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Durability of concrete incorporating crushed brick as coarse aggregate

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Using crushed bricks as coarse aggregates in concrete is of particular interest to preserve natural aggregate sources as well as to reduce waste and waste storage. The objective of this experimental work was to study the durability of reinforced concrete made with crushed brick as aggregate. Concrete made with brick aggregates showed an increase in its workability compared to that in concrete with natural aggregate. The improvement in workability enhanced with an increase in coarse brick aggregate content. Concrete samples made with brick aggregates showed slight improvement in compressive strength compared to that in concrete made with 100% natural aggregate. By increasing the brick content, the resistance to chloride penetration decreased due to the higher porosity and absorption in brick aggregates compared to those in natural aggregates. All samples were able to pass the 300 cycles of the freeze/thaw tests. Corrosion of the reinforcing steel bars in samples containing brick as their coarse aggregates initiated before that in samples with natural aggregates. Therefore, based on the data and results found in this study, it can be concluded that natural coarse aggregates can be replaced by crushed bricks, without significant change in the durability of concrete when the steel is not present. However, when concrete is reinforced with steel, replacing natural aggregates with crushed brick is not recommended.

Biography

Amir Poursaee is an Assistant Professor of Materials Engineering in Glenn Department of Civil Engineering at the Clemson University, where he teaches courses in infrastructure corrosion construction materials, and non-destructive evaluations (NDE). He has published more than 30 peer-reviewed papers, monographs, book and book chapters.

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