

AN ABSTRACT OF A THESIS

PERMEABILITY OF PERVIOUS PORTLAND CEMENT PAVEMENT

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Pervious pavements rely on an open void structure to temporarily store water in the pavement and stone base as a storm water detention device. Specified values for effective voids range from 15 to 25 percent, and as seen in cores taken from existing pervious pavement projects, can reach values in excess of 35 percent. The research presented herein was conducted in order to measure the permeability of pervious portland cement concrete with effective voids ranging from 15 to 35 percent using a constant head permeameter.

Pervious concrete samples were fabricated in the laboratory using a mixture design consisting of size 89 aggregate, portland cement, and water. Using a Marshall hammer and varying the amount of compactive effort, six sets of cylinders with different amounts of effective voids were made to cover the range most seen in pervious pavement projects. Each set consisted of five cylinders. Two cylinders were used to measure the effective voids and the remaining three cylinders were used to measure permeability and compressive strength.

This research shows that as effective voids increase, the permeability increases and compressive strength decreases. The average effective voids ranged from 13.21 to 34.84 percent with average permeability values of 0.0026 cm/sec and 1.2 cm/sec, respectively. The mean compressive strength of the concrete was 1300 psi at the high void samples and 5940 psi at the low void samples. These results are intended to aide concrete practitioners in choosing the optimal effective void content for specific project requirements.