WET-DRY TEST FOR SOIL-CEMENT MIXTURES

1.0 SCOPE

1.1 These test methods cover the procedures for determining the soil-cement losses, moisture changes, and volume changes (swell and shrinkage) produced by repeated wetting and drying of hardened soil-cement specimens. The specimens are compacted in the mold, before cement hydration, to maximum density at optimum moisture content using the compaction procedure described in the Test for Moisture-Density Relations of Soil-Cement Mixtures.

1.2 Method A - This method shall be used when 100 percent of the soil sample passes the 5000 μm sieve.

1.3 Method B - This method shall be used when part of the soil sample is retained on the 5000 μm sieve and 100 percent passes the 20000 μm sieve.

2.0 APPLICABLE DOCUMENTS

2.1 Portland Cement Association, Soil-Cement Laboratory Handbook

2.2 ASTM D559 Standard test methods for wetting and drying compacted soil-cement mixtures

2.3 AASHTO T135 Standard method of test for wetting-and-drying compacted soil-cement mixtures

2.4 TLT-501 Mix design method for soil-cement mixtures

2.5 TLT-502 Moisture-density relations for soil-cement mixtures

2.6 TLT-504 Freeze-thaw test for soil-cement mixtures

3.0 OUTLINE OF METHOD

3.1 These test methods are used to determine the resistance of compacted soil-cement specimens to repeated wetting and drying. The test methods were developed to be used in conjunction with Test Methods TLT-504 and the criteria given in the (PCA) Soil-Cement Laboratory Handbook to determine the minimum amount of cement required in soil-cement to achieve a degree of hardness adequate to resist field weathering.

4.0 APPARATUS

4.1 The equipment used are similar to those listed in the above mentioned publications.

5.0 PROCEDURE

5.1 The procedures used are similar to those used in the above mentioned publications.

5.2 The specimens are placed in the moisture room immediately after forming and allowed to cure for seven (7) days.

5.3 The specimens are immersed in water at room temperature for five (5) hours.

5.4 After immersing, they are transferred to an oven maintained at 71◦C and left for 42 hours.

5.5 At the end of the drying period, they are removed from the oven and allowed to cool for one hour.

5.6 The sequence is repeated for 12 cycles, at the end of which they are weighed.

5.7 Each specimen is placed on a scale and brushed at 5 kg pressure using a wire brush, so that the total surface area is brushed twice, (total of 18 strokes on the sides and four (4) on each end).

5.8 After brushing, the specimens are weighed, measured, and their condition evaluated and recorded.

5.9 The dry weight after brushing is calculated using the weight after brushing and the corrected moisture content of the sample. Moisture contents after testing are corrected for loss due to hydration by adding ¼ of the cement content to the moisture content.

5.10 The difference between the dry weight after brushing and the original dry formed weigh is determined, and the % weight loss calculated, based on the original dry weight.

5.11 Compressive strengths are not determined on wet-dry specimens.

6.0 REPORT

6.1 Test results are recorded and summarized.

6.2 The % weight loss versus cement content is presented graphically to show durability patterns and trends.