Test Procedure for

ADMIXING LIME TO REDUCE PLASTICITY INDEX OF SOILS

TxDOT Designation: Tex-112-E

Effective Date: August 1999

1. SCOPE

1.1 This method covers reducing the plasticity of soils and flexible base materials. The strength imparted to the compacted mass by the lime is not considered—only the permanent effect produced on the soil constants of the binder.

1.2 Do not confuse this method of improving a material with soil-lime stabilization, covered in Tex-121-E.

1.3 It is desirable to test and use the recommended construction procedure for soil-lime stabilization to gain the strength of the matrix resulting from the chemical reaction of the lime with clay.

1.4 The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.

2. APPARATUS

2.1 Sample splitter or quartering cloth.

2.2 Set of standard U.S. sieves, meeting the requirements of Tex-907-K.

2.3 Balance, Class G5 in accordance with Tex-901-K, with a minimum capacity of 36 kg (80 lb.)

2.4 Drying oven, maintained at 60°C (140°F).

2.5 Crusher (optional), adjustable to produce material passing a 2.00 mm (No. 10) sieve.

2.6 Mechanical pulverizer (optional).

2.7 Wedgewood mortar and pestle.

2.8 Scoop.

2.9 Small siphon tube (optional).
2.10 Sample containers, metal pans, cardboard cartons.

2.11 Filter paper, non-fibrous.

2.12 Sample splitter, quartering machine, or quartering cloth.

2.13 Mechanical mixer (stirring device).

2.14 Dispenser cup.

2.15 Apparatus for conducting the soil constants tests, listed under the various procedures.

2.16 Plaster of Paris molds (optional).

Note 1—Dry the plaster of Paris molds at a temperature not to exceed 60°C (140°F) after forming, and wash and dry after each use.

3. PROCEDURE

3.1 Select a large representative sample of soil or flexible base material to be treated with lime.

3.2 Using a sample splitter, obtain a representative test sample that will produce approximately 300 g of soil binder.

3.3 Prepare soil binder from test sample in accordance with Tex-101-E, Part I.

3.4 Calculate the amount of lime to be added to the soil binder by multiplying the target lime percentage by the mass (50 g) of soil binder and divided by the percent soil binder (in decimal). The recommended target lime percentages are 1, 2, 3, and 4% for base material and 2, 4, 6, and 8% for sub-grade.

3.5 Weigh 50 g of soil binder and add the amount of lime calculated in Section 3.4 to the soil binder; the percentage of lime used is based on the dry mass of the soil.

3.6 Add enough water to each sample, including the natural material, without time being added to bring the soil-water mixture to approximately the plastic limit consistency.

3.7 Cover the wet material and allow the mixture to cure for 24 hours.

3.8 Perform the soil constants tests specified in the controlling specifications and compare with the test results obtained on the original untreated material.

3.9 Plot the liquid and plastic limits of the various soil and lime mixtures as water content on the ordinate and time percentages of the abscissa.

4. CALCULATION

4.1 The optimum percentage of lime is the least amount of lime used to produce the lowest plasticity index (PI), which is the difference between the liquid and plastic limits.
5. REPORT

5.1 Determine the optimum lime percentage to the nearest whole percent.