Abstract

ABSTRACT

The main objective of this dissertation is a comparative study made of the variations in some important properties of concrete cast with partial replacements of the coarse aggregate using broken brick and tile pieces with respective to those cast without such replacements.

Two series of tests had been carried out to study such variations in the compressive strength, total water absorption and surface absorption properties of these concrete. These tests were conducted on grades 30, 40 and 50 mixes according to normal mix design procedures.

The test results have confirmed that for concrete cast with coarse aggregate replaced up to 50% by either broken brick or tile pieces, the higher the replacement % the lower is the compressive strength and the higher the water absorption and initial surface absorption values. Such reduction in strength apply not only to earlier concrete age, but also up to 28 days.

Nevertheless, the actual test results show that the 28 day compressive strength, water absorption and surface absorption values respectively obtained for concrete cast with the largest percentages of coarse aggregate replacements [i.e. 50% replaced by either broken brick or tile pieces] are still maintained at about 80% of those properties obtained from the controlled specimens [i.e. with 0% replacements of coarse aggregates]

This implies that whenever there is future shortage in the supply of nature coarse aggregates, well designed concrete mixes of higher grade strength of approximately 20% higher but composing of up to 50% replacements of coarse aggregates with either broken brick or tile pieces can be considered as the replacement mixes in terms of the compressive strength, water absorption and surface absorption values.