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压实黏土干燥裂隙及渗透性能研究

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DESICCATION CRACKS AND HYDRAULIC PERFORMANCE OF COMPACTED CLAY LINER VIA LABORATORY WET-DRY CYCLING TESTS

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摘要 压实黏土干燥过程中产生的裂隙可能对渗透性能有较大影响。通过室内模拟试验研究发现,裂隙面积率、裂隙总长度和裂隙宽度随含水率减小而增大。压实黏土中裂隙可分为主裂隙和次裂隙2类,次裂隙出现前后裂隙参数的变化速率有较大差异。较宽裂隙在湿化后不能完全愈合,干湿循环过程使压实黏土产生了不可逆的变化。采用试验筒壁上涂阿尔代胶的方法可以有效模拟土样中裂隙的形成,并能较好地防止侧漏。渗透试验发现,一次干湿循环导致压实黏土的渗透系数增大将近2个数量级。湿化过程中干燥裂隙不能完全愈合及微裂隙的形成可能是导致渗透系数增大的主要原因。

关键词: 压实黏土 渗透系数 干燥 湿化 裂隙

Abstract: Desiccation cracks of compacted clay liner might have a great effect on its hydraulic conductivity. During the decrease of its water content, its crack area ratio, length and width will increase. Desiccation cracks can be divided into the major and the minor types. There are obvious differences for the change rate of crack parameters before and after minor cracks appear. Wider cracks can't entirely heal after hydration, which reveals that the wet-dry cycling is irreversible for the compacted clay liner. Development of cracks in the clay can be monitored successfully with the Araldite that was put on the inside wall surface of the test cylinder. The Araldite can also prevent side-leakage. One wet-dry cycling can increase the hydraulic conductivity of the compacted clay liner for nearly two orders in its magnitude. Non-completely-healing cracks and microcracks might be the main reasons for the increasing of hydraulic conductivity during the wet-dry cycling.

Key words: Clay liner Hydraulic conductivity desiccation Hydration Crack

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