

RECYCLED MATERIAL AVAILABILITY IN MARYLAND – A SYNTHESIS STUDY

PROBLEM & OBJECTIVE

There is growing interest in using recycled materials in highway construction nationwide. The objectives of this research study were to: (i) document the state of the practice for the use of selected recycled materials; (ii) review their known performance for applications pertinent to Maryland conditions, based on past experience; (iii) identify potential constraints and performance concerns reported from past studies; and (iv) identify potential specification revisions needed for their safe use in alternative applications in Maryland. The following four recycled materials were identified by the Maryland Department of Transportation State Highway Administration (SHA) and included in this synthesis study:

- recycled concrete aggregate (RCA);
- reclaimed asphalt pavement (RAP);
- dredged materials (DM);
- foundry sand (FS).

METHODOLOGY

To achieve the objectives of this study, the project team examined the currently employed practices on the use of these recycled materials and identified potential areas of concern, related to material performance, environmental considerations, design and field performance (when applicable). A survey to State Departments of Transportation (DOT) was conducted through the American Association of State Highway and Transportation Officials (AASHTO) Subcommittee on Materials and pertinent Maryland specifications on the use of RCA, RAP, and foamed asphalt stabilized base material (FASB) for highway applications were examined to identify areas where the revised specifications need to be developed.

Based on feedback from SHA, the research team identified applications that are applicable to Maryland-specific conditions and focused on these recycled applications in the synthesis. Material characterization, constraints and need for revised specifications were presented for each combination of recycled material and highway application in the report.

RESULTS

The following 15 out of the 50 state DOTs and the Washington D.C. DOT responded to the survey: Alaska, Alabama, Colorado, Connecticut, Delaware, Florida, Georgia, Montana, North Dakota, Ohio, South Dakota, Texas, Virginia, Wisconsin and Wyoming. The survey findings are:

- RAP was used by all the states that responded to the survey. RCA was used by more states than FS was while DM was not used in any highway application. The main sources of recycled materials are bridges and highways, recycling plants in-state, and demolished buildings or structures. Only a small amount of recycled materials comes from old pavements, recycling plants out-of-state or contractors.
- Environmental concerns of using these materials include metal and organic contaminants, low or high pH level, and HMA plant fumes. Environmental concerns, however, are not as big an obstacle as the technical challenges.
- The requirements in the state specifications include: source, processing, mix design, testing, production requirements and construction methods. These may include limitations on the percentage of recycled material, gradation, stockpile processing, mechanical tests, leaching tests, plant equipment requirement, and quality control methods.

The recommendations for revising the existing SHA specifications and pertinent material testing standards were presented in the Chapter 4 of the report. To develop revised specifications, pilot studies are needed for developing the experimental data to assess impact on highway material properties, defining rational acceptance values and statistically based specification tolerances. Implementation actions were recommended.

REPORT INFORMATION

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LINK TO FINAL REPORT

http://www.roads.maryland.gov/OPR_Research/MD-16-SHA-UM-4-03_Recycled-Materials-Availability_Report.pdf