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粘土环境岩土工程特性对填埋场衬垫防渗标准的影响

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摘要 采用溶质运移的一维迁移模型，研究了粘土环境岩土工程特性对填埋场衬垫防渗标准的影响，对目前采用的填埋场粘土类衬垫防渗设计标准及其有效性进行了多参数组合的计算分析；此外，还比较了粘土衬垫与复合衬垫对污染物离子的防渗阻隔性能，对土工膜在衬垫中的作用进行分析；研究表明，应针对不同地区的情况(干旱少雨或多雨等)考虑衬垫的形式。与其他因素相比，粘土的渗透系数对衬垫层渗漏影响最大，以水力渗透系数作为填埋场粘土衬垫的设计标准是可行的，但离子扩散系数的影响也不可忽略；而增强粘土的活性，提高粘土吸附离子的性能，则可延长离子通过衬垫的击穿时间；与单纯的粘土衬垫相比，复合衬垫对离子具有更好的阻隔性能，故在南方多雨地区宜采用复合衬垫；而用污染物的渗漏总量作为填埋场衬垫的设计标准比击穿时间更合理。

关键词 岩土力学；粘土；环境岩土工程特性；填埋场衬垫；防渗标准

分类号

EFFECT OF GEOENVIRONMENTAL CHARACTERISTICS OF CLAY ON STANDARD OF LANDFILL LINER

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Abstract

Using 1D flow and transport model，the effect of geoenvironmental characteristics of clay soil on landfill liner is evaluated. And the results are used to analyze the effectiveness of the standard of landfill liner. Two types of liner，i. e.，clay liner and single-layer composite liner，are studied. And three index，breakthrough time，leaching rate and leaching contaminant quantity are calculated，respectively. The results show that the type of liner must meet the special needs of field condition in droughty or rainy area. And the composite liner can limit the spread of pollutants more effectively than clay liner in rain-belt of South China. Among all the parameters，the effect of ks on landfill liner is the highest. Thus，it is reasonable to use ks as the design parameter of liner. But the effect of diffusion and adsorption of ion in clay cannot be ignored. And the leaching contaminant quantity adopted as control index is more suitable than breakthrough time.

Key words rock and soil mechanics；clay；geoenvironmental characteristics；landfill liner；seepage standard

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