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Jeremy Adato
Cleveland State University

Norbert Delatte
Cleveland State University, n.delatte@csuohio.edu

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Using Ultrasonic Pulse Velocity (UPV) to Predict Properties and Performance of Pervious Concrete

Fenn College of Engineering

Civil and Environmental Engineering Department

Student Researcher: Jeremy Adato

Faculty Advisor: Norbert Delatte, P.E., Ph.D., F.ACI, F.ASCE

Abstract

Pervious concrete is a type of porous portland cement concrete with interconnected voids. This material has been increasingly used to reduce the amount of stormwater runoff from paved areas. It has also been shown to improve the water quality near low volume and low speed pavements as well as in parking lots. Due to the low compressive strength of pervious concrete associated with the high void content, it currently is not used in highway structures except perhaps as an overlay for conventional concrete pavement. The large, open pore structure of this material allows water to pass through its structure, thereby helping to reduce the deleterious effects of storm-water runoff. Since pervious concrete is a relatively new type of material, standard methods for testing its performance characteristics are currently being developed. For this purpose, a total of 42 pervious concrete cylinders removed from different field installations in the United States were collected and studied. Density, void ratio, hydraulic conductivity (falling head method) of pervious specimens was evaluated. UPV tests were conducted on all specimens and the results were compared to develop the use of UPV to estimate the properties and performance of pervious concrete.