TECHNICAL NOTE

Mirafi® HP-Series Multiaxial Performance

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Traditionally, geosynthetics have always been thought to provide radial reinforcement. Recent marketing trends in the geosynthetics industry are focusing on the multi-axial strength properties of geosynthetics that are used in roadway stabilization and reinforcement applications. The basis for this concept is that vehicular wheel loads are distributed radially outward through the pavement layers of the roadway as shown in Figure 1. This concept requires that geosynthetics chosen for this application should provide radial tensile strengths to counteract these radial stresses. The assumption that geotextiles and "biaxial" geogrids only provide reinforcement at right angles is unproven. Recent testing has shown that most geosynthetics have an inherent multiaxial strength even in an unconfined test. This multi-axial reinforcement would be even more prevalent in a confined state within a pavement system.

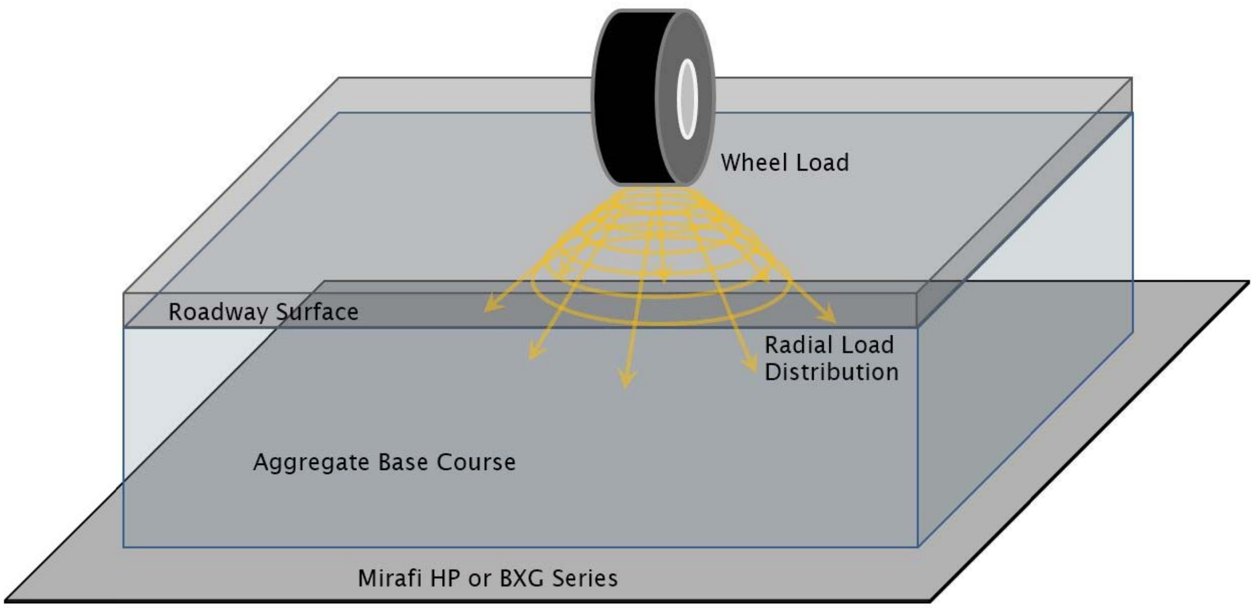

Figure 1: Wheel Load Three Dimensional Radial Load Distribution through a Pavement System's Layers.

The performance of Mirafi® HP-Series woven high-tenacity polypropylene geotextiles has been researched and tested in countless roadway reinforcement and stabilization applications. Mirafi® HP-Series geotextiles have consistently been found to outperform other geosynthetics used in roadway reinforcement applications. Recently, Drexel University in Philadelphia, Pennsylvania tested the strength properties of Mirafi® HP-Series geotextiles in unconfined multiaxial tension tests in order to quantify their multiaxial strength properties. Mirafi® HP-Series geotextiles show significant strength in the machine (MD) and cross machine direction (CD) as well as at a forty-five degree (bias) in this testing. Results of the unconfined testing show HP-Series geotextiles have essentially equal strength radially, while the extruded biaxial geogrid does not. An example of the laboratory apparatus testing an HP-Series product is shown in Figure 2.

