

RMRC



Recycled
Materials
Resource
Center



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Research Project 61

Large Scale Model Experiments of Recycled Base Course Materials Stabilized with Cement and Cement Kiln Dust

Project Objectives

- Determine the resilient modulus of recycled pavement material (RPM) and road surface gravel(RSG) with and without cement and cement kiln dust (CKD) stabilization.
- Compare results from Large Scale Model Experiments (LSME) and NCHRP 1-28A method.
- Determine AASHTO structural layer coefficients of the test materials.

Project Summary

This research project compared the stiffness of the two different pavement materials, RPM and RSG, at 7 and 28 days, with and without cement and CKD and used them to calculate AASHTO base layer coefficients. Tests were done both in LSME and in the laboratory. LSME were designed to replicate field conditions.

A Class 5 material gradation conventional base course was used as a reference material. Both RPM and RSG had plastic deformations

greater than the Class 5 base. Results of wet-dry and freeze-thaw durability tests were used to select optimum Portland and CKD content by weight, being 4% and 10% respectively.

Durability tests showed that RPM and RSG were much more durable when blended with cement than CKD.

Summary moduli were much less for the LSME test than the laboratory tests with internal LVDTs but greater than laboratory tests with external LVDTs.

Project Partners

Portland Cement Association Education Foundation, Lafarge Cement Company Inc.

End Products

The least plastic deformation occurred when RSG was blended with 10% CKD. Adding cement or CKD significantly reduced plastic deformation and elastic deflection measured in the LSME. RSG blended with CKD at 28 days of curing had a resilient modulus of 1340 MPa, the highest in the study. Strength increased with increasing cement content from 3% to 7% and also with curing time for RPM and RSG. RPM blended with CKD showed strength increasing CKD content and curing time, however no clear trend was seen with RSG.

Further Information

The Recycled Materials Resource Center (RMRC) is a national center that promotes the appropriate use of recycled materials in the highway environment. It focuses on the long-term performance and environmental implications of using recycled materials