



# Project Summary

Texas Department of Transportation

## 0-5812: Development of Application Guide and Specifications for Geotextiles in Soil and Base

### *Background*

Geotextiles, one among the different geosynthetic products, can be used for a number of functions or applications in pavement design. Specifically, woven or nonwoven geotextiles have been used in pavements to fulfill the functions of separation, filtration, drainage, reinforcement, and mitigation of crack propagation. Indeed, geotextiles often perform more than one function simultaneously depending on the type of geotextile and its location within the pavement system. The benefits of using geotextiles in pavements and other transportation applications have triggered a proliferation of products. While this abundance of new products has led to reduction in costs, it has also made it difficult for TxDOT personnel to choose appropriate products based on their engineering properties. As a consequence, opportunities for more cost-effective pavements are probably being missed by not using (or by incorrectly using) geotextiles in pavement construction. In addition, selection of geotextiles in TxDOT is further deterred because the available Departmental Material Specifications (DMS) is not comprehensive enough (it refers to a single function and a single type of geotextiles) and because AASHTO guidelines (AASHTO M288) are reportedly generic in nature.

### *What the Researchers Did*

This study included an assessment of the existing literature, conducted with the objective of assessing current selection and design methodologies for use of geotextiles in pavement applications, with particular emphasis on their suitability for conditions typical of TxDOT pavements and Texas materials and environmental conditions.

In addition, a survey of TxDOT and other state DOTs regarding use of geotextiles in pavement systems was conducted with the objective of summarizing the experience gained by TxDOT districts and other state DOTs and highway agencies on the use of geotextiles in pavement systems.

Subsequently, a Guide for Application and Selection of Geotextiles and of Departmental Material Specifications (DMS) was compiled. This was conducted with the objectives of materializing into guidelines the use and selection of geotextiles, accounting for the various functions in pavement design and to develop DMS based on the types and functions of geotextiles in pavement applications.

Installation and construction specifications were subsequently compiled in order to complement the appropriate selection of geotextiles to fulfill specific functions with appropriate construction specifications suitable to TxDOT needs.

Finally, preparation of products and research reports were conducted in order to document the literature and survey information as well as the guidelines and specifications generated in this research.

### *Research Performed by:*

Center for Transportation Research (CTR),  
The University of Texas at Austin

### **Research Supervisor:**

Jorge Zornberg, CTR

### **Researchers:**

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**Project Completed:** 8-31-09

## What They Found

Results from both the national and TxDOT surveys conducted as part of this project indicated a widespread use of geotextiles for various applications in roadway design. Both sets of results indicate that there remains some confusion regarding geotextiles and their applications; however, TxDOT responses indicated the need of guidelines for including geotextiles in design and an educational program to get the information to working engineers. The national survey results also highlighted the prevalence of AASHTO M288 as the dominant national source for material properties. Confusion related to the reinforcement application was prevalent throughout both sets of survey results, highlighting the need for clarification on the controlling mechanisms and quantifiable benefits in future research.

The DMS developed as part of this study is intended to be a general document covering baseline material requirements for the targeted roadway applications involving placement of a geotextile. It is expected that projects will often require a special specification, either due to special site conditions or an attempt to focus on only one application and geotextile product. In this case, the DMS may be viewed as an all-encompassing document from which applicable property requirements, depending on project-specific goals and site conditions, may be selected. Additionally, project-specific concerns may often result in the need for more extensive design procedures.

The design guidelines produced as the major product of this project are intended to guide the engineer through the selection, specification, and placement of geotextiles in roadway design. This process includes identifying and understanding relevant applications, understanding the design methodology behind each application, choosing an appropriate material/product, and properly installing the product on-site. The design guidelines follow this basic sequence: background, design, selection, specification, and installation.

## What This Means

This research is expected not only to provide TxDOT with the tools for correct selection of geotextiles, but also with opportunities for education on the benefits of using geotextiles in pavement design.

### *For More Information:*

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