

## 具有砂质夹层的土壤入渗计算

### Infiltration calculation of soil with sand in layer

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中文摘要:

根据室内系统的试验研究, 对土壤具有砂质夹层的入渗计算问题, 即非线性入渗阶段转为稳渗阶段时间与稳渗率, 提出了一个以现有均质土积水入渗公式为基础的计算方法。该方法利用Kostiakov入渗模型与砂层以上土体达到饱和和所需水量建立水量平衡关系, 由该关系可以确定出非线性入渗阶段转为稳渗阶段的时间; 再由实验数据回归的方法, 将层状土转折后的稳渗率与均质土入渗过程在转折时刻的瞬时入渗率的比值与夹层的埋深及中值粒径建立相关关系, 从而可由夹层土壤埋深、中值粒径以及均质土在转折时刻的瞬时入渗率确定出层状土转折后的稳渗率。该方法经试验数据的检验, 除个别点外, 误差均在5%以内。由于确定稳渗率与夹层土壤埋深、颗粒组成、均质土入渗规律等有关, 实际确定时会有一定困难, 因此该方法尚待完善和生产实际的考验。

英文摘要:

An infiltration calculation solution for the soil with sand inter layer, including the time when nonlinear infiltration transmits into the steady infiltration and the steady infiltration rate, was developed based on the Lab experimental data and exiting infiltration equations. According to the Kostiakov infiltration equation and the water storage amount of the upper layer at saturation, the water volume balance equation was established, and the time when nonlinear infiltration transmits into the steady infiltration was obtained from the water volume balance equation. The ratio of the steady infiltration rate with the infiltration rate of the uniform soil corresponding to the time when nonlinear infiltration transmits into the steady infiltration were calculated, and the functional relation of the ratio with the depth of the upper layer and the medium particle size of the sand was founded by the correlation analysis method. Hence, the steady infiltration rate may be calculated based on the depth of the upper layer, the medium particle size of the sand and the infiltration rate of the uniform soil corresponding to the time. The method was evaluated through experimental data, and the relative error was less than 5%. This method requires accurately measure the particle size of the sand, the depth of the upper layer and the infiltration rate of the uniform soil corresponding to the time, therefore the method need to be further improved and evaluated.

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