CHARACTERIZATION OF WATER RETENTION AND MASS TRANSPORT PROPERTIES FOR RECYCLED ROADBED MATERIALS BLENDED WITH AAC FINES

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Permeable pavement systems (PPS) contribute to reduce surface runoff during heavy rainfall and to mitigate urban heat island effect.

The purpose of this study is to improve water retention capacity for recycled road-base materials utilizing fines (typically under 2 mm) from industrial by-products. Especially, the effects of mixing of fine grains made from autoclave aerated concrete (AAC; 0.106-2 mm) with graded recycled concrete (RC; 0.075-31.5 mm) and steel slag for roadbed construction (SS; 0.075-31.5 mm) were examined. Besides, mass transport parameters such as gas diffusion coefficient, air permeability, thermal conductivity, and heat capacity were measured for tested samples to characterize gas and heat exchange properties and pore structural properties of gas flow. After compacting the samples by Proctor D method, water retention curves were obtained through the drying process from water saturation. The gas and heat transport parameters were also measured at each suction stage and air-dried condition.

As a result, the mixing of AAC fines contributed highly to increase water retention capacities for both graded RC and SS. The mixing of AAC fine grains, on the other hand, did not affect the pore structural properties such as equivalent diameter and tortuosity for gas flow, suggesting the retained water in AAC fine grains would not impede the gas flow in graded roadbed materials mixed with AAC fine grains.

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