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Subgrade preparation

Geocells load support applications are generally classified as follows and illustrated in Figure 1 - Figure 5:

1. Unpaved access roads and hard-standing areas.
2. Base and subbase stabilization of flexible pavement structures.
3. Stabilized trackbed structures.
4. Raft construction on soft soils.
5. Structural spread footings.

The extent and nature of subgrade preparations depend on the type of structure and the subsoil conditions.

- Paved roads, railroad trackbeds and structural footings require accurate grading, shaping and proof-rolling of the subgrade soils.
- Provision of adequate cross-fall or crowning at formation level is particularly important.
- Raft construction, involving extremely weak compressible subsoils, generally limits subgrade preparation work to the clearing of large vegetation. Any existing root mass is normally left intact.

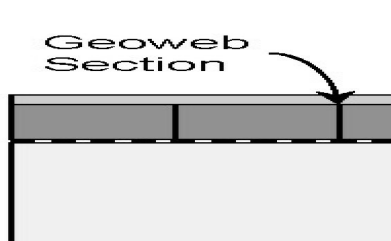


Figure 1 Unpaved access

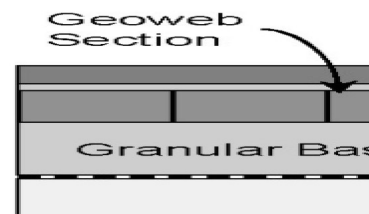


Figure 2 Flexible pavement

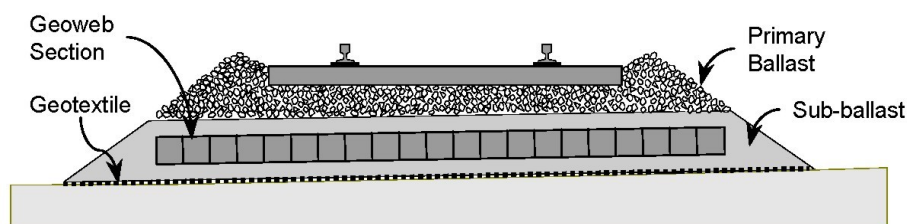


Figure 3 Trackbed stabilization



Figure 4 Pipeline support

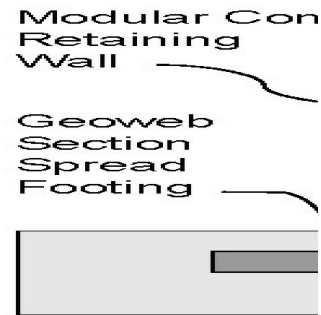


Figure 5 Spread footing

Geotextile underlayer

- Most load support applications involve a geotextile separator layer at the subgrade surface. When required, this separation layer is critical to the performance of the load support system.
- Ensure that minimum overlap between rolls is maintained. See Figure 6.
- The geotextile may also function as a lateral drainage medium. A thick, non-woven geotextile or geo-composite materials are then required.
- High-strength geotextiles are used when building Geocells structures over soft compressible soils. Pre-sewn seams, rather than overlapped joints, may be required in some situations.

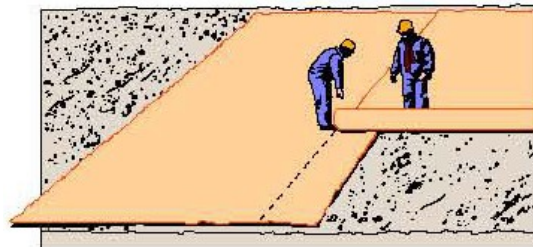


Figure 6 Geotextile placement

Installation of geocells sections

- **Option 1:** Expand the specified Geocells section into position and anchor with stakes. See Figure 7. When anchors are used, ensure the clip arm is hooked over the cell wall or placed through the cell-wall slot hole.
- **Option 2:** Expand and manually fill selected perimeter cells prior to machine infilling. See Figure 8.
- **Option 3:** The use of stretcher frames is generally recommended only for underwater or extremely cold applications.

