips Every 6th Cell
- TP-93 Tendons 8 Per Panel
- ATRA Key
- ATRA Tendon Clip
- Tendon Installation
GW30V629 = 6” web 29 cells long
8 cells wide

Wolfeboro, NH
GW30V429 = 4” web 29 cells long
8 cells wide
Maine DOT
Dam Project Worcester, MA
Dam Project Worchester, MA

DAM RIPRAPH SLOPE PROTECTION AND GEOCELLS
NO SCALE
Dam Project Worcester, MA
Dam Project Worchester, MA
Thank You