

特深基坑排桩冻土墙围护结构的冻胀力模型试验研究

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摘要 润扬长江公路大桥南汊悬索桥南锚碇基坑深29 m, 平面尺寸为69 m×51 m, 采用排桩冻土墙围护结构, 为解决该结构设计中冻胀力取值难题, 进行深基坑排桩冻土墙围护结构冻胀力物模试验研究。首先根据相似理论, 推导模拟试验的相似准则; 然后, 进行模型设计和制作; 最后, 通过模拟试验, 首次得到没有卸压孔时, 排桩所受水平冻胀力为0.238 MPa, 当在冻土墙外侧施工卸压孔时, 排桩所受的水平冻胀力平均值为0.133 MPa。并给出了随着基坑开挖的卸压作用, 桩上受到的水平冻胀力呈现减小趋势, 最大衰减率达40%。从而为这种新型围护结构的工程应用提供设计依据。

关键词 [土力学](#); [特深基坑](#); [排桩](#); [冻土墙](#); [水平冻胀力](#); [模型试验](#)

分类号

MODEL TEST STUDY ON FROST-HEAVING FORCE IN RETAINING STRUCTURE OF ROW-PILES AND FROZEN SOIL WALL OF SUPER DEEP FOUNDATION PIT

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Abstract

The retaining structure of row-piles and frozen soil wall will be adopted in the south anchor deep foundation pit of south branch suspension cable of Runyang Bridge, which is 29 m deep and 69 m×51m in plan. To solve the problem of determining the frost-heaving force in design, model test is made to study the frost-heaving force in the retaining structure of row-piles and frozen soil wall of super deep foundation pit. First, the similarity criterion of the model test was deduced according to similarity theory. Then the design and model construction are carried out. Finally, the horizontal frost-heaving stress against row-piles without pressure relief holes is 0.238 MPa, which is obtained by test firstly. And the average horizontal frost-heaving stress against row-piles with pressure relief holes is 0.133 MPa. The horizontal frost-heaving force is attenuated in the process of excavation with the maximum attenuation rate being 40 percent. The research results can provide designing basis for this kind of retaining structure.

Key words [soil mechanics](#); [super deep foundation pit](#); [row-pile](#); [frozen soil wall](#); [horizontal frost-heaving force](#); [model test](#)

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