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论文

主应力轴旋转对压实黄土动变形特性的影响

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摘要:

实际工程中的地基或路基的土体往往处于复杂初始应力状态,在地震或其他动荷载的作用下会出现变形和沉降,而常规的室内土工试验无法真实再现这种固结应力条件下土的动力特性。通过对原有的DTC 199型周期扭转荷载三轴仪进行简单的改造后可进行土体在主应力轴发生旋转时的压实黄土动变形的试验研究。结果表明,在其他固结条件不变的情况下,初始主应力方向角 α 对压实黄土的动剪切模量有一定的影响,随着 α 的增加,动剪切模量有减小的趋势,最大动剪应力也逐渐减小,但是 α 对最大动剪切模量的影响不太显著。初始主应力方向角 α 对压实黄土的阻尼比基本没有影响,在 λ -lg γ_d 的半对数坐标图中,阻尼比随动剪应变的增加有逐渐增大的趋势,并且表现出较好的相关性。

关键词: 压实黄土,初始主应力方向角,动剪切模量,阻尼比

EFFECT OF PRINCIPAL STRESS ROTATION ON DYNAMIC DEFORMATION OF COMPACTED LOESS

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Abstract:

In real projects, soils under foundations or roadbeds are usually in complex initial stress

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state, deformation and settlement happens under earthquakes or other dynamic loadings. Conventional laboratory experiments of soils cannot authentically reproduce dynamic behaviors of soils under this kind of consolidation stress conditions. After having reformed the DTC 199 torsional cyclic load triaxial apparatus, dynamic deformation of compacted loess can be tested when the initial principal stress axis is rotated. Results show that the initial angle α of the principal stress has an influence on the dynamic shear modulus of the compacted loess when other consolidation conditions are fixed. As α increases, the dynamic shear modulus shows a decreasing trend, and the maximum dynamic shear stress reduces gradually. But α does not considerably influence the maximum dynamic shear modulus. The initial angle α of the principal stress has basically no influence on the damping ratio of compacted loess. The damping ratio has an increasing trend with the increase of dynamic shear strain in the semilog plot of λ -lg γ d, and they show good relativity.

Keywords: Compacted loess The initial angle of principal stress Dynamic shear modulus
Damping ratio