Expand and fit the Geocells section over the dowels of a suitably dimensioned stretcher frame. Invert the frame and position the section to receive infill material. When the Geocells section is filled, remove the frame and repeat the process. See Figure 9.

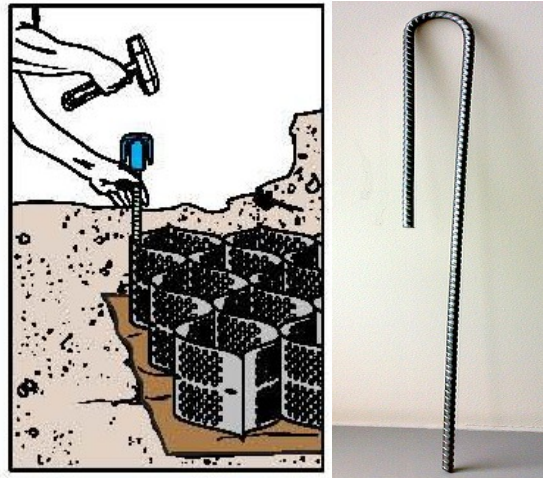


Figure 7 Stake anchorage

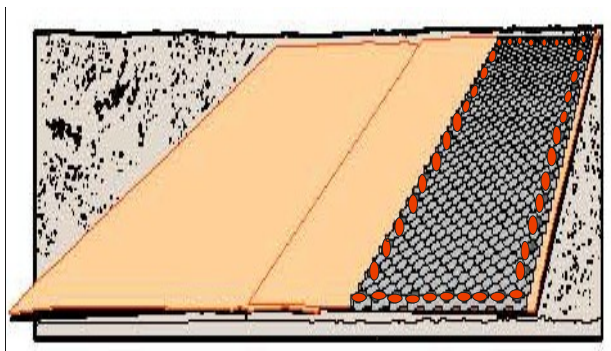


Figure 8 Infilling perimeter cells

(example marked with red color)

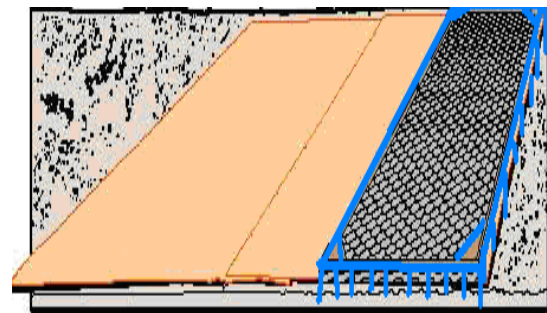


Figure 9 Use of stretcher frame

(exact dimensions of frames and the technical documentation available from the produces)

Installation of geocells sections on curves

Method 1: Geocells sections can be readily adapted to cover curved areas by varying the degree of cell expansion across the width of individual sections. See Figure 10.

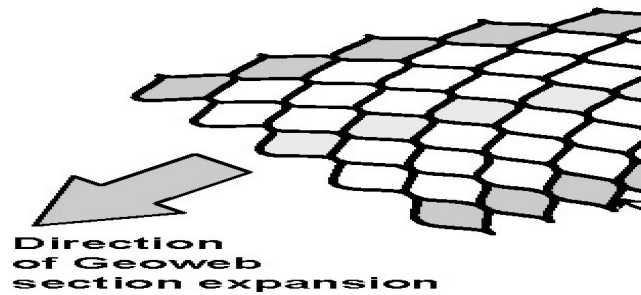


Figure 10 Curved expansion of section

Method 2: Progressively vary the degree of cell expansion along the length of a section. See Figure 11.

