

高盐分环境下TDR测试高含水率方法研究

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A method of measuring high water content for marine clay with high salinity by TDR

摘要

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摘要 有效采用TDR技术测试土体含水率的关键在于建立介电常数与体积含水率之间的定量关系, 目前常用的介电常数与体积含水率之间的Topp经验关系式是建立在低盐分环境下较低含水率条件下的。通过一系列室内试验, 探讨了高含盐量环境下高含水率海相淤泥的介电常数与体积含水率的关系。研究表明, Topp经验关系式不适用于含盐量为1.5%~4.5%和质量含水率为120%~320%的海相疏浚淤泥。为了快速连续测试海相疏浚淤泥含水率, 提出了一种基于 w/θ 和 w/k 坐标系定量分析介电常数与含水率关系的新方法, 建立了 w/θ 与 w/k 的线性关系式, 明确了高盐分环境下高含水率疏浚淤泥的介电常数与含水率之间有很好的相关性。同时采用他人已有的试验数据进一步验证了这种方法的有效性。

关键词: TDR 高含水率 高含盐量 介电常数

Abstract: The effectiveness of applying TDR technique to measure water content depends on the relationship between the dielectric constant and the water content. The empirical relationship proposed by Topp has been often used in engineering practice. However, the Topp empirical relationship is derived from the test data under the conditions of high salinity and high water content. In this study, a series of tests are performed to investigate the relationship between the dielectric constant and the water content for marine dredged clay with salinity of 1.5%~4.5% and water content of 120%~320%. A new relationship between w/θ and w/k is proposed for the clay with high salinity and high water content. The available data compiled from references are also used to verify the validity of the proposed relationship.

Keywords: TDR high water content high salinity dielectric constant

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