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## Application of FRP scrap and repeated recycled aggregate in concrete production

**M Shahria Alam**

The University of British Columbia, Canada

Because global landfills are filling at a fast rate with waste that can potentially be recycled, it is now time for the development and implementation of sustainable materials in construction. This article investigates the properties of a new generation concrete containing fiber reinforced polymer (FRP), fiber scrap aggregate (FSA), and repeated recycled concrete aggregate (RRCA). Although previous research has been undertaken for the use of RCA in concrete, the use of FSA is a new research area and has been found in this study to have exciting potential. Through different replacements of these aggregates in the concrete, both individually and in combination, conclusive test results were produced. The results also indicate that both the fresh and hardened RRCA concrete properties were a little different compared to those of the control concrete containing only natural aggregate. In the case of fresh properties, the RRCA concrete experienced slightly lower slump than the control concrete. The FSA concrete had a lower compressive strength than the control concrete; however, it produced sufficient strength for nonstructural applications. The results determined for FSA and RRCA concrete were better than expected and illustrate the potential for concretes be used for nonstructural and structural applications. The results found for the combination batches indicate that both their fresh and hardened properties produce values between the individual RCA and FSA concrete batches that were mixed and tested. The conclusions drawn from this research will hopefully encourage further development of new sustainable materials in the construction industry.

shahria.alam@ubc.ca