土木工程

非饱和粉土回弹模量的应力依赖性与水敏感性耦合分析

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摘要：

为了研究路基内部应力状态和含水率变化对回弹模量的影响,建立了路基土回弹模量的预估模型。根据室内三轴重复加载试验结果,研究了应力依赖性控制指标的选择,结果表明:体应力变化时,回弹模量不具有单调变化的规律,所以不宜作为应力依赖性的控制指标;而利用围压和偏应力作为控制指标时则能全面的反映回弹模量的变化规律。根据土水特征曲线,利用基质吸力表征含水率的影响,构建应力依赖性和水敏感性的耦合模型,并通过试验结果的拟合验证,发现该模型能够较好地反映回弹模量随应力水平和含水率变化的规律。

关键词： 非饱和粉土 应力依赖性 水敏感性 耦合分析

Coupling analysis of stress dependence and water sensitivity for the resilient modulus of unsaturated silt soil

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Abstract:

The influences of stress and water content on the subgrade resilient modulus were studied by constructing the prediction model. According to the results of repeated loading tri-axial test, the control indicator was researched. The results showed that the resilient modulus presented different changes with the volume stress increasing, which was unsuitable to reflect the stress dependent of resilient modulus. The confining pressure and the deviatoric stress were more appropriate to be the control indicators. Based on the soil water characteristic curve, the relationship between matric suction and water content was analyzed, and the matric suction was used in the prediction model to express the influence of the water content on the resilient modulus. The model could couple the stress dependence and water sensitivity, and also could well reflect the effects of stress and water, which was verified by the experimental results fitting.

Keywords: unsaturated silt soil stress dependence water sensitivity coupling analysis

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