RMRC

Recycled Materials Resource Center

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Research Project 73

Use of Fly Ash for Reconstruction of Bituminous Roads

Project Objectives

- Development of a new large-volume application for self-cementing coal combustion products
- Assessing the engineering properties of road surface gravel, recycled pavement material, and a natural aggregate

Project Summary

Recycling part or all the pavement materials in an existing road during rehabilitation and reconstruction is an attractive construction alternative. For roads with a hot mix asphalt (HMA) surface, the HMA, underlying base, and a portion of the existing subgrade often are pulverized to form a new base material referred to as recycled pavement material (RPM). Compacted RPM is overlain with a new HMA layer to create a reconstructed or rehabilitated pavement. This process is often referred to full-depth reclamation (FDR). Similarly, when an unpaved road with a gravel surface is upgraded to a paved road, the existing road surface gravel (RSG) is blended and compacted to form a new base layer that is overlain with an] HMA surface. Recycling pavement and road materials in this manner is both cost effective and environmentally friendly. Recycled base materials may contain asphalt binder, fines, and/or other deleterious materials that can adversely affect strength and stiffness.

To address this issue, chemical stabilizing agents such as cement, asphalt emulsions, lime, cement kiln dust (CKD), or cementitious fly ash can be blended with RPM or RSG to increase the strength and stiffness. This “stabilized” material is often referred to as SRPM or SRSG. Use of industrial material resources for stabilization, such as CKD or fly ash, is particularly attractive in the context of sustainability.

The project consisted of four major elements: (i) laboratory testing, (ii) prototype pavement evaluation, field assessment of two existing roadways constructed with SRPM and SRSG, and (iv) assessment of potential impacts to ground water. This project report was created as a design guide and includes step-by-step design procedures along with practical implications relevant to implementation. It can be found in the full report located on the website.

Project Partners

Combustion Byproducts Recycling Consortium, LaFarge North America, Great River Energy, Minnesota Local Roads Research Board

End Products

Ash stabilization has been proven to be beneficial in providing a durable construction platform that can carry construction equipment and local traffic prior to and during HMA paving. Ash stabilization appears to be capable of providing relatively long-term pavement support, however additional observation and testing of pavement condition is required. Performance, in terms of ride (PSR) and pavement distress, should be monitored for five to ten years.

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