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AAYU INTERNATIONAL

GEOCELLS / GEOCELDAS

- EARTH RETENTION
- LOAD SUPPORT
- SLOPE PROTECTION
- CHANNEL PROTECTION

Product introduction.

The geocell geosynthetic cellular confinement system is a matrix of lightweight, expandable and flexible thermoplastic strips that are ultrasonically bonded to form a strong, dimensionally stable and inert honeycomb structure Forms a Long Lasting Structural Barrier.

Material	100% Original HDPE (High Density Polyethelene)			
Standard Colour	Black	Green	Tan	White
Jointing	Ultrasonic Welding			
Surface	Smooth	Textured	Perforated	Non-Perforated
Density (g/cm^3)	>0.94		ASTM D 792	
Carbon Black Content (%)	1.5~2.0~2.5		ASTM D 1603	
Sheet Thickness (mm)	≥1.25 ≥1.50 ≥1.75		ASTM D 5199	
Seam Peel Strength (KN/m)	≥14.2		COE GL-86-19	
Low Temperature Brittleness (℃)	< -77		ASTM D 746	
Environment Stress Crack Resistance (Hours)	>4000		ASTM D 1693	

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Earth Retention Systems

RETAINING WALLS / EARTH RETENTION

The Geocell system, when layered, becomes an economical retaining wall system meeting all project-specific structural requirements. The system allows for construction flexibility and provides aesthetics through a completely vegetated face. Horizontal terraces are formed where vegetation can flourish in the exposed outer cell infill. The system captures rainwater and controls groundwater evaporation, creating a more natural environment for vegetation.

TYPICAl APPLICATIONS

- bioengineered walls
- steepened embankments
- dike and levee protection
- culvert headwalls
- landscape development walls
- vegetated channel structures
- sound barriers

Subgrade Preparation

1. Excavate and shape foundation soils.

2. Ensure foundation soil meets minimum strength requirements through proof rolling or other conventional method. If unacceptable foundation soils are encountered,excavate and replace with suitable quality material.

Separation Layer and Base Materials Installation

3. When separation between subgrade soil and infill material is required, place geotextile over subgrade.

4. If additional base materials or engineered soils are required between separation geotextile and geocell,install the appropriate depth and compact to a minimum 95 percent Standard Proctor or 90-92 percent Modified Proctor test - dependent upon locale and soil conditions.

Geocell Panel Placement and Connection

5. Position and expand geocell panels to the appropriate dimensions. Hold individual panels in their expanded positions with rebar J-pins or wooden stakes. Join panels using traditional stapling methods or connecting studs.
6. Confirm each geocell panel is expanded uniformly and correctly aligned. Nest panels along each joint to ensure adjacent geocell panels are flush at joint and adjoining cells are fully anchored. Alternate the installation of rebar J-pins or wooden stakes to ensure each panel is Stable.

Exposed Aggregate or Engineered Infill

7. Fill geocell with specified aggregate material progressively from front to back. Be sure to use an infill material with particle sizes appropriate for the specified depth of the geocell.
8. For vegetative walls fill inner cells progressively with aggregate infill material. Limit the drop height of infill material to 1m to avoid displacement of the cell wall. Fill outer cells with soil to allow vegetation to grow.
9. Overfill cells to allow for layered compaction, as the structure forms. Ensure to stagger rebar J-Pins on each layer.
10. Compact infill to a minimum of 95 percent Standard Proctor or 90-92 percent Modified Proctor test.

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LOAD SUPPORT

The Geocell load support system stabilizes the selected infill and provides economical solutions to unstable surface or base problems in three key areas: 1) a load distribution system over weak soils, 2) base stabilization for paved surfaces and 3) surface stabilization for unpaved surfaces.

Subgrade Preparation

1. Excavate and shape foundation soils.
2. Ensure foundation soil meets minimum strength requirements through proof rolling or other conventional method. If unacceptable foundation soils are encountered, excavate and replace with suitable quality material.

