

ABSTRACT

Waste disposal remains a big problem in the construction industry and thus, a lot of effort has gone into innovation and research on how best to tackle it. Recycling of waste material by utilising it in concrete production provides a solution that helps to address waste disposal while simultaneously offering an alternative resource that reduces extraction of natural resources from the environment. Ceramic waste aggregates present a viable solution as they have rough angular surfaces and are highly resistant to chemical attack. They are available in large quantities due to the high use of ceramics in construction projects, thus making them available from both the waste generated during manufacturing and during installation of ceramic products on site. This study focused on the partial replacement of natural coarse aggregates with ceramic coarse aggregates to investigate the impact on the compressive strength and water absorption properties of hardened concrete. 100mm x 100mm x 100mm concrete cubes with 0%, 10%, 20% and 30% of replacement of natural coarse aggregates were made on which compressive strength and water absorption tests were carried out. The results show that adding ceramic coarse aggregates up to 20% leads to a notable increase in the compressive strength of concrete, after which there is a drastic decrease at 30% that goes well below that of the control. However, the water absorption of hardened concrete increases significantly. Therefore, while the use of ceramic coarse aggregates can improve the compressive strength of concrete, there will be an increase in its water absorption capacity. This thus limits the site conditions under which ceramic coarse aggregates can be used as an alternative to natural aggregates.