



RESEARCH PROJECT CAPSULE [18-6C]

April 2018

TECHNOLOGY TRANSFER PROGRAM

Influence of Internal Curing on Measured Resistivity

JUST THE FACTS:

Start Date:
April 1, 2018

Duration:
12 months

End Date:
March 31, 2019

Funding:
TT-Fed/TT-Reg

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Sponsored jointly by the Louisiana
Department of Transportation and
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POINTS OF INTEREST:

Problem Addressed / Objective of
Research / Methodology Used
Implementation Potential

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PROBLEM

The Louisiana Department of Transportation and Development (DOTD) has required surface resistivity measurements for structural concrete applications since 2013. The 2016 Standard Specifications for Roads and Bridges includes this requirement.

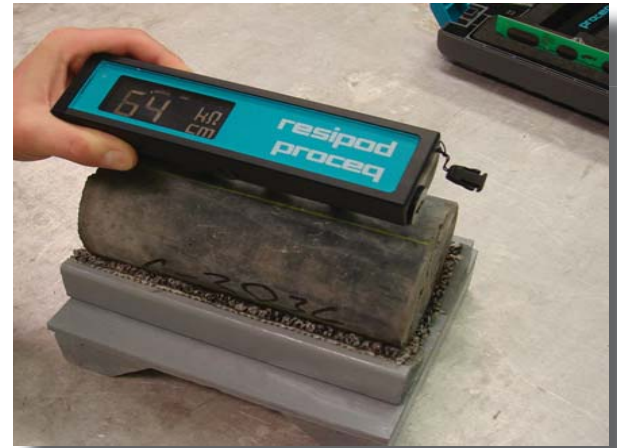


Figure 1
Surface resistivity meter

DOTD has investigated the use of saturated lightweight fine aggregate as an internal curing agent for structural concrete applications. Generally, when a concrete mixture contains saturated lightweight fine aggregate, the mixture's resistivity is slightly less compared to a control mixture, but the reduction is not significant.

OBJECTIVE

The objectives of this research are to compare the surface resistivity (in laboratory conditions) of conventional versus internally-cured concrete containing the same basic cementitious combinations and contents and to better identify the effects of gravel versus limestone (i.e., siliceous versus carbonate) on surface resistivity measurements.

METHODOLOGY

Initially, a comprehensive literature review will be conducted in order to establish the current state-of-practice regarding internally-cured concrete and measured resistivity.

Using Type I cement and three additional combinations of cement and supplementary cementitious materials, two coarse aggregates, two water/cement ratios, and four lightweight fine aggregate options, a total of 64 test cylinders will be prepared. The lightweight fine aggregate options include use of no lightweight fine aggregate and use of three locally-available source materials.

After casting, the samples will remain in cylinder molds for 48 hours prior to being demolded and placed in a 100% humidity room until testing. Comparative non-destructive testing will be conducted on samples at various ages (e.g., 7, 14, 28, 56, 90, 180 days). Tests will include surface resistivity, air content, and slump.

Statistical analysis of the test results will be used to compare the effect of internally-cured versus conventional concrete, and the effect of gravel versus limestone coarse aggregates.

IMPLEMENTATION POTENTIAL

Other than showing that the inclusion of lightweight fine aggregate is not detrimental to the measured resistivity of concrete, there is no expected direct implementation effort by DOTD.



*Figure 2
Lightweight fine aggregate*