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Predictions of HMA Permeability Using 3-D Microstructure Simulation of Fluid Flow

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Abstract: A numerical scheme is used in this study to simulate fluid flow in three dimensional (3-D) microstructures. The governing equations for the steady incompressible flow are solved using the Semi-Implicit Method for Pressure-Linked Equations (SIMPLE) finite difference scheme within a non-staggered grid system that represents the 3-D microstructure. An Xray Computed Tomography (CT) system is used to capture the 3-D microstructures. The HMA specimens included field cores, laboratory linear kneading compactor (LKC) specimens, and laboratory Suprapave gyratory compactor (SGC) specimens. The numerical permeability results are compared with closed form solutions.