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砂卵石土动力特性的动三轴试验研究

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摘要 砂卵石土在自然界分布广泛，并具有抗剪强度高、地震荷载作用下不易液化等优良工程特性，因此在工程建设中得到广泛应用。为反映其在复杂应力状态下的动力变形强度特性，通过砂卵石土室内动三轴试验，对不同饱和度的砂卵石土的动力特性进行研究。主要分析围压、固结比和振动频率对砂卵石土动强度的影响。试验结果表明：(1) 砂卵石土的动应力随固结比的增大而略有增加，随振动频率的增大而有较大增幅，而且其动强度随着围压的增大而显著增大；(2) 在相同围压下，随动应力增加，破坏振次减小；(3) 砂卵石土的动弹性模量随动应变的增大而减小，随围压增大而增大；(4) 其阻尼比随动应变的增大而增大，明显表现在微小动应变中。

关键词 土力学；砂卵石土；动三轴试验；动应力－应变关系；动弹性模量；动阻尼比

分类号

DYNAMIC TRIAXIAL TESTING STUDY ON DYNAMIC CHARACTERISTICS OF SANDY PEBBLE SOIL

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Abstract

Sandy pebble soil has good engineering properties and has been applied widely in the engineering construction. In order to study the dynamic characteristics of deformation and strength under complex stress conditions，the dynamic characteristics of sandy pebble soils with different saturation degrees are studied thoroughly by dynamic triaxial tests in laboratory. The influences of the confining pressure，consolidation ratio and vibration frequency on the dynamic characteristics of sandy pebble soil are mainly analyzed. Results show that：(1) the dynamic stress of the sandy pebble soil increases little with the accretion of the consolidation ratio，but great with the increase of the vibration frequency；and the dynamic strength markedly increases with the accretion of the consolidation ratio；(2) under the same confining pressure，with the increase of the dynamic stress，the failure vibration time decreases；(3) the dynamic elastic modulus induces with the dynamic strain increasing，but increases as the accretion of confining pressure；and (4) the damping ratio increases with the dynamic strain increasing，especially in minor dynamic strain.

Key words soil mechanics；sandy pebble soil；dynamic triaxial test；dynamic stress-strain relationship；dynamic elastic modulus；dynamic damping ratio

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