

Development of High Quality Pervious Concrete Specifications for Maryland Conditions

Problem

The Maryland State Highway Administration (SHA) has yet to adopt specifications for pervious concrete. The intent of this study was to develop preliminary specifications for high quality pervious concrete for Maryland conditions.

Objective

The main objective of the study was to develop preliminary specifications for high quality pervious concrete suitable for use in SHA projects. The study included an extensive literature review and laboratory investigations to determine structural and durability characteristics of the pervious concrete pavement.

Description

The study utilized aggregates that are used in SHA projects and the durability studies assumed Maryland weather conditions. Investigations were conducted to enhance the structural and durability characteristics of pervious concrete through the use of different admixtures. The admixtures included cellulose fibers, a delayed set modifier and a viscosity modifier. Pervious concrete specimens were tested for density, void content, compressive strength, split tensile strength, permeability, freeze-thaw durability, and abrasion resistance.



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Results

The study found that of the different admixtures tested, cellulose fibers had the largest impact in improving durability. Including cellulose fibers in the pervious concrete mix resulted in significant increases in resistance in all the three different types of freeze-thaw durability tests that were conducted. It also resulted in significant increases in abrasion resistance. By bridging the gap between the coarse aggregates, the cellulose fibers bound the pervious concrete mixture with an interwoven matrix of fibers. This also improved the tensile strength of the pervious concrete. The delayed set modifier resulted in a more fluid mix and in large gains in compressive strength at seven and fourteen days. This admixture may inhibit some of the cement from setting around aggregates and may result in some cement settling to the bottom and forming a less pervious layer. The viscosity modifying admixture created a more workable and easier to mold mix. However, its effect on strength and durability were minimal. The results from the laboratory studies and findings from the extensive national and international literature review were used to develop preliminary specifications for high quality pervious concrete for Maryland conditions. The preliminary specifications developed on this project can aid SHA in the official adoption of pervious concrete specifications for use on future projects.

Report Information

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