

RMRC



Recycled Materials Resource Center



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Research Project 68

Recycled Materials Used as Unbound Base Course

Project Objectives

- To provide recommendations for recycled asphalt pavement and recycled concrete aggregate used as unbound base course
- To provide specifications for recycled asphalt pavement and recycled concrete aggregate used as unbound base course

Project Summary

The production of demolition and construction waste has been increasing at a gradual rate in recent years. The use of these materials as recycled unbound base course in new roadway construction has become more common in the last twenty years. Recycled roadway materials are typically generated and reused at the same construction site, providing increased savings in both money and time. It has been speculated that in some municipalities recycled materials costs less to use than conventional crushed-stone base material by as much as 30%.

The most widely used recycled materials are recycled asphalt pavement (RAP) and recycled concrete aggregate (RCA). RAP is produced by removing and reprocessing existing asphalt pavement and RCA is the product of the demolition of concrete structures such as buildings, roads and runways. The production of RAP and RCA results in an aggregate that can be well graded and of high quality. The aggregates in RAP are coated with asphalt cement that reduces the water absorption qualities of the material. In contrast, the aggregates in RCA are coated with a cementitious paste that increases the water absorption qualities of the material.

There are no approved national specifications for RAP or RCA. To remedy this situation, specifications have been introduced in ASTM Subcommittee D18.14 Geotechnics of Sustainable Construction. This committee was established with the encouragement of RMRC in 2007. There are specifications that have been introduced and are going through the ASTM process. A standard specification entitled “Standard Specification for Grading Requirements and Density Determination of Recycled Asphalt Pavement Materials as Unbound Base and Subbase for Highways and Airports,” was approved at the subcommittee level and was balloted in the Main Committee D18 for Soil and Rock. It received some comments and negative votes and being revised and prepared for re-balloting.

There is also a guideline that is also prepared in ASTM D18.14 Subcommittee entitled “Standard Guide for Recycled Aggregates As Unbound Roadbase”, which covers both RAP and RCA and aimed at crushers. This guide is reviewed in the subcommittee and is being held for the outcome of on-going research relevant to some aspects of this guide such as allowable deleterious materials content.

Project Partners

American Society of Civil Engineers

End Product

The result of this report was a summarization on quantitative aspects of both recycled asphalt pavement and recycled concrete aggregate and their relation to natural aggregate. The areas where RAP/RCA were quantified are: Impurities, Resilient Modulus Strain, Compaction Characteristics, Design, and Durability

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