

GEOTEXTILES ENHANCE ROAD PERFORMANCE



Background

This nation's infrastructure is deteriorating. In 2005, the American Society of Civil Engineers (ASCE) published its *Report Card for America's Infrastructure*. The ASCE graded the nation's infrastructure condition at a "D" and estimated that an investment of \$1.6 trillion would be required to improve road and bridge conditions.

Pavements across our nation are constructed over a wide variety of water sensitive subgrade soil including silt, clay and loess. These soil conditions, in combination with moisture, result in the deterioration of the pavement with time. Potholes, ruts and uneven pavements are not only a safety concern but affect the movement of goods and services that depend on a reliable surface transportation system.

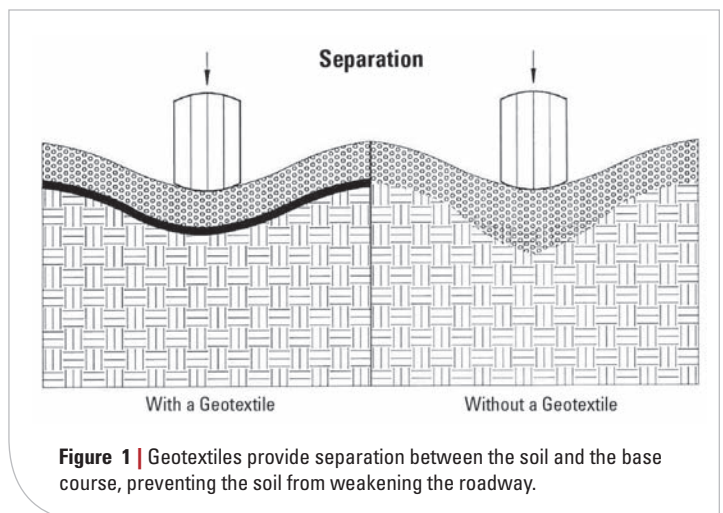
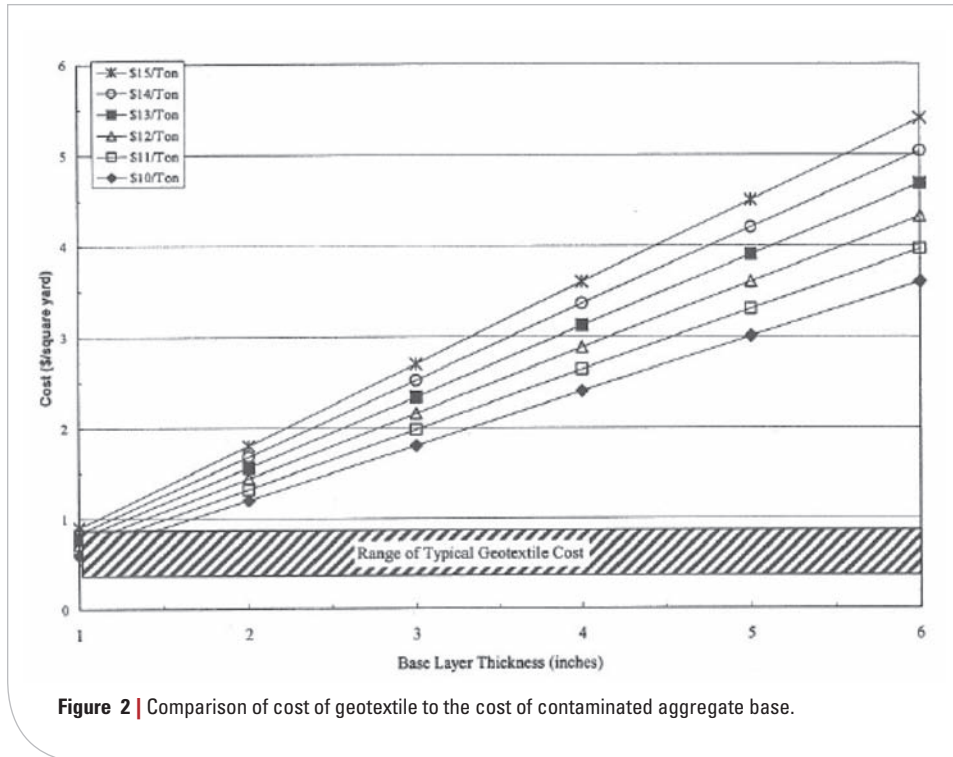


Figure 1 | Geotextiles provide separation between the soil and the base course, preventing the soil from weakening the roadway.

