Florida Department of Transportation Research

Performance Assessment of Portland Cement Pervious Pavement

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Pervious concrete is a porous pavement. Water is able to pass through it. The U.S. Environmental Protection Agency recognizes the use of pervious concrete to be a best management practice for stormwater runoff. However, it is not in general use because of concerns about its long-term performance and durability. For that reason, researchers at the University of Central Florida's Stormwater Management Academy conducted four related studies to evaluate the performance of pervious concrete at sites where it has been in use for several years.

The ERIK device

In the first study, the investigators performed on-site testing to measure infiltration rates for eight pervious concrete parking lots and their subsoils, which were, on average, 12 years old. Using the test data, the researchers created a model to simulate the hydraulic function of pervious concrete and predict its behavior under various rainfall conditions over a one year period. They also developed a new device, the embedded ring infiltrameter kit (ERIK), which can monitor filtration rates through both the pervious concrete and the subbase soils over time.

The second study investigated pervious concrete construction and maintenance techniques used at sites in Florida, Georgia and South Carolina. Based on the study results, the researchers suggested updates for pervious concrete construction specifications for locations with similar soil conditions to those tested. They also compared two maintenance techniques: vacuum sweeping and pressure washing using test cylinders. Both improved infiltration by at least 200%. The drawback of pressure washing is that it has potential to release pollutants into the environment.

The third study confirmed that pervious concrete has lower compressive strength than conventional concrete, so it cannot sustain heavy vehicle traffic loads for extended times.

In the final study, researchers evaluated the wear and infiltration of a pervious concrete shoulder along I-4 for one year. The shoulder showed no visible wear from the truck traffic it experienced during the study. The infiltration rate of the concrete and subbase remained consistent during the study. Tests of the filtered water quality showed it to be nearly equivalent to rainwater.

Test site along I-4

As a result of this project, state regulatory agencies are considering allowing the use of pervious concrete for stormwater treatment. Also, contractors and regulatory agencies are now specifiying the ERIK device for pervious concrete installations. The benefits of these changes would be fewer conduits needed to transport water from sites, less land area used for ponds, and more groundwater replenishment.

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