ITLGC Geocell Installation Guide | SLOPE PROTECTION

Purpose

Geocells provide a three-dimensional confinement system for soil, aggregate, or concrete to prevent surface erosion from water or wind.

This guide outlines the recommended installation process for permanent slope protection in applications such as:

- Steep slopes and Embankments
- Shoreline Protection
- Pond Slopes
- Geomembrane Protection
- Containment Berms

Materials Equipment

- GeoCell panels- Cell depth and aperture per engineer's design.
- Separation Layer Options (if specified)
    - Nonwoven Geotextile- Filtration and separation between infill material and subgrade.
- Anchoring devices- On slopes ≤ 3:1 or for temporary anchoring use wood or rebar stakes (length ≈ 3x cell depth), placed inside the top side of the cell. These can be pulled back out after the cells are filled.
- On slopes ≥ 3:1 or per net sliding force calculations a polyester tendon system per engineer's design, anchored to a piped inside a dead man anchor trench.
- Breaking strength of tendons, quantity and spacing per engineer's design and net sliding force calculations.
- If tendons are used, they are tied to a 4" or 6" solid PVC or HDPE pipe to be placed horizontally at the base of the anchor trench, fully embedded and backfilled/compacted.
- Connection devices- Cable ties or pneumatic stapler with staples.
- Infill material- per engineer's design (angular rock, soil to be vegetated or concrete).
- Not recommended: Rounded rock (river rock, pea gravel).
- Hand tools- Utility knife (hook blades preferable), measuring tape/wheel, 3-5 lb. mallet, shovels, rakes, chalk line.

Site Preparation

- Clear slope of vegetation, debris and loose soil.
- Excavate anchor trench to the designed depth, width and setback from the crest of the slope.
- Grade slope to final design angle, ensuring uniform surface.
- Lightly compact slope face to reduce sloughing (avoid heavy compaction if vegetated).
- If specified install underlayment layer per manufacturers recommendation.

GeoCell Deployment

- Measure slope length, including anchor trench.
- Stage collapsed panels at the crest. Depending on the length of the slope this can be multiple panels as well as partial panels.
- Connect all panels at the crest so that the material is deployed as one unit.
- If tendons are required measure, cut and pre-thread through the collapsed panels.
- Tendons are tied to the pipe, first cell and then every 3 to 6 cells down slope depending on the engineer's design.
- The tendons can be tied directly to the cell wall or to load displacement washers as per engineer's design.
- If tendons are not required place a minimum of one cell inside a shallow anchor trench and secure with stakes every 3 cells.
- Once the geocell is secured at the top pull the panels down slope and expand.
- If tendons are used keep the tendons from twisting and they should be free from slack between tied points.
- Once the panels reach the toe of the slope adjust so that the panel is square, straight and perpendicular to the slope.

Panel Connection

- Connect adjacent panels in every cell along both width and length using cable ties or staples.

Infill Placement

- Fill and compact anchor trench first.
- Once the anchor trench is filled, begin filling of the expanded and secured panels from the top down. Exception to fill from the bottom up when site conditions prevent equipment access from the top of the slope.
- Avoid drop heights > 3 feet to protect the empty cells.
- Vegetated: topsoil slightly overfilled 1-2 inches. Topsoil should be free of large clumps or debris for even coverage.
- Rock armored: angular stone.
- Concrete armored: fill to the top of the cell and screed flush to the cell wall.

Anchoring

- Anchoring
- Anchor trenches: Backfill and compact prior to filling the panels.
- Toe anchor trench (if specified): Backfill and compact after the panels are filled to lock in place.
- For tendon anchored systems: verify tension of tendon and clip security before backfilling the anchor trench.

Quality Control

- Check that panels are fully expanded, square and anchored before infill.
- Confirm all seams are connected cell to cell.
- Ensure anchor trench and toe trenches are fully compacted.
- Verify infill material meets gradation, placement, and compaction specifications.

Maintenance

- Inspect after heavy rainfall events for infill loss, displacement, or undermining.
- Refill areas where the silhouette of the geocell is exposed.
- For vegetated systems, maintain vegetation to ensure full coverage and root reinforcement.