



## Abstract

Porous concrete is a unique and effective way to address and mitigate impact of urbanization on the environment that disturbs the hydrologic cycle of the catchment. Capturing stormwater and allowing it infiltrate into the ground is essential for groundwater recharge, which eventually reduces stormwater runoff. The compressive strength is as important as its permeability characteristics. Previous studies indicate that porous concrete has lower compressive strength capabilities than conventional concrete and will only support light traffic loadings. This study aims to develop a design of porous concrete with a mixture of aggregate size to increase the compressive strength while not compromising its permeability characteristics.

This research investigated the effects of material composition of different mixtures of aggregates substitution with smaller aggregate on the compressive strength of porous concrete, in an effort to increase the compressive strength. Aggregate properties, such as moisture content, absorption, specific gravity, unit weight, angularity, flakiness index value, elongation, aggregate crushing value and aggregate impact value, are determined for use in formulating concrete mix designs. Using three different coarse aggregate gradations, 2.36-5mm, 5-10mm and 10-14mm, fifteen different concrete mixtures were cast mixing two aggregate gradations with substitution of smaller aggregate in which the aggregate : cement and water : cement ratio were held constant, while concrete aspects investigated include slump as well as compressive strength after curing periods of 7 and 21 days. Aggregate blending is used to generate the required coarse aggregate gradations.

Test results show that coarse aggregate properties often have a significant effect on the mechanical properties of porous concrete. Every mixture was reached their highest compressive strength when the substitution increased up to 40% and mixture 01 (2.36-5mm and 5-10mm), mixture 03 (5-10mm and 10-14mm) both were increased their strength in similar pattern with against of substitutions of smaller aggregate and mixture 02 (2.36-5mm and 10-14mm) showed significantly less improvement in compressive strength compared to other two mixtures. However realize that for both cured period and for every substitution the highest compressive strength could obtain by using the mixture 03 (5-10mm and 10-14mm) with the optimum value of 24.74 kPa. It is shown that using a mixture of two coarse aggregate will influence the compressive strength of porous concrete.