Precision Statements for the Surface Resistivity of Water Cured Concrete Cylinders in the Laboratory


ABSTRACT: A rigorous round-robin testing program was conducted for surface resistivity (SR) measurements of water cured concrete cylinders in the laboratory. Fourteen different laboratories participated in this effort, testing twelve different Portland cement concrete mixtures containing a wide range of constituent materials. Also, test results from two different commercially available SR meters were compared for statistical equivalence of the data. The results of this effort have been used to formally document the repeatability (inter-operator precision) and reproducibility (multilaboratory precision) of SR measurements in the laboratory.

Introduction
As the lead state for an American Association of State Highway and Transportation Officials (AASHTO) Technology Implementation Group, Florida recently had its Department of Transportation State Materials Office and numerous other agency construction materials laboratories participate in a rigorous round-robin testing program to develop precision statements for surface resistivity (SR) measurements of water cured concrete cylinders in the laboratory. This testing program was conducted in general accordance with ASTM C802, "Standard Practice for Conducting an Interlaboratory Test Program to Determine the Precision of Test Methods for Construction Materials" [1]. The data analyzed as part of this effort included SR test results from 14 different participating laboratories and 12 different Portland cement concrete (PCC) mixtures. Hardened cylindrical concrete specimens 100 mm (4 in.) in diameter by 200 mm (8 in.) in length were tested in each laboratory after 28, 56, and 91 days of standard laboratory curing. SR was measured in accordance with AASHTO TP95-11, "Standard Method of Test for Surface Resistivity Indication of Concrete's Ability to Resist Chloride Ion Penetration" [2].

SR Test Equipment
In accordance with the current AASHTO provisional specification (TP95-11), SR testing was performed using portable equipment employing the specified Wenner [3] linear four-probe array.