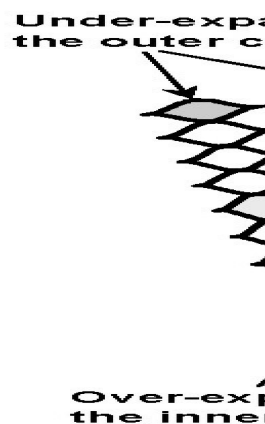


Figure 11 Tapered expansion of section

Connecting Geocells Sections

- Each section of geocells should be checked to make sure the cells are properly extended and the outer dimensions are equal to the nominal dimensions (i.e. standard section 6,10 m x 2,44 m). Extending section to the nominal dimensions is an advantage and has an influence to a better look of the stabilizing area.
- Adjoining cells should be aligned and attached the way that the upper edges of adjoining cells walls were laying in the same line.
- The adjoining cells should be joined abutted
- If technical documentation does not describe the amount of band clips required to join each standard 60-strip sections, it is normally joined with band clips by joining each second cell of the adjoining sections
- In case of joining shorter sides of small cell sections there are 5 band clips being used and 15 band clips for joining longer sides . The band should be interwoven through the adjoining cells and clipped so the lock of the band will

rest on the upper edge of joined cells. The bands should not be pulled through the perforation holes. The bands should wrap the whole height of the strip

- For joining sections there should be used bands made of polyamide 6.6, which after wrapping the walls of adjoining sections will have teeth on the whole working length which secure proper tightening of the band. The ends of bands sticking out of the locks should be cut off, unless a construction manager tells to keep it.
- Depending on the local conditions the amount of required band clips may be verified by a construction manager
- If technical documentation does not specify differently, the bands should be used in black color



Rys. 12 Examples of cable ties to the connecting sections

Placement and compaction of geocells Infill

- Place fill into expanded cells with suitable material handling equipment such as a front-end loader or excavator. See Figure 13 and Figure 14.
- Limit drop-height of infill material to a maximum of 1 m.
- Overfill Geocells sections at least 50 mm above the cell walls before trafficking or compacting.
- Compact infill material to the specified density with conventional compaction equipment. See Figure 15. See Compaction Equipment on page 5 for limitations.



Figure 13 Fill placement with loader

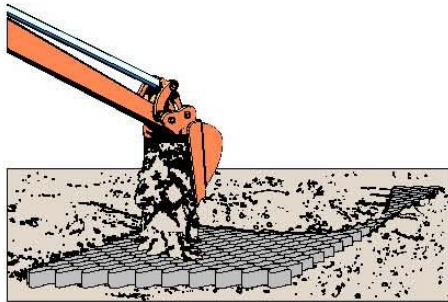


Figure 14 Fill Placement with excavator



Figure 15 Infill compaction

Upon completion of the installation, ensure that an aggregate surcharge of at least 10 mm is maintained above the Geocells cell walls at all times.

Unbound aggregate surfacing must be graded and maintained on a regular basis.

NOTE: When pea gravel or other highly rounded stone is used for the infill and will have direct traffic over the surface, blend it with 40%-45% sand to prevent excessive movement of the material.

Dimensions and weights of palletized geocell sections

Geocell sections are normally folded and palletized for shipment to the site. Table 1 provides example pallet dimensions and weights for a standard type of section and cell sizes. The method of packaging is set according to the customer's requirements and is dependant on the transportation method and on the amount of material.

Table 1: Geocell shipping dimensions and weights (example – small cells, 60 strips)

Cell depth	Pallet dimensions	Minimum weight	Maximum weight
75 mm	1200 mm x 1100 mm	400 kg	660 kg
100 mm	1200 mm x 1100 mm	380 kg	710 kg
150 mm	1200 mm x 1100 mm	400 kg	660 kg
200 mm	1200 mm x 1100 mm	380 kg	710 kg

Infill volumes

Cell Depth	75 mm	100 mm	150 mm	200 mm
Volume (m ³ / 100 m ² of area)	7.5 m ³	10.0 m ³	15 m ³	20.0 m ³

Table 2: Infill volumes for geocell sections

Tools and equipment

Installation efficiency is greatly improved by the appropriate choice of construction equipment and tools. The following guidelines apply to most Geocell system applications. Non-standard tools and equipment may provide additional benefits in some situations.

