

深厚覆盖层上高土石坝的动力稳定分析

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收稿日期 2004-3-30 修回日期 2004-4-26 网络版发布日期 2007-2-11 接受日期 2004-3-30

摘要 在高地震烈度区修建深厚覆盖层上的高土石坝面临许多新问题, 如大坝的动力稳定、坝基液化问题等。以直粘土心墙及坝基截渗墙土石坝为例, 采用三维动力固结有限元方法, 研究强震区深厚覆盖层上的高土石坝的动力稳定问题。三维动力固结有限元程序以动力固结方程为基础, 采用能够反应土体非线性、滞后性以及不可恢复性动变形特性的拟等效弹塑性本构模型, 放弃了动孔压上升模式, 在震动全过程中跟踪孔隙水压力产生、扩散和消散的发展变化, 实现了动力渗流与动力反应分析的真正耦合, 可较好地反映土体在地震过程中的实际状态, 避免了动本构模型与动孔压模型有时难以合理搭配的问题。计算结果表明, 深厚覆盖层上修筑的直心墙土石坝的静应力和静位移均较大, 但它的动应力、动位移及加速度的反应值却均较小, 且坝底的孔压比也较小, 可满足稳定性要求。

关键词 [土力学](#); [动力固结](#); [拟等效弹塑性模型](#); [深厚覆盖层](#); [高土石坝](#)

分类号

DYNAMIC STABILITY ANALYSIS OF HIGH EARTH-ROCKFILL DAM ON THICK MORaine COVER FOUNDATION

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Abstract

To build high earth-rockfill dam on thick moraine cover foundation in high earthquake intensity region will face many new problems such as dynamic stability, dam foundation liquefaction etc. As an example, three-dimensional dynamic consolidation FEM is employed to analyze the reaction of high earth-rock fill dam with clay core and cat-off wall. The dynamic stability is researched. An equivalent quasi-elastoplastic constitutive model which can express nonlinear viscid and un-recoverable deformation of soil is employed in the new dynamic consolidation FEM, while dynamic pore water pressure model is abandoned. The generation, diffusion and scatter of dynamic pore water pressure in a complete earthquake process are tracked. It is a real coupling of dynamic seepage and dynamic reaction. The calculation results show that the static stress and displacement of the dam on thick moraine cover foundation are bigger; the dynamic stress, displacement and acceleration are smaller; the ratio of pore water pressure in the dam base is smaller than the dam on rock foundation. The dam is safe.

Key words [soil mechanics](#); [dynamic consolidation](#); [equivalent quasi-elastoplastic model](#); [thick moraine cover foundation](#); [high earth-rock fill dam](#)

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