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建筑材料吸水过程中毛细管系数与吸水率关系的理论分析

Analytical relationship between capillarity coefficient and sorptivity of building material

中文关键词：建筑材料　毛细吸水　毛细管系数　吸水率　非饱和

英文关键词：building material　capillary sorption　capillarity coefficient　sorptivity　unsaturated

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中文摘要：

　　非饱和建筑材料的毛细吸水过程是造成建筑材料性能劣化的重要因素，它还将引起钢筋锈蚀。本文基于Darcy非饱和流体理论建立了建筑材料的吸水扩散模型，并推导出了非线性扩散方程的近似解析解。根据水分扩散系数与含水量的关系，建立了毛细管系数与吸水率之间的理论关系表达式，据此可通过累计吸水量试验预测水分渗透深度。与文献中试验结果的比较说明，本文提出的理论方法是可行的。

英文摘要：

　　The capillary absorption of water under unsaturated state is an important factor causing the degradation of building materials. It also induces the corrosion of reinforcement. Based on the Darcy's unsaturated flow theory the diffusion model for describing the movement of water in building material is established and an analytical solution of the nonlinear equation is deduced. On this basis, the expression of the relationship between capillary coefficient and sorptivity is established according to the relationship between moisture diffusion coefficient and water content. Thus, the penetration depth or height of water movement in building material can be calculated based on the cumulative volume of water obtained by means of gravimentric test. The validity of this method is verified by experimental results published by other author.

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