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Yasser Khodair, Luqman



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## Self-Compacting Concrete using Recycled Asphalt Pavement and Recycled Concrete Aggregate

Yasser Khodair, Ph.D<sup>1\*</sup>, and Luqman<sup>2</sup>

<sup>1</sup>Associate Professor, Department of Civil Engineering and Construction, Bradley University; 1501 West Bradley Avenue, Peoria IL, 61625

<sup>2</sup>Graduate Research Assistant, Department of Civil Engineering and Construction, Bradley University; 1501 West Bradley Avenue, Peoria IL, 61625.

\*Corresponding Author.

### ABSTRACT

In this study recycled concrete aggregate (RCA) and recycled asphalt pavement (RAP) are used in the production of self-consolidating concrete (SCC) with varying percentage replacements of natural coarse aggregate (NCA). A total of 16 concrete mixtures were prepared and tested. Mixtures were divided into four different groups, with constant water to cementitious (w/cm) material ratio of 0.4, based on RCARAP content: 0, 25, 50, and 75% of NCA replaced by RCARAP. Portland cement was used for the control mixtures of each group, while all other mixtures were designed with partial replacement of cement by SCMs (70%FA, 70%S, and 25%FA+25%S). The fresh properties such as flowability, deformability; filling capacity, and resistance to segregation of concrete were investigated. The hardened properties such as compressive strength and split tensile strength were studied. The durability characteristics including the unrestrained shrinkage test, and rapid chloride permeability test (RCPT) were investigated. Partial replacement of cement using FA and S resulted in smaller 28-days-compressive strength compared to control mixtures. The replacement of NCA by RCARAP reduced the workability, and the compressive and tensile strengths of SCC mixtures.

**KEYWORDS:** Self-consolidating concrete, recycled asphalt pavement (RAP), recycled concrete aggregate (RCA), supplementary cementitious materials, fly-ash and slag

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