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岩土工程地质

黄土损伤与流变耦合模型及参数研究

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摘要:

以试验为基础,对不同含水量 Q_3 黄土的蠕变特征进行了分析研究,结合黄土结构损伤特性及其对黄土力学特征影响,通过考虑结构损伤对变形模量的劣化来反映黄土结构性对蠕变规律的影响,提出了黄土损伤与流变耦合作用的本构模型。该模型不仅具有参数少的优点,而且能够准确描述黄土的突发性破坏特征。利用结构性软土流变的研究成果,给出了黄土流变模型参数的确定方法,并对模型参数随非饱和黄土含水量变化的规律进行了研究。数值模拟结果表明,该模型能够很好地描述黄土的加速蠕变阶段的变形特征。

关键词: 结构性 黄土 损伤 含水量 流变 数值模拟

COUPLING STUDY ON DAMAGE AND RHEOLOGICAL MODEL OF LOESS AND ITS PARAMETER

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Abstract:

Based on experiment results, the creep propriety of Q_3 loess with variation water content are analysed. As structural damage can decrease the

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strain modulus of loess, and the coupling action of creep laws of constitutive model of damage and rheology are also advanced. Being aware of the structural damage characteristic of loess, the rheological model of loess can reveal the natural deed of sudden destroy besides the advantage of less rheology parameter. In the paper, the pattern of model parameters changing with the water content of unsaturation loess are also studied as well as the methods that can decide the parameters of rheological model of loess are given by applying the rheology research results of structural soft soil. The result of numerical simulation shows that the constitutive model can describe loess's deformation characteristic well in the accelerated stage.

Keywords: Structural Loess Damage Water content Rheology Numerical simulation

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