Table 3: Standard construction tools for Installation of the geocell system

Geocell Components	Power Tools	Concrete Finishing	Surveying Equipment
Clips/Anchors	Heavy-duty drill	Bull floats	Surveyor's auto-level
Connection Device	Circular saw	Hand floats	Tripod and rod
Hand Tools	Percussion hammer	Steel trowels	Laser beacons
Shovels and spades	Stapler	Poker vibrators	Audio target receiver
Rakes and screed bars	Wire staples	Tamping rods	Survey stakes
Sledge hammers	Gas generator		Markers + spray cans
Crowbars	Air compressor		String-lines + spirit level
Utility knives	Electric Impact Hammer		
Spikes, nails + lumber	Anchor Driving Tool and Gad.		
Templates			

Excavation and materials handling equipment

Conventional excavators, front-end loaders, mini-excavators and skid-steer loaders, equipped with smooth-edged buckets, are normally employed for the installation of Geocell systems. Infilling of Geocell sections can also be carried out with conveyors, chutes and skips. As a rule, the overall rate of installation relates directly to the speed and efficiency of infill placement and compaction.

Compaction Equipment

Compaction of slope surfaces prior to installation of the Geocell system is normally carried out with:

1) vibratory plate compactor attachments for backhoes, 2) a mobile winch assembly at the slope crest to support a roller or plate compactor, or 3) manual tamping. Slope pre-compaction is primarily intended to minimize sloughing of loose surface topsoil or aggregate fill materials.

Storage of geocell

As collateral for the geocell is responsible contractor. Geocell should be stored on pallets, in a place with low humidity and away from flammable and corrosive substance, preferably in a sheltered spot. If it is not possible to store under a roof storage geocells allowed in open space, but be sure to secure the appropriate geocells against UV

Jeśli składowanie geosiatki komórkowej na otwartej przestrzeni trwa do 2 miesięcy, wykonawca powinien zabezpieczyć ją zwykłą folią stretch. W przypadku gdy składowanie trwa dłużej niż 2 miesiące wykonawca musi koniecznie zabezpieczyć geosiatkę komórkową folią stretch o odporności na promienie UV. Ponadto należy dodatkowo przykryć geosiatkę folią o następujących parametrach:

If the geocell storage in the open space takes up to two months, the contractor should protect it by a simple stretch film. In the case of storage longer than two months the contractor must necessarily protect the geocell stretch film for UV resistance. In addition, further covered with foil geocell with the following parameters:

- UV resistance
- durability of polyethylene at least 6 months
- thickness of 150 micrometers

Limited Warranty

Geo Globe Polska warrants each Geocells section which it ships to be free from defects in materials and workmanship at the time of manufacture. Geo Globe Polska's exclusive liability under this warranty or otherwise will be to furnish without charge to Geo Globe Polska's customer at the original f.o.b. point a replacement for any section which proves to be defective under normal use and service during the

Strona 10 z 11

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10-year period which begins on the date of shipment by Geo Globe Polska. Geo Globe Polska reserves the right to inspect any allegedly defective section in order to verify the defect and ascertain its cause.

This warranty does not cover defects attributable to causes or occurrences beyond Geo Globe Polska control and unrelated to the manufacturing process, including, but not limited to, abuse, misuse, mishandling, neglect, improper storage, improper installation, improper alteration or improper application.

Geo Globe Polska makes no other warranties, express or implied, written or oral, including, but not limited to, any warranties or merchantability or fitness for any particular purpose, in connection with the geocells system. In no event shall geo globe polska be liable for any special, indirect, incidental or consequential damages for the breach of any express or implied warranty or for any other reason, including negligence, in connection with the geocells system.

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