Geogrid Installation Guide

Site Preparation

The engineer shall verify that the subgrade and elevations are ready for Geogrid installation. For moderately competent soils (CBR > 2), it may be prudent to lightly proof roll the subgrade to locate unsuitable materials. When possible, backdrag to smooth out any ruts.

Smooth grade and compact the soils using appropriate compaction equipment. Swampland, peat, muskeg or marshes may be difficult to smooth grade and/or compact. In these situations, create a surface that is as uniformly smooth as possible. Grade or crown the surface for positive drainage away from the construction zone. The subgrade should be free of sharp objects or debris that could damage the geogrid.

Place the rolls of Geogrid in position, cut the roll bands and manually unroll the material over the prepared surface.

Subgrade Strength	Geogrid Overlap[1]	Direct Traffic?[2]	Geotextile Required?[3]
CBR ≤ 0.5	*Consult a Qualified Geotechnical Engineer*		
0.5 ≤ CBR ≤ 2	2–3 ft.	No	Analysis Required
2 ≤ CBR ≤ 4	1–2 ft.	Limited	Analysis Required
4 ≤ CBR	1 ft.	Yes	No

Notes:
1. General Geogrid Overlap Rule: Overlap = 3 ft. for CBR ≤ 1; Overlap = 1 ft. for CBR ≥ 4; interpolate between.
2. Direct Traffic pertains only to conventional rubber-tired equipment.
3. Analysis Required = Geotextile required only if filtration criteria is not met by aggregate fill.

Placing and Overlapping Geogrid

Overlap adjacent rolls along their sides and ends in accordance with Table 1.

Overlap (shingle) geogrids in the direction the fill placement will be spread to avoid “peeling” of geogrid at overlaps by the advancing fill. To expedite shingling, consider placing rolls at the far end of the coverage area first, and work toward the near end from where the fill will be advanced. Weaker subgrades that are easily rutted with conventional construction traffic will require an end-dumping operation. Please refer to item 5 Dumping and Spreading Aggregate Fill for more information.

Adjacent geogrid rolls are not normally mechanically connected to one another, particularly if fill is placed and spread as described herein.

Cut and overlap the geogrid to accommodate curves. Cutting may be done with sharp shears, a knife-like implement or handheld power saws. (Wear appropriate safety equipment such as gloves and eye protection.) Cut grid to conform to manhole covers and other immovable protrusions.

Place geogrids in daily work sections so that proper alignment is maintained.

In some cases, especially on cooler days, Geogrid will exhibit “roll memory” where the product may roll back upon cutting or reaching the end of the roll. It is recommended that the installer take appropriate measures to ensure that the product lies flat during fill placement. This can be easily achieved by using U-staples, zip ties or simply adding fill to weigh down the product.

Gloves should be worn when handing and cutting Geogrid.

Tensioning and Pinning

Geogrid may be anchored in place to maintain overlaps and alignment over the coverage area.

Before fully unrolling the geogrid, anchor the beginning of the roll, in the center and at the corners, to the underlying surface.

Anchor the Geogrid with small piles of aggregate fill or a washer and pin. Heavy-gauge U-staples may also be used by driving them into the subsoil through the apertures of the grid.

Unroll the Geogrid, align it, and pull it taut to remove wrinkles and laydown slack with hand tension, then secure in place.

Additional shoveled piles of aggregate fill, pins or staples may be required to hold the geogrid in place prior to placement of the aggregate fill.

When aggregate fill is spread by pushing it over the Geogrid with heavy equipment, such as bulldozers, the shoving action may create a wave in the sheet of geogrid ahead of the advancing fill. Shoveled fill or pins can trap this wave and force the geogrid up into the aggregate layer where it can be damaged by the spreading equipment. Pulling the geogrid taut will mitigate laydown slack, thereby removing waving. If significant waving occurs, the pins or shoveled material should be removed to allow the waves to dissipate at the ends and edges of the roll.

Dumping and Spreading Aggregate Fill

Generally, at least 6 in. is required for the initial lift thickness of aggregate fill over the geogrid. However, for very soft conditions, a significantly thicker fill layer will be required to prevent excessive rutting and/or bearing capacity failure of the underlying subgrade soils.

Over relatively competent subgrades (CBR > 4, see Table 1), aggregate fill may be dumped directly onto the geogrid. **Standard, highway-legal, rubber- tired trucks (end dumps and belly dumps) may drive over the geogrid at very slow speeds (less than 5 mph) and dump aggregate fill as they advance, provided this construction traffic will not cause significant rutting upon the bare subgrade. Turns and sudden starts and stops should be avoided.**

Over softer subgrades, back trucks up and dump fill upon previously placed fill. For very soft subgrades, extreme caution should be taken to avoid overstressing the subgrade soil both during and after fill placement. Please contact your representative or a qualified geotechnical engineer for guidance with constructing over very soft subgrade soils (CBR < 0.5).

