Kansas Department of Transportation

TECHNICAL SUMMARY

Long-Term Corrosion Monitoring in Mechanically Stabilized Earth (MSE) Walls

Report Number: K-TRAN: KSU/KU-21-3 ▪ Publication Date: September 2025

Stacey Kulesza, Ph.D., P.E.*

Kansas State University Transportation Center
**Currently affiliated with Texas State University*

Robert Parsons, Ph.D., P.E.
Hao Liu, Ph.D.
Jie Han, Ph.D., P.E.

The University of Kansas

Field Electrical Resistivity Setup at the MSE Wall at US-54 over McLean Blvd. in Wichita, Kansas

Introduction

Mechanically stabilized earth (MSE) walls often contain galvanized steel reinforcement. Because galvanized steel eventually corrodes, however, the corrosion process must be closely monitored to accurately determine where structures are in their life cycle and to improve specifications to lengthen the lifespan of future MSE walls. This report is a continuation of the K-TRAN: KSU-19-5 report, which examined the reinforcement of 12 walls for corrosion progress and evaluated backfill resistivity using field and laboratory methods.

Project Description

In the current study, six of the walls from the previous report were re-evaluated, and an additional 12 walls, including walls with both sand and gravel backfills, were evaluated at various stages in their life cycles. KDOT engineers cut into the walls, while engineers at the University of Kansas (KU) inspected the reinforcement condition and retrieved samples for laboratory testing. Engineers at Kansas State University (KSU) conducted field resistivity tests at the time of sampling for comparison.

Project Results

The results of this investigation are consistent with the findings of the first report: progressive corrosion of MSE walls occurs at various rates depending on the wall, and resistivity is a significant indicator of backfill corrosivity. Therefore, resistivity as measured by non-destructive field methods was correlated with laboratory resistivity measurements where backfill conditions did not meet corrosivity specifications. The non-destructive field method provided a minimally invasive, practical way to measure resistivity. Similar to the first report, resistivity was correlated with the size of the finer fraction of the backfill, meaning resistivity increased substantially when D_{10} was greater than the #100 sieve (0.15 mm) as expected from low moisture content due to improved drainage and a lower percentage of fines. Results also showed that resistivity was much lower in samples with an elevated level of chlorides.

Project Information

For information on this report, please contact Robert Parsons, Ph.D., P.E.; The University of Kansas, 1530 W. 15th St, Lawrence, KS 66045; 785-864-2946; rparsons@ku.edu.

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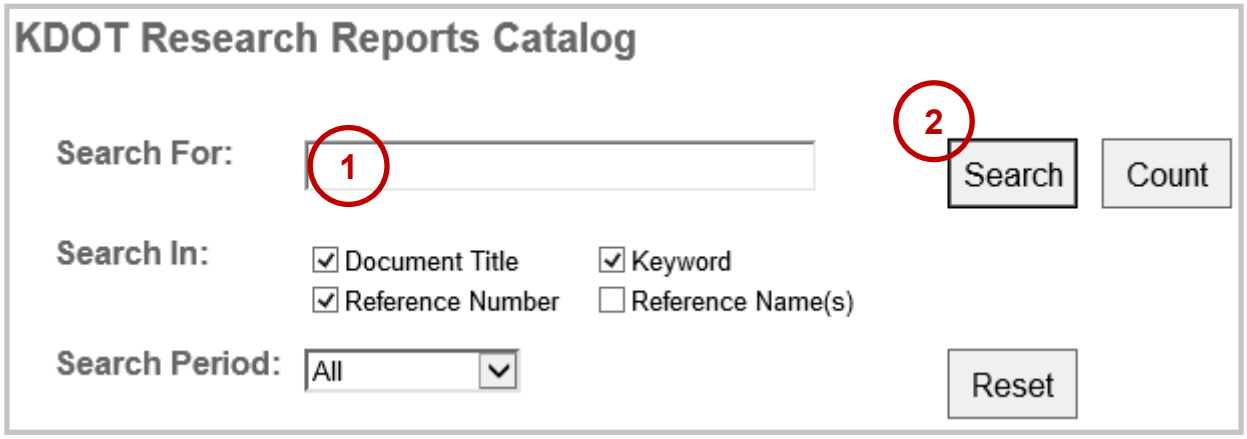

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