RMRC

Recycled Materials Resource Center

THE UNIVERSITY of WISCONSIN MADISON

Research Project 75

Ash Utilization in Low Volume Roads

Project Objectives

- Evaluation of the impact self-cementitious fly ash has upon the stiffness and strength of base materials
- Determination if leachate from fly ash stabilized layers meet USEPA maximum contaminant levels

Project Summary

Utilization of byproducts is becoming a common method to improve the ride quality and structural capacity of roads. Use of self-cementitious fly ash in stabilizing the existing roads (gravel roads or recycled paved roads) to form a stable base for hot mixed asphalt layer is of great interest as this reconstruction approach costs significantly less compared to traditional reconstruction where road surface materials are replaced with new aggregate base (estimated to be 1/3 of the traditional total reconstruction), more rapid and convenient. This approach was implemented in two projects in Minnesota. The first project took place in the City of Waseca, MN and involved reconstruction of a city street (7th Street and 7th Avenue) by fly ash stabilization of recycled pavement materials. The second project involved the conversion of a gravel road (CR 53) to a paved road in Chisago County, MN. The detailed findings related to each of these projects were submitted as individual reports and are attached to this report.

This report reviews the data collected at these two sites as well as other fly ash stabilization projects that the investigators monitored in Wisconsin to arrive at some general observations and conclusions.

This report is separated into two reports. The first section focuses specifically on the modulus of the fly ash stabilized layer. Considered the most mechanical property of any pavement layer, examining the modulus of a fly ash stabilized layer gives us great insight on the stiffness and strength impacts of the layer. The second section focuses on the environmental sustainability of a fly ash stabilized layer. This is done by determining the composition and concentration of the leachate draining through the fly ash stabilized layer through using a pan lysimeter.

Project Partners

Minnesota Local Road Research Board, Minnesota Department of Transportation

End Products

The following conclusions were made in regard to the aforementioned objectives above:
- Addition of self-cementitious fly ash (typically about 10% by dry weight) improves the stiffness and strength of the base materials, whether recycled pavement material, road surface gravel or subgrade soil, significantly.
- Chemical analysis of the draining leachate from the fly ash-stabilized layers showed that the concentrations of many trace elements were (except for Mn) were below USEPA maximum contaminant levels (MCLs) and Minnesota health risk levels (HRLs) established by the Minnesota Dept. of Public Health. Specifically, mercury was not detected in the leachate.
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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.

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