Kansas Department of Transportation

TECHNICAL SUMMARY

Testing Aggregate Backfill for Corrosion Potential

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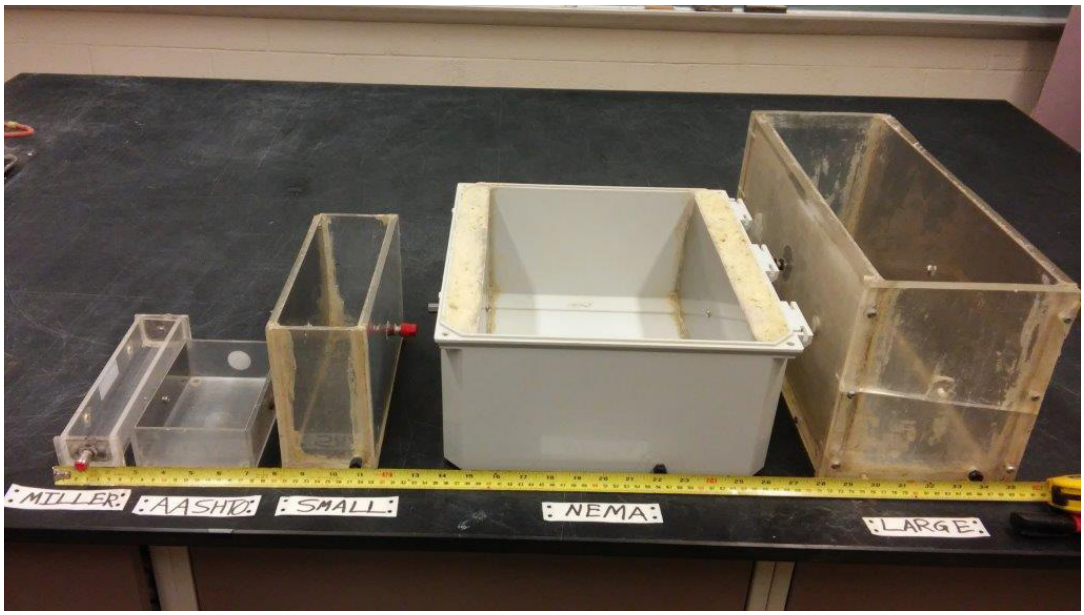
Introduction

The Kansas Department of Transportation (KDOT) has designed and constructed numerous mechanically stabilized earth (MSE) walls to support new and expanded highway projects throughout Kansas. MSE walls often contain galvanized steel strips as the mechanical reinforcement within layers of specified backfill material. Inclusion of these strips creates a stronger composite material connected to a visually appealing wall facing, but galvanized steel reinforcement is potentially vulnerable to corrosion.

Corrosivity of MSE backfill is typically characterized using electrical resistivity among other properties. KDOT currently uses the American Association of State Highway and Transportation Officials (AASHTO) Standard T 288 (2012) to calculate the resistivity of MSE backfill. There is concern that this method may not reflect field conditions well, and thus may mischaracterize the corrosivity of backfill. AASHTO T 288 tests were conducted as a part of this research, and the condition of the samples at the time of testing was not consistent with expected field conditions.



Test Boxes Used for New ASTM Procedure

Project Description

A new procedure has been proposed that appears to more accurately simulate field conditions. This new procedure (ASTM C XXX-XX) has been extensively tested and compared with AASHTO T 288 in this experimental study.

Project Results

The proposed ASTM test simulated expected field conditions more accurately than the AASHTO T 288 test. Results also appear to indicate the need for a larger resistivity box to accurately characterize the corrosivity of larger aggregates. Preliminary recommendations for box geometry are 8:1 minimum electrode spacing to maximum particle size and 3:1 minimum height to maximum particle size. It was also observed that increasing the number of soak/drain cycles of the material resulted in a substantial increase in resistivity.

Project Information

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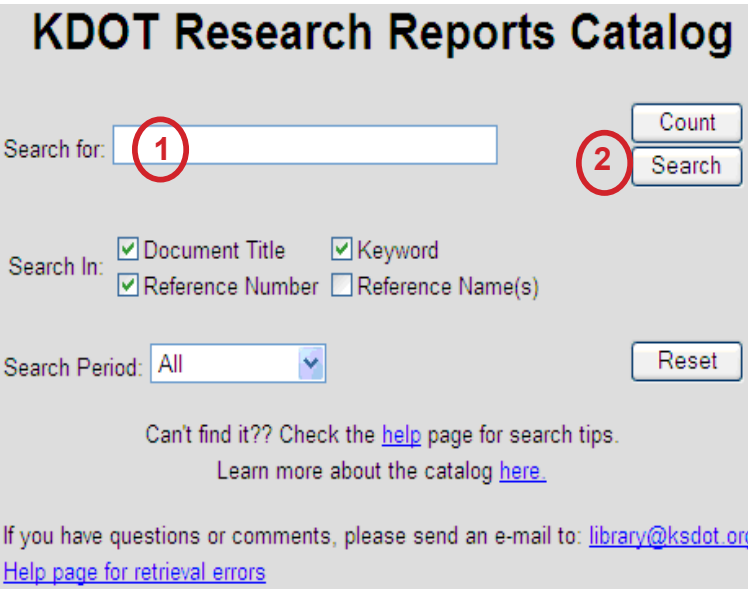

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