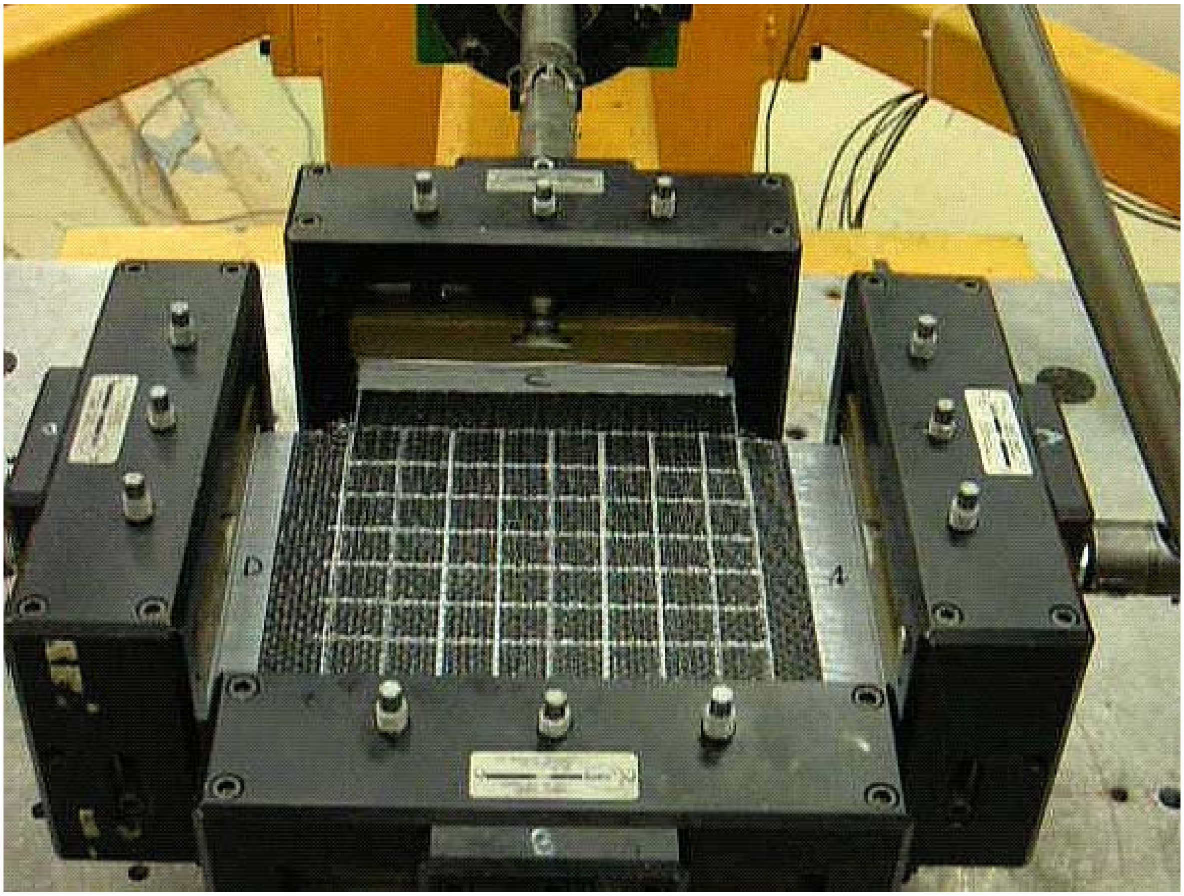

Figure 2: Mirafi HP-Series in Drexel University's Unconfined Multiaxial Testing Device.

As a result of the testing at Drexel University, a diagram has been developed showing the radial tensile stiffness for Mirafi® HP270, HP370, HP570. For comparative purposes, three extruded geogrids with triangular shaped apertures are included in the diagram shown in Figure 3. The tensile modulus values shown in the diagram are taken at one-half percent strain, highlighting the geosynthetic's multiaxial tensile strength characteristics. Currently, the geosynthetics industry is suspicious with regard to the relevance of the multiaxial characteristics of geosynthetics in roadway stabilization and reinforcement applications. Nonetheless, Mirafi® HP-Series geotextiles posses superior radial strength characteristics and continue to outperform the competition.

