

目次

大型叠层剪切变形模型箱的研制

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收稿日期 2005-7-20 修回日期 2005-11-11 网络版发布日期 2006-12-15 接受日期

摘要 振动台模型试验是研究工程结构抗震的重要手段之一。在碎石桩复合地基抗液化特性振动台试验研究中, 基于半无限自由场原型土层的地震反应分析, 在比较了目前国内外研究岩土结构地震问题振动台试验常用的3种模型箱(刚性模型箱、圆筒型柔性模型箱和叠层剪切变形模型箱)各自优缺点的基础上, 设计一个可以用于振动台试验的大型叠层剪切变形模型箱。该模型箱由方钢管焊接的矩形框架和层间滚珠轴承构成, 可以很好地模拟原型土层在天然地震剪切波作用下的变形特性。试验结果表明, 所设计的叠层剪切变形模型箱不仅为本次试验获得成功打下了坚实的基础, 还可以应用于其他岩土地震问题的试验研究。关键词: 土力学; 碎石桩复合地基; 振动台试验; 叠层剪切变形模型箱

关键词

分类号

DEVELOPMENT OF LARGE-SCALE LAMINAR SHEAR MODEL BOX

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Abstract

Shaking table test is an important method to study earthquake resistance of engineering structures. The design process of a large-scale soil laminar shear model box, which is indispensable in shaking table test, is described. The advantages and disadvantages of all sorts of the soil model boxes used in the shaking table test are compared. Based on the comparison and analysis of seismic response of the prototype soil deposit of semi-infinite free-field, a large-scale laminar shear model box, which can replicate prototype soil layer boundary conditions, is designed. The internal dimensions of the model box are 3 m in length, 2 m in width and 1.8 m in height. The model box consists of fifteen rectangular, laminar rigid frames can well simulate the boundary conditions of prototype soil layer. The developed laminar shear model box lays a firm foundation for the success of the test and can also be adopted in other tests for seismic geotechnical problems.

Key words [soil mechanics](#) [sand-gravel pile composite foundation](#) [shaking table test](#) [laminar shear model box](#)

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