In the past year we have traveled 3 trillion miles on U.S. highways. Transportation use is outpacing population growth. The National Surface Transportation Policy and Revenue Study Commission has identified that one of the issues that can improve the effectiveness of our surface transportation system is to perform cost effectiveness evaluations of the systems used.

Geotextiles prevent early deterioration of roadways



Geotextile Technology

What is a geotextile? A geotextile is a class of industrial-grade textile that is composed of polypropylene and/or polyester resin (products of the oil refining process) that have yarns that are woven, knitted, needlepunched, or thermally or chemically bonded to form a flat permeable sheet. Carpet backing, car trunk liners, trampolines, swimming pool covers are other types of industrial textiles.

Pavements in the U.S. first incorporated geotextiles beneath roads, parking lots and railroad track ballast in the 1960s. In the early 1970s, we estimate 3 million square yards of geotextiles were used in infrastructure projects. By the 2000s, we estimate more than 300 million square yards were used beneath roads throughout the world. Most state Departments of Transportations (DOT) now have standard specifications for their use in roads. A 2006 study by the Geosynthetic Research Institute found that 40 out of the 50 state DOTs have a specification for a separation geotextile.

Pavements typically consist of a bituminous or concrete surface, an engineered aggregate base, or support layer and then the natural soil subgrade. Geotextiles prevent the mixing of the fine subgrade soils with the engineered aggregate support layer. By preventing this mixing, geotextiles prevent early deterioration of roadways.

Figure 2 provides a comparison of aggregate costs versus geotextile costs.



Steele County Highway Department



Photos | Geotextile being rolled out to provide separation.

Cost Savings

The cost of the installed separation geotextile is typically less than the cost of 1 inch of base course aggregate; separation geotextiles typically prevent contamination of several inches of base aggregate. Therefore, the benefit significantly outweighs the cost of using a separation geotextile in pavements.

As early as 1994, a joint American Association of State Highway and Transportation Officials (AASHTO) industry task force identified “quantifying life cycle cost-benefit of pavements incorporating geotextile separators” as a top priority research need for the transportation industry. Local and state studies have proven that the use of geotextiles as separators has enhanced road performance as a result of the placement of the geotextile between the subgrade and the pavement aggregate base layer. Studies show the extended life of pavement sections that incorporate geotextiles. These studies have shown reduced long-term maintenance and reduced pavement rehabilitation costs for roads using geotextiles.



Case Studies

Duluth, Minnesota Airport Authority—In a paper published in *Geotechnical Fabrics Report* (August 1999), the performance of a bituminous airport taxiway (Taxiway A) was evaluated after 15 years of use at the Duluth International Airport in Minnesota. As a result of superior performance of the geotextile pavement section, the Duluth Airport Authority reported that funding for the crack sealing of this particular pavement section had been shifted to a another taxiway/runway of the same age that had not been constructed with geotextiles.

Harford County, Maryland—Harford County, a bedroom suburb of Baltimore has many years of experience with the advantages of using geotextiles beneath pavements. County officials report that when they constructed Technology Drive, the primary roadway into the minor league baseball facility, Ripken Stadium, that a separation geotextile was used over a soft subgrade. After 7 years of performance, the County reported superior performance compared with other roadways of the same age that did not use geotextiles.

Greenville County, South Carolina—In a paper published at a national conference (Geosynthetics' 1997) a test road study for Greenville County, S.C. demonstrated that by incorporating a separation geotextile in a pavement section, that pavement maintenance decreased by 5-15% annually over a 9-year period.



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