Separation Layer and Base Materials Installation

3. When separation between subgrade soil and infill material is required, place geotextile over subgrade.
4. If additional base materials or engineered soils are required between separation geotextile and geocell, install the appropriate depth and compact to a minimum 95 percent Standard Proctor or 90-92 percent Modified Proctor test.

Geocell Panel Placement and Connection

5. Position and expand geocell panels to the appropriate dimensions. Hold individual panels in their expanded positions with rebar J-pins or wooden stakes. Join panels using traditional stapling methods or connecting studs.
6. Confirm each geocell panel is expanded uniformly and correctly aligned. Nest panels along each joint to ensure adjacent geocell panels are flush at joint and adjoining cells are fully anchored. Alternate the installation of rebar J-pins or wooden stakes to ensure each panel is stable.
7. Install rebar fixing or wooden stakes along the joint of each panel in every other perimeter cell to hold the geocell panels stable during infill. Alternate the installation of rebar fixing pins or wooden stakes to ensure each panel is stable

Exposed Aggregate or Engineered Infill

8. Fill geocell with specified aggregate material progressively from front to back. Do not use an infill material with particle sizes greater than 65mm.
9. Overfill cells with aggregate infill material. Limit the drop height of infill material to 1m to avoid displacement of the cell wall.
10. Overfill cells to a depth of approximately 50mm and level for exposed aggregate surfaces. Maintain the 50mm wear surface over geocell panels to prevent wear to the cell walls.
11. Compact infill to a minimum of 95 percent Standard Proctor or 90-92 percent Modified Proctor test.

Base Stabilisation

12. Overfill geocell to a depth of 25mm and compact to a minimum of 95 percent Standard Proctor or 90-92 percent Modified Proctor test.

13. The wearing course may consist of asphalt/concrete/paver stones/gravel or grass stabilizer or other as specified. Install per engineer's specifications.

- site access roads
- permeable, load-supporting surfaces
- roadway shoulders
- intermodal/port facilities
- transportation/storage yards
- stabilized drainage layer
- trails and walkways
- track ballast and subballast structures
- stabilized base for asphalt or modular block pavements
- boat ramps/low water crossings
- foundation mattresses and pipeline protection

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Slope Protection & Retaining Walls

The Geocell slope and shoreline protection system confines, reinforces and restrains the upper soil layer and infill controlling down-slope movement and slippage due to hydrodynamic and gravitational forces.

- Provides effective slope protection and structural confinement of topsoil/vegetation and granular materials such as sand, gravel and larger rock or stone.
- Becomes a flexible concrete mat with built-in expansion joints when cells are infilled with concrete.
- Creates additional stability by integrating tendons on steeper slopes and shoreline embankments or when a geomembrane or hard soil/rock surface prevents anchoring with stakes.
- Allows embankments to be steeper than when unconfined, reducing use of valuable land space.

Subgrade Preparation:

1. Excavate and shape foundation soils.

2. Install a geotextile underlayer on prepared surfaces.

3. If required, install geogrid underlayer on prepared surfaces.

Geocell Panel Placement and Tendon Fixing

4. First calculate the length of the slope in order to determine the number of panels required and the length of your tendons. Allow approx. 200mm for each securing anchor to be tied off plus an additional 1m per tendon run for anchor placement. The number of securing anchors and tendons used will depend on the gradient of the slope (i.e.the steeper the slope the more anchors and tendons required.)

5. Position collapsed geocell panels at crest of slope.Secure tendons at the crest of the slope with galvanized anchors.

6. Feed the tendon through the first collapsed panel. Secure subsequent panel/s with connecting studs and continue to feed tendon through each individual collapsed panel.
7. Once the tendon has been fed through all panels, fully extend tendon down the slope
8. Drive a rebar J-pin through every perimeter cell along the crest of the slope to secure the top edge of the geocell panels in place.
9. Begin to expand the panel/s down the slope, securing the panels as you go with j-pins (according to suggested laying pattern) in their fully expanded position.
10. Once the entire matrix has been positioned, return to tendons working from the crest down, drive in anchors tight against the cell walls in line with tendon.
11. Take the slack from the tendon and wrap it around the central column 3 or 4 times before repeating the process on the next anchor.
12. Tie off the tendon securely on the last anchor at the bottom of the slope, Drive a rebar J-pin through every perimeter cell along the final row.

