ENGINEERING BULLETIN

PREMIUM WOVEN GEOTEXTILES FOR ROADWAY STABILIZATION

Propex's Geotex® line of premium woven geotextiles 2x2, 3x3 and 4x4 are ideal for stabilizing paved and unpaved roads over very soft soils. These geotextiles combine the high strength and modulus of geogrids (see Figure 1) with the separation and drainage properties vital to construction over soft soils.

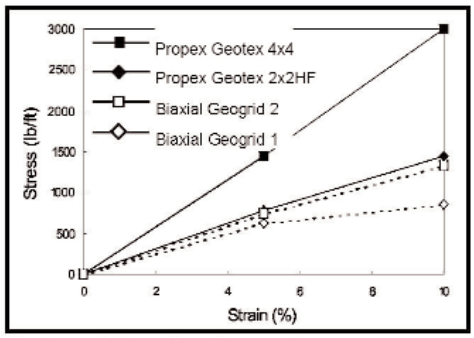

Figure 1 - Stress-strain relationship of Propex geotextiles and biaxial polypropylene geogrids

Reduced Cost for Accessing Difficult Sites

Site access can be difficult and costly when constructing over soft and saturated soils. Propex's Geotex line of premium woven geotextiles provides an essential working platform, making it easy for construction equipment to get on site and begin work. These fabrics have high modulus values that minimize aggregate fill depth requirements and can eliminate the need for costly undercutting and over-excavation. Propex's premium woven geotextiles can reduce aggregate fill requirements by as much as 50%.

Separation and stabilization are the primary functions allowing a geosynthetic to stabilize a roadway. Reinforcement is a secondary function that comes into play when needed, when there is an excessive deformation of the road. Premium high-strength geotextiles perform these functions by keeping the subgrade and aggregate separated, by conforming to the bottom of the aggregate to lock it in place to stabilize the road, and by providing reinforcement when required. A geogrid, by contrast, does not offer and separation and therefore should have a geotextile placed below it if used. However, there is no reason to use a grid or grid/fabric combination beneath roads since Geotex premium woven geotextiles will do a better job performing all the functions and will cost much less than geogrid. In addition, the use of a geotextile allows the use of a more open, free-draining aggregate, since a tight aggregate mix is not needed to limit subgrade fines upward migration. The more free-draining the aggregate, the higher the structural strength of the aggregate, so less aggregate layer thickness may be used.

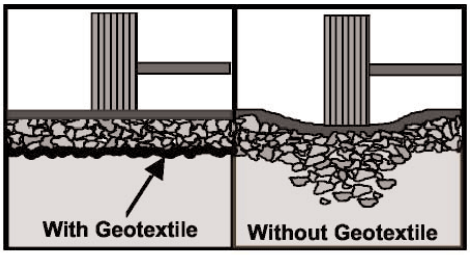

Figure 2 - Effect of geotextile on road base integrity.

Increased Long-Term Roadway Performance

Research performed by Virginia Tech University determined that geotextiles substantially improve performance of flexible pavements (Smith et al., 1994). Propex woven geotextiles doubled or tripled the service life of test sections constructed over moderate to soft soils (CBR between 2 and 4.5 %). Biaxial polypropylene geogrids studied in this research had no effect on the pavement performance. The study demonstrates that separation of the weak soil from the base course aggregate is the key to increased service life.

Contaminating a road base aggregate with just 8% additional fine soil particles can decrease the aggregate strength by up to 80% (Jorenby and Hicks, 1986). As shown in Figure 2, geotextiles prevent this contamination through their separation function, thereby preserving the strength and original design thickness of the aggregate layer. When typical roadway materials are used, geogrids are unable to provide separation of aggregate and fine subgrade soil (Koerner and Koerner, 1994, and FHWA, 1989).

Propex Geosynthetics

Propex offers a complete line of Geotex® woven and nonwoven geotextiles to improve the performance of highways, unpaved roads, parking lots, airports, loading docks, and storage areas. Free software is available facilitating the design of unpaved and paved roads with and without geotextiles so costs can be compared. For additional technical assistance on the use of Propex geotextiles in roadway stabilization applications, visit our web site at www.geotextile.com.

References

Jorenby, B.N. and Hicks, R.G. (1986), "Base Course Contamination Limits," Transportation Research Record 1095, Transportation Research Board and National Research Council, Washington DC, pp 86-101.

Koerner, R.M. and Koerner G.R. (1994), "Separation: Perhaps the Most Underestimated Geotextile Function," Geotechnical Fabrics Report, IFAI, St. Paul, MN, January, pp 4-10.

Smith, T.E., Brandon, T.L., Al-Qadi, I.L., Lacina, B.A., Bhutta, S.A., and Hoffman, S.E. (1994), Laboratory Behavior of Geogrid and Geotextile Reinforced Flexible Pavements, Virginia Tech, Blacksburg, VA, December.

Federal Highway Administration (1989) Geotextile Design and Construction Guidelines, U.S. Department of Transportation, FHWA, Publication No. FHWA-HI-90-001.

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