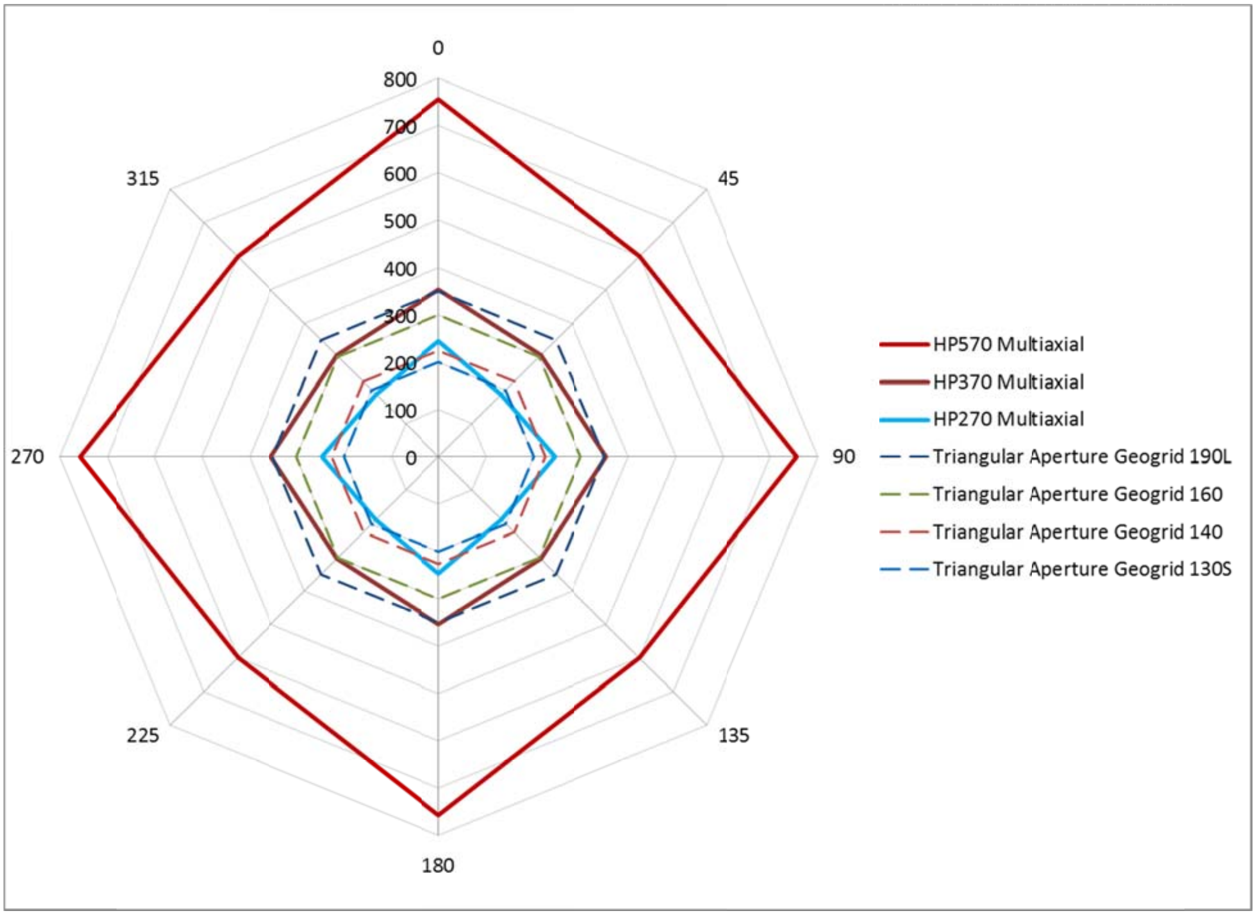

Figure 3: Polar diagram showing average radial stiffness (lb/ft) at 0.5% strain for Mirafi® HP570, HP370 and HP270 Geotextiles through 360°