Infill Material:

13. Infill expanded panels with chosen material working from the bottom of the slope up towards the crest.

(For less exposed slopes seeded top-soil is suggested, adding small shrubs will give improved protection)

14. Limit drop height to a maximum of 1m to avoid damage or displacement of the cell walls.

15. Compact infill material per engineer's specification.

TYPICAl APPLICATIONS

- cut or fill embankment slopes
- shoreline revetments
- abutment protection
- stormwater/waste water lagoons
- containment dikes and levees
- geomembrane protection
- landfill linings and covers
- dam faces and spillways

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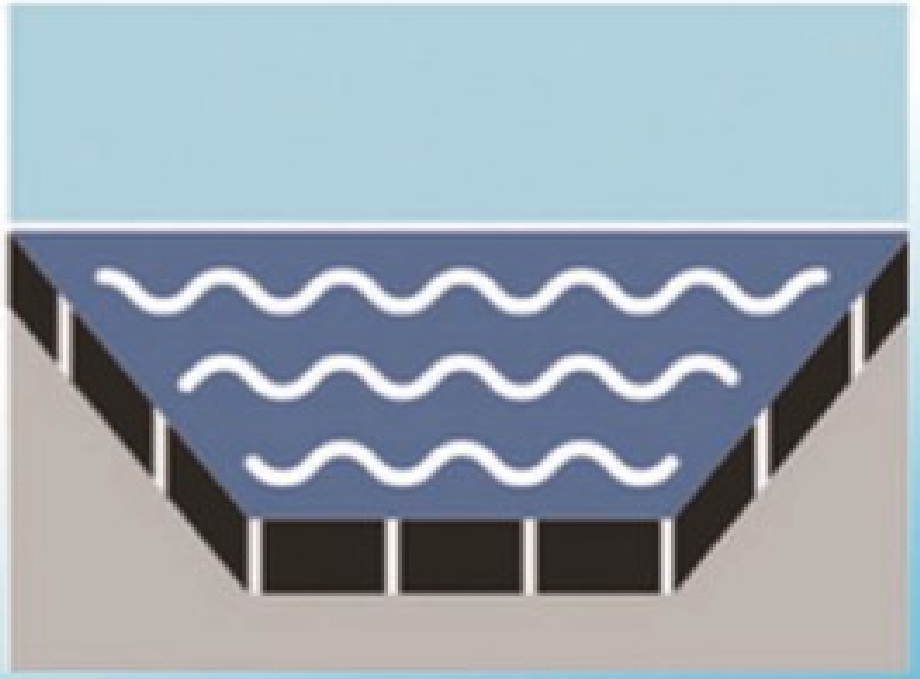
Channel Protection Systems

Geocell system provides a wide variety of economical, flexible protection treatments for open channels and hydraulic structures. The system provides stability and protection of channels exposed to erosive conditions ranging from low-to-high flows either intermittent or continuous.

Geocell can be used for channel and shoreline protection and on scour aprons, boat ramps and spillways. geocell avoids the need to install costly load support structures.

TYPICAl APPLICATIONS

- swales and drainage ditches
- stormwater diversion or containment
- process water channels or containment
- spillways/down chutes/drop structures
- culvert outfalls
- intermittent or continuous/low-to-high flow channels



Subgrade Preparation

1. Excavate and shape foundation.
2. Install a geotextile underlayer on prepared surfaces.
3. If required, install geogrid underlayer on prepared surfaces. Geocell Panel Placement and Anchorage.
4. Subject to site requirements, generally follow the slope protection installation method or earth retention installation method.

Infill Material

5. Place chosen infill material in expanded cells
6. Limit drop height to a maximum of 1m to avoid damage or displacement of the cell walls.
7. Compact infill material per engineer's specification.

Infill materials, subject to site conditions, include:

- top soil for low to moderate and intermittent flow conditions
- granular materials including gravel and concrete for channels subject to severe hydraulic and mechanical stresses.

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