



# Project Summary

Texas Department of Transportation

## 0-5635: Develop Guidelines for Effective Prime Coats

### Background

Prime coats have long been used to seal the surface pores in pavement bases to increase effectiveness of surface treatments. These seals help by:

- reducing migration of moisture and absorption of the first application of surface treatment binder,
- strengthening the granular base near its surface by binding the finer particles of aggregate,
- helping to protect the base from inclement weather and limited vehicular traffic before the next pavement layer is constructed, and
- promoting adhesion between a granular base and a subsequently applied bituminous surface by precoating the surface of the base and by penetrating the voids near the surface.

The main objective of this research project was to evaluate the effectiveness of prime coats and determine which combinations of methods and materials provide the most benefit to the Texas Department of Transportation (TxDOT). Testing methods and equipment were developed to measure the penetration of the prime coat into the base course and to determine the increase in adhesion and cohesion at the surface of the base course provided by the prime coat.

### What the Researchers Did

Previous research was reviewed and an extensive questionnaire on materials, practices, and procedures was completed by TxDOT district personnel in phone interviews with the research staff. Test equipment was fabricated (Figure 1) or purchased (Figure 2) and testing procedures were developed (and modified during testing) to determine the impacts of the prime coat and the cohesion and adhesion at the surface of the base.

Test sections were solicited from districts and, where possible, test sections were established and tested prior to and after the prime coat was placed. Additional testing was conducted after the seal coat was placed.

### Research Performed by:

Texas Transportation Institute (TTI),  
The Texas A&M University System

### Research Supervisor:

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### Researchers:

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



Figure 1. Cohesion Tester.

## What They Found

In general, prime coats had very little impact on improving cohesion and adhesion. Prime coats that mixed the prime into the top surface of the base performed best. Too many fines and too much dust at the surface inhibited penetration and bonding between the layers.



Figure 2. Adhesion Tester.

## What This Means

Prime coats are placed for many reasons, and this failure to bond the layers together does not mean that they should not be used. Instead, a serious effort should be made to improve the surface of the base so that the layers will stick together. In the meantime, prime coats should still be used so that they can continue to provide the other benefits (waterproofing, etc.). In general however, the type of prime coat was not important and the best method was to mix in the prime coat. Prime coats that do not use asphaltic materials performed at least as well as the standard prime coat types.

*For More Information:*

0-5635-1 Effective Prime Coats for Compacted Pavement Bases

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