Do not drive tracked equipment directly on the Geogrid. Ensure at least 6 in. of aggregate fill (or required minimum design fill thickness) is spread between the geogrid and tracked equipment.

Only operate rubber-tired equipment directly on the geogrid if the underlying subsoil is not prone to rutting under limited construction traffic.

Over softer subgrades (CBR < 2), a lightweight, low ground pressure (LGP) dozer is recommended to evenly push out the fill over the exposed geogrid.

Care should be taken not to catch the dozer blade or other equipment on the Geogrid. The dozer blade should be raised gradually as each lift is pushed out over the geogrid. The desired effect is fill that cascades onto the geogrid, rather than being pushed into it.

When building over a soft subgrade, it is desirable to work from stronger to weaker areas.

Be aware of geogrid overlaps and advance the aggregate fill with the shingle pattern.

Compacting

Standard compaction methods may be used unless the soils are very soft. In these cases, static instead of vibratory compaction is recommended. Compaction is then achieved using a light roller. Keeping the moisture content of the fill material near optimum will make compaction more efficient. Water spray is most effective with sand fill. For construction over very soft soils, compaction requirements are normally reduced for the initial lift as the primary intent of the initial lift is to achieve a suitable working surface. If rutting or severe pumping occurs under truck or dozer traffic, fill should be added immediately to strengthen the section.

Compact aggregate fill to project specifications, after it has been graded smooth and before it is subject to accumulated traffic. Inadequate compaction will result in surface rutting under wheel loads. This rutting reduces the total effective thickness of the fill and increases stress on the subgrade. Compaction equipment and methods should be appropriate for the type of fill being used, its thickness and the underlying subgrade conditions.

If the aggregate fill thickness is insufficient to support imposed load(s) when constructing over soft soil, excessive subgrade and surface rutting will result. Measures should be taken to ensure the proper thickness of granular fill is placed atop the geogrid to maximize support and minimize movement at the surface.

Special Considerations

REPAIRS

If Geogrids become damaged during or after installation, repair them by patching the area with the following measures:

1. Remove fill from the surface of the damaged geogrid and clear a 3 ft. area around the damage.
2. The geogrid patch should cover the damaged area and extend 3 ft. beyond it in all directions.

SURFACE RUTTING

If deep rutting occurs beneath truck wheels, do not grade out the ruts. Rutting is normally indicative of fill that is too thin, too wet or inadequately compacted. Grading out the rut will reduce aggregate fill thickness between the wheel paths and may lead to geogrid exposure.

Fill in the ruts with additional specified aggregate fill and compact. This places extra fill where it's needed and may prevent further rutting under channelized traffic.

Crown the fill during the grading process to ensure rainfall runoff and to prevent fill saturation.

COLD WEATHER

At sub-freezing temperatures, Geogrid is less impact resistant and can be fractured with dynamic force (i.e., striking with a hammer). Other aspects of dynamic loading associated with very cold temperatures should be avoided. For example, direct trafficking by rubber-tired equipment atop geogrid is permissible when the subgrade is competent. However, it's not advisable at very cold temperatures.

AGGREGATE FILL CONSIDERATIONS

The preferred gradation is well-graded crushed aggregate fill with maximum particle size of 1½ in. and less than 10% fines (passing #200 sieve). The gradations listed in Table 2 (below) provide good stability and low moisture susceptibility. Other granular fill may be acceptable depending on project conditions – this determination should be made by the engineer of record for the project. As a part of this determination, a filter analysis should be performed to determine whether a geotextile is required to maintain separation between the aggregate fill and the subgrade

soils. In cases where filtration cannot be achieved based on the aggregate gradation, a non-woven geotextile should be placed below the geogrid to maintain separation.

The moisture content of the fill should not exceed optimum. Wet fill is not easy to compact and will rut under wheel loading.

Table 2 – Preferred Fill Gradation

Size	% Passing
1 ½ in	100
¾ in	50-100
4	25-50
40	10-20
100	5-15
200	Less than 10

PREFERRED EQUIPMENT

Soft Ground – the preferred equipment imposes low contact pressure and vibrations on the ground surface. This may be done with smaller machinery, wide tires and/or LGP tracks. Equipment that concentrates heavy loads over relatively small contacts, such as front-end loaders, is not recommended. In all soft ground cases, fill must be sufficiently thick to avoid overstressing the underlying soils and Geogrid.

Competent Ground – the preferred equipment maximizes productivity for specific construction requirements. Over competent ground, geogrids can be trafficked directly by rubber-tired equipment, making hauling equipment (i.e., dump trucks) and spreading equipment (i.e., motor graders) ideal. Spreader boxes are not recommended – wrinkling in the geogrid between the screed and wheels of the box and dump trucks can cause slack to become trapped, raising the geogrid up